REVISED DRAFT
ENVIRONMENTAL IMPACT STATEMENT

Hydroelectric Power Development

182

UPPER SUSITNA RIVER BASIN
SOUTHCENTRAL RAILBELT AREA ALASKA

OFFICE OF THE CHIEF OF ENGINEERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 20314

DECEMBER, 1975

SUMMARY

Hydroelectric Power Development, Upper Susitna River Basin
(Southcentral Railbelt Area, Alaska)

(X) Revised Draft Environmental Statement ( ) Final Environmental Statement

Responsible Office: Alaska District, Corps of Engineers
Colonel Charles A. Debelius, District Engineer
P.O. Box 7002, Anchorage, Alaska 99510
Telephone (907) 753-3128

1. Name of Action: ( ) Administrative (X) Legislative

2. Description of Action: The recommended plan is to construct dams on the upper Susitna River at Watana and Devil Canyon, powerplants, electric transmission facilities to the Railbelt load centers, access roads, and permanent operating and recreational facilities.

Since the current study is in the feasibility stage, impacts are not exhaustively evaluated. If the project is authorized and funded for detailed preconstruction studies, the environmental, social, economic, and engineering aspects of the project will be studied at greater depth and length prior to a recommendation to Congress for advancement to final project design and construction phase.

3 a. Environmental Impacts: The two-dam system would inundate some 50,500 acres extending 84 miles upstream from Devil Canyon Dam. Nine miles of a total 11-mile reach of white water would be inundated in Devil Canyon. Transmission lines would total 364 miles in length, corridors would average 186-210 feet in width, and require about 8,200 acres of right-of-way, of which about 6,100 acres would require vegetative clearing. The project would utilize a renewable resource to produce projected power needs of the Railbelt area equivalent to the annual consumption of 15 million barrels of oil. Heat and noise and air pollution problems associated with most alternative energy production sources would be prevented. Stream flows for some distance below Devil Canyon would carry significantly reduced sediment loads during the summer months. Recreational opportunity would be increased by access roads and creation of project-related recreational facilities.

b. Adverse Environmental Effects: The following adverse impacts would result from project implementation: impairment of visual quality resulting from access roads, dams, and transmission lines; loss of vegetation and habitat due to inundation and road construction; creation of public access resulting in increased pressure on wildlife and need for intensified game management and fire prevention practices.

increased turbidity of Susitna River downstream from Devil Canyon Dam during winter months; prevention of future mineral extraction from inundated land and limitations of options for uses of lands affected by the transmission corridors; direct impact on moose through some reduction of existing habitat; possible inhibition of movement of caribou which cross the reservoir between calving and summer ranges; temporary degradation of air, water, and vegetation as a result of slash and debris disposal; inundation of one historical site and any archaeological sites which might be discovered within the reservoir pools; social impacts related to seasonality of construction work and demands upon services of small communities located in the vicinity of construction activity.

4. Alternatives: Construct no additional electrical generating facilities, construct other Susitna hydroelectric alternatives, construct other Southcentral Railbelt hydroelectric facilities, develop other alternative energy generating facilities using resources such as coal, oil, and natural gas, nuclear power, geothermal, solar, or other alternative power generating resources.

5.a. Comments Received (District Review):

United States Department of the Interior
    Alaska Power Administration
    Geological Survey--Reston, Virginia
    Fish and Wildlife Service
    Bureau of Outdoor Recreation--Seattle, Washington
    National Park Service--Anchorage, Alaska
    National Park Service--Seattle, Washington
    Bureau of Indian Affairs--Juneau, Alaska
    Bureau of Land Management--Anchorage, Alaska
United States Department of Commerce
United States Environmental Protection Agency
Department of the Army
    U.S. Army Cold Regions Research and Engineering Laboratory--Hanover, NH
Department of Transportation
    Coast Guard--Seattle, Washington
    Federal Aviation Administration--Anchorage, Alaska
    Federal Highway Administration--Portland, Oregon
Department of Housing and Urban Development--Seattle, Washington

State of Alaska--Office of the Governor

Greater Anchorage Chamber of Commerce

Office of the Mayor--Anchorage, Alaska

Sierra Club
Alaska Conservation Society--College, Alaska
Alaska Conservation Society--Anchorage, Alaska
Knik Kanoers and Kayakers, Inc.--Anchorage, Alaska
Cook Inlet Region, Inc.--Anchorage, Alaska
Sea Airmotive, Inc.--Anchorage, Alaska
Orah Dee Clark Jr. High, Seventh Grade, Sixth Period Class

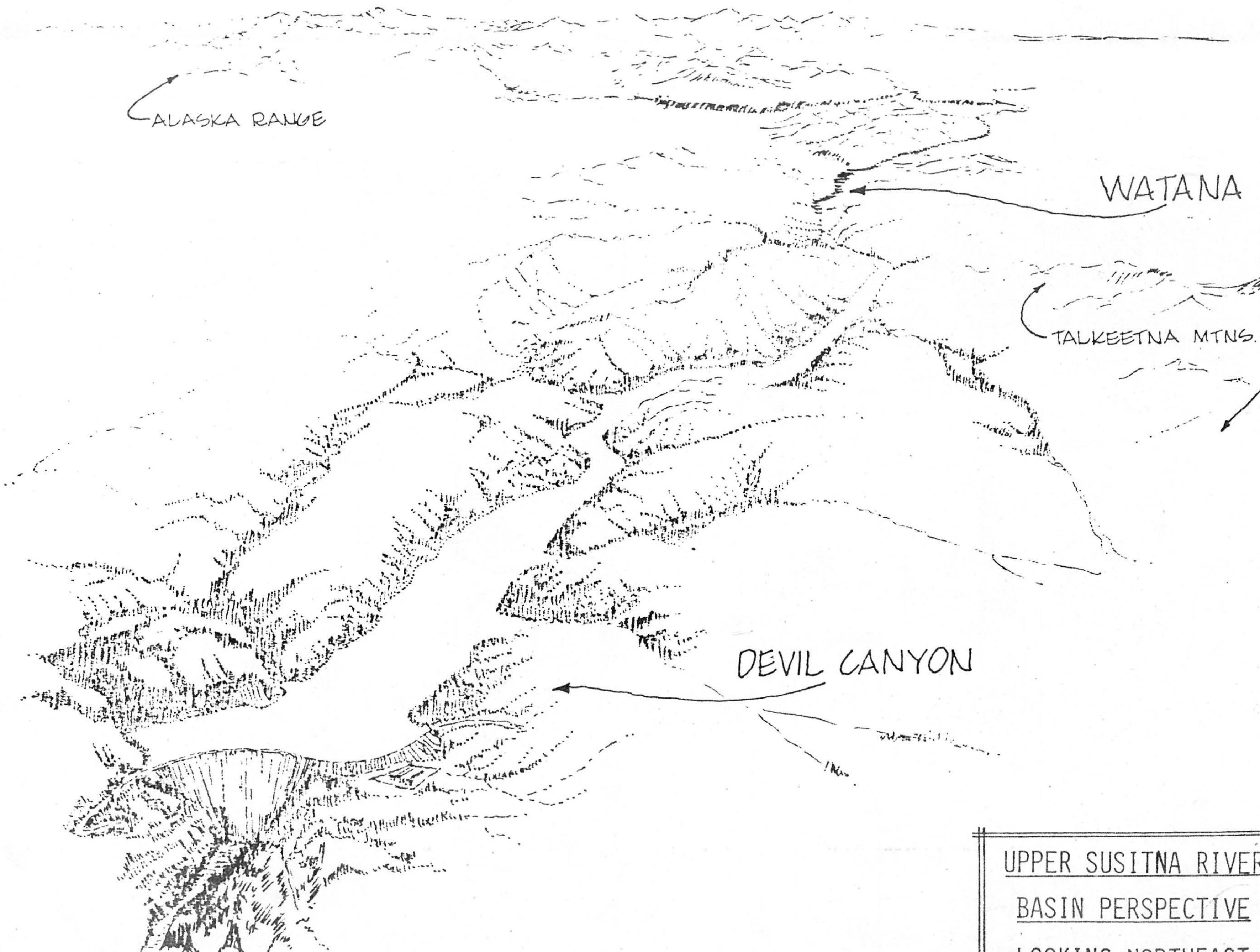
Private Citizens

6\. b. Comments Requested (Departmental Review):

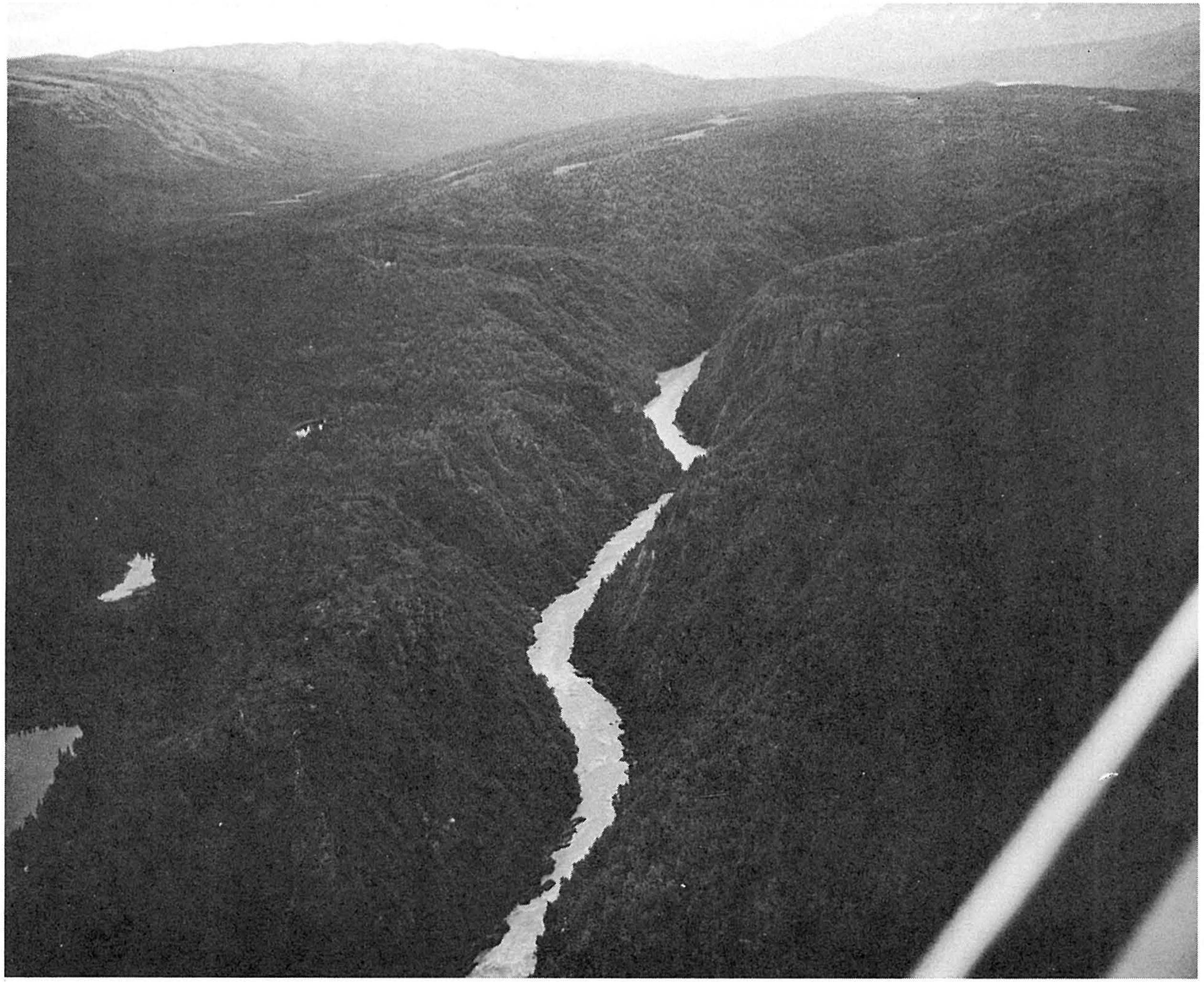
United States Department of the Interior
United States Department of Agriculture
United States Department of Commerce
United States Environmental Protection Agency
Federal Energy Administration
United States Department of Transportation
Federal Power Commission
United States Department of Housing and Urban Development
United States Department of Health, Education and Welfare

Office of the Governor of Alaska--State Clearinghouse

6\. Draft Statement to CEQ 3 October 1975.
Revised Draft Statement to CEQ______________.



UPPER SUSITNA RIVER
BASIN PERSPECTIVE
LOOKING NORTHEAST



Looking downstream on Susitna River at Devil Canyon damsite. Dam would be located near bottom of photo. Vegetation is mostly white spruce.

DRAFT ENVIRONMENTAL IMPACT STATEMENT
SOUTHCENTRAL RAILBELT AREA, ALASKA
HYDROELECTRIC POWER DEVELOPMENT
UPPER SUSITNA RIVER BASIN

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1.0 PROJECT DESCRIPTION

1.01 Purpose and Authority. The utilization of renewable resources to produce electrical energy for domestic and industrial uses has become a primary concern in today's energy crisis. The consumption of non-renewable sources of energy such as petroleum and natural gas has now reached a critical point where conservation of domestic sources must be considered. With the forecast increase in development for Alaska and corresponding increase in demand for electric power, the Committee on Public Works of the U.S. Senate, at the request of local interests, adopted a resolution on 18 January 1972, requesting a study for the provision of power to the Southcentral Railbelt area of Alaska. The resolution is quoted as follows:

> That the Board of Engineers for Rivers and Harbors created under the provisions of Section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby, requested to review the reports of the Chief of Engineers on: Cook Inlet and Tributaries, Alaska, published as House Document Numbered 34, Eighty-fifth Congress; Copper River and Gulf Coast, Alaska, published as House Document Numbered 182, Eighty-third Congress; Tanana River Basin, Alaska, published as House Document Numbered 137, Eighty-fourth Congress; Yukon and Kuskokwim River Basins, Alaska, published as House Document Numbered 218, Eighty-eighth Congress; and, other pertinent reports, with a view to determining whether any modifications of the recommendations contained therein are advisable at the present time, with particular reference to the Susitna River hydroelectric power development system, including the Devil Canyon Project and any competitive alternatives thereto, for the provision of power to the Southcentral Railbelt area of Alaska.

1.02 Scope of the Study. The Southcentral Railbelt area is that portion of the Yukon and southcentral subregions which extends from Cook Inlet and the Gulf of Alaska on the south to the southern slopes of the Brooks Range on the north, a distance of about 500 miles. This area, containing about 75 percent of Alaska's population, is served by the Alaska Railroad and is commonly referred to as the "Railbelt" (see Figure 1). Major power resources, both hydroelectric and fossil fuels, and the greatest power demands are in this region.

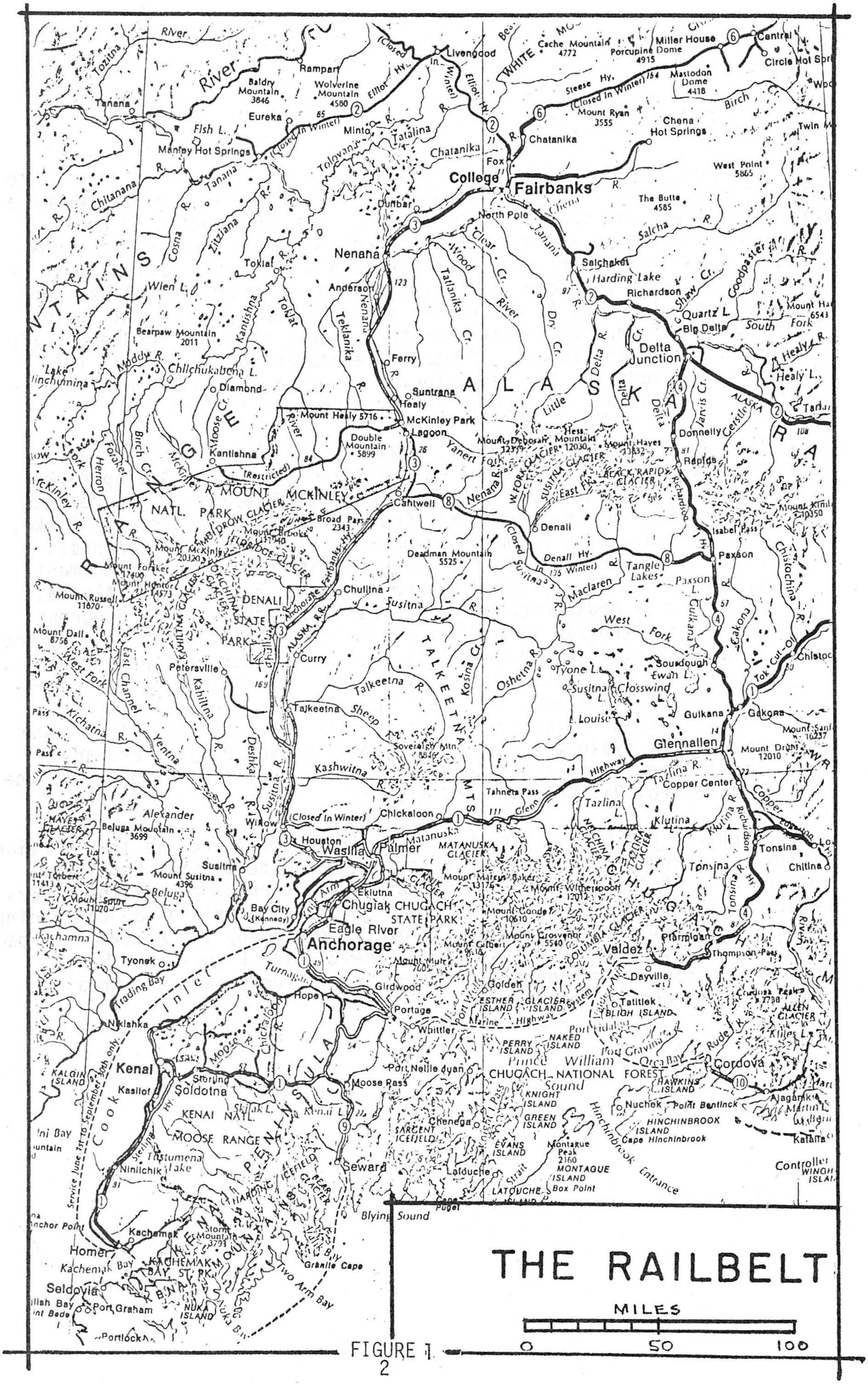

THE RAILBELT
MILES
0
50
100
Fairbanks
College
Fox
North Pole
Livengood
Central
Circle Hot Springs
Chena Hot Springs
Chatanika
Manley Hot Springs
Tanana
Rampart
Eureka
Minto
Nenana
Dunbar
Anderson
Ferry
Suntrana
Healy
McKinley Park
Lagoon
Cantwell
Denali
Paxson
Salchaket
Richardson
Big Delta
Delta Junction
Donnelly
Rapids
Gulkana
Gakona
Glennallen
Copper Center
Tonsina
Chitina
Valdez
Cordova
Whittier
Portage
Girdwood
Hope
Moose Pass
Seward
Anchorage
Eagle River
Chugiak
Eklutna
Palmer
Wasilla
Houston
Willow
Talkeetna
Curry
Chulitna
Chickaloon
Petersville
Susitna
Tyonek
Kenai
Soldotna
Kasilof
Ninilchik
Homer
Seldovia
Port Graham
Portlock
ALASKA RANGE
MOUNT McKINLEY NATL. PARK
Mount McKinley 20320
DENALI STATE PARK
TALKEETNA MTS.
CHUGACH STATE PARK
CHUGACH NATIONAL FOREST
KENAI NATL. MOOSE RANGE
KENAI PENINSULA
Cook Inlet
Prince William Sound
Alaska R.R.
Anchorage-Fairbanks Hy.
Richardson Hy.
Glenn Highway
Denali Hy.
Steese Hy.
Elliott Hy.
Sterling Hy.
Tok Cut-Off
Copper River Hy.

FIGURE 1

The proposed action discussed in this draft environmental impact statement is a two-dam system located in the Upper Susitna River Basin, which will provide hydroelectric power to the Southcentral Railbelt region in Alaska.

1.03 Description of Action. The recommended plan consists of construction of dams and powerplants on the upper Susitna River at Watana and Devil Canyon, and electric transmission facilities to the Railbelt load centers, access roads, permanent operating facilities, and other project-related features.

A subsidiary purpose in the construction of the electric transmission line will be the interconnection of the two largest electric power distribution grids in the State of Alaska, which will result in increased reliability of service and lower cost of power generation.

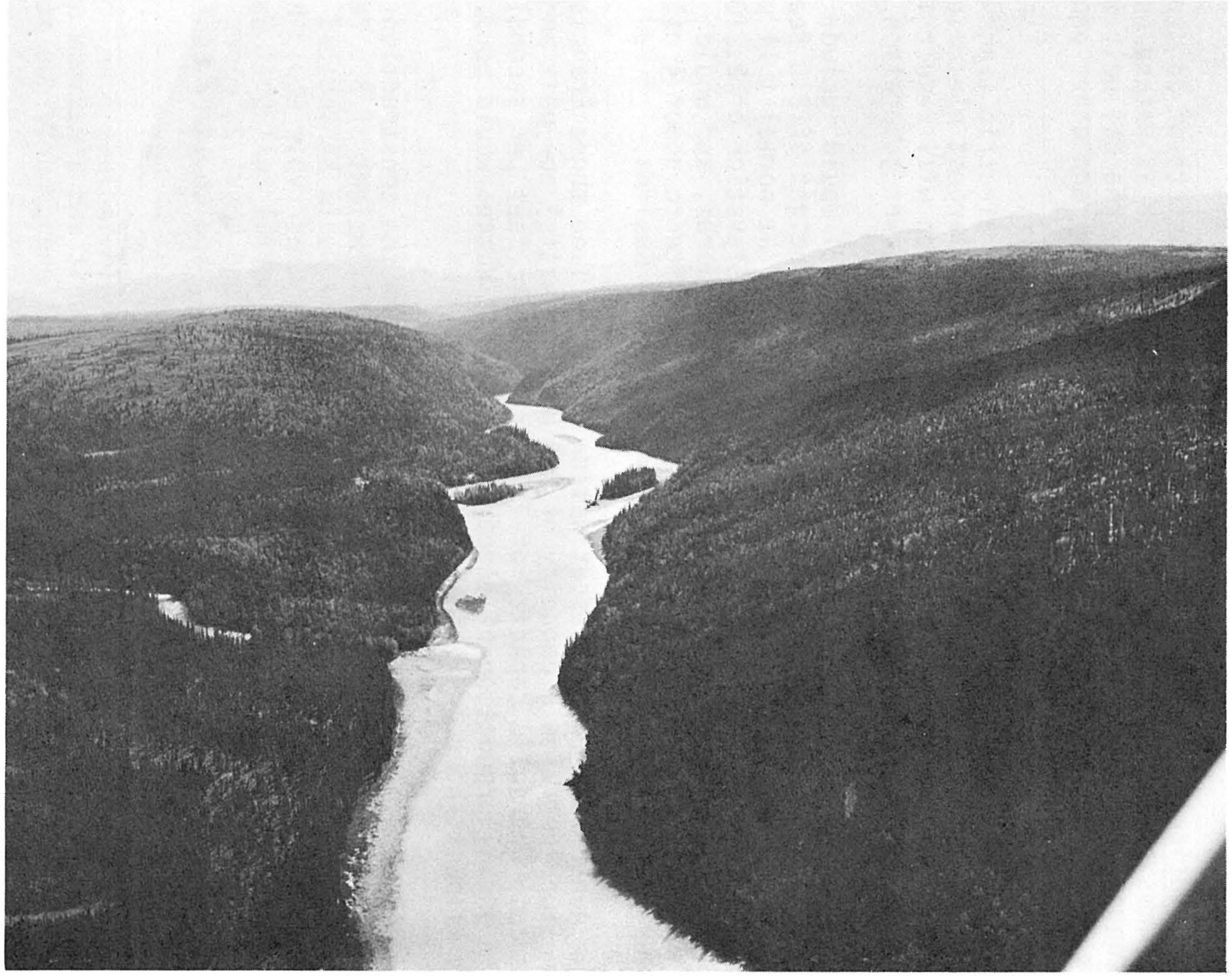
The proposed plan for the Watana site (Figure 2) would include the construction of an earthfill dam with a structural height of 810 feet at river mile 165 on the Susitna River. The reservoir at normal full pool would have an elevation of 2,200 feet and a crest elevation of 2,210 feet, have a surface area of approximately 43,000 acres, and would extend about 54 river miles upstream from the damsite to about 4 miles above the confluence of the Oshetna River with the Susitna.

The generating facilities at Watana would include three Francis reaction turbines with a capacity of 264 MW (megawatts) per unit and a maximum unit hydraulic capacity of 7,770 cfs (cubic feet per second). The firm annual production of electrical power at Watana would be 3.1 billion kilowatt-hours.

Development of the Devil Canyon site includes the construction of a concrete, thin-arch dam with a maximum structural height of 635 feet and with a crest elevation of 1,455 feet. The dam would be located at river mile 134 on the Susitna River. Devil Canyon reservoir would have a water surface area of about 7,550 acres at the normal full pool elevation of 1,450 feet. The reservoir would extend about 28 river miles upstream to a point near the Watana damsite, and would be confined within the narrow Susitna River canyon.

The generating facilities at Devil Canyon would include four Francis reaction turbines with a capacity of 194 MW per unit and a maximum unit hydraulic capacity of 6,250 cfs. The firm annual energy provided at Devil Canyon would be 3.0 billion kilowatt-hours.

A total of 6.1 billion kilowatt-hours of firm annual energy would be produced by the combined Devil Canyon-Watana system. Secondary annual average energy production from this two-dam system includes an



Looking upstream toward Watana damsite. Tsuena Creek in left center of photo. Damsite just beyond the visible section of river.

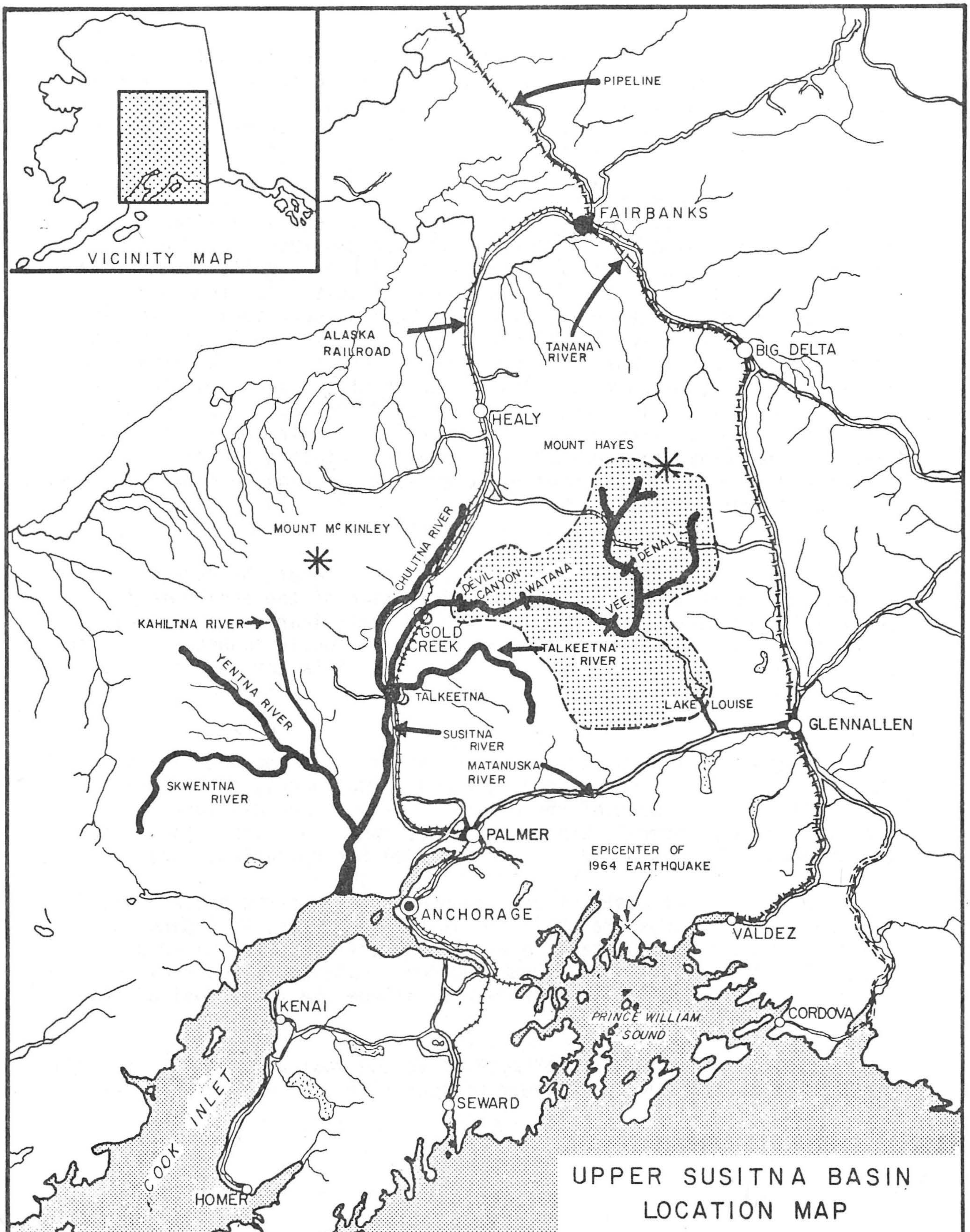

VICINITY MAP
PIPELINE
FAIRBANKS
ALASKA RAILROAD
TANANA RIVER
BIG DELTA
HEALY
MOUNT HAYES
MOUNT McKINLEY
CHULITNA RIVER
DEVIL CANYON
WATANA
DENALI
VEE
KAHILTNA RIVER
GOLD CREEK
TALKEETNA RIVER
YENTNA RIVER
TALKEETNA
LAKE LOUISE
GLENNALLEN
SUSITNA RIVER
MATANUSKA RIVER
SKWENTNA RIVER
PALMER
EPICENTER OF 1964 EARTHQUAKE
ANCHORAGE
VALDEZ
KENAI
PRINCE WILLIAM SOUND
CORDOVA
COOK INLET
SEWARD
HOMER
UPPER SUSITNA BASIN
LOCATION MAP
SCALE
0
50
100Miles

FIGURE 2

additional 0.8 billion kilowatt-hours per year. The 6.9 billion kilowatts of firm and secondary annual energy would be the energy equivalent of about 15 million barrels of oil per year, or about 112 billion cubic feet of natural gas per year, or about 1.5 billion barrels of oil over a 100-year project-life period.

Most of the generated electrical power would be utilized in the Fairbanks-Tanana Valley and the Anchorage-Kenai Peninsula areas. The proposed transmission system would consist of two 198-mile, 230 kv single circuit lines from Devil Canyon to Fairbanks (called the Nenana corridor), and two 136-mile, 345 kv single circuit lines from Devil Canyon to the Anchorage area (called the Susitna corridor). Both lines would generally parallel the Alaska Railroad. Power would be carried from Watana to Devil Canyon via two single circuit 230 kv transmission lines, a distance of 30 miles. Total length of the transmission lines would be 364 miles. The general locations of the transmission lines are shown on Figure 3. Transmission line corridors would require a right-of-way of approximately 186-210 feet in width totaling slightly more than 8,200 acres of which about 6,100 acres would require clearing. Towers would be either steel or aluminum and of free-standing or guyed type, depending upon final design and local conditions.

Access to the Devil Canyon and Watana sites would be determined by siting studies that would include consideration of the environmental impacts for roads and transmission lines. Preliminary studies indicate an access road approximately 64 miles in length would connect the Watana site with the Parks Highway via Devil Canyon. A factor considered in location and design of access roads would be their subsequent use for public recreational purposes.

Project-oriented recreational facilities would include visitor centers at the dams, boat launching ramps, campgrounds, picnic areas, and trail systems. Some of these facilities would be developed in cooperation with Federal, State or private owners of land adjacent to the project. Housing would also be provided for operations personnel.

The total first costs of the proposed hydroelectric project based on January 1975 prices are estimated at $1.52 billion, including the transmission system. Overall, Devil Canyon costs are estimated at $432,000,000, and Watana at $1,088,000,000. Watana Dam would be constructed first and Watana's costs would include the total cost of the transmission system.

The benefit-to-cost ratio compared to the coal alternative at 6-1/8 percent interest rate and 100-year project life is 1.4 using Federal financing.

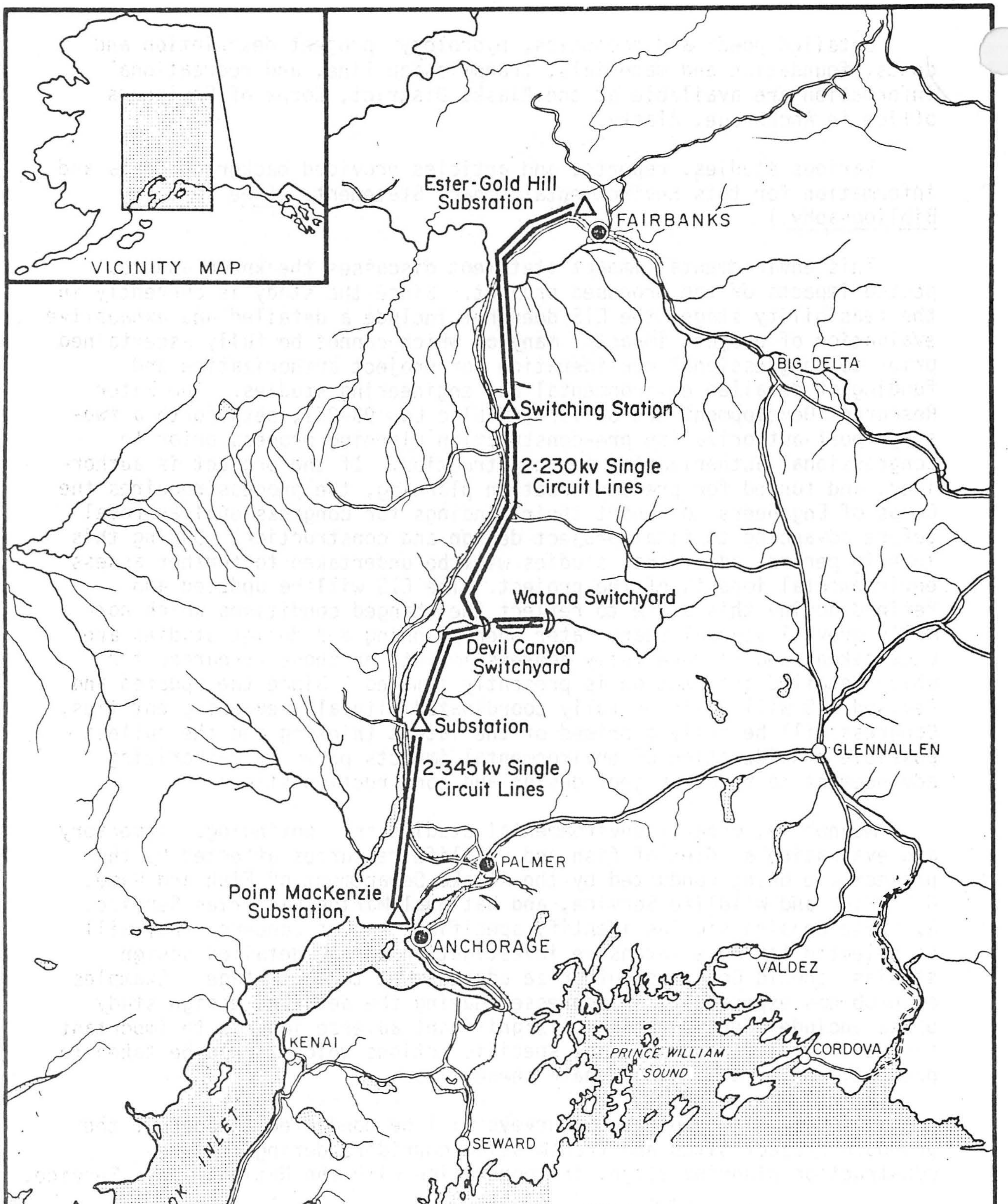
Detailed power and economics, hydrology, project description and costs, foundation and materials, transmission line, and recreational information are available at the Alaska District, Corps of Engineers office in Anchorage, Alaska.

Various studies, reports, and articles provided background data and information for this Environmental Impact Statement. (See Selected Bibliography.)

This environmental impact statement discusses the known and suspected impacts of the proposed project. Since the study is currently in the feasibility stage, the EIS does not include a detailed and exhaustive evaluation of project impacts, many of which cannot be fully ascertained prior to congressional consideration for project authorization and funding of detailed environmental and engineering studies. The Water Resources Development Act of 1974, Public Law 93-251, sets forth a two-stage post-authorization pre-construction planning process prior to Congressional authorization for construction. If the project is authorized, and funded for pre-construction planning, the process requires the Corps of Engineers to report their findings for congressional approval before advancing to final project design and construction. During this interim period, additional studies will be undertaken to further assess environmental impacts of the project. The EIS will be updated and refined during this phase to reflect the changed conditions which normally prevail several years later when planning and design studies are undertaken, and to more fully address impacts on those resources for which detailed information is presently limited. Since the updated and revised EIS will again be fully coordinated with all reviewing entities, Congress will be fully apprised of the latest thinking and the fullest possible consideration of environmental impacts prior to authorizing advancement to final project design and construction stages.

Meanwhile, general environmental studies are continuing. Inventory and evaluation studies of fish and wildlife resources affected by the project are being conducted by the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and National Marine Fisheries Service. As these ongoing studies identify specific areas of concern, they will be selected for more intensive investigation during detailed design studies, should Congress authorize advancement to that stage. Examples of problems expected to be addressed during the detailed design study phase include identification of significant adverse impacts to important fish and wildlife species, and specific actions which should be taken to prevent, ameliorate, or mitigate these impacts.

Intensive archaeological surveys will be conducted throughout the proposed project sites and transmission corridors during the pre-construction planning stage, in cooperation with the National Park Service.



UPPER SUSITNA RIVER PROJECT
TRANSMISSION SYSTEM LAYOUT

FIGURE 3

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2.0 ENVIRONMENTAL SETTING WITHOUT THE PROJECT

2.01 Physical Characteristics

2.01.1 Description of the Area. The Susitna River, with an overall drainage area of about 19,400 square miles, is the largest stream discharging into Cook Inlet. The Susitna River basin is bordered on the south by the waters of Cook Inlet and the Talkeetna Mountains, on the east by the Copper River plateau and the Talkeetna Mountains, and on the west and north by the towering mountains of the Alaska Range. The upper Susitna River upstream from the proposed Devil Canyon damsite drains an area of approximately 5,810 square miles (see Figure 2).

Three glaciers flow down the southern flanks of the Alaska Range near 13,832-foot Mount Hayes to form the three forks of the upper Susitna River. These forks join to flow southward for about 50 miles through a network of channels over a wide gravel flood plain composed of the coarse debris discharged by the retreating glaciers. The cold, swift, silt-laden river then curves toward the west where it winds through a single deep channel, some 130 miles through uninhabited country, until it reaches the Alaska Railroad at the small settlement of Gold Creek.

After the Susitna escapes the confinement of Devil Canyon, the river's gradient flattens. The river then turns south past Gold Creek, where it flows for about 120 miles through a broad silt and gravel-filled valley into Cook Inlet near Anchorage, almost 300 miles from its source.

Principal tributaries of the lower Susitna basin also originate in the glaciers of the surrounding mountain ranges. These streams are generally turbulent in the upper reaches and slower flowing in the lower regions. Most of the larger tributaries carry heavy loads of glacial silt during the warmer summer months.

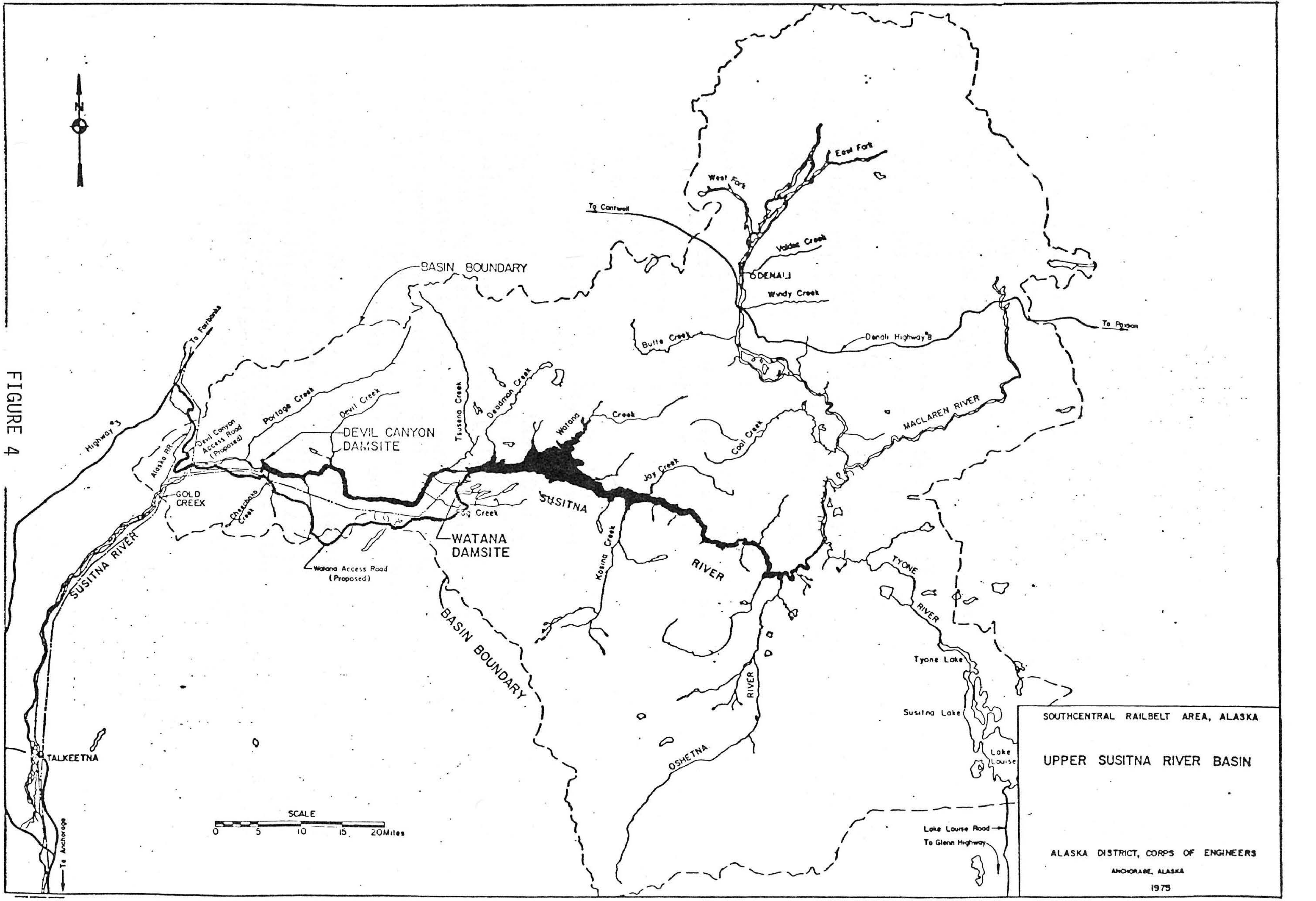
The Yentna River, one of the Susitna's largest tributaries, begins in the high glaciers of the Alaska Range, flows in a general southeasterly direction for approximately 95 miles and enters the Susitna 24 miles upstream from its mouth.

The Talkeetna River originates in the Talkeetna Mountains on the southeastern part of the basin, flows in a westerly direction, and discharges into the Susitna River 80 miles upstream from Cook Inlet and just north of the community of Talkeetna.

The Chulitna River heads on the southern slopes of Mount McKinley, the highest point in North America, with an elevation of 20,320 feet. The river flows in a southerly direction, joining the Susitna River near Talkeetna.

Susitna Glacier on Susitna River drainage. Glacier melt in summer months contributes to high sediment in the river.

FIGURE 4



SOUTHCENTRAL RAILBELT AREA, ALASKA

UPPER SUSITNA RIVER BASIN

ALASKA DISTRICT, CORPS OF ENGINEERS
ANCHORAGE, ALASKA
1975

The principal tributaries of the upper Susitna basin are the silt-laden Maclaren, the less turbid Oshetna, and the clear-flowing Tyone (Figure 4). Numerous other smaller tributaries generally run clear. Streamflow in the Susitna River basin is characterized by a high rate of discharge from May through September and by low flows from October through April.

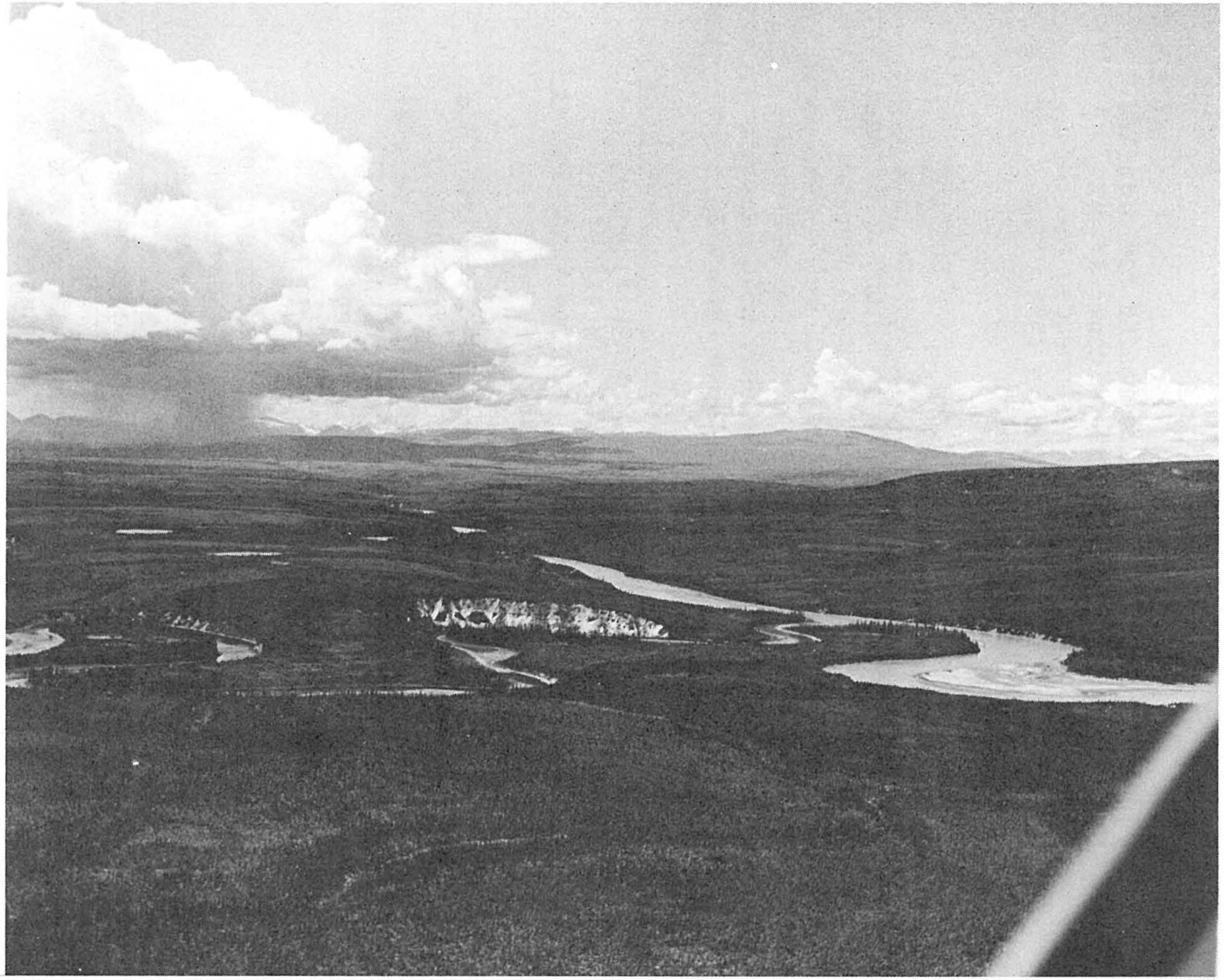
Much of the Upper Susitna River Basin is underlain by discontinuous permafrost. Permafrost is defined as a thickness of soil, or other surficial deposit, or of bedrock beneath the ground surface in which a temperature below 32°F has existed continuously for two years or more. Such permanently frozen ground is found throughout much of Alaska.

The area above and below the Maclaren River junction with the Susitna is generally underlain by thin to moderately thick permafrost. Maximum depth to the base of permafrost in this area is about 600 feet. Around the larger water bodies, such as lakes, permafrost is generally absent. In some areas of the lower section of the upper Susitna basin, permafrost is not present. Additional data is required before permafrost areas can be specifically identified upstream from Devil Canyon.

Because of the length of the proposed transmission system, and the diversity of terrain and ecosystems bisected by a corridor extending from Anchorage to Fairbanks, the system is divided into six major segments which lend themselves to discussion in terms of generally similar ecological characteristics. The route extending south from Watana Dam to Point MacKenzie is referred to as the Susitna Corridor. The route north from Gold Creek to Ester is called the Nenana Corridor (both corridors share the line from Watana to Gold Creek). The corridor for most of its length generally parallels the Alaska Railroad.

The Susitna Corridor is subdivided into three major segments: (a) Point MacKenzie north to Talkeetna, a distance of 84 miles; (b) Talkeetna to Gold Creek, 38 miles; and (c) Gold Creek to Watana, 44 miles. The Nenana Corridor is also divided into three segments (continuing north): (a) Gold Creek to Cantwell, 62 miles; (b) Cantwell to Healy, 39 miles; and (c) Healy to Ester, 97 miles. These locations are shown on Figure 3. Relevant physical and ecological features of individual transmission line segments are described in the following paragraphs.

2.01.2 River Characteristics. The upper Susitna River is a scenic, free-flowing river with very few signs of man's presence. The extreme upper and lower reaches of the Susitna occupy broad, glacially scoured valleys. However, the middle section of the river, between the Denali Highway and Gold Creek, occupies a stream-cut valley with extremely violent rapids in Devil Canyon.



Confluence of the Tyone and Susitna Rivers several miles above the upper reaches of the proposed Watana reservoir.

The Susitna, the Bremner in the southcentral region, and the Alsek in the southeast are the three major whitewater rivers in Alaska. Portions of all three are Class VI (on a scale of I to VI) boating rivers, at the upper limit of navigability, and cannot be attempted without risk of life. Few kayakers have completed the difficult 11-mile run through Devil Canyon.

The Susitna was one of the Alaskan rivers recommended for detailed study as possible additions to the National Wild and Scenic Rivers System in 1973, but was not one of the 20 rivers recommended for inclusion in the system by the Secretary of the Interior in 1974. The Susitna River has not yet been studied as recommended.

About 86 percent of the total annual flow of the upper Susitna occurs from May through September, with the mean daily average flow from late May through late August in the range of 20,000 to 32,000 cubic feet per second. In the November through April period, the mean average daily flow of the river is in the range of 1,000 to 2,500 cubic feet per second. On 7 June 1964, the recording station at Gold Creek measured a flow slightly in excess of 90,000 cubic feet per second, which was the highest flow recorded for the upper Susitna River since recording started in 1950.

High summer discharges are caused by snowmelt, rainfall, and glacial melt. The main streams carry a heavy load of glacial silt during the high runoff periods. During the winter when low temperatures retard water flows, streams run relatively silt-free.

2.01.3 Cook Inlet. All of the major water courses which flow into Cook Inlet either originate from glaciers or flow through erosive soils; either type of stream carries a high suspended-solids load. The natural high flow period in streams tributary to Cook Inlet occurs during the summer months of May to September, the main period when sediment is transported to the Inlet.

Freshwater runoff into the upper Inlet is an important source of nutrients and sediments. Large quantities of nitrate, silicate, and surface-suspended sediment with particulate organic carbon enter the Inlet with fresh water. Concentrations are especially high in the initial runoff each spring and summer. These additions decrease in concentration down the Inlet upon subsequent mixing with saline oceanic water and with tidal action. The large input of fresh water dilutes and tends to reduce salinity and phosphate concentration around river mouths and in the upper reaches of Cook Inlet.

2.01.4 Geology/Topography.

2.01.4.1 General. The Railbelt area is characterized by three lowland areas separated by three major mountain areas. To the north is the

Tanana-Kuskokwim Lowland, which is delineated by the Alaska Range to the south. The Susitna Lowland is to the southwest, bounded to the north by the Alaska Range, and to the east by the Talkeetna and Chugach Mountains. The Copper River Lowland in the east is bounded on the north by the Alaska Range, and the west by the Talkeetna Mountains. Each basin is underlain by quaternary rocks surfaced with glacial debris, alluvium, and eolian deposits. The mountains are primarily metamorphic and sedimentary rocks of the Mesozoic, with several areas of intrusive granitic rocks in the Talkeetna Mountains and the Alaska Range, and Mesozoic volcanic rocks in the Talkeetna Mountains. Figure 5 delineates the major features.

2.01.4.2 Susitna Basin. The Alaska Range to the west and north and the Talkeetna Mountains to the east make up the high perimeter of the Lower Susitna River Basin. The Alaska Range is made up of Paleozoic and Mesozoic sediments, some of which have been metamorphosed in varying degrees and intruded by granitic masses. The Talkeetna Mountain Range, with peaks up to 8,850 feet, is made up of a granitic batholith rimmed on the Susitna basin side by graywackes, argellites, and phyllites. Much of the interior portion of the basin is fluvial-glacial overburden deposits. Glaciers, in turn, carved the broad U-shaped valleys. Glacial overburden covers the bedrock, which is composed mainly of shale and sandstone with interbedded coals, Paleozoic and Mesozoic sediments, and lava flows.

The Upper Susitna River Basin is predominantly mountainous, bordered on the west and south by the Talkeetna Mountains, on the north by the summits of the Alaska Range, and on the south and east by the flat Copper River plateau. Valleys are floored with a thick fill of glacial moraines and gravels.

2.01.4.3 Transmission Line Corridor. Beginning at sea level at Point MacKenzie, the transmission line corridor rises to an elevation of 500 feet at Talkeetna. The corridor traverses a wide river valley with rolling terrain east of the Susitna River and extremely flat land to the west. The valley flattens and widens to the south, is poorly drained, and has many bogs and lakes.

From Talkeetna to Gold Creek, the corridor follows a moderately narrow valley floor narrowing toward the northern end. Maximum elevation is 900 feet.

The corridor from Gold Creek to Watana rises to an elevation of about 2300 feet on the plateau south of Devil Canyon before descending to the Watana damsite.

LEGEND

SEDIMENTARY AND METAMORPHIC ROCKS

▤ QUATERNARY
Surficial deposits, alluvium, glacial debris, eolian sand and silt

▥ TERTIARY
Sandstone, conglomerate, shale, mudstone; nonmarine and marine

░ MESOZOIC
Sandstone and shale; marine and nonmarine; includes some metamorphic rocks

▨ PALEOZOIC AND PRECAMBRIAN
Sandstone, shale, limestone; mostly marine; includes some early Mesozoic rocks

▦ PALEOZOIC AND PRECAMBRIAN
Metamorphic rocks: schist, gneiss, etc.; mainly Paleozoic

IGNEOUS ROCKS

< ∧ ∧ Quaternary and Tertiary volcanic rocks

▧ Mesozoic intrusive rocks; mainly granitic

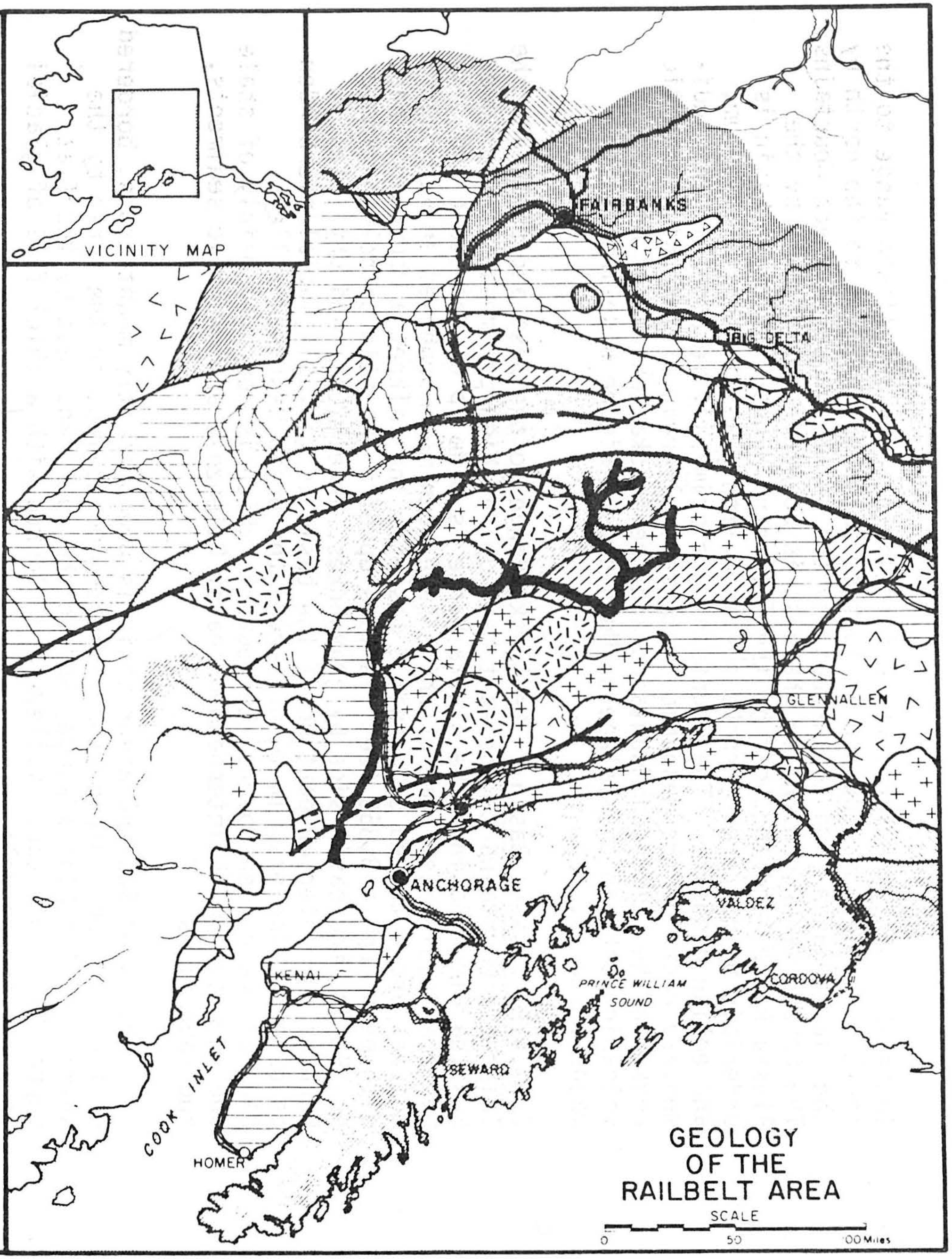
+ + + Mesozoic volcanic rocks

▨ Paleozoic volcanic rocks

△ △ △ Paleozoic intrusive rocks; granitic and ultramafic

—— — — Fault
(Dashed where inferred)

Source: U.S.G.S.
APA-1975



GEOLOGY OF THE RAILBELT AREA

FIGURE 5

Between Gold Creek and Cantwell, the corridor rises to a 2400-foot elevation. It traverses a wide valley with moderately incised rivers in the south, becoming a very wide depression in Broad Pass with rolling valley bottom continuing to the northeast.

From Cantwell, elevation 2200 feet, the Nenana River valley narrows to the north into a series of tight canyons separated by the wide valley of Yanert Fork. The corridor emerges from the canyon into a wide rolling plain south of Healy, with stream terraces adjacent to the Nenana River. The corridor is bisected by the Denali Fault at Windy Creek. Elevation at Healy is 1400 feet, dropping to 350 feet at Nenana, and rising again to 1500 feet in the Goldstream Hills southwest of Ester.

2.01.4.4 Seismic Areas. The southcentral area of Alaska is one of the world's most active seismic zones. In this century, 9 Alaskan earthquakes have equalled or exceeded a magnitude of 8.0 on the Richter Scale, and more than 60 quakes have exceeded a magnitude of 7.0. Several major and minor fault systems either border or cross the Susitna River basin. The March 1964 Alaska earthquake, with a magnitude of 8.4, which struck southcentral Alaska, was one of the strongest earthquakes ever recorded. A total of 115 lives were lost, 98 by quake-associated tsunami (seismic sea waves). The Richter scale is a logarithmic scale where a 7.0 earthquake would be ten times stronger than a 6.0 quake and an 8.0 quake would have one hundred times the intensity of a 6.0 earthquake.

Much of southcentral Alaska falls within seismic zone 4 (on a scale of 0 to 4) where structural damage caused by earthquakes is generally the greatest. This area of Alaska and the adjoining Aleutian chain are just part of the vast, almost continuous seismically and volcanically active belt that circumscribes the entire Pacific Ocean Basin.

2.01.4.5 Minerals. Most of the Susitna basin above Devil Canyon is considered to be highly favorable for deposits of copper or molybdenum and for contact or vein deposits of gold and silver. One known deposit of copper of near-commercial size and grade is near Denali. Also, the Valdez Creek gold placer district, from which there has been some production, is within the proposed project watershed.

Though a number of mineral occurrences are known and the area is considered favorable for discovery of additional deposits, much of the drainage basin has never been geologically mapped. Thus, geologically, the basin constitutes one of the least known areas in the State except for a few areas in the vicinity of Denali where some geologic mapping has been done.

Geologic information for the project area is not detailed enough to assess mineral resource potential within the proposed reservoir impoundment areas.

The Alaska State Department of Natural Resources states that there are "active" and "non-active" mining claims in the upper Susitna River drainage area between Devil Canyon and the Oshetna River. Many of these claims are in upper Watana Creek above the maximum reservoir pool elevation, and in the surrounding drainage areas where copper activity is moderately extensive.

2.01.5 Climate. The Susitna basin has a diversified climate. The latitude of the region gives it long winters and short summers, with great variation in the length of daylight between winter and summer. The lower Susitna basin owes its relatively moderate climate to the warm waters of the Pacific on the south, the barrier effect of the Alaska Range on the west and north, and the Talkeetna Range on the east. The summers are characterized by moderate temperatures, cloudy days, and gentle rains. The winters are cold and the snowfall is fairly heavy. At Talkeetna, at an elevation of 345 feet, which is representative of the lower basin, the normal summer temperature ranges between 44° and 68°F, with winter temperatures ranging between 0° and 40°F. The extreme temperature range is between -48° and 91°F. The average annual precipitation is about 29 inches, including about 102 inches of snowfall.

The upper Susitna basin, separated from the lower basin by mountains, has a somewhat colder climate and an average overall annual precipitation rate of approximately 30 inches.

The climate of the transmission line corridor from Devil Canyon to Point MacKenzie is transitional, with mild, wet conditions prevailing toward the southern end of the segment. The northern corridor has extremely variable climate related to differences in elevation. From Gold Creek to Cantwell, the annual temperature averages 25.9°F and annual precipitation 21.85 inches. From Cantwell to Healy, the annual temperature is 27.7°F and annual precipitation 14.5 inches. High winds are reported in this segment. North from Cantwell, the climate is typical of the interior, with an average temperature of 26.4°F and annual precipitation 11.34 inches.

2.02 Biological Characteristics.

2.02.1 Fish.

2.02.1.1 Anadromous Fish. Fish inhabiting the Susitna basin are divided into two major groups: resident and anadromous. The anadromous fish spends a portion of its life cycle in salt water, returning to the freshwater streams to spawn. In this group are included five species of Pacific salmon: sockeye (red); coho (silver); chinook (king); pink (humpback); and chum (dog) salmon. Juvenile salmon of several of these spend several years in fresh water before migrating to sea. All five species of salmon die soon after spawning. Dolly Varden, a char, is widely distributed in the streams of Cook Inlet and is present in the Lower Susitna River Basin with both anadromous and resident populations.

Smelt runs are known to occur in the Susitna River as far upstream as the Deshka River about 40 miles from Cook Inlet.

Salmon are found to spawn in varying numbers in some of the sloughs and tributaries of the Susitna River below Devil Canyon. Salmon surveys and inventories of the lower Susitna River and its tributaries have been made over a number of years, resulting in considerable distribution data; however, population studies and additional resource studies are needed. The surveys indicate that salmon are unable to ascend the turbulent Devil Canyon, and, thus, are prevented from migrating into the Upper Susitna River Basin.

The 14 million pounds of commercial salmon caught in Cook Inlet during 1973 comprised about 10 percent of the 136.5 million pounds of salmon harvested in Alaska during the year. Chum, red, and pink salmon totaled about 94 percent of the salmon catch for Cook Inlet during 1973. (1973 Catch and Production--Commercial Fisheries Statistics--Leaflet #26, State of Alaska Department of Fish and Game).

The 1973 commercial catch figures do not approach the maximum sustained yields for Cook Inlet, but do present the latest available commercial catch information, and except for chinook salmon are representative of the last several years of commercial salmon fishing. Sport and subsistence fishing for salmon in Cook Inlet and in the Susitna basin are also important considerations.

According to the Alaska Department of Fish and Game, a significant percentage of the Cook Inlet salmon run migrates into the Susitna River Basin. Although all salmon stocks are important, data from earlier 1950 and 1960 fish and wildlife reports added to the latest 1974-75 studies indicate that only a small percentage of the Susitna Basin salmon migrate into the 50-mile section of the Susitna River between the proposed Devil Canyon damsite and the confluence of the Chulitna River to spawn in the river's clearwater sloughs and tributaries. Further studies should determine more specific information on salmon numbers and habitat impacts. A 1974 assessment study, by the Alaska Department of Fish and Game, of anadromous fish populations in the Susitna River watershed estimated 24,000 chum, 5,200 pink, 1,000 red, and between 4,000 and 9,000 coho salmon migrated up the Susitna River above the river's confluence with the Chulitna River during the 7-week study period from 23 July through 11 September when most of the salmon were migrating up the river. The report indicated that chinook salmon were also present.

According to the 1974 assessment by the Alaska Department of Fish and Game, a minimum of 1,036 pink, 2,753 chum, 307 coho, and 104 sockeye, and an undetermined number of chinook salmon spawned during the August and September spawning period in the streams and sloughs of the Susitna River between the Chulitna River tributary and Portage Creek as determined from peak slough and stream index escapement counts. The assessment also indicated that a portion of the pink salmon spawn in the study area may have been destroyed by a late August-early September flood.

Chinook (King Salmon). The king salmon spends from one to three years in fresh water before migrating to sea. It is not unusual for this species to attain a weight of over 40 pounds. The maximum age is 8 years. In 1973, over 5,000 kings were caught in Cook Inlet; the total commercial catch comprised about 1.5 percent of the total weight of salmon caught in this area. The 1973 catch figures for king salmon were very low when compared to the average yearly catch for this species.

Sockeye Salmon (Red). The sockeye salmon averages between 6 and 8 pounds, with a range of from 2 to 12 pounds. This species spends from 1 to 3 years in a river system in which there are connecting lakes. The maximum age attained by this salmon is 7 years, but most return to spawn at 4 or 5 years of age. The landlocked variety of this species is called a kokanee and usually attains a length of from 12 to 15 inches. In 1973, almost 700,000 sockeyes were caught in Cook Inlet, with a total weight of over 5 million pounds, or 37.0 percent of the total weight of the Cook Inlet commercial salmon catch. About 14.5 percent of the sockeye salmon catch in Alaska occurred in Cook Inlet.

Coho Salmon (Silver). The coho or silver salmon spends from 1 to 2 years in fresh water and returns from the ocean to spawn at 3 or 4 years of age. Mature coho average about 10 pounds; some reach weights of over 30 pounds. The 106,000 cohos caught in Cook Inlet during 1973 weighed just over 648,000 pounds and comprised about 4.5 percent of the total commercial salmon catch for the area.

Pink Salmon (Humpback). The pink salmon migrates to sea immediately after hatching and returns to spawn at 2 years of age. The average weight of a mature pink is 3 to 4 pounds, with some pinks weighing up to 10 pounds. The 624,000 pink salmon caught in Cook Inlet during 1973 weighed over 2,260,000 pounds and comprised about 16.2 percent of the total weight of the commercial salmon catch in the area. Historically, odd-year catches of pink salmon are poor. Even-numbered year catches average about 2 million pinks.

Chum (Dog Salmon). Chum salmon attain weights of up to 30 pounds, with an average mature weight of 8 to 9 pounds. This species migrates to sea immediately after hatching and matures between 3 and 6 years of age. The 742,000 chums caught in Cook Inlet during 1973 weighed almost 5,800,000 pounds and made up over 41.0 percent of the total commercial salmon catch for the area, the largest percentage of any of the 5 species of Pacific salmon. About 12.5 percent of the 1973 Alaskan chum salmon catch occurred in Cook Inlet.

Salmon eggs hatch in late winter or early spring following the summer and fall spawning periods. The eggs incubate in gravelly streambeds and cannot tolerate high levels of siltation or low flows that dewater the streambeds during the incubation or alevin (pre-emergent) stages. Low flows, especially critical during the winter months, can dewater many of the spring-fed freshwater sloughs that are available to spawning salmon (see Table 1, page 45.)

2.02.1.2 Resident Fish. Grayling, rainbow trout, lake trout, Dolly Varden, whitefish, sucker, sculpin, and burbot (ling) comprise the principal resident fish population of the Susitna River basin. Although distribution studies have been made in the past, the magnitude of resident fish populations in the Susitna drainage is largely unknown.

During the warmer months of the year, when the Susitna River is silt laden, sport fishing is limited to clearwater tributaries and to areas in the main Susitna River near the mouths of these tributaries.

Resident fish, especially grayling, apparently inhabit the mouths of some of the clearwater streams on the Susitna River between Devil Canyon and the Oshetna River; however, most of the tributaries are too steep to support significant fish populations. Some of the upper sections of these clearwater tributaries, such as Deadman Creek, support grayling populations. Lake trout are also prominent in many of the terrace and upland lakes of the area.

2.02.2 Birds.

2.02.2.1 Waterfowl. The east-west stretch of the Susitna River between the Tyone River and Gold Creek is a major flyway for waterfowl. The majority of the waterfowl nesting areas in the Upper Susitna River Basin are on the nearby lakes of the Copper River Lowland region, on the Tyone River and surrounding drainage areas, and on the ponds and lakes of the wide flood plain in the Denali area.

The Upper Susitna River Basin has a moderate amount of use by waterfowl when compared with the Lower Susitna River Basin. The lower basin has a substantially greater amount of waterfowl habitat, and a greater number and variety of waterfowl seasonally use the thousands of lakes and ponds in this area to nest and to raise their young. Large numbers of migrant birds also use the Susitna River basin for feeding and resting during spring and fall flights to and from Alaska's interior and north slope. Distribution and density of waterfowl habitat within the Railbelt area is shown on Figure 6.

2.02.2.2 Raptors. Raptors, including golden eagles, bald eagles, and various species of hawks, owls, and falcons, occur throughout the entire Susitna River basin but in smaller numbers in the river canyon between Portage Creek and the Oshetna River. A June 1974 survey of cliff-nesting raptors conducted by the U.S. Fish and Wildlife Service, determined that the population densities of these birds between Devil Canyon and the Oshetna River are low and that no endangered species of peregrine falcons, American or arctic, appear to nest along the upper Susitna River. Peregrines have occasionally been sighted within the area of the upper Susitna basin and along migration routes through the Broad Pass area of the upper Chulitna River.

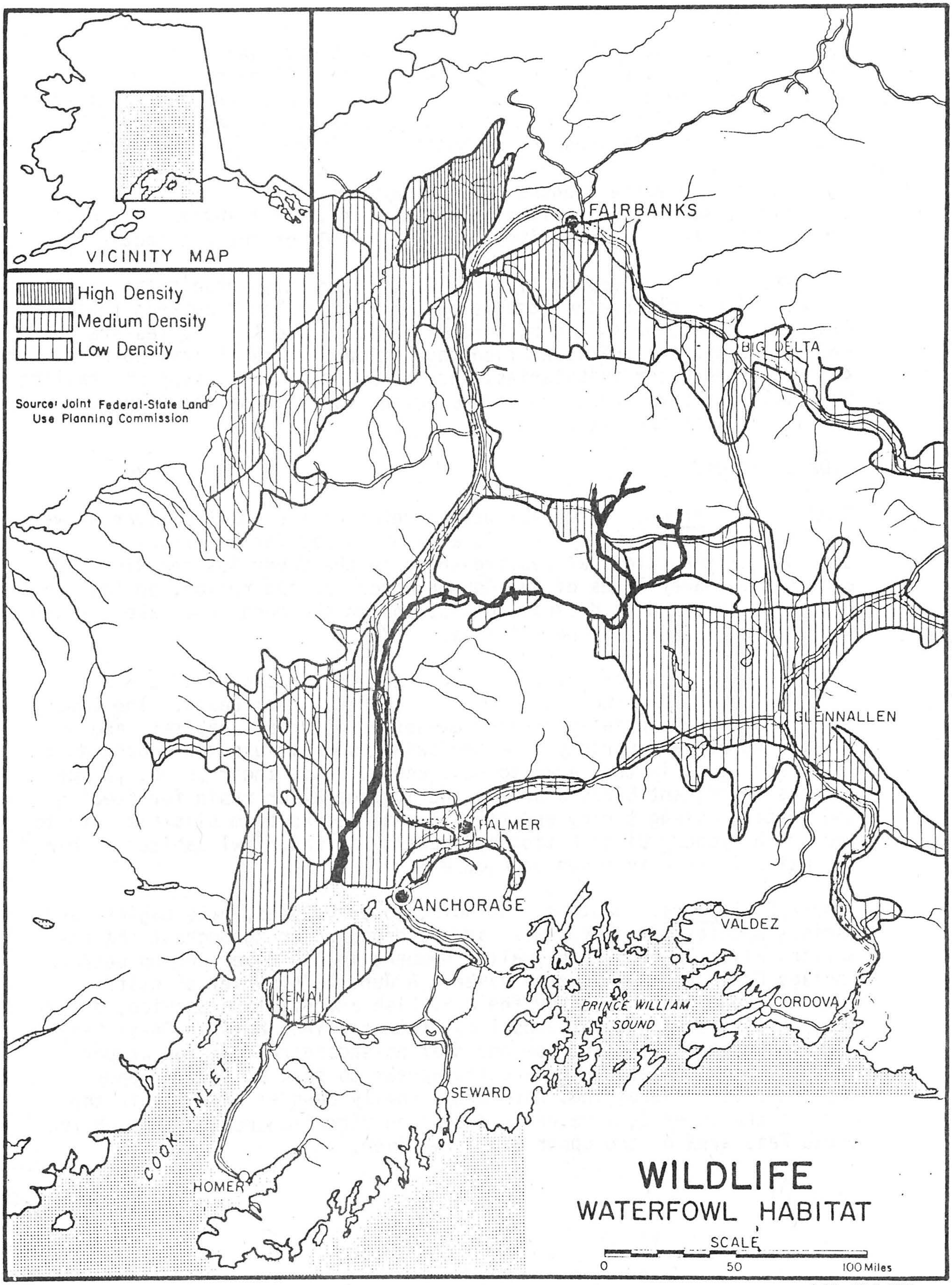


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FIGURE 6

On the basis of the 1974 U.S. Fish and Wildlife Service findings, other raptor populations in the canyon area of the upper Susitna River were determined to be minor, although minimal data were acquired on the tree-nesting raptors. Several nesting pairs of bald eagles and gyrfalcons were observed in or near the canyons of this area, and golden eagles frequently occupied upland cliffs in the vicinity of Coal Creek.

Substantial populations of ravens were found in reaches of the Susitna River above Gold Creek. The nests of this large bird are often used by raptors, including peregrines and gyrfalcons. However, there was no evidence that the nests observed were being used by raptors.

2.02.2.3 Other Birds. Unknown numbers of game birds, such as spruce grouse and willow ptarmigan, inhabit the Upper Susitna River Basin. Some incidental game bird hunting takes place along the Denali Highway, but such hunting pressures are practically nonexistent in most of the area.

Various other species of birds including songbirds, shorebirds, and other small birds are found throughout the Upper Susitna River Basin in varying numbers.

2.02.3 Mammals.

2.02.3.1 Caribou. One of the most significant wildlife resources of the Upper Susitna River Basin is the wide-ranging Nelchina caribou herd. This herd, a major recreational and subsistence resource in the south-central region, declined from a population high of about 71,000 in 1962 to a low of between 6,500 and 8,100 animals in 1972. This spectacular decline has been attributed to various factors, including migration to other areas, bad weather, predation, and overhunting. Motorized all-terrain vehicle access to the backcountry has improved hunting success even in the face of a rapidly declining caribou population.

Segments of the Nelchina herd periodically range throughout much of the Upper Susitna River Basin (see Figure 7). The major calving area for the herd is on the northeast slopes of the Talkeetna Mountains on the upper reaches of the Kosina Creek, Oshetna River, and Little Nelchina River drainages. Calving generally takes place between mid-May and mid-June. Except for intermittent seasonal migration routes across the Susitna River in areas upstream from Tsusena Creek, caribou are not resident to the main Susitna River canyon between Devil Canyon and the Oshetna River.

Caribou depend upon climax range, especially for winter forage; any alteration of the vegetation, especially of sedges and lichens, has a detrimental impact upon their distribution and numbers. A trait of the Nelchina herd is an almost constant change of winter ranges, a phenomenon that has undoubtedly characterized Alaska's caribou populations for centuries.

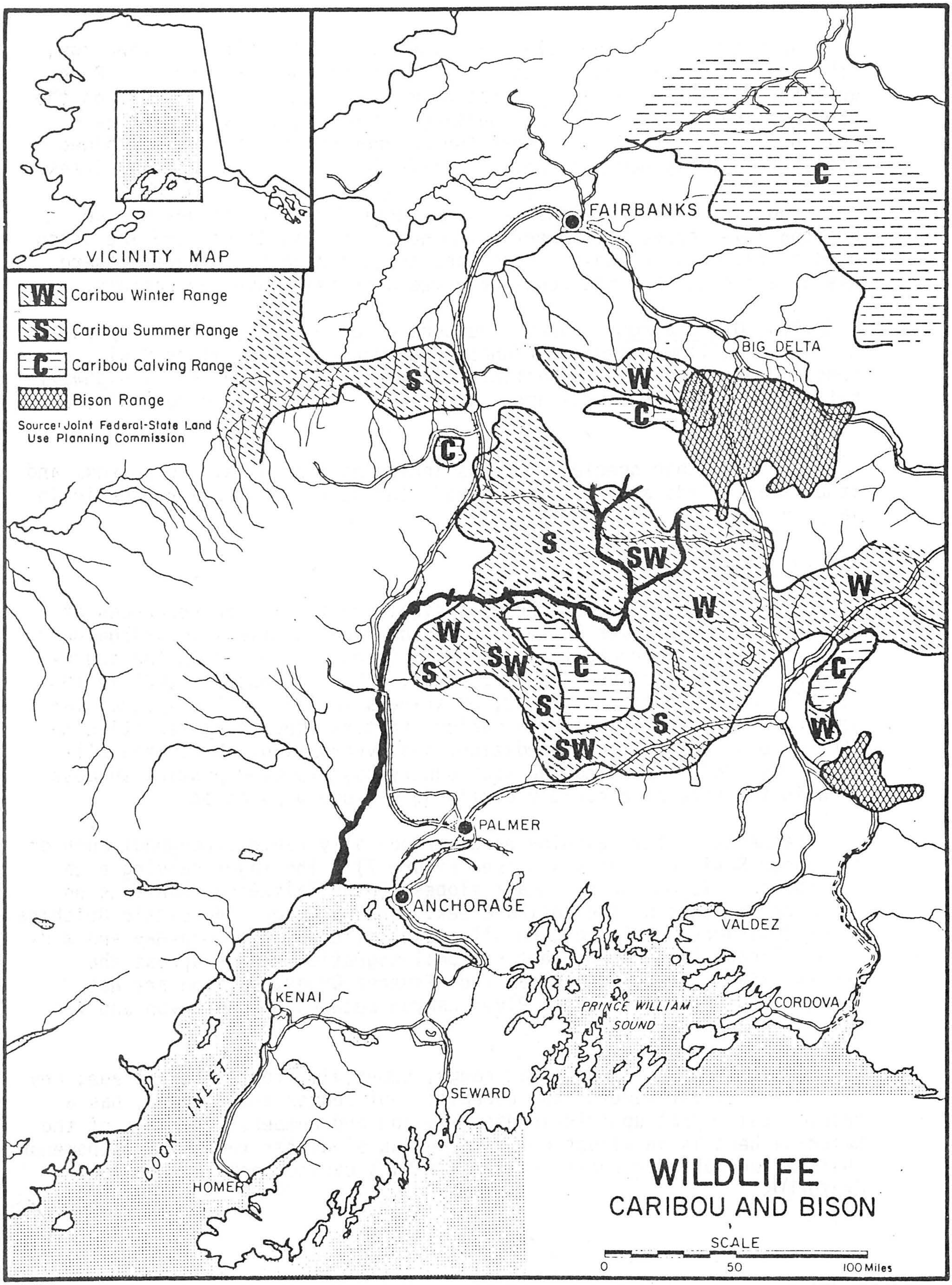

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FIGURE 7

The Alaska Department of Fish and Game considers the Nelchina herd to be one of the State's most important caribou populations. Several thousand hunters from Anchorage and Fairbanks participate in the annual hunting of this species. Additional thousands of non-hunting recreationists view the migrations of caribou as they cross the State's major highways. In addition, the herd provides sustenance to predators and scavengers such as wolves, grizzly bears, black bears, wolverines, lynx, and various species of birds.

Caribou are essentially limited in distribution within the transmission line system to the 136-mile segment extending north from Cantwell. In the mountainous area between Cantwell and Healy, they concentrate south of canyons. They are found in concentrations on the west bank of the Nenana River north of Healy and south of Clear Air Force Base.

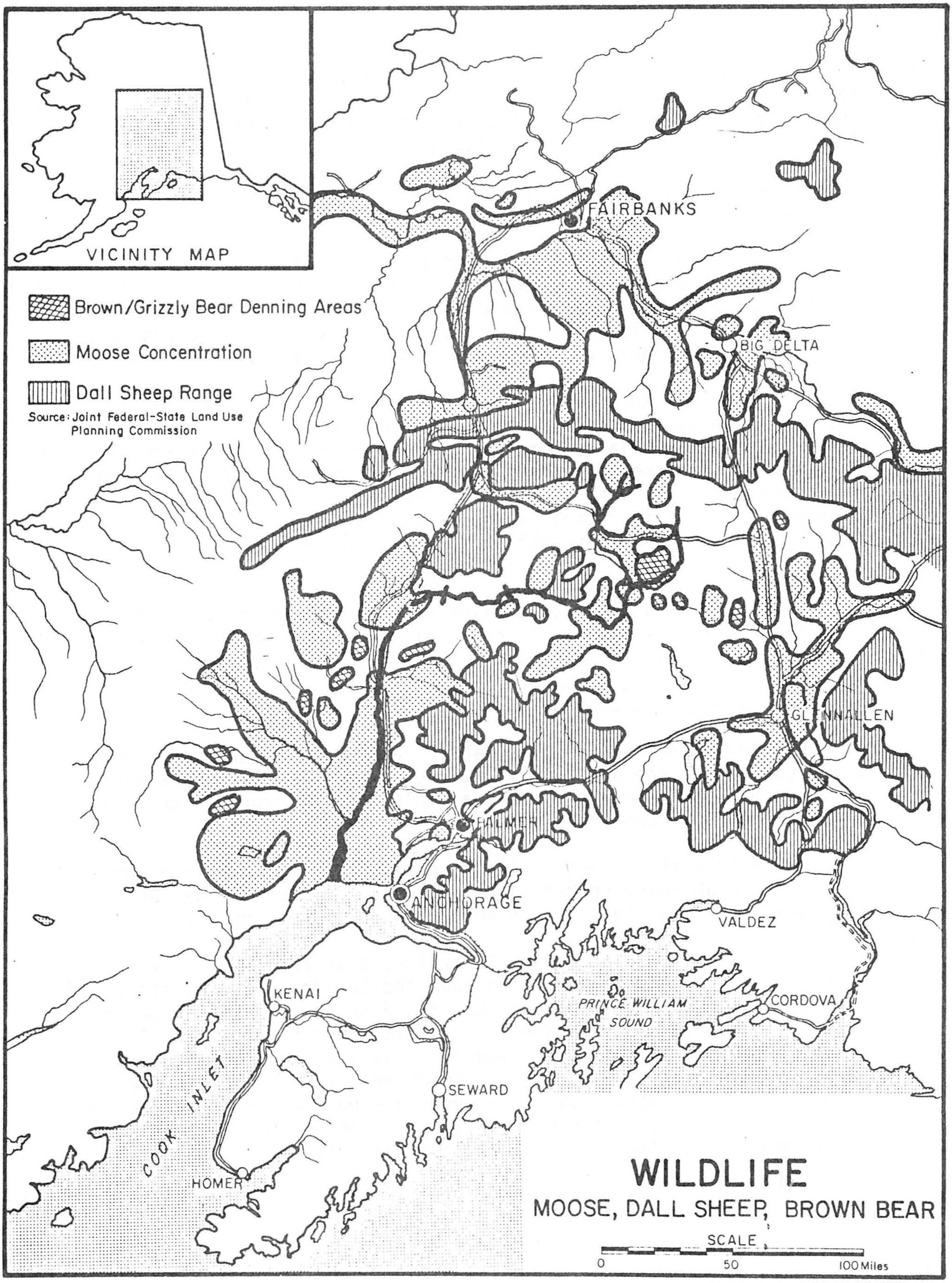
2.02.3.2 Moose. Moose range throughout much of the Upper Susitna River Basin (Figure 8). Wide fluctuations of populations have occurred over the years. A 1973 Alaska Department of Fish and Game fall aerial count resulted in sighting of approximately 1,800 moose in the upper Susitna River drainage. Numbers of moose in the southcentral region of Alaska have been reduced in recent years due mainly to weather conditions, hunting pressures, wolf predation, unbalanced age-sex ratios, and elimination of habitat.

Much of the Upper Susitna River Basin is at or above timberline, resulting in large amounts of "edge" at timberline which produce considerable quantities of willow, an important winter forage for moose. Successional vegetation changes following fire also contribute heavily to areas favoring moose habitat.

Limited numbers of moose inhabit the Susitna River bottom between Devil Canyon and the Oshetna River, because of a restricted amount of suitable habitat. However, the available habitat provides critical winter range for moose that do utilize this area.

Moose inhabit the entire length of the transmission line corridor but are more abundant in the lower valleys. In mountainous terrain, they are more commonly found in more open parts of canyons.

2.02.3.3 Grizzly/Brown Bears. Grizzlies, also referred to as brown bears in Alaska, are common throughout the Susitna River drainage and are fairly numerous in the upper Susitna despite the absence of salmon. Alpine and subalpine zones are the habitats most frequently used by grizzlies, although the more timbered areas are seasonally important. Denning begins in October, and all bears are in dens by mid-November (see Figure 8). Bears usually reappear during May, depending on weather conditions. Important spring foods include grasses, sedges, horsetails, other herbaceous plants, and carrion when available. On occasion,



Source: Joint Federal-State Land Use Planning Commission

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FIGURE 8

moose or caribou calves are taken. Berries--lowbush and highbush cranberries, blueberries, and bearberries--provide major summer food supplements. A prime consideration for grizzly bears is to minimize direct conflict with humans as the grizzly is adversely affected by contact with man.

Hunting for grizzly bears in this area often occurs incidentally to other hunting during the short fall open season.

Within the transmission line corridor, most grizzly bears are limited in distribution to the higher areas, primarily between Cantwell and Healy although they are found throughout this part of Alaska.

2.02.3.4 Black Bears. The Upper Susitna River Basin supports fair black bear densities. The larger populations are in semi-open forested areas with readily accessible alpine-subalpine berry crops. River bottoms, lake shores, and marshy lowlands are favorite spring black bear areas. Black bears generally eat many of the same types of food as are eaten by grizzlies. Denning habits are also somewhat similar to the grizzly bear's.

Natural fires generally benefit black bears, especially when dense mature spruce stands are burned. Most other land uses do not seriously affect bear numbers in this area, and black bears are not as adversely affected by contact with man as are grizzlies.

Black bears are found in forested areas throughout the length of the transmission line corridor.

2.02.3.5 Dall Sheep. These sheep are present in many areas of the Alaska Range, Talkeetna Mountains, and in the higher elevations of the Susitna River basin (Figure 8). The greatest concentrations of Dall sheep in the Susitna basin occur in the southern portions of the Talkeetnas; herds become scattered on the northern portion of the range, where parts of the mountains are uninhabited by sheep. Dall sheep are also found in the Watana Hills. Because of the relatively gentle nature of much of the Talkeetna Mountains and Watana Hills, predation in this area has more effect on sheep numbers than in more rugged habitats. Sheep have always furnished some of the diet of wolves and other carnivores in this area.

Within the transmission line corridor, Dall sheep are essentially limited to the mountainous area between Cantwell and Healy.

Hunting pressure for rams is fairly heavy due to relatively good access from highways, by air, and by ATVs (all-terrain vehicles). Nevertheless, as is true elsewhere in the State, ram-only hunting seems to have little effect on overall numbers. Sheep populations are almost entirely controlled by natural factors such as habitat, weather conditions, predation, and disease. Conflicts between man's activities and critical sheep habitat, such as lambing or wintering areas, can adversely impact Dall sheep populations.

2.02.3.6 Mountain Goats. Goats occur in low numbers in various areas of the Talkeetna Mountains and in the Watana Hills area, and do not provide a significant amount of hunting in the upper Susitna basin. The goats generally inhabit rougher terrain than do Dall sheep, and are thus less susceptible to man's activities.

2.02.3.7 Wolves. Wolves occur throughout most of the Upper Susitna River Basin. Populations are subject to rapid fluctuations, and estimates should be viewed with extreme caution. Wolf numbers have been estimated from a low of 13 in 1943, after predator control efforts, to a high of 400 to 450 in 1965. Currently an estimated 300 wolves populate the area encompassing the upper Susitna, the Talkeetna Mountains, and the upper Copper River drainage area. The wolf has been removed from predator classification and is now classified as a game animal in Alaska.

Alaska Department of Fish and Game management studies concluded that, from 1957 to 1967, wolf predation neither adversely affected other game populations, nor reduced hunting success for sportsmen. However, absolute conclusions were uncertain since moose and caribou populations may have reached their highs during this period. The study proved that wolves and men can often coexist while competing for game animals, but that at times man must accept reduction of available game by wolves.

2.02.3.8 Wolverines. This area of Alaska has consistently produced more wolverines than any other area of comparable size in the State. Wolverines are seen regularly throughout the area, and it is not unusual for a hunter returning to a kill site to find a wolverine feeding on his moose or caribou. Wolverines have withstood human encroachment and trapping without any noticeable reduction in numbers or range.

2.02.3.9 Other Mammals. Fur animal species of the upper Susitna in addition to wolf and wolverine include beaver, muskrat, otter, mink, Canada lynx, fox, marten, and weasel. Found in varying populations throughout much of the Upper Susitna River Basin and transmission corridor, each of these species has its own unique habitat requirements. However, except for a limited number of beaver, the river canyon area between Devil Canyon and the mouth of the Oshetna River is not considered good quality fur animal habitat for most of these species.

Other mammals found in this area include coyotes, snowshoe hares, ground squirrels, tree squirrels, pikas, marmots, and several species of voles, shrews, and mice. As with other animals, the populations of the various species vary as adverse or beneficial factors are encountered.

Susitna River between Watana and Vee damsites. Heavier vegetation, in this case upland spruce-hardwood forest, is limited to the valley slopes, the vegetative biome on the upper plateaus is generally moist tundra, muskeg, and alpine tundra.

2.02.4 Threatened Wildlife of the United States. The only species in the U.S. Fish and Wildlife Services publication, Threatened Wildlife of the United States, that might be resident in or migrate through the Upper Susitna River Basin are the two subspecies of the peregrine falcon: *Falco peregrines anatum* (American) and *Falco peregrines tundrius* (arctic). Although no peregrines appear to be nesting along the upper Susitna River at present, there have been occasional sightings within the area and along known migration routes for this species as they move through the Broad Pass area on the upper Chulitna River. These migrating peregrines are occasionally reported to include members of the two endangered subspecies.

Several species of wildlife that are considered threatened or depleted in the Lower 48 States have substantial populations within Alaska. Such species include the American bald eagle, the wolf, and the grizzly bear.

2.02.5 Vegetation. The major ecosystems of Alaska are divided into marine and land groupings, with the land group divided into fresh-water, tundra, and coniferous systems. The freshwater system includes glaciers and ice fields, lakes, and riverine ecosystems; the tundra system is subdivided into moist, wet, and alpine tundras; and the coniferous system is divided into six plant-related classifications.

The Upper Susitna River Basin includes the following four broad land ecosystem classifications: moist tundra; alpine tundra; upland spruce-hardwood forest; and lowland spruce-hardwood forest. The largest percentage of the basin is classified as moist or alpine tundra with most of the area in and adjacent to the main river channel below the Maclaren River classified as either upland or lowland spruce-hardwood forest.

At Gold Creek, the bottomland forest of white spruce and black cottonwoood is very much in evidence on well drained banks. Ascending the river, balsam poplar replaces the cottonwoods around Fog and Tsusena Creeks. Thin hardwoods and white spruce become less and less in evidence but still occur in small stands on well drained river bars and tributary fans upstream to Butte Creek. Above this tributary, only scattered stands of black spruce occur, growing up to the glaciers. The lower hillsides have a low brush cover with moist tundra in the lower areas. The periodically flooded river flats are in willow, sedges-high brush, and wet tundra. Since much of the drainage basin is uplands, alpine tundra is one of the most prominent vegetation types.

Alpine tundra is composed of low mat plants, both herbaceous and shrubby. Moist tundra usually forms a complete ground cover and is very productive during the growing season. Plant types vary from almost continuous cottongrass with a sparse growth of sedges and dwarf shrubs to stands where dwarf shrubs dominate. Tundra ecosystems are especially fragile and are very susceptible to long-term damage or destruction from overuse. Regeneration is extremely slow, with some lichens requiring more than 60 years to recover.

Most of the timber ecosystems in the upper Susitna basin are located adjacent to the river and tributaries on the canyon slopes and on the surrounding benchlands. The major timber species include birch, balsam poplar, black cottonwood, white spruce, and black spruce. Overall, the timber quality in this area is not good, with a wide variety of sizes, mostly smaller and noncommercial. Much of the birch and spruce is more suitable for pulp than for sawtimber; however, a fair yield of sawlogs could be obtained from stands of black cottonwood and balsam poplar.

The transmission line corridor transects five generally distinct vegetation types. Three of these--upland spruce-hardwood, lowland spruce-hardwood, and alpine tundra--are common within the upper Susitna basin, as discussed above. Two are related to distinctly different land forms. Bottomland spruce-poplar is confined to broad flood plains and river terraces, and warmer slopes of major rivers. Characteristic vegetation is white spruce, balsam poplar, birch, and aspen. Low bush, bog, and muskeg are another distinct type usually formed on outwash, and old river terraces, in filling ponds and sloughs, and throughout lowlands. Characteristic plants are tamarack, black spruce, alders, willows, and berries.

Progressing northward from Point MacKenzie, the corridor is principally characterized by bottomland spruce-poplar, lowland spruce-hardwood, and muskeg bog to Talkeetna. From this point to Gold Creek, bottomland spruce-poplar is interspersed with upland spruce-hardwood. The segment leading from Gold Creek to Cantwell is typically bottomland spruce-poplar interspersed with upland spruce-hardwood, and low brush-bog/muskeg. Through the Alaska Range between Cantwell and Healy, the vegetation is a mixture of upland spruce-hardwood, lowland spruce-hardwood, alpine tundra, and some low brush-muskeg/bog. From Healy to Ester, the vegetation is characterized by bottomland spruce-poplar, upland spruce-hardwood, lowland spruce-hardwood, and low brush-muskeg/bog.

2.03 Cultural Characteristics.

2.03.1 Population. The Southcentral Railbelt area of Alaska contains the State's two largest population centers, Anchorage and Fairbanks, and almost three-fourths of the State's total population. The Anchorage area alone has over half the residents in the State. Recently revised estimates for 1975 indicate over 386,000 people will be in Alaska by the end of the year, compared to slightly over 302,000 counted in the 1970 census, an increase of about 28 percent in that period. Other estimates by the Alaska Department of Labor indicate an expected State population of almost 450,000 for the year 1980, an additional 16 percent increase over 1975, and a population increase of nearly 50 percent in 10 years. The largest growth in the State has been in the Southcentral Railbelt area, and this trend is expected to continue. With the possible relocation of Alaska's capital from Juneau to the Railbelt area, an additional population impact will be exerted on this area of the State.

Looking upstream at Susitna River near Gold Creek about 15 miles below Devil Canyon. Note Alaska Railroad bridge.

At the present time, only a few small settlements are located along the Parks Highway between Anchorage and Fairbanks and the Alaska Railroad in the Susitna River valley. Except for the small settlement at Denali, there are few, if any, permanent full-time residents in the Upper Susitna River Basin above Devil Canyon.

2.03.2 Economics. Both Anchorage and Fairbanks are regional economic centers for the Southcentral Railbelt area. Government, trade, and services comprise the major portion of the area's total employment. Construction and transportation are also important. Making relatively less significant contributions are the financing, mining, and manufacturing industries, while agriculture, forestry, and fisheries contribute less than one percent of the employment dollar to the economy of the Railbelt area. In 1972 the wages and salaries for the southcentral region of Alaska amounted to more than $704,000,000.

In the government groups, employment is divided more or less equally between Federal, State, and local sectors. The area's major Federal employer is the Department of Defense, with most of its employees concentrated in four military installations. State and local government employment includes employees from agencies of the State of Alaska and the cities and boroughs within the area.

After government, the two groups having the largest employment are trade and services. Their importance as sources of employment for the Railbelt area residents is a further manifestation of the region's two relatively concentrated population centers and of the high degree of economic diversity, as well as levels of demand for goods and services, which are substantially higher than in most other parts of Alaska. The importance of construction is largely due to the high level of expansion experienced by the Anchorage and Fairbanks areas since 1968. This growth can partly be attributed to the trans-Alaska pipeline project, which is encouraging much new construction in both public and private sectors.

High levels of employment in the region's transportation industry reflect the positions of Anchorage and Fairbanks as major transportation centers, not only for the Southcentral Railbelt area but for the rest of the State as well. The Port of Anchorage handles most of the waterborne freight moving into southcentral and northern Alaska. International airports at Anchorage and Fairbanks serve as hubs for commercial air traffic throughout Alaska and are important stopovers for 37 major international air carriers. Anchorage also serves as the transfer point for goods brought into the area by air and water, which are then distributed by air transport, truck or by Alaska Railroad to more remote areas.

Although exerting relatively little direct impact on total employment, mining, finance, insurance, and real estate play important roles in terms of the secondary employment they generate in the region. Most people employed in mining engage in activities relating to petroleum extraction from fields in Cook Inlet and the Kenai Peninsula. A substantial portion of the royalties and taxes collected by the State as a result of oil production in the area is returned to the area in the form of jobs in State government and through revenue sharing with various local governments. The total value of oil and gas production in the southcentral region for 1972 was almost $240 million. Similarly, the Anchorage financial sector, in spite of its small employment, exerts considerable economic leverage as the banking center for Alaska.

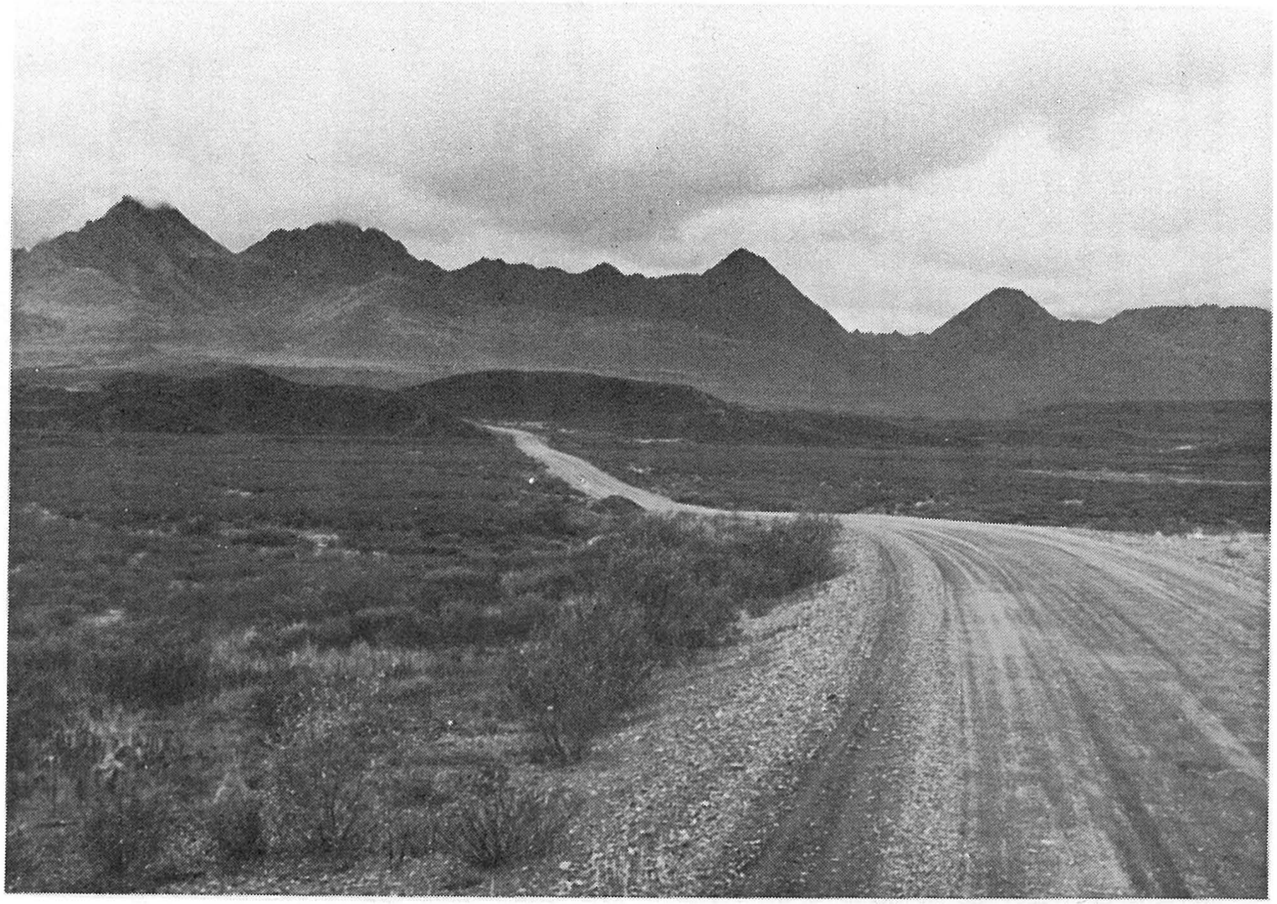
Most agricultural activities in the Southcentral Railbelt area take place in the Matanuska, Susitna, and Tanana Valleys. The potential for agriculture in these areas of Alaska is considered favorable, although development of the industry has not been extensive.

Commercial fisheries activity is the oldest cash-based industry of major importance within the region. The industry has changed substantially during the past 20 years and continues to be modified as a result of both biologic and economic stimuli. The salmon industry has always been a major component of the industry in terms of volume and value. Since 1955, the king crab, shrimp, and Tanner crab fisheries have undergone major development, and halibut landings have increased substantially in recent years. The total wholesale value of commercial fish and shellfish for the southcentral region of Alaska in 1972 was just over $100 million including a catch of almost 110 million pounds of salmon with a wholesale value of nearly $38 million.

The southcentral region of Alaska includes the Kodiak-Shelikof area, the Cook Inlet area, and the Copper River-Gulf of Alaska area. The Southcentral Railbelt area is that portion of the southcentral and Yukon subregions that is served by the Alaska Railroad.

The region's timber output is less than 10 percent of the total timber harvested commercially in Alaska. The timber industry is shifting from supplying the local market to production aimed at the export market. Stumpage value of timber cut from State and National forest lands in the southcentral region during 1972 was about $130,000.

The tourist industry plays an increasingly important role in the economy of the region. Precise data on tourism are not available, but the numbers of Alaskan visitors have increased from about 130,000 in 1971 to approximately 216,000 in 1973. A forecast by the Division of Tourism in 1973 estimated 288,000 people would visit Alaska in 1975 and about 554,000 in 1980.



Looking north along the Denali Highway to the Amphitheater Mountains. Morainal ridges run across the middle of the photo. The biome along most of the eastern half of the Denali Highway is moist tundra.

With population trend projections showing a substantial increase in the number of future residents in the State and especially in the South-central Railbelt area, there will be a related increase in the demand for jobs, goods, energy, and services. Alaska has a wealth of reserves in renewable and nonrenewable resources that will have to be addressed in the very near future.

The world consumption of nonrenewable resources for energy production such as oil and gas has reached or will soon reach a critical point in time where alternative means to produce energy must be developed. The need for the development and utilization of those renewable resources must be weighed against the adverse effects that these developments would have on an ever-decreasing regime of natural environment.

2.03.3 Transportation.

2.03.3.1 Rail. The Alaska Railroad runs from Seward on the Gulf of Alaska, past Anchorage, up the Susitna Valley, past Mount McKinley National Park, and down to Fairbanks on the Tanana River, a distance of 483 miles. The Federally constructed and operated Alaska Railroad was built between 1914 and 1923.

2.03.3.2 Roads. Paved roads in the Railbelt area include: the 227-mile Sterling-Seward Highway between Homer and Anchorage, with a 27-mile side spur to Seward; the newly-constructed 358-mile Parks Highway between Anchorage and Fairbanks; a 205-mile section of the Alaska Highway that connects Tok Junction with Fairbanks; the 328-mile Glenn Highway connecting Anchorage with Tok Junction; and the 266-mile Richardson Highway from Valdez, on Prince William Sound, to its junction with the Alaska Highway at Delta Junction, 97 miles southeast of Fairbanks.

The only road access through the upper Susitna basin is the 135-mile gravel Denali Highway between Paxson on the Richardson Highway and Cantwell on the Parks Highway, and the 20-mile gravel road from the Glenn Highway to Lake Louise. The Denali Highway is not open for use during the winter months.

2.03.3.3 Air. In addition to major airlines within Alaska, there are numerous small commercial operators plus the highest per capita ratio of private aircraft in the nation. Many small remote landing strips are scattered throughout the Susitna basin, and float planes utilize many lakes and streams to ferry freight and passengers to the remote back-country areas. In many areas of the State, the only access is provided by the airplane.

2.03.3.4 Other Forms of Transportation. ATVs and other types of off-road vehicles provide transportation into areas in the upper Susitna basin where there are no developed roads. Several developed trails are shown on maps of the upper basin. Trails are utilized by ATVs, trail bikes, hikers, horseback riders, and winter travelers.

Shallow-draft river boats, small boats, canoes, rubber rafts, and kayaks utilize sections of the upper Susitna River, a few tributary streams, Lake Louise, and some of the other lakes for recreation purposes. Except for these few areas, boating use is practically nonexistent within much of the upper basin.

2.03.4 Recreation.

2.03.4.1 Access. The greatest constraint on recreation activities for most of the 5,800-square-mile Upper Susitna River Basin is the shortage of road access. Except for a 20-mile gravel road from the Glenn Highway to the southern shores of Lake Louise on the upper drainage of the Tyone River, the main access to the area is by way of the gravel Denali Highway through the upper part of the basin.

Float planes are used to fly in hunters, fishermen, and other recreationists to various areas within the basin, but, except for a few larger isolated lakes, this form of access is relatively minor. All-terrain vehicles and snowmobiles also provide off-road access to areas within the upper Susitna basin. Boats are used to some extent to provide access on the Tyone River drainage and to areas of the Susitna River between the Denali Highway and Devil Canyon.

Much of the Upper Susitna River Basin has very little recreational activity at the present time. Great distances, rough or wet terrain, and lack of roads limit use of most of this area to a few hardy souls who enter these wild lands for recreational purposes, or to the wildlife residents and migrant birds and animals that pass through the region.

2.03.4.2 Hunting. A major recreational use of the upper Susitna area is big-game hunting and associated recreational activities. The greatest hunting pressures are exerted from a few fly-in camps, and from areas along the Denali Highway. Most wolves and bears harvested are taken while hunting caribou or moose. The increased use of ATVs to provide access and to haul big game is a significant factor in improved hunting success, even in the face of declining game populations. The mechanized ATV can penetrate deeply into previously inaccessible country, leaving few areas that provide havens for the reduced numbers of caribou and moose. It appears that the use of ATVs for hunting, already prohibited in some areas, may have to be further controlled.

The hunting of Dall sheep, mountain goats, and waterfowl is minimal in the upper basin even in areas of road access such as the Denali Highway.

2.03.4.3 Fishing. Access is again the major factor in determining areas that are utilized in fishing for grayling, rainbow trout, whitefish, and lake trout. The Susitna and Maclaren Rivers are silt laden throughout their entire courses during the warmer months of the year. Therefore, sport fishing is limited to lakes, clearwater tributaries, and to areas in the main Susitna near the mouths of these tributaries.

Sport fishing pressure in the upper Susitna basin is light. Many lakes and some areas of the river afford landing sites for float-equipped aircraft. A few areas along the main Susitna and some tributaries, such as the Tyone River and Lake Louise, have some pressure from boat fishermen. An increasing number of hunters use ATVs to get into and out of the back country, exerting incidental fishing pressure in some areas.

As previously stated, salmon do not migrate into the upper Susitna River above Devil Canyon so are not a factor in the sport fishery of this area.

2.03.4.4 Boating. A minor amount of recreational boating occurs in the waters of the upper Susitna basin. Some lakes such as Lake Louise have a heavier amount of boating activity, and some rivers such as the Tyone and the Susitna have a lighter amount of boating activity. Some kayakers utilize portions of the main Susitna River, but very few have braved the difficult waters of the Susitna through the area known as Devil Canyon.

2.03.4.5 Camping. Most camping use in this area is incidental to other recreational activities such as hunting, fishing, boating, and highway travel. Some developed campground facilities are located at Lake Louise and at three campgrounds along the Denali Highway outside the upper Susitna basin. Tourism during the summer months involving the use of campers, trailers, and similar recreational vehicles is increasing at a dramatic rate in Alaska. Many of these vehicles camp along the roads where adequate facilities do not exist and where these activities are creating ever-increasing adverse impacts upon the land.

2.03.4.6 Other Outdoor Recreational Activities. Most other recreational activities in the upper Susitna River basin exert varying environmental impacts on the area. Many activities such as hiking, backpacking, and photography take place incidentally to other recreational pursuits such as hunting, fishing, boating, camping, and driving for pleasure. Trail bikes, snowmobiles, four-wheel-drive vehicles, and other mechanical equipment can cause extreme adverse environmental damage to the fragile ecosystems of the basin when used in a careless, uncontrolled manner.

At the present time, recreation is one of the major uses of the upper Susitna River drainage area, but the overall utilization of this area by humans remains comparatively light.

2.03.5 Historic Resources. The current National Register of Historic Places has been consulted, and no National Register properties will be affected by the project. A historical-archaeological study recently completed for the Corps of Engineers by the Alaska Division of Parks (Heritage Resources Along the Upper Susitna River, August 1975) indicates 11 historic sites within the study portion of the upper Susitna basin. These are all essentially related to the discovery of gold. Most of the early mining activity occurred on Valdez Creek, where the town of Denali was established. Nine of the sites are located in that general area. Two sites, both designated as cabins, are located on Kosina Creek, one near its mouth, and one about six miles upstream. The apparent dearth of historical locations between Devil Canyon and the Maclaren River is explained by the following excerpt from the Alaska Division of Parks' report (in discussing the first mapping of the area in 1912): "Except for a few prospects on the Oshetna River, the USGS never received any reports of gold being found on the Susitna between Devil Canyon and the Maclaren in significant quantities. Though the Tanaina and Ahtna Indians did a great deal of hunting and fishing on the river in this area, the white man found little gold, an almost unnavigable river, and no reason to settle anywhere near the 'Devil's Canyon'."

In 1920 the Alaska Railroad was completed, giving general access to Mount McKinley National Park. Highways followed in the 1940's and 1950's, and the primary use of the area became recreational. The road approach to Mount McKinley Park was by way of the gravel Denali Highway until the recent completion of the Parks Highway between Anchorage and Fairbanks.

2.03.6 Archaeological Resources. Only one archaeological site has been examined within the study area portion of the upper Susitna basin, and it has never been excavated. This is the Ratekin Site, located near the Denali Highway several miles east of the Susitna River. Three other late prehistoric archaeological sites have been reported, one on upper Valdez Creek, and two on the Tyone River. Very little information is presently available on the aboriginal uses of the Upper Susitna River Basin. Based upon the knowledge of the prehistory of contiguous areas, the Alaska Division of Parks' report concludes that the Upper Susitna River Basin was likely inhabited as early as 10,000 years ago, during Late Pleistocene/Early Holocene times, with use continuing in intensity during Late Prehistoric/Early Historic times.

One archaeological site within the general vicinity of the proposed transmission line corridor is listed in the National Register of 4 February 1975. This is the Dry Creek site.

Extensive archaeological remains have been found in the Tangle Lakes area outside the Upper Susitna River Basin near the Maclaren River drainage, and the area has been entered on the National Register of Historic Places. The remains are apparently associated with a large proglacial lake that existed during and after the last period of glaciation, dating back some 10,000 to 12,000 years. It is reasonable to expect further remains to be found around the lakebed margins when more detailed investigations are made.

2.04 Energy Needs. Power requirements for the Railbelt are increasing rapidly, and substantial amounts of new generating capacity and additional transmission system development will be needed in the near future. The Railbelt now derives most of its power from oil and natural gas. Past planning has contemplated that natural gas and, eventually, fuels from the Alyeska Pipeline would continue as long-range energy sources for Railbelt power systems. However, recent changes in the national and international energy situation indicate that other alternatives such as the abundant coal and hydro resources of the Railbelt should be reconsidered.

The energy demand curve used in the hydropower study is based on 1975 projections provided by the Alaska Power Administration. The curve represents the combined demand of the areas that could be served directly from an interconnected Railbelt system, and is premised upon assumed growth rates after 1980 that are substantially below existing trends. These growth rates assume substantial savings through increased efficiency in use of energy and through conservation programs.

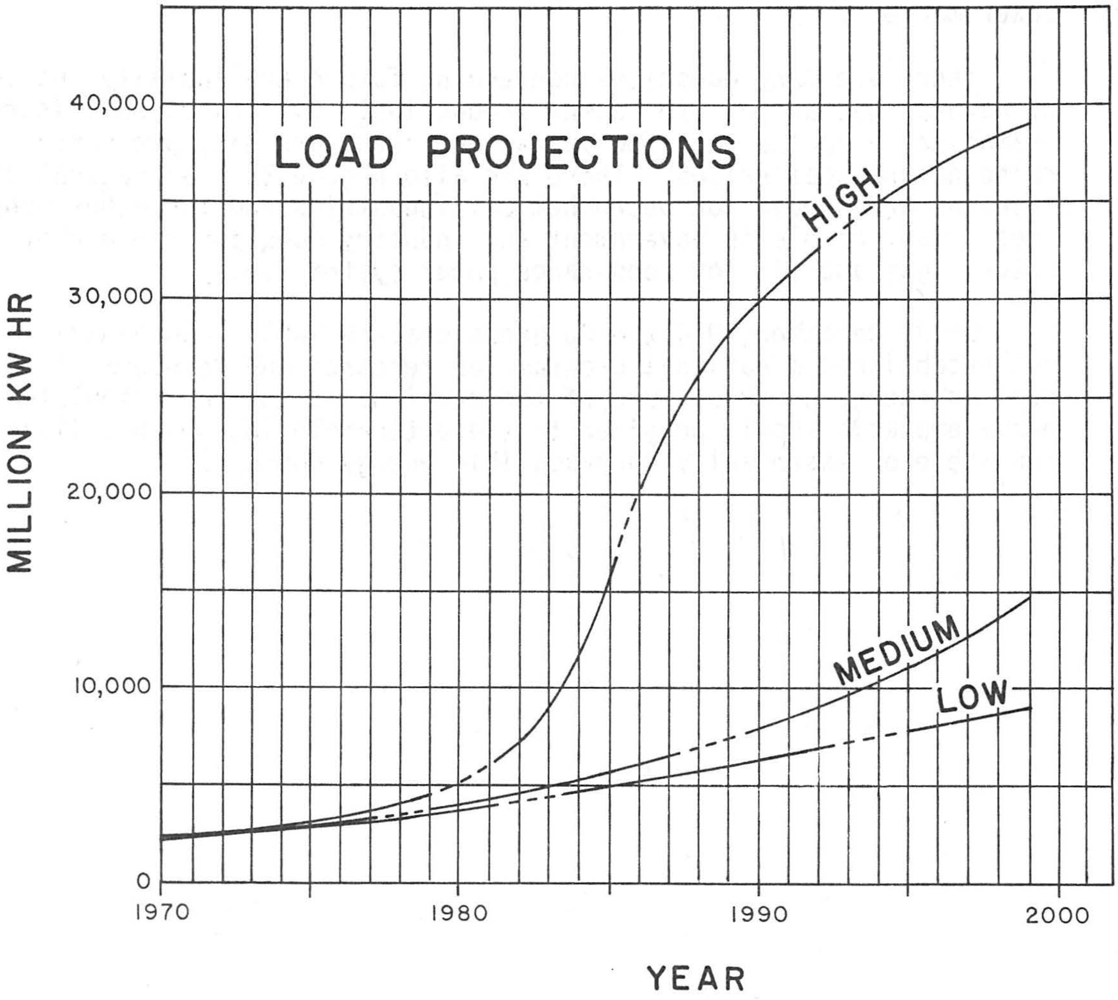
The load projection used in the hydropower study is depicted in Figure 9 along with the other estimates provided in APA's 1975 analysis. The "higher" range anticipates significant new energy and mineral developments from among those that appear most promising, along with an annual growth rate in residential, commercial, and light industrial uses that remains throughout the study period somewhat above recent electrical energy consumption growth rates in the U.S. The "lower" range presumes minimal industrial development, a load growth rate for the remainder of this decade well below current actual rates of increase, and energy growth over the next twenty years that barely matches the latest population growth rate projections for that period. This lower estimate generally assumes a significant slackening of the pace of development almost immediately and continuing throughout the period of study. The "mid-range" appears to be a reasonably conservative estimate, with annual rates of increase in power requirements less than 7 percent after 1980 as compared to an historical annual growth rate of 14 percent during the period 1960 to 1971. This adopted "mid-range" projection assumes steady but moderate growth after the present boom period coupled with more efficient energy use.

Because of lead time needed for coal and hydroelectric development, immediate needs for the next decade will have to be handled by additional oil and gas-fired units. However, the opportunity exists for hydro and coal to become the main energy sources for Railbelt power by about 1985, if priority is attached to these resources.

Studies by the advisory committees for the current Alaska Power Survey provide estimates of costs for alternative power supplies from coal, natural gas, and oil-fired plants. Indications are that power from Susitna hydroelectric development would be comparable in cost to present gas-fired generation in the Cook Inlet area and would be less expensive than alternatives available to other Southcentral Railbelt power markets.

There are many questions concerning future availability and costs of natural gas and oil for power production. Oil prices have increased dramatically in the past few years, and there are many pressures to raise natural gas prices. There are also arguments that natural gas reserves are needed for petrochemical industries and for other non-power uses. Many people in Government and industry question the use of natural gas and oil for long-range power system fuels.

On 31 December 1974 the Congress enacted Public Law 93-577. This act established a national program for research and development in non-nuclear energy sources. One of the sections of the law stipulated that heavy emphasis should be given to those technologies which utilize renewable or essentially inexhaustible energy sources.



PROJECTED
ENERGY DEMAND
SOUTHCENTRAL RAILBELT

FIGURE 9

3.0 RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS.

3.01 Present Land Status. Lands in the general project area of the proposed Upper Susitna River Basin hydroelectric development at Devil Canyon and Watana are under Federal jurisdiction and administered by the U.S. Bureau of Land Management. These lands have been classified as power sites by Power Site Classification Number 443, dated 13 February 1958. The project areas are designated in the Power Site Classification by approximate damsite locations and contour designations as follows:

Devil Canyon: This area begins approximately 1.4 miles upstream from the mouth of Portage Creek and includes all lands upstream from this point below the 1500-foot contour.

Watana: This area begins approximately 1.5 miles upstream from Tsusena Creek and includes all lands upstream from Tsusena Creek and from this point below the 1,910-foot contour.

Transmission Corridor: Most of the route segments lie in lands that are pending or tentatively approved State selections, native village withdrawals, and native regional deficiency withdrawals, all of which are in a state of flux at the present. There is very little privately owned land within the proposed corridor. Most of the affected lands between Point MacKenzie and Talkeetna are potential State selections. Native village withdrawals relevant to the settlements of Montana Creek, Caswell, and Knik are indeterminate. From Talkeetna to Gold Creek, the corridor transects State selected land and borders on Denali State Park. Between Gold Creek and Devil Canyon, the lands are 50/50 State selections and native regional deficiency. From Gold Creek to Cantwell, the lands are comprised of native withdrawals and State selections. From Cantwell to Healy, the route is State selected land bordering on Mount McKinley National Park. Route lands between Gold Creek and Healy also fall within the Mount McKinley Cooperative Planning and Management Zone. From Healy to Ester, the route primarily transects State selected land with some existing Federal withdrawals and native village withdrawals. Land status described above is subject to change as determinations are made for ultimate disposal.

3.02 Alaska Native Claims Settlement Act. The Power Site Classification withdrawals are in an area designated under the Alaska Native Claims Settlement Act (Public Law 92-203) for village deficiency withdrawals: lands which can be selected by village corporations which cannot meet their selection entitlement from withdrawals in the areas immediately surrounding those villages as provided in Section 11(a)(3) of PL 92-203. Lands within the power site withdrawal may not be selected as Native Village deficiency lands. Accordingly, the effect of PL 92-203 concerns only the lands lying above the contours designated in the Power Site withdrawal. A proposed exchange of lands is presently being considered by the Cook Inlet Native Regional Corporation, the State of Alaska, and the Bureau of Land Management. This proposed exchange would result in the State's becoming owner of the lands above the contours designated in the power site withdrawal in lieu of the Native Village corporations. The proposed exchange, however, necessitates an amendment to PL 92-203, and possibly to Alaska statutes, to permit such an exchange to proceed.

3.03 Utility Corridors. The U.S. Bureau of Land Management has prepared a report suggesting a Primary Corridor System for the State of Alaska. The report was prepared in accordance with the provisions of Section 17 (b)(3) of the Alaska Native Claims Settlement Act (Public Law 92-203).

The Primary Corridor System is defined as a network of corridors intended for the systematic transport of high-value, energy-related resources from their point of origin to processing or transshipment points in other regions of the State. The network is intended to identify transportation routes for resources of national or statewide significance and is analogous to the transportation network that already exists in conterminous states consisting of navigation, highway, railroad, and pipeline systems.

The Susitna project is one of the hydroelectric power developments sufficiently advanced in the planning phase to warrant corridor consideration for high-voltage power transmission lines. The transmission lines from the proposed Susitna project have been identified as a portion of Corridor No. 29 in the suggested Primary Corridor System.

4.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

4.01 Hydrology and Water Quality. About 86 percent of the total annual flow of the upper Susitna River occurs from May through September. Average daily flows from the latter part of May through the latter part of August fluctuate in the range of 20,000 to 32,000 cubic feet per second (cfs). November through April the average daily flows range between 1,000 and 2,500 cfs. The river also carries a heavy load of glacial sediment during the high runoff periods. During the winter when low temperatures reduce water flows the streams run relatively silt-free.

Some of the impacts that could be caused by the project downstream from Devil Canyon Dam are discussed below.

Significant reductions of the late spring and early summer flows of the river and substantial increases of the winter flows would occur. The flow of the river during the period 1950 through 1974 averaged about 9,280 cfs. The projected average regulated downstream flows for a Devil Canyon-Watana system computed on a monthly basis would range between about 7,560 cfs in October to almost 15,100 cfs in August. In extreme years, the monthly averages would range from about 6,300 cfs to nearly 28,300 cfs. The average monthly regulated flows compared to the average unregulated flows based on the period from 1950 through 1974 are as follows:

TABLE I - FLOWS

Month	Regulated cfs	Unregulated cfs
January	9,905	1,354
February	9,429	1,137
March	9,026	1,031
April	8,278	1,254
May	8,158	12,627
June	8,329	26,763
July	9,604	23,047
August	15,091	21,189
September	10,800	13,015
October	7,560	5,347
November	8,369	2,331
December	8,968	1,656

The heavier sediment material now carried by the river during high runoff periods between Devil Canyon and the junction of the Chulitna and Talkeetna Rivers with the Susitna River would be substantially reduced, and a year-round, somewhat milky-textured "glacial flour" (suspended glacial sediment) would be introduced into the controlled water releases below the dam. Preliminary studies by the Corps of Engineers indicate that the suspended sediment in releases at Devil Canyon Dam would be at low levels (15-35 ppm). According to fishery investigations during the winter of 1974-75 by the Division of Commercial Fisheries of the Alaska Department of Fish and Game on the Susitna River between Portage Creek and the Chulitna River, suspended solid samples of river water at Gold Creek, Chase and the Parks Highway bridge, indicated a range of from 4 to 228 ppm, and that these suspended solids are within anadromus fish tolerances. Although the average sediment load in summer months is less than 1000 ppm, loads sometimes reach a maximum of 5000 ppm in the unregulated river. Reduction of existing summer sedimentation peaks should have a beneficial effect on anadromous and resident fish populations for some distance downstream from Devil Canyon Dam.

On occasions when spilling water over Devil Canyon Dam would be necessary during late summer periods of extreme high flows, nitrogen supersaturation could be introduced into the river below the dam. Fish exposed to high levels of this condition can suffer gas-bubble disease (like bends to a deep-sea diver) which can be fatal.

The combined high level regulating outlets and powerhouse capacities (30,000 cfs and 24,000 cfs respectively) at the Watana Dam are adequate to accommodate floods with recurrence intervals of up to approximately 50 years. At the Devil Canyon Dam the hydraulic capacity of the initial four generating units is approximately 25,000 cfs at normal maximum pool elevatioon of 1,450 feet. The low level outlet works at Devil Canyon are not designed to generate at pool elevation 1,450 feet, therefore, total outflow without spill is limited to a maximum of 25,000 cfs. Of the 25 years of streamflow record, spills were estimated to occur in 11 of the operation years, with the average spill lasting 14 days with an average flow of an additional 8,500 cfs. However, any nitrogen supersaturation and dissolved oxygen thus introduced should be reduced substantially in the turbulent river section just downstream from Devil Canyon dam. The proposed spillway at Watana Dam is not conducive to high levels of nitrogen or oxygen supersaturation, and spills would occur very seldom, only on the occasions of extreme flooding conditions in late summer. Few fish, under existing conditions, are believed to occupy the two and one-half mile section of Susitna River between the proposed Devil Canyon damsite and the mouth of Portage Creek. This situation could change with a decrease in regulated flows during the summer months.

Temperature of the water released from Devil Canyon Dam would be adjusted to approach the natural river water temperatures. This would be made possible by the proposed incorporation of selective withdrawl outlets into the dam structure.

Variations in water releases at Devil Canyon Dam would cause less than a one-foot daily fluctuation of downstream water levels in the river during the May through October period since the reservoir would not be used for peaking purposes. The regulated daily fluctuations during the winter months could range up to one foot under normal operating conditions. According to U.S. Geological Survey studies, the natural normal daily fluctuations in the Susitna River below Devil Canyon range up to about one foot.

Stratification conditions within the reservoirs could cause some temperature and dissolved oxygen problems in the river for some distance downstream from the Devil Canyon Dam and within the reservoirs themselves. These conditions could have an adverse impact on the downstream fishery. However, this problem can be minimized by multiple-level water release structures which are proposed for incorporation into both dams. This would provide the capability of selective withdrawal of water from various levels within the reservoir to moderate release temperatures and dissolved oxygen content. Spillway designs will also be considered to reduce supersaturation of downstream water flows with atmospheric gases.

There would be a period of channel stabilization in the 50-mile section of the Susitna River below Devil Canyon Dam in which the river would tend to adjust to the stabilized flow with low sediment levels but general channel degradation caused by a river's attempt to replace the missing sediment load with material picked up from the riverbed is not expected to be a significant concern along the coarse gravel bed reaches of the Susitna River between Talkeetna and Devil Canyon. However, this phenomenon would be the subject of future detailed studies to determine the distance at which sediment loads would become reestablished.

Upstream from the dams the major environmental impacts would be caused by the reservoir impoundments. Under the proposed two-dam system, the reservoir behind the Devil Canyon Dam would fluctuate up to 5 feet during the year, while Watana reservoir would fluctuate between 80 and 125 feet during the year under normal operating conditions. The maximum daily fluctuation at Devil Canyon reservoir under normal operating conditions would be less than two feet.

Devil Canyon reservoir would cover about 7,550 acres in a narrow steep-walled canyon (1/4 to 3/4-mile-wide) with few areas of big game habitat and a minimal amount of resident fish habitat near the mouths of several of the tributaries that enter the Susitna River in the 28-mile section above the proposed damsite. The reservoir would also flood approximately 9 miles of the 11-mile, whitewater section of Devil Canyon.

Watana reservoir, with a structural height of 810 feet and a pool elevation of 2,200 feet, would flood about 43,000 acres in a 54-mile section of the Susitna River that would reach upstream about 4 miles above the Oshetna River confluence. Except in a few areas near the mouths of tributaries such as Deadman Creek, Watana Creek, Jay Creek, and Kosina Creek, the Watana reservoir would be contained within a fairly narrow canyon 1/3-mile to 1 mile in width for much of its length.

The spillway design at Watana diverts the excess river flows into the Tsusena Creek drainage approximately 2.5 miles above the creek's confluence with the Susitna River. On the occasions (approximately once every 50 years) when it would be necessary to divert excess river flows over the spillway during extreme flooding conditions in late summer, the adverse environmental impact on fish and vegetation resources in lower Tsusena Creek could be significant.

Watana reservoir would flood reaches of the Susitna River upstream from Tsusena Creek that are sometimes used as caribou crossings. It would also flood some moose winter range in the river bottom. The reservoir would also cover existing resident fish habitat at the mouths of some of the tributaries in this section of the river and possibly would create other fish habitat at higher elevations on these tributaries.

Potential water quality impacts caused by construction of transmission facilities are the increased siltation of rivers and lakes; alteration of stream flows; eutrophication (increased nutrient levels) and pollution of lakes and streams; and disruption of aquatic habitat due to gravel borrow, fill, and excavation. Eliminating or minimizing these potential adverse impacts would be emphasized during the design, construction, and maintenance of the proposed project.

4.02 Fish. One of the environmental impacts caused by the proposed Devil Canyon-Watana project would be the substantial reduction of natural river flows during the latter part of June and the early part of July when salmon start migrating up the Susitna River. The projected average monthly regulated flows during periods in August and September, when the majority of the salmon are spawning, approach the average natural flows of the river during this period.

In a 1974 study by the Alaska Department of Fish and Game on surveys conducted to locate potential salmon rearing and spawning sloughs on the 50-mile section of the Susitna River between Portage Creek and the Chulitna River, 21 sloughs were found during the 23 July through 11 September study period. Salmon fry were observed in at least 15 of these 21 backwater areas. Adult salmon were present in 9 of the 21 sloughs. In 5 of the sloughs the adult salmon were found in low numbers (from 1 to 24 with an average between 6 and 7). In 4 other sloughs large numbers were present (from 107 to 681 with an average of just over 350).

During December 1974 and January and February 1975, the Alaska Department of Fish and Game investigated 16 of the 21 sloughs previously surveyed during the summer of 1974. Of the 16 sloughs, 5 indicated presence of coho salmon fry. The numbers of fry captured in the 5 sloughs at various times ranged from 1 to 21 with an average of 5. Many of the 16 sloughs surveyed were appreciably dewatered from the summer/fall state.

The report also stated that a number of coho fry were captured in the Susitna River near Gold Creek indicating that some coho salmon fry do overwinter in the main river.

The winter investigations indicated that the Susitna River between Devil Canyon and Talkeetna was transporting suspended solid loads ranging from 4 ppm to 228 ppm.

It may be reasonable to assume that one of the most critical factors in salmon spawning is the dewatering of areas in which the salmon have spawned. If winter flows are insufficient to cover the spawning beds it would be of little consequence if high summer flows allowed salmon to spawn in some of the sloughs that are dewatered during the egg incubation or alevin stages. According to a Hydrologic Reconnaissance of the Susitna River Below Devil's Canyon, October 1974 by the National Marine Fisheries Service when comparing regulated flows to natural flows (see Table 1 on page 45), "It is reasonable to conclude that during the months of October through March spring flows may be enhanced in the river valley bottom, during the months of May through mid-September these springflows may be depressed."

It is reasonable to assume on the basis of existing data that there will be some changes in the relationship between the regulated river and access to existing salmon rearing and spawning sloughs and tributaries downstream from Devil Canyon Dam. It appears feasible to develop a program to improve fish access to and from some of the sloughs and tributaries in the Susitna River as a consequence of the project's stabilizing effect on summer flows. Such a program would be a project consideration.

Flooding, which occurs frequently under natural conditions and presently destroys salmon eggs in this stretch of the river would be almost completely eliminated by regulation of the upper Susitna River flows.

Reduction in flows and turbidity below Devil Canyon Dam might cause some disorientation of salmon migrating into the section of the Susitna River between Portage Creek and the Chulitna River during an initial period after construction of the dams and until future salmon stocks readjusted to the change in regulated river conditions.

During the period of construction, river flows will be diverted through tunnels in the canyon walls and past the construction areas at the damsites with minimal changes in existing water quality.

During the periods in which the newly-constructed reservoirs would be filling with water, downstream flow maintenance would be coordinated with the fish and wildlife agencies to prevent unnecessary damage to downstream fishery resources. It is proposed to initiate construction of Watana Dam in about 1981, and Devil Canyon approximately five years later.

According to a study discussed in the Journal of Fisheries Research Board of Canada--Volume 32, No. 1, January 1975, Ecological Consequences of the Proposed Moran Dam on the Fraser River, some of the beneficial downstream impacts of the dam could include the following:

The higher regulated winter flows might increase the survival of salmon eggs in the sloughs and backwater areas of the river downstream from the dam. The increased flows could insure better coverage and better percolation through the gravel and presumably increase egg and alevin survival. Salmon alevin are young fish with attached egg-sacs that remain in the gravel beds until they emerge as fry.

An additional consequence of reduced turbidity below the dam might be a gradual reduction in the percentage of fine materials in the salmon spawning areas near the mouths of sloughs and tributaries as they enter the Susitna River. This could also lead to improved percolation through the gravel in the streambed and possibly improve survival of eggs.

Reduced siltation during the summer months should prove beneficial for both anadromous and resident fish species for some distance downstream from the proposed Devil Canyon Dam. It is also reasonable to expect that some additional salmon spawning and rearing habitat would develop within some sections of the Susitna River between Devil Canyon and Talkeetna.

According to the Moran Dam study, reduced turbidity during the summer months or during the periods of seaward migration could lead to an increase in visibility within the river and therefore an increase in predation of salmon fry. A slight increase in turbidity during the winter months might also increase the survival of young salmon due to a decrease in visibility during that period. Another impact on juvenile salmon could be the extention of the seaward migration period due to less turbid water in the 50-mile portion of the Susitna River below Devil Canyon.

Other hydrologic factors previously discussed would also affect the fishery resource downstream from the dams. These and other changes could also influence the food and life cycles for fish in this section of the river. Biological and physical changes likely to occur are the subjects of ongoing studies by State and Federal agencies under the direction of the U.S. Fish and Wildlife Service. Results of these studies will be used in determining needs for more detailed final design phase studies, feasible project modification, and mitigative or ameliorative measures.

Upstream from the dams, the major impact on the resident fish populations would be caused by the reservoir impoundments. Under the proposed plan, Devil Canyon reservoir would fluctuate very little. Even though the steep-walled canyon of this reservoir might prove less than desirable for a program to develop a resident fish population, some species of fish might be able to adapt to this reservoir and provide some future sport fishing benefits.

Watana Dam would have a widely fluctuating reservoir which would generally prove detrimental to the development of resident fish populations. Suspended glacial sediment could be a factor in both of the reservoirs after the heavier glacial sediments have settled out; however, many natural lakes in Alaska such as Tustumena and Tazlina, with heavy inflows of glacial debris sustain fish populations under similar conditions, so to develop populations of fish under related conditions may be feasible.

Most resident fish populations, especially grayling, utilize some of the clearwater tributaries of the Susitna River or areas near the mouths of these streams as they enter the glacially turbid main river channel during periods of high runoff. Many of these tributaries would be flooded in their lower reaches by the proposed reservoir impoundments. The resident fish populations would be affected by the increased water levels in the proposed reservoirs; but in some areas, access to tributaries for resident fish may be improved by increased water elevations.

It appears highly unlikely that anadromous fish such as salmon could be successfully introduced into the Upper Susitna River Basin. With the succession of very high dams and the related problems and costs of passing migrating fish over and through these dams, such a program appears infeasible (Report, Ecological Consequences of the Proposed Moran Dam on the Fraser River). This report states in reference to high dams: "The choice is clearly between upstream salmon stocks or dams." However, the introduction of a resident salmon species, such as sockeye (kokanee) or others to some waters of the upper Susitna basin might prove feasible with further studies.

Other problems related to the introduction of anadromous fish into the Upper Susitna River Basin would include the following: Fish would experience high mortality rates if they attempted to move downstream through turbines or outlet works in the proposed series of high-head dams. According to Corps of Engineers studies, a 35 percent mortality rate could be expected on fish such as young salmon at each high dam. Perhaps even more significant than turbine loss is the experience background that juvenile salmonids will generally not migrate out of large storage type reservoirs. Reverse currents, temperature stratification, etc., apparently disorients the migrants and causes them to lose their migrational motivation. As a result many never even reach the dam and they spend their lives as residuals in the reservoir. (Example: Brownlee Reservoir, Snake River, Idaho and Oregon)

Impact upon aquatic life from the transmission line should be small because of the care that would be taken to prevent degradation of streams within the corridor. However, the aquatic food chain in the taiga (boreal forest) and tundra is extremely simple, and as a result, disruption of habitat for one species quite often indirectly affects many other species. Potential impacts are: increased siltation of rivers and lakes; alteration of flows; eutrophication and pollution of lakes and streams; and disruption of habitat due to gravel borrow, fill, and excavation. All construction and maintenance activities would be controlled to prevent or minimize adverse environmental impacts.

4.03 Wildlife. Reservoir impoundments, transmission line corridors, and access roads would have varying degrees of environmental impact on wildlife.

The Devil Canyon reservoir would be located within the confines of a narrow, steep-walled canyon with few areas of big-game habitat and on no major migration routes for big-game animals. In some cases, animals such as moose and caribou may find it easier to cross the narrow reservoir than they would the present fast-moving river at the bottom of a deep, steep-sided canyon.

The proposed Watana Dam would be generally contained within a fairly deep and narrow river canyon. Watana reservoir would lie across one of the intermittent seasonal caribou migration routes between the main calving area of the Nelchina caribou herd, located south of the river in the northeast foothills of the Talkeetna Mountains, and some caribou summer range on the north side of the Susitna River. Calving generally takes place during a month-long period starting in the middle of May and most of the caribou move out of the calving area in June and July.

Ice-shelving conditions caused by winter drawdown on Watana reservoir or spring ice breakup conditions on the reservoir could cause problems for caribou, moose, or other animals if they attempt to cross this reservoir when these adverse conditions exist. Warmer weather and a rapidly filling reservoir should eliminate any adverse ice conditions at Watana during the month of May. As caribou are strong swimmers, they should have fewer problems crossing the narrow 2/3 to 1 mile wide section of the reservoir in the historic crossing areas in the vicinity of Kosina and Jay Creeks during July after calving than they would crossing the swollen glacial river during periods of high runoff. Some caribou could also migrate around the upper reaches of the proposed Watana reservoir area as indicated in existing spring migration patterns. Caribou migration patterns for the Nelchina herd are continually changing, as stated in Alaska Department of Fish and Game study reports. Their studies also indicated the use of the Watana reservoir site by Nelchina caribou for grazing and crossing was minimal during the period November 1974 through April 1975. Under adverse ice conditions, the reservoirs could result in increased problems for some segments of the herd. Also, there could be some permanent changes in historical herd movement patterns.

Within the transmission line corridor system, impacts to caribou would be limited to the 136-mile segment extending north from Cantwell. There is no significant caribou use of areas to the south. Although the transmission line and related access roads would not impose a physical barrier to migration of caribou, construction and maintenance work during certain seasons may inhibit herd movement. Since caribou are primarily confined to the west bank of the Nenana River, they will not be significantly affected in this area if the line runs along the east bank. Although physical destruction of caribou habitat will not be a significant impact of power line construction, there are indirect consequences which could be significant. Increase of fires resulting from manmade causes could destroy tundra lichen which is their prime source of winter food. It is estimated that approximately 50 years are required for a burned area to recover a usable cover of lichen for caribou. Noise generated by the transmission lines could also modify normal behavior, as could public accessibility provided by transmission line roads.

A moose survey conducted in early June 1974 by the Alaska Department of Fish and Game indicated that, although spring counting conditions were less than ideal, a total of 356 moose were seen along the upper Susitna River and in the lower drainage areas of the major tributaries. A 1973 fall count in the same general area sighted a total of 1796 moose.

Of the 356 moose counted in the June 1974 survey, 13 were seen in or near the area of the proposed Watana reservoir below Vee Canyon. None were sighted within the proposed Devil Canyon reservoir impoundment. Although limited moose habitat appears to exist within the pool areas of the proposed Devil Canyon and Watana reservoirs, it is considered critical to those moose now utilizing the area. Special studies will be required to determine impacts upon moose habitat and populations.

During the June 1974 Fish and Game survey period, one grizzly was sighted on the upper Oshetna and one on the Maclaren River. Five black bears were sighted on the Susitna River. A total of 56 caribou were sighted in the survey area.

Moose are found throughout the length of the transmission line corridor. The greatest adverse impact to these animals would be the increased hunting access provided by roads and the openness of the corridor itself. Habitat, on the other hand, would overall be improved. Subclimax growth within the transmission line corridor would increase moose browse.

The proposed reservoirs at Devil Canyon and Watana are located along a major flyway for waterfowl. Very few waterfowl appear to nest on the sections of the river that would be flooded by these reservoir proposals. On the other hand, the reservoirs would provide suitable resting areas for waterfowl migrating through the basin.

Migrating birds would possibly suffer some mortality from collisions with towers or lines, but such losses should be negligible. The line would generally parallel normal north-south migration routes. The cables would be large enough to have a high degree of visibility and would be widely enough spaced to be ineffective snares. Electrocution of birds is also unlikely since the distance between lines and between lines and ground would be great enough to make shorting out by birds almost impossible.

A transmission line per se will not have many impacts upon wildlife; most of the impacts will be as a result of construction and maintenance. Direct destruction will affect the less mobile animals such as the small mammals, whose territories may be small enough to be encompassed by the construction area. The significance of this impact to these animals is small in relation to their population in surrounding areas.

The loss of habitat for bears, wolves, wolverines, Dall sheep, and other animals also appears to be minimal. However, losses to any significant element of the food web will affect consumers. Thus, losses to moose or caribou would impact upon predator species. Other birds, including raptors, songbirds, shorebirds, and game birds, do not appear to be significantly affected by the reduction of habitat in the area of the proposed dams and reservoirs and on the transmission line corridor, although some habitat will be lost for all species of wildlife that utilize the affected areas.

Road access to the two damsites and to the transmission line would have a significant impact on fish and wildlife resources in areas opened to vehicle encroachment. Specific areas such as Stephan Lake, Fog Lakes, lower Deadman Creek, and the northern slopes of the Talkeetna Mountains could be significantly impacted by hunters, fishermen, and other recreationists by an access road to the Watana Dam. The same would be true along various segments of the transmission line. State game management policies could control some of the adverse impacts on fish and wildlife in these areas. However, this increase in public accessibility would significantly increase the necessity for intensified law enforcement and fire prevention measures.

4.04 Recreation. Much of the Upper Susitna River Basin has little or, in many areas, no recreational activity at the present time. A combination of poor road access, rough terrain, and great distances presently limit the use of the 5,800-square-mile basin, especially the lands directly impacted by the proposed project, to a few hunters, fishermen, and other hardy souls who utilize these wild lands for recreational purposes.

The construction of the proposed hydroelectric project would have an impact on a number of present and projected recreational activities both in the immediate dam and reservoir areas and downstream from the dams.

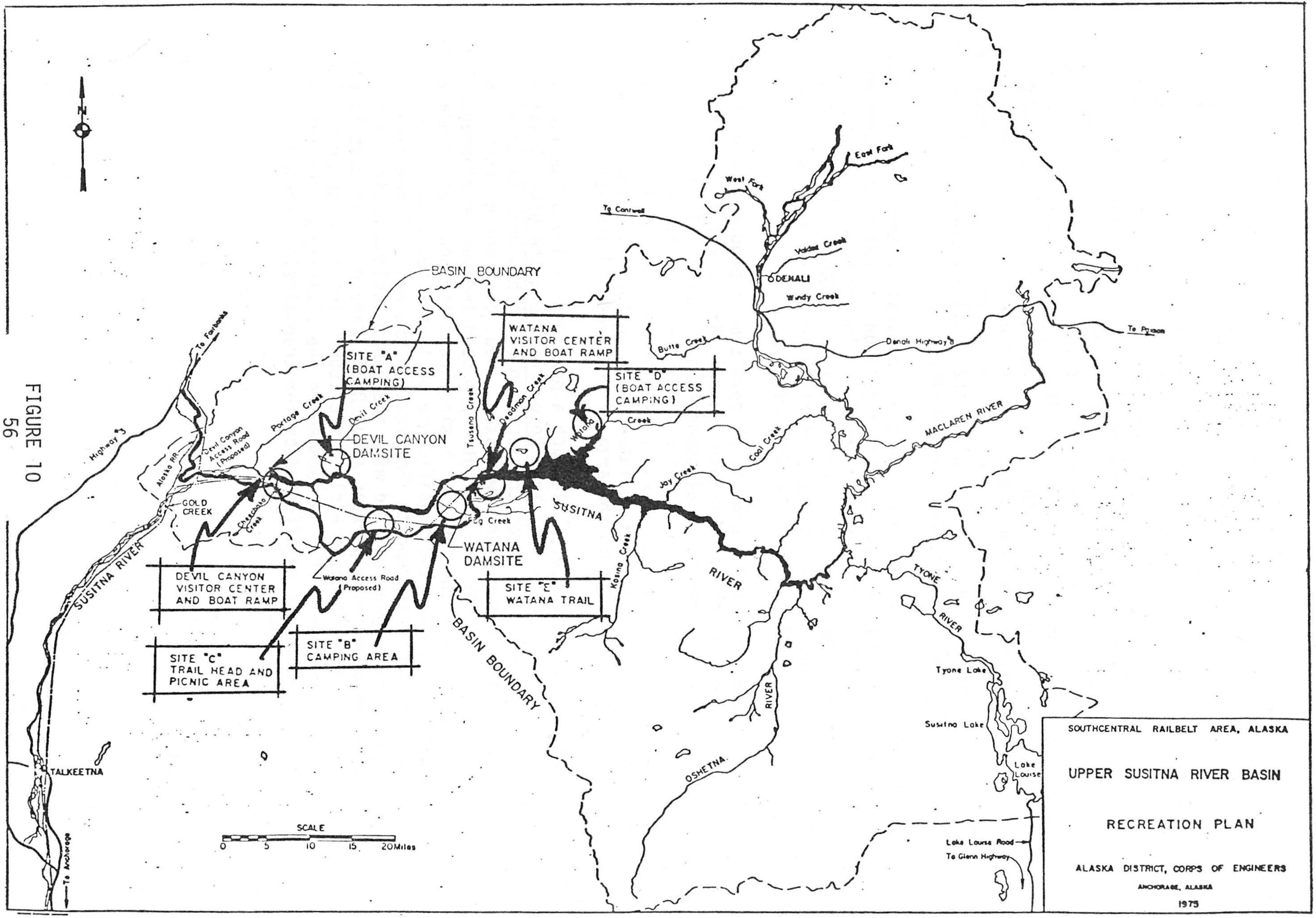
At the present time, the Susitna River upstream from Portage Creek to the Denali Highway bridge is a free-flowing river with few signs of man's activities and minimal public use. The project would significantly change both the present riverine setting and human use of the area. Improved road access into the upper Susitna basin would substantially increase pressures on all the resources impacted by outdoor recreation activities within these areas. Along with a potential increase in hunting pressure, the construction of project-oriented recreational facilities would further increase public use in the immediate vicinity of the proposed dams and reservoirs. These recreational developments would eventually include visitor centers at the dams, boat launching ramps on the reservoirs, campgrounds, picnic areas, trail systems, and other related developments, as shown in Figure 10. It is estimated that with the recommended development plan, the initial annual visitation to the project area would be about 77,000 people.

The possible relocation of the state capital to the Lower Susitna River Basin could have a substantial impact on the extent of development of recreational facilities within the Devil Canyon-Watana project area. At the present time, few people reside within a 100-mile radius of the project area, and day-use of the project by local residents would be minimal under existing growth conditions.

Any project-related recreational development program would involve cooperation between the appropriate Federal, State, and local interests and would require State or local sponsorship, sharing of costs for construction, and maintenance of the developed recreational facilities by the appropriate State or local sponsor. The State of Alaska (Division of Parks) has indicated an interest in sponsoring a program of recreational development in the area of the proposed project.

4.05 Historical Resources. Although a preliminary investigation by the Alaska Division of Parks (Heritage Resources along the Upper Susitna River, August 1975) indicates the location of 11 historic sites within the upper Susitna basin hydropower study area, only one of these would be directly affected by the currently proposed two-dam development. This site is located near the mouth of Kosina Creek and would be inundated by the Watana reservoir. The significance of this site, a cabin, is not disclosed in the State report. However, on the basis of the limited early modern history associated with the upper Susitna basin, particularly the downstream portion above Devil Canyon, it is most likely that the site is related to early exploratory mining in the area. The Knik historical site, although located in the vicinity of the transmission line would not be affected by the transmission corridor.

FIGURE 10



SOUTHCENTRAL RAILBELT AREA, ALASKA

UPPER SUSITNA RIVER BASIN

RECREATION PLAN

ALASKA DISTRICT, CORPS OF ENGINEERS
ANCHORAGE, ALASKA
1975

Looking upstream at Susitna River near Denali. Tundra ecosystems with scattered areas of black spruce.

4.06 Archaeological Resources. Of the four presently known archaeological sites in the upper Susitna basin, all lie upstream from the influence of the Watana Dam and reservoir, according to the Alaska Division of Parks report of August 1975. On the basis of probable highest game diversity in early times, the report selects areas most likely to have been inhabited by people, and thus identifies sites for potential archaeological exploration. These sites are most generally designated as being near the confluence of streams where habitat diversity was likely highest. The report concludes that "--the entire river system should be regarded as an area of extremely high archaeological potential." The report further states: "While it is difficult to measure the amount of adverse impact each of the four dam complexes will have on heritage resources, it is possible to ascertain that the Devil Canyon Dam will have the least effect. The Watana Dam will have the second lowest adverse impact, followed by Denali Dam. The construction of the Vee Dam site will have the most adverse impact on significant heritage resources." (The Vee and Denali Dams are not in the proposed plan of development.)

More intensive reconnaissance of the affected areas will be necessary following project authorization to determine the actual existence and locations of sites.

The Dry Creek archaeological site is located in the vicinity of the proposed transmission line corridor. The site will not be affected by development within the proposed route.

4.07 Vegetation. All of the vegetation within the pools of the proposed reservoirs and in the proposed road locations would be eliminated if the dams were constructed. Trees would also be cleared in areas within transmission line corridors. Most of the trees and shrubs would be cleared during construction operations, and some of the commercial timber would probably be marketed. Most of the residue slash material and debris would be burned or buried.

Much of the existing tree and shrub cover in the Upper Susitna River Basin is located in the river and creek bottoms and on the steep canyon slopes above the streams and would be lost during dam construction. The operations to clear the vegetation within the reservoir impoundments and other areas would require a network of temporary roads and work areas for personnel, equipment, and vehicles within and around the areas to be cleared. Controls over the clearing and related operations would include provisions to reduce or prevent many of the adverse environmental impacts of these activities including the possibility of uncontrolled fires.

The major ecosystems of the upper Susitna basin include the upland and lowland spruce-hardwood forest systems and the moist and alpine tundra systems. All these ecosystems are susceptible to long-term damage or destruction; the predominant tundra systems are especially vulnerable. Particular care would have to be taken to protect the land and the vegetation from unnecessary damage, and remedial actions would also need to be taken to make feasible repairs to whatever damage should occur. Except for the river itself the area within the proposed reservoir pool is dominated by the upland spruce-hardwood forest ecosystem.

Most of the direct impacts of the transmission line and required access roads upon vegetation would be relatively small with respect to the magnitude of surrounding unaffected land. Up to 6,100 of the approximately 8,200 acres of right-of-way would have to be cleared.

The effect on scenic quality would be a major impact of the cleared right-of-way. Regrowth beyond a limited height would be prevented by maintenance, thus cuts through forested areas would be permanently visible. This effect would not be as significant in more open areas at higher elevations, such as Broad Pass, where no tree clearing is required. On the other hand, in such areas the transmission line itself would be more visible. This effect is more fully discussed under the heading of Esthetics.

The disposal of slash and debris, whether by burning, burying, chipping, or stacking has potentially adverse effects upon remaining vegetation and other resources. Although stacked or dispersed slash may provide habitat for small animals, there is a high potential that slash may result in increased fire hazard and increases in insect populations which could damage surrounding forests. Chipping is very expensive and requires more machinery to travel along the right-of-way. Disposal of chips is a problem because they should be dispersed to prevent killing the plants on the ground. Since decomposition rates are slow, chips may not revert to humus for quite some time. Vegetation along most of the transmission line corridor is conducive to a high rate of fire spread and is considered to be of medium to high resistance to fire control. However, with proper precautionary measures, burning would probably be the most desirable method of slash and debris disposal from an environmental viewpoint.

Significant impacts to wildlife would result from habitat modification resulting from impacts upon vegetation. Transmission corridor clearing in forest areas and maintenance of a subclimax plant community of brush and low plants would improve habitat for some species by increasing primary productivity in the cleared areas. Browse for moose will be increased; the conjunction of good cover in the original forest with a swath of browse creates a diverse "edge" habitat for many animals dependent on subclimax growth. Animals dependent on climax or near-climax vegetation will suffer loss of habitat; examples are the red squirrel and northern flying squirrel, both of which depend upon white spruce.

4.08 Mining. The U.S. Department of Interior, Bureau of Mines office in Juneau, Alaska, has stated that the Susitna River basin in the proposed reservoir impoundment areas is generally favorable for various types of mineral deposits, but the area has never been mapped geologically.

4.09 Agriculture. No project benefits are anticipated for irrigation at this time, and except for providing reasonably priced electrical power to farms and agricultural activities, no other major impacts on agriculture are expected.

Presently most agricultural activity in the State, from crop farming to dairy farming, occurs in the Cook Inlet subregion. Of the 2.5 million acres of land that have soil characteristics conducive to the production of cultivated crops in the Cook Inlet-Susitna Lowlands, about 70 percent occurs in the valleys of the Matanuska and the Susitna Rivers and their tributaries. Most of this land is as yet undeveloped.

4.10 Roads. Permanent roads would be built to provide access from the Parks Highway to the Devil Canyon and Watana damsites and some segments of the transmission line. Permanent roads would also provide access to proposed recreation facilities within the project area. Temporary roads for project construction and reservoir clearing operations would also be constructed. No roads would be built within the transmission line corridor in the 39-mile reach between Cantwell and Healy, and the 10-mile reach between Gold Creek and Chulitna. No permanent roads would be constructed upstream from the vicinity of Watana dam.

The impact of road access to areas within the proposed hydroelectric developments would be significant; also, the roads themselves would have a definite impact upon the land. Resource values impacted by proposed roads include fish, wildlife, vegetation, recreation, scenery, water, and soils. Air and noise pollution related to road construction and dust generated by vehicle travel on unpaved roads could also be significant adverse environmental impacts.

In sections where permanent transmission line access roads are required, the road would be built and maintained to a standard suitable for four-wheel-drive vehicles. Not all sections will have access roads; in critical areas, winter construction or helicopter construction will be used.

It is also expected that helipads and possibly an aircraft landing strip would be provided within the project area for air evacuation of injured workers and for the convenience of reduced travel time; any temporary aircraft landing facilities would be rehabilitated after project construction.

Proposed right-of-way restoration after construction includes removal of temporary structures and temporary roads, disposal of slash and refuse, and where necessary, revegetation.

Design, location, construction, rehabilitation, and maintenance of a project road system will be given prime consideration with the utilization of good landscape management practices.

4.11 Construction Activities. Proposed project-related construction activities include the building of the dams and their related facilities; the clearing of reservoir areas; the construction of roads, electrical distribution systems, and recreation facilities; and the building of facilities for workers. The construction of the Susitna project is estimated to take 10 years to complete, with an estimated 6 years of construction for the Watana dam and 5 years for Devil Canyon with a one-year overlap.

The impact of these construction activities on the existing environment would be significant. The activities themselves would cause varying degrees of physical pollution to the air, land, and water within the project area and to some areas outside the development area. Fish, wildlife, vegetation, visual resources, soils, and other resource values would be adversely impacted by construction activities within the project area. General construction activities would intrude on existing fish and wildlife habitat, cause soil erosion problems with related reduction of water quality, clear areas of vegetation, cause noise and dust problems, intrude on natural visual resource values, introduce air pollutants into the atmosphere by burning slash and debris, and cause other related environmental impacts. For instance, breaking the surface mat of vegetation and disruption of surface drainage can result in wind and water erosion, and melting of permafrost, resulting in subsidence and disruption of groundwater tables, which in turn results in erosion.

Most of the damage to soils along the transmission line would occur during the construction phase. The construction schedule would be arranged so that work requiring use of an access road, such as delivery of materials, could be done in winter and spring, when the ground is least vulnerable to physical disturbances. This would eliminate the need for extensive filling and consequent use of borrow pits or quarries.

To obtain materials from borrow sources and quarry sites for the construction of the dams, roads and other facilities would be necessary. Borrow areas would be located within the proposed reservoir pool areas where feasible. Any borrow or quarry sites necessary outside of the pool area would be rehabilitated. Areas will also be needed to dispose of some materials and debris. All construction activities would be controlled to minimize or to prevent adverse environmental impacts.

4.12 Workers' Facilities. No communities within commuting distance to the proposed project area could absorb the number of workers required for the construction of the dams and related facilities. Some type of temporary construction camps with the necessary facilities would need to be provided during the construction periods, and permanent facilities would need to be built for maintenance and operational personnel after completion of the construction phase.

The construction and operations of the workers' camps would comply with State and Federal pollution control laws and standards, and all activities would be controlled to minimize adverse environmental impacts presented by the camps. Lands used for operating the temporary camp areas would be rehabilitated when the project work was completed.

4.13 Esthetics. The proposed project would be located in areas that presently have practically no permanent signs of man's presence. The land between Portage Creek and the Denali Highway is a natural and scenic area which would probably qualify for wilderness classification under most definitions of the term.

The construction of the proposed hydroelectric project would have a significant impact on the existing natural scenic resource values within the project area. Any dam construction on the upper Susitna would change a segment of what is now a natural, free-flowing river into a manmade impoundment. Within a 12-month period, Devil Canyon reservoir could fluctuate up to 5 feet while Watana reservoir would fluctuate up to 125 feet under normal operating conditions. The proposed Watana impoundment is located in a narrow, steep, isolated canyon where the seasonal fluctuation would not have a substantial scenic impact. The violent, whitewater section of the Susitna River through Devil Canyon would be substantially inundated by a dam at Devil Canyon. Roads and transmission lines would also impact the natural scenic resource values of the area.

Since it is expected that a considerable number of tourists and State residents would visit the damsites, every effort would be given to minimizing the adverse visual impacts of construction activities. A great deal can be accomplished to maximize scenic resource values that will remain after construction. Good landscape management practices would add substantially to the recreational experience of the project visitor with facilities that are well planned and well maintained.

The proposed transmission line corridor would cross no existing or presently proposed scenic, wild, or recreational rivers, nor would it cross any existing or presently proposed wilderness areas or wildlife refuges. In most segments, the transmission line would parallel existing corridors or traverse no significantly large areas of intact wilderness. However, in some segments where the transmission line would pioneer a corridor through a previously intact area, the quality of wilderness would suffer, especially where the transmission line is easily visible. Location and design of the transmission facilities will include maximum considerations to minimize the adverse esthetic impacts within the transmission corridor.

The transmission line would have minimum impact on scenic quality from Point MacKenzie to Talkeetna since it could be concealed or in some areas be laid parallel and adjacent to existing line clearings. The line would have a moderate impact on scenic quality between Talkeetna and Gold Creek. The line could be hidden well from rail lines unless the corridors were consolidated. From Gold Creek to Devil Canyon, the line could either be largely concealed from the road or could be used as the road access route itself. Between Gold Creek and Cantwell, a visible line would have substantial impact, particularly if located west of the highway and railroad. The line through this area could be somewhat concealed, with the exception of Broad Pass which has the least vegetative cover. From Cantwell to Healy, the line would have a severe impact on scenic quality; not only is the canyon an area of high scenic quality, concealment of the line is difficult and the west bank of the Nenana is Park land. The impact would be moderate near Healy and in the Goldstream Hills and low along the lower Nenana River. Impact would be less if Golden Valley Electric Association right-of-way were joined. It would be more difficult to reduce the visual impact of the transmission line corridor from the air traveler, but the design of the transmission facilities would consider this important factor.

The installation of significant lengths of high voltage underground electrical transmission cable is limited by present technology. From the standpoint of esthetics, underground transmission cables would definitely be preferred to an overhead transmission system. Should technology of underground electrical power transmission become sufficiently advanced prior to transmission line construction, it may be feasible to utilize underground cable in short reaches of the transmission system where the visual obtrusiveness of an overhead system is particularly objectionable.

In seismically active areas the reliability of underground cables must be questioned where slicing of the cable can result from settling or slumping of the soil; oil-filled or compress-gas filled cable may rupture during soil movement; and it is more difficult to locate and correct damaged underground cable. Overhead transmission lines also have more inherent resiliency than underground cables.

4.14 Earthquakes. Several major and minor fault systems either border or cross the Upper Susitna River Basin, and the southcentral area of Alaska is in one of the world's most active seismic zones. One of the strongest earthquakes in recorded history struck southcentral Alaska in March of 1964; the magnitude of the quake was 8.4 on the Richter Scale. The quake was centered just north of the Prince William Sound area, approximately 120 miles from the proposed damsites (see Figure 2).

Devil Canyon and Watana Dams will be designed to withstand a Maximum Credible Earthquake of 8.5 magnitude with an epicenter of 40 miles at a focal depth of 20 miles, which is the approximate distance of both damsites to the Denali Fault system, and is the most likely source of a seismic event of this magnitude. The Susitna Fault, truncated by the Denali Fault, bisects the region in a northeast to southwest direction approximately 2.5 miles west of the Watana damsite. Due to the relatively short length of the Susitna fault, a maximum credible earthquake of 6.0 is considered reasonable. An earthquake of this magnitude along this fault will be considered in the design of Watana and Devil Canyon dams.

4.15 Sedimentation. Reservoir sediment inflow would vary at each reservoir. Under the proposed system, Devil Canyon reservoir would lose approximately 6.5 percent of its total storage area to sedimentation during a 100-year period. Watana reservoir would have a 100-year sediment inflow that would equal about 3.6 percent of the reservoir's storage capacity.

Both proposed reservoirs have a dead storage area that is not utilized for power production; therefore, much of the initial 100-year sedimentation for the reservoirs would be contained within this "dead storage space," which would not have any significant effect on reservoir operations. Much of the heavier sediment deposited in Watana reservoir would collect at the head of the 54-mile-long reservoir. Even though the project-life is computed on a 100-year period for economic reasons, with adequate maintenance, the useful life of the proposed project due to sedimentation is estimated to be in excess of 500 years. If at some future time a feasible program of sediment removal were developed, the useful life period could be extended.

4.16 Climatic Conditions. The severe climatic conditions in the Upper Susitna River Basin could have a substantial environmental impact on the design, construction, and operation of the proposed hydroelectric development. Permafrost conditions, extreme cold winter temperatures, a long period of cold weather, and ice conditions on the reservoir and river are some of the significant climatic conditions that would have to be considered.

The Upper Susitna River Basin is underlain by discontinuous permafrost, so some project areas will have to contend with permafrost and other areas will not.

Extremely cold winter temperatures and long periods of cold weather will place substantial restrictions on many project construction activities and increase the time needed to complete the construction of the project to a total of 10 years.

Icing conditions on the reservoirs and the river may cause a wide range of adverse impacts both on project construction activities and on project operations. An ice-free stretch of warmer, open water below

Devil Canyon Dam could cause ice-fog conditions in that area during periods of extremely cold weather. Regulations of winter flows are not expected to have any significant effects on river ice conditions necessary for the continued use of the stream for winter travel downstream from Talkeetna.

The effects of possible high winds and icing conditions on the transmission lines will be evaluated and design features will be incorporated into the construction of these facilities to reduce or eliminate the adverse impacts posed by these conditions.

4.17 Air Pollution. Most of the existing electrical power in the Southcentral Railbelt area is produced by gas, coal, and oil-fired generating units which cause varying degrees of air pollution.

Cook Inlet gas is a clean fuel that causes few serious air pollution problems at the present time. The existing gas turbines have very low efficiencies and emit visible water vapor during the colder winter months. Also, nitrogen emissions could be of significant concern for any proposed larger gas-fired plants.

Hydroelectric energy could replace the burning of fossil fuels for electric power generation in much of the Fairbanks area and could help to alleviate the severe winter ice fog and smoke problems in that area.

Hydroelectric projects provide a very clean source of power with practically no direct air pollution-related problems. This type of electrical power generation could reduce a substantial number of future air pollution problems associated with the burning of gas, oil, and coal. It would be necessary to burn some of the residue slash material and debris during project construction and clearing operations, and fires would be controlled as necessary.

4.18 Social.

4.18.1 Population. Substantial increases in population are expected within the Southcentral Railbelt area through the year 2000 and, with the possible relocation of Alaska's State capital from Juneau to the Railbelt, an additional population impact can be expected in this area.

The population of the area will increase with or without the development of hydroelectric projects proposed for the Susitna River; construction of the project is not expected to have any significant long range effect on overall population growth, but is rather designed to fulfill presently projected needs of a growing population as one alternative means of producing power which will have to be provided in one way or another. Thus the total amount of power generated by the proposed Susitna hydroelectric project would generally be an alternative source, which would have as one of its major considerations a renewable energy source, rather than being an additional power source. Projected power requirements based on mid-range estimates show that the proposed Susitna hydroelectric development program could supply a substantial portion of the Railbelt's projected electric power needs starting in about 1985. The proposed upper Susitna River hydro projects will not create large blocks of excess electric power for heavy energy-consuming industries. If larger amounts of electric energy are needed for a program of heavy industrial development, additional energy-producing sources will have to be constructed. In summary, the project is designed to serve projected population needs--not to stimulate population growth as a consequence of industries which would be attracted by large blocks of excess electrical energy.

A 10-year Devil Canyon-Watana hydroelectric development program would have an economic impact on the Southcentral Railbelt area that would be felt to a greater degree during the construction phase of project development.

It is expected that this proposed project would have some stabilizing influence on the overall economy of the Railbelt area during the period of construction starting in about 1980, since construction would be initiated several years after the Alaskan oil pipeline has been built and about the time the proposed gas pipeline is scheduled for completion. The number of men required to construct this project is estimated to be about 1,100 men during the peak summer construction period.

Various community, borough, state, and private facilities and agencies would be impacted to varying degrees by the workers involved in the construction of the proposed project. Workers' camps would be constructed in the vicinity of some of the various construction activities, but additional impacts would be created by the families of the construction workers living in various nearby communities who would require additional facilities and services. It is also expected that due to adverse climatic conditions, much of the construction on the project facilities would be restricted to the warmer months of the year--probably April through October. The seasonal nature of the construction work would have an adverse impact on the local economy during the winter months.

After the construction of the project, a small number of people would be required to operate and maintain the project and project-related facilities--these people would not create a significant social or economic impact on the railbelt area.

5.0 ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Approximately 50,550 acres of land would be flooded by the reservoirs (7,550 acres at Devil Canyon, 43,000 acres at Watana) at normal pool elevation. This encompasses an almost continuous 84-mile reach of the upper Susitna River. Approximately 2 miles of natural river would remain unflooded between the two reservoirs. All woodlands and other vegetation within the reservoir pools would be permanently lost. Transmission line clearing would be required essentially the full length of the 136-mile-long Susitna corridor for a total of about 3,700 acres. Only about half of the 198-mile-long Nenana corridor would require clearing, or approximately 2,400 acres.

Water released from the reservoirs would be slightly turbid throughout the year, whereas under existing conditions the stream normally runs clear from late fall until early spring breakup. Studies to date indicate that the sediment in suspension would not be high in the releases at Devil Canyon dam, ranging probably from 15-35 ppm. On the other hand, heavy sediment loads now carried by the stream during the warmer months of spring through early fall would be significantly reduced.

Downstream water quality problems related to temperature, dissolved oxygen, and nitrogen supersaturation could occur. These would be held to minimal, and possibly insignificant levels by spillway design and the incorporation of multiple-level water withdrawal structures.

Approximately 9 miles of the existing 11-mile whitewater reach through Devil Canyon would be lost through inundation.

The lower 2.5 miles of Tsusena Creek, which would be utilized as a spillway for excess river flows (this would occur only on the occasions of a period of excessive late summer flooding), will suffer adverse impacts to fish and on-shore vegetation during such periods.

Some moose habitat within the canyon floor and adjacent slopes would be inundated by the reservoirs. Most of the present use is upstream from Tsusena Creek, thus the greatest impact to moose would result from the Watana reservoir. The amount of good habitat is limited, but its loss would be permanent.

The Watana reservoir would lie between the spring calving grounds and portions of the summer range of the wide-ranging Nelchina caribou herd. Mortality to caribou and other animals attempting to cross the reservoirs could result from ice-shelving conditions which might occur into the month of May, on Watana reservoir, and other difficulties which might be encountered in swimming both reservoirs. The reservoirs could conceivably alter historical herd movement and distribution, although the animals do not exhibit any readily definable patterns, other than in the broadest of terms, at the present time.

Although other major wildlife species, such as bears, wolves, wolverines, and Dall sheep are not expected to be directly affected by the project to a significant extent, there will inevitably be some secondary impacts resulting from disruption of existing predator-prey relationships. Overall, terrestrial wildlife habitat will be reduced. Small animals resident to inundated areas will be lost. Within the transmission line corridors, those species dependent upon climax or near-climax vegetation will be the most adversely affected. Examples are the red squirrel and northern flying squirrel.

Resident fish populations above Devil Canyon Dam (there are no anadromous fish under existing conditions above this point) could be adversely affected to some extent by the change from a riverine to lake environment within the reservoir pools, and by the substantial winter drawdown conditions at Watana. The resident sport fishery is not significant within the main river channel. Primary impacts would occur near the mouths of a few clearwater tributaries which provide some known grayling habitat. The intricate changes expected to occur downstream from Devil Canyon will result in both beneficial and adverse impacts to resident and anadromous fishes. Adverse impacts could result from possible reduction in nutrients and primary productivity, cutting, and erosion of existing streambed configuration, increased turbidity during the winter months, and changes in the hydraulic and biological regime of salmon rearing and spawning sloughs. (As pointed out in Section 4, many of the anticipated changes downstream from Devil Canyon Dam could prove beneficial to both the anadromous and resident fishery. Determinations as to the offsetting effects of these changes are the subject of on-going studies.)

Roads required for project construction, operation, and maintenance would impair visual quality and permit general public access into a largely pristine area. This would have the potential to increase pressure on existing game populations through hunting, trapping, and general disturbance and harrassment. This in turn would require intensified game management and law enforcement practices and preventative measures for the control of wildfire. Another harmful effect would be the impact of some of the roads themselves where delicate ecosystems are traversed. Some of the inevitable consequences of road construction are destruction of vegetation and wildlife habitat, reduced insulation of frozen soils, and settling from permafrost degradation, resulting in both erosion and alteration of the groundwater regime.

Degradation of visual quality in general would be a major adverse effect of project construction. This would be attributable primarily to roads, dam construction, right-of-way clearing for the transmission line, and the obtrusiveness of the transmission line itself. Although care would be taken to minimize these impacts to the greatest possible extent, the overall natural setting and scenic quality of the damsites and transmission line corridor would be permanently impaired.

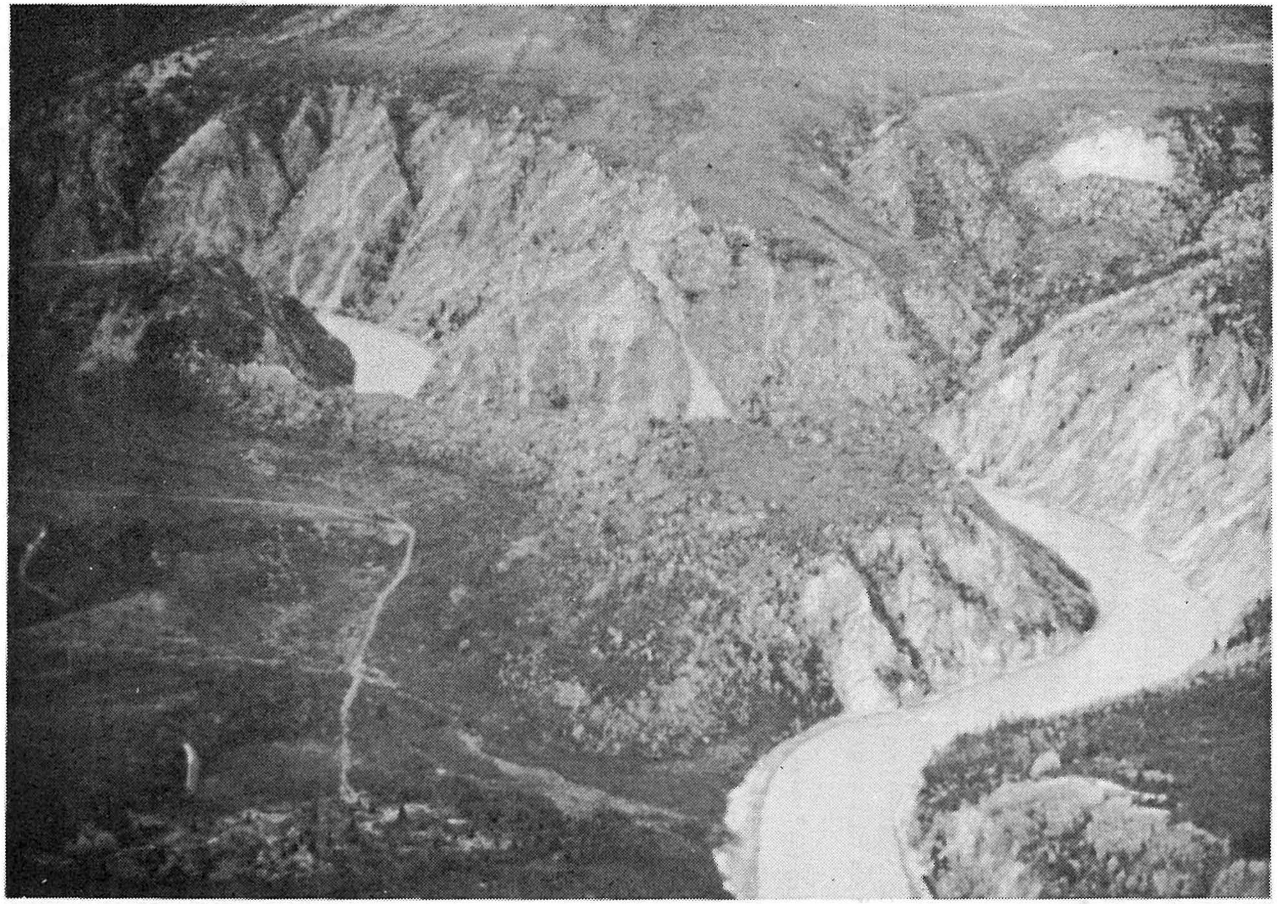
Although only one historical cabin site and no archaeological sites are presently known to exist within the proposed reservoir pools or transmission line corridor, ground reconnaissance of the affected areas which would take place prior to any construction activity could result in the discovery of such sites. Where determined necessary, sites would be salvaged at project cost.

Disposal of slash and other woody debris resulting from reservoir and transmission line right-of-way clearing would have varying degrees and duration of impact. Material in the reservoir pools would most likely be disposed of by burning. This could increase the possibility of wildfire in woodlands adjacent to the clearing area, and would affect ambient air quality, and introduce ash and other material into the Susitna River during reservoir filling. These impacts, while temporarily harmful, would be of short duration. Other methods of disposal, such as stacking, burying, and chipping, have related adverse impacts, many of which are more severe or of longer duration than burning.

Mineral resource potential within areas which would be inundated by the reservoirs is not fully known. Inundation would obviate the practicability of future mining or extraction of such resources.

Future options concerning any other use of lands within the reservoir pools would effectively be foreclosed. Impacts on land use related to the transmission lines are more difficult to assess. There will be unavoidable impacts on present and future land use with foreclosure of some alternative future uses. These could be both adverse and beneficial. For instance, the transmission line would probably predate agricultural land use along much of the corridor. This could be beneficial since a right-of-way would provide cleared land at little or no expense to the farmer. On the other hand, irrigation and tilling methods would have to adapt themselves to the spacing of towers and land occupied by the tower bases would be unusable. Also, the transmission corridor could attract future corridors. This could be beneficial in preventing separate rights-of-way impacts such as more clearing and additional road construction, but might further impair visual impacts associated with additional structures within the existing corridor.

Both temporary and permanent facilities would have to be provided for project workers. Impacts from temporary facilities, while adverse, would be temporary. Permanent facilities would be located and designed to minimize adverse impacts. Small communities near construction activities would be impacted by an influx of temporary construction workers and their families, with resultant increased demand upon community services. The temporary nature of this influx of people would be difficult to cope with, and could well have community effects lasting well beyond the departure of this transient population. Another problem related to work generated by the project would be its seasonality. In many instances, construction activity would be limited to the warmer season, thus many of these workers would be seasonally employed.



Susitna River at Vee damsite. This demonstrates the typically incised character of the Upper Susitna from Devil Canyon to the Tyone River. Note that heavier vegetation is limited to slopes and creek valleys.

6.0 ALTERNATIVES TO THE PROPOSED ACTION

6.01 General. Alaska has a wide variety of energy alternatives to produce electricity. Each of the major energy resources--oil, coal, natural gas, and hydroelectric potential could easily meet projected power requirements well beyond the year 2000. The nuclear energy alternative is also available, and geothermal resources could be significant in some parts of the State. Present energy generation systems depend heavily on fuel oils and natural gas with smaller amounts of electrical energy coming from hydro powerplants and coal.

It is assumed that hydroelectric power from the Upper Susitna River Basin could be operational by 1986 with the completion of the first dam and powerplant; thus economic and financial feasibility should be assessed in terms of realistic alternatives that could be made available in about the same time frame. Such alternatives include power from Cook Inlet oil and natural gas, coal resources in the Beluga and Nenana fields, oil from the Alyeska pipeline, natural gas from the North Slope, other hydro resources, nuclear power, and geothermal power.

Public Law 93-577 passed by the Congress on 31 December 1974 has emphasized the conservation of nonrenewable resources and the utilization of renewable resources where possible. The construction of the proposed hydroelectric dams on the upper Susitna River is a feasible project that utilizes a renewable resource to generate electrical power while helping to conserve the use of nonrenewable resources such as oil and natural gas. Present Alaskan power systems have a significant environmental impact on urban environments, but a relatively small environmental impact outside the urban areas. Substantial increases in Southcentral Railbelt power requirements will involve the development of future electric power systems, larger facilities, and some alternatives that have very important environmental implications.

Future power systems will also require approaches that include full consideration of environmental values and alternatives and must anticipate that Alaska and the nation will attach increasing importance to environmental protection, energy conservation, and conservation of nonrenewable resources. Additional requirements must be anticipated for long-range advance planning and site selection, public participation, and full consideration of the environment in planning, design, construction, and operation of power facilities.

The significant environmental impacts of the various proposed alternatives would vary depending on the location, design, construction, and operation of the facilities for each of the alternatives.

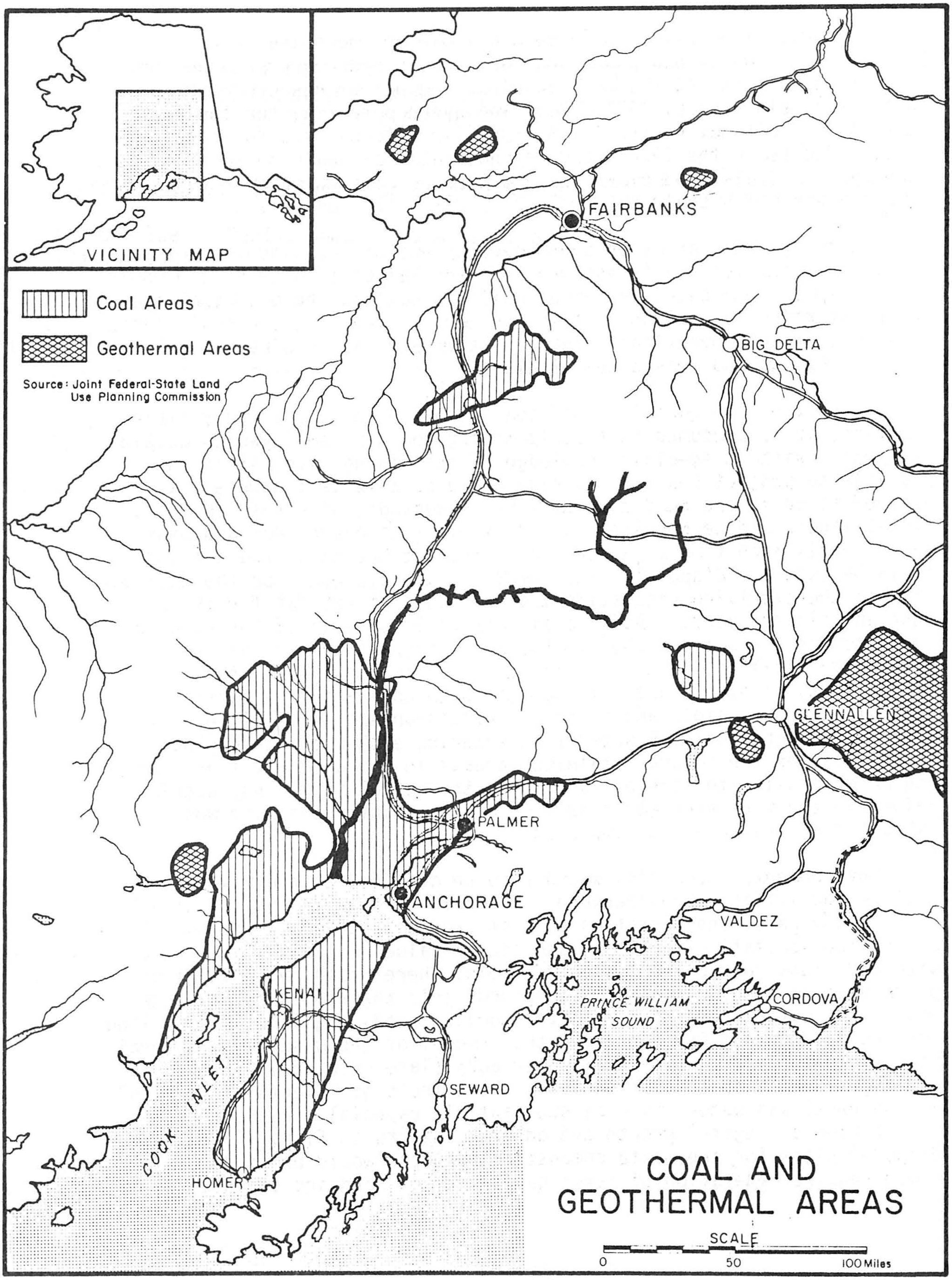
Solutions considered in this investigation to meet electrical needs in the Southcentral Railbelt area were grouped in three major categories: alternative sources of power; alternative hydropower sources in the Railbelt area; and alternative hydropower plans in the Upper Susitna River Basin. The extent of study given to each potential solution was established by first screening each alternative for suitability, applicability, and economic merit in meeting needs. Each alternative was tested for physical, political, financial, institutional, economic, environmental, and social feasibility. Continuous coordination was maintained with area State and Federal agencies which have related interests. Alternative measures considered for power purposes are discussed in the following paragraphs.

6.02 Alternative Sources of Power.

6.02.1 No Action. One of the alternatives to the development of facilities to generate additional electric power would be not to build any additional facilities. This approach would save the costs of planning, designing, constructing, and operating additional facilities. It would also avoid the adverse environmental impacts which would be generated by the construction of dams or of other electrical generating facilities; however, additional power sources are thought to be necessary and would not be provided by this alternative. If a hydroelectric system is not developed, alternative power sources would be required to satisfy projected future growth needs of the Railbelt area. Because of lead time involved in planning, financing, and construction of any currently viable alternative, oil and natural gas must continue to provide the bulk of the area's power supplies until the 1980's. On an equivalent time-frame basis, coal is the most likely future electrical energy source for the Railbelt area, if hydropower is not developed. The impacts of the coal alternative are discussed in the following paragraph.

6.02.2 Coal. Coal is the most abundant fossil fuel in the nation. Southcentral Alaska has two known extensive deposits (Figure 11). The Beluga River area northwest of Cook Inlet contains coal reserves of at least 2.3 billion tons or, energy-wise, an equivalent of almost 6 billion barrels of oil. Development of Beluga coals would enhance possibilities for coal-fired power generation at reasonable cost. Coal resources in the Nenana Fields in the Southcentral Railbelt south of Fairbanks near Healy, Alaska, are even more extensive than the Beluga River reserves, totaling at least 7 billion tons, or equivalent of about 18 billion barrels of oil.

In many cases, the major obstacle to increased coal usage is the problem of removing the high sulfur content in order to meet air pollution standards when the coal is burned. Other problems include strip and subsurface mining, with associated environmental impacts, and transportation of the coal. The Beluga coals have low amounts of sulfur but also have high ash and water content. Considerable refining would be needed to enable its use in power generation.



Source: Joint Federal-State Land Use Planning Commission

A.P.A.-JULY 1975

FIGURE 11

The coal alternative could be available on about the same time frame as other major new power sources such as hydropower and possibly nuclear power. It appears that baseload thermal plants could be utilized in the Railbelt area by 1990. Coal and hydro potential for the Southcentral Railbelt may be the least expensive alternatives for the new power supplies in the 1980's and beyond, but coal would be more expensive than hydro. Coal-fired plants should also be given consideration in remote areas which could be supplied by water transportation.

In the absence of major hydro development or the discovery of additional gas reserves, it is assumed that the Railbelt power system would shift from oil and gas-fired power units to coal as the principal energy source starting about 1985. It is further assumed that the coal plants would either be conventional steam or steam and gas turbine units located near the Beluga and Nenana coal fields.

In view of the quantities of coal involved and present-day mining practice, it is presumed that strip mining would be employed to obtain the coal. Without specific knowledge of the mining site, it is not possible to project how much acreage would be affected; however, it is assumed to be in the hundreds, possibly thousands, of acres. Much additional land would be required for stockpiling of overburden and mine wastes until such time as a portion of the pit became worked out and could be used for disposal. The immediate impacts would be the destruction of the overlying vegetation and thus loss of habitat for the resident animals and birds. Additional land would be altered for roads or other routes for working the mine(s) and transporting the coal to generation facilities. Air quality could be expected to suffer from large inputs of dust. Water in contact with coal and mine wastes generally become acidic and toxic to vegetation and animal life. It is difficult to prevent such water from entering either the underground water table or the natural drainage streams in the area and thus impacting water quality to some distance from the actual mine. Any scenic values in the mine area would be lost at least until the mine was exhausted and restoration completed.

Environmental qualities would also be affected at the power generating facilities. Considerable land would be occupied by the structures and more by the operating coal stockpiles and access routes. The associated vegetation, habitat, and scenic values would be lost. Even with emissions controlled to legal levels, there would be an input of particulate matter and chemical compounds into the atmosphere. Large amounts of water would be needed for cooling ponds requiring either land for installation of the ponds and the removal of the water from natural sources or the use of a natural water body (lake or river) for the cooling element. In the latter case, the effects of "thermal pollution" on the receiving water would be substantial, especially as regards stimulation of vegetal growth and adverse impacts on fish, if present. Disposal sites for the waste combustion products would be needed and could require alteration of large quantities of land and its natural values.

Social impacts would be mixed in effect. The operation of the minepowerplant would provide long-term employment for many more people than for hydroelectric facility of the same size. Because of this, the visible economic effects related to disposable income and the multiplier effect of additional cash circulating in the economic community would be much more evident than with a hydropower system. However a coal-thermal facility would forego the recreational and possible flood control benefits provided by a hydropower project.

The adverse effects of coal mining will occur eventually regardless of the presence of hydropower development as this resource will be utilized for other purposes.

Using coal as a power source involves extensive adverse impacts to the environment, both in the magnitude of the effects and in the size of the areas affected. Development of hydropower sources would allow for other, more beneficial uses of our coal resources. Therefore, coal is determined to be a less desirable source of electrical energy production than hydroelectric development. Coal was the economic standard by which each of the hydro alternatives was tested.

6.02.3 Oil and Natural Gas. In the period following the 1967 Department of Interior report, Alaska Natural Resources and the Rampart Project, most studies by Federal agencies and area utility companies focused on the Cook Inlet supplies of natural gas and, more recently, on pipeline fuels for Railbelt power. Location of potential oil and gas reserves in the Southcentral area are shown in Figure 12.

Cook Inlet gas is a clean fuel, and few serious air pollution problems exist for gas-fired units. Gas turbine exhaust is noisy, but modern noise suppression equipment can reduce this impact. Energy conservation aspects of gas-fired units may become significant because existing gas turbines have low efficiencies and emit visible water vapor during the colder winter months. Also, nitrogen emissions could be of significant concern for any proposed larger gas-fired plants.

Existing plans for the Cook Inlet area involve additional large, advanced-cycle gas turbine units at Beluga and additional turbines and waste-heat-recovery units in Anchorage. The Fairbanks area utility companies plan additional gas turbine units using pipeline fuels.

Plans for the near future include a number of measures to increase efficiency, including the advanced cycle and waste-heat-recovery units mentioned previously. However, because of lead time involved in planning, financing, and constructing alternatives, oil and natural gas must provide the bulk of the area's power supplies, at least until the mid-1980's.

Cook Inlet natural gas has provided low cost power benefits for the surrounding area in the recent past and, with substantial reserves under contract, should handle area power requirements for several more years.

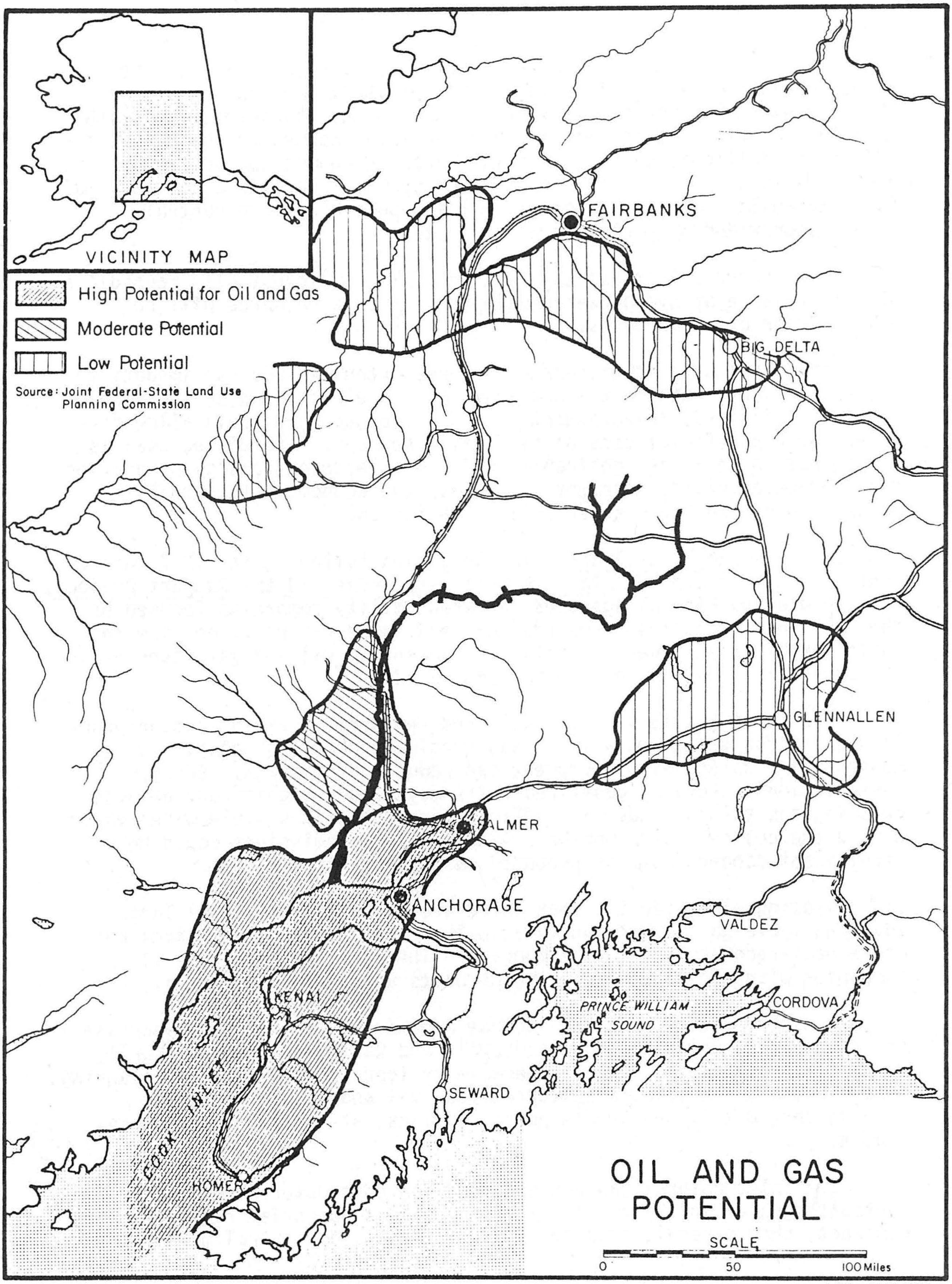

VICINITY MAP
High Potential for Oil and Gas
Moderate Potential
Low Potential
Source: Joint Federal-State Land Use Planning Commission
FAIRBANKS
BIG DELTA
GLENNALLEN
PALMER
ANCHORAGE
VALDEZ
KENAI
COOK INLET
PRINCE WILLIAM SOUND
CORDOVA
SEWARD
HOMER
OIL AND GAS POTENTIAL
SCALE
0
50
100 Miles
A.P.A.-JULY 1975

FIGURE 12

Also, additional reserves may be found in future exploration to meet future demands. It appears reasonable to assume that there will be substantial increases in costs for future oil and gas supplies as U.S. domestic reserves decline, worldwide demand increases, and foreign oil prices remain high.

Higher costs for fuels in the future, especially for oil and gas, should be considered in all future planning, and should anticipate serious national efforts to develop alternative energy sources that limit the use of oil and gas for power generation. To a very large extent these factors invalidate many previous power studies which were made on the assumption that cheap, long range oil and gas fuel sources would be available.

Alaska power systems now depend on oil and gas for about 60 percent of total energy production, and by 1980 about 90 percent of the State's electric energy will come from these premium fuels. Estimated 1972 fuel use for Alaska's power systems included 1.4 million barrels of oil and 16 billion cubic feet of natural gas. If recent trends continue, the use would increase to about 26 million barrels of oil and 134 billion cubic feet of natural gas annually by the year 2000 under mid-range level estimates.

Since low cost natural gas became available for power production in the Cook Inlet area, the Upper Susitna River Basin hydro power development has not looked attractive to the area utilities.

Now the long range outlook for availability and cost of gas is changing; this, coupled with high power costs in the Fairbanks area, possibilities that pipeline fuels will also be quite expensive, and broader new interest in conservation of nonrenewable resources has created renewed interest in Susitna hydro potential.

A concentrated effort to develop alternatives for power generation such as coal, hydro, and eventually nuclear power could result in substantial reduction in demand for oil and natural gas. The lead times and large investments required to develop alternatives reinforce the point that oil and natural gas must supply near future requirements. For most smaller power systems, basically no economically feasible alternatives to diesel generation exist, at least for the present.

The availability of fuels in Alaska will undoubtedly improve as reserves and facilities are developed, which should lead to reduced dependence on costly imported diesel fuels and other petroleum products for power generation and other uses within the State. However, there is no longer any reason to anticipate that Alaskan oil and gas will provide an abundant, cheap energy source for the long term. These fuels will be expensive, if only because of pressures to export the fuels to areas where higher prices can be obtained. The present use of oil and natural gas as a source of electrical energy is viable for Alaska; however, a higher and better future use of these resources can and, in all probability will, be made.

In view of the national efforts to develop energy sources that limit the use of oil and gas for power generation, this alternative was rejected.

6.02.4 Nuclear Power. The use of nuclear power as a commercial electrical energy source for the nation is expected to increase considerably by the year 1985. Adverse environmental impacts are associated with surface and subsurface mining of uranium, changes in land use, disposal of waste heat, risk of accidents, and safe storage of highly radioactive wastes. In spite of these factors, more than 50 percent of the electrical power of the nation is expected to be generated by nuclear power by the year 2000. By the end of this century, breeder plants, which produce additional fuel while they produce power, will gradually take over a larger share of the production of electricity. Possibly at some time in the next century, nuclear fission plants and proposed nuclear breeder plants will be replaced by nuclear fusion reactors and by central generating stations running on solar power.

Nuclear power should be considered a likely long-range source of baseload power for the Railbelt area and is generally considered a distant option because of size of power markets, cost and environmental factors, and the availability of more favorable coal and hydro alternatives. The foreseeable future for nuclear power generation in Alaska should become materially more favorable only if there is either a breakthrough in costs and technology or significant new development in small-sized plants.

Because of the size of power markets, costs, and environmental factors, nuclear power development in Alaska is not considered to be an attractive alternative to cheaper, readily available power sources during this century.

6.02.5 Geothermal. Geothermal resources may eventually provide significant power generation in Alaska; the Southcentral Railbelt area has substantial geothermal potential (see Figure 11). This source of energy is not considered a reasonable short term alternative to other more proven types of power generation, as increased utilization of geothermal resources depends upon additional technological development and economics. Geothermal power generation is also considered to be a future supplement to other power sources rather than an alternative method of producing electricity.

Some of the possible problems associated with the generation of electric power from geothermal resources include siting of facilities, brine disposal, and corrosion. This renewable resource could also provide usable side products such as heat, water, and chemicals.

This is not considered a realistic alternative to other energy sources within the foreseeable future.

6.02.6 Solar. The radiant heat of the sun is another renewable source of energy that has considerable potential for generating power in this country and the world. Practical use of solar energy to produce electric power on a large scale is primarily a question of developing the technology to generate and to store large amounts of electricity produced by the sun's radiation. A major disadvantage wherever such development is pursued is the large land area required for reflector installation to provide usable amounts of power and thus the large environmental disturbances inherent in such a change in land use.

A second concern especially in Alaska is that during the winter, when demand for electrical power is greatest, the sun is either absent from or at best a brief visitor to local skies. Solar power generation is not considered a feasible planning alternative for Alaskan power systems in the near future.

6.02.7 Wind and Tidal. Research and development proposals for wind generators should improve future capabilities of wind-powered electrical generating systems. With increased diesel fuel costs, wind-generated electrical power is a possible alternative power source for remote areas with small loads. The extreme costs and environmental effects involved in most tidal flow hydroelectric proposals are major factors opposing this alternative method of generating electrical power. Neither alternative is considered feasible for provision of large amounts of energy at this time.

6.02.8 Wood. In parts of southeastern Alaska, wood is used to fire steam-generating power plants. Alaska does have vast forest reserves that could be used; however, these same trees have far higher and better alternative uses in wood, paper, and other industries. In addition the esthetic, ecological, and environmental impacts of the large harvests necessary to allow production of large amounts of energy appear to be massive. Wood as an energy source is not considered a major alternative.

6.02.9 Intertie. Alaska could purchase surplus power from sources in Canada or the "Lower 48;" however, the cost of transmission facilities and the uncertainty of available dependable power would be major factors opposing such a scheme. Therefore, an intertie does not appear to be feasible at this time.

6.02.10 Solid Waste. The burning of solid waste products to produce electrical power has potential in some areas of the country, but there does not appear to be an adequate supply of solid waste products in the railbelt area to produce substantial amounts of energy. Associated air quality and odor problems would also appear to be severe. This alternative is not considered feasible to meet the energy needs in the railbelt area, but could supplement the total power needs for the area.

6.02.11 Hydropower. The reconnaissance report on potential development in the State of Alaska made in 1948 by the U.S. Bureau of Reclamation, included hundreds of potential power development sites located throughout the five study regions of the State: Southeast, Southcentral, Yukon-Kuskokwim, Seward Peninsula, and Arctic. In 1969 and again in 1974 the 1948 report was updated, and in May 1974 the latest revision was published as the 1974 Alaska Power Survey. The two largest market areas for power are located in the Southcentral Railbelt, particularly the Anchorage-Cook Inlet area, and the Fairbanks-Tanana Valley area. The large amount of the available renewable water resource which could produce electric power has excellent potential to answer the energy needs of the Southcentral Railbelt area.

6.03 Alternative Hydrologic Basins in the Southcentral Railbelt Area

6.03.1 Rampart Canyon. Considerable study has been made of the possibility of developing hydroelectric power in the Upper Yukon Basin with a damsite located in Rampart Canyon on the Yukon River approximately 140 miles northwest of Fairbanks, Alaska. The project has one of the greatest hydroelectric potentials in North America. The proposal would create a reservoir with a water surface area of approximately 10,600 square miles, with a maximum length of 280 miles and a maximum width of about 80 miles. The project would provide firm annual energy of 34.2 billion kilowatt-hours (the energy equivalent of over 74 million barrels of oil per year). However, the impacts on fish and wildlife resources in the Yukon Flats would be significant. Implementation of such a project would also be extremely controversial.

Rampart is engineeringly feasible and the proposed project would provide enough excess energy to encourage further industrial development in Alaska, but it would introduce a number of secondary impacts not associated with the recommended alternative. Excess energy could also be transmitted to the "Lower 48" through an intertie system. However, this would be a major action not directly applicable to energy needs of the Railbelt Area. Justification would have to be based on a nationwide plan which included Rampart as a recommended alternative to the development of other energy sources. Within the time-frame criteria established for fulfillment of projected growth needs in the Railbelt Area, this is not considered a viable alternative.

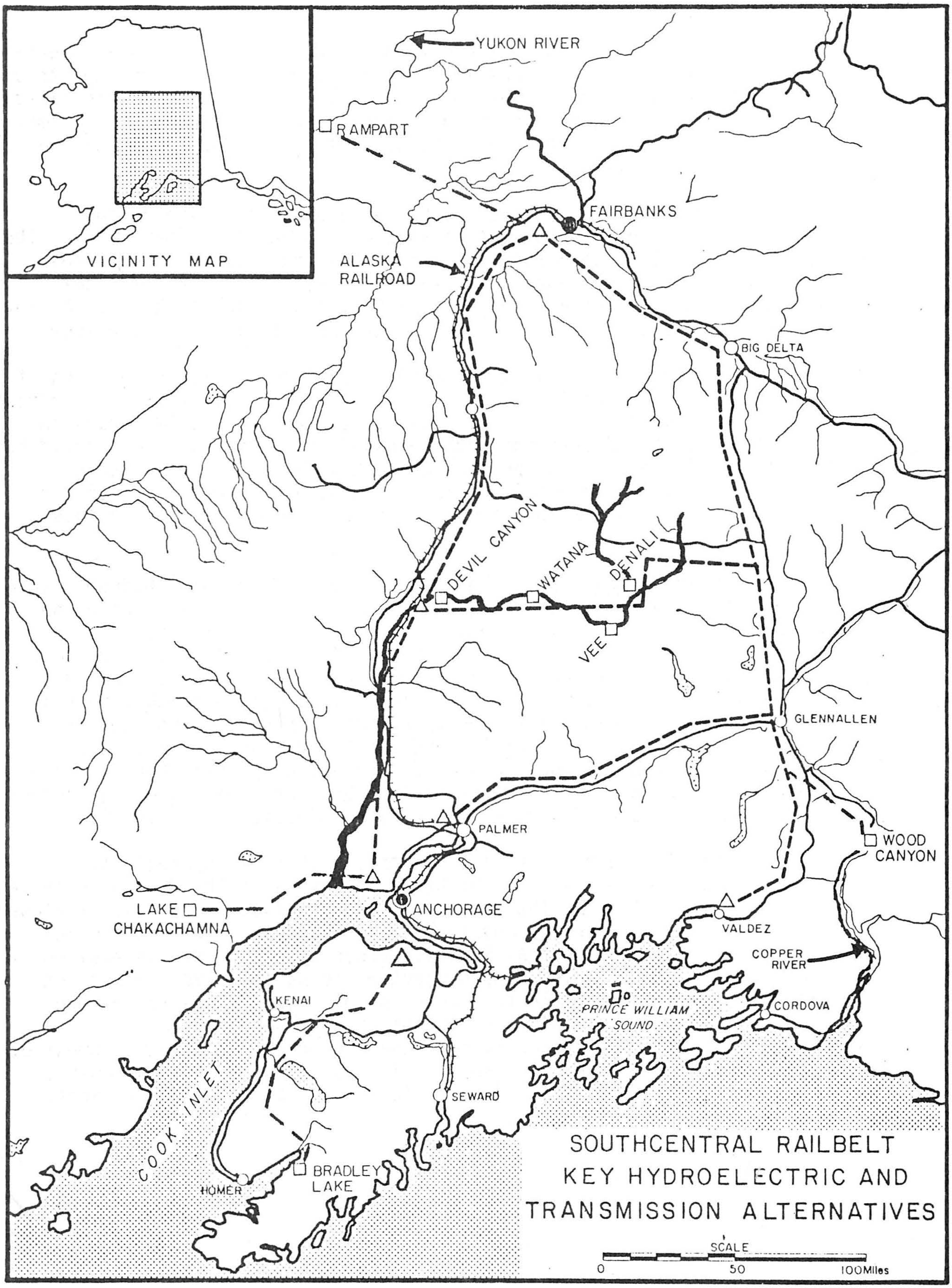

VICINITY MAP
YUKON RIVER
RAMPART
FAIRBANKS
ALASKA RAILROAD
BIG DELTA
DEVIL CANYON
WATANA
DENALI
VEE
GLENNALLEN
PALMER
WOOD CANYON
LAKE CHAKACHAMNA
ANCHORAGE
VALDEZ
COPPER RIVER
KENAI
PRINCE WILLIAM SOUND
CORDOVA
SEWARD
COOK INLET
HOMER
BRADLEY LAKE
SOUTHCENTRAL RAILBELT
KEY HYDROELECTRIC AND
TRANSMISSION ALTERNATIVES
SCALE
0
50
100 Miles

FIGURE 13

The tremendous financial investments, the substantial environmental impacts, the limited opportunities for marketing the enormous amounts of power, and the availability of more favorable, less costly alternatives preclude recommending construction of the Rampart project at this time. Rampart Dam could be developed if future national needs recommend the project's construction.

6.03.2 Wood Canyon. Another possible location for significant hydroelectric power development is Wood Canyon on the Copper River. The damsite would be located about 85 miles above the mouth of the Copper River in the Chugach Mountains of southcentral Alaska. A "high dam" would develop firm annual energy of 21.9 billion kilowatt-hours. A "low dam" would provide 10.3 billion kilowatt-hours of firm annual energy.

The construction of a dam at Wood Canyon would force relocation of two communities and would create serious environmental problems affecting both fish and wildlife values, especially to the large salmon runs on the Copper River. Unless the problem posed to migrating salmon could be solved satisfactorily, the project would have an extremely adverse effect on the major commercial fishing industry in a wide area of the Gulf of Alaska. This alternative is not considered feasible at this time.

6.03.3 Chakachamna Lake. The possibility of developing hydroelectric power from Chakachamna Lake was investigated. The lake is located on the Chakachamna River which empties into the west side of Cook Inlet approximately 65 miles west of Anchorage. The facility would generate 1.6 billion kilowatt-hours of firm annual energy. The project would require the erection of transmission facilities over difficult terrain to tie into a Southcentral Railbelt transmission system and the construction of a high-cost 11-mile tunnel for power generation. The adverse environmental impact would be substantially less than for many proposed Alaskan hydroelectric projects. However, the low energy output and the high costs render this alternative infeasible at this time.

6.03.4 Bradley Lake. The site for this authorized hydroelectric project is at Bradley Lake on the Kenai Peninsula at the head of Kachemak Bay near Homer, Alaska. The proposal would generate 0.4 billion killowatt-hours of firm annual energy and could serve as a southern peaking installation for a Southcentral Railbelt power system. Adverse environmental impacts of this proposed project would be relatively minor compared to the other hydroelectric development alternatives which were considered. If an economically feasible plan can be developed for Bradley Lake, the project could be integrated with future development of the Susitna River basin. By itself, this project would fulfill only a small portion of the projected electrical needs of the Railbelt area.

Upstream view of Devil Canyon damsite.

6.03.5 Susitna River. Surveys for potential hydropower development in the Susitna River basin were reported by the Corps of Engineers in 1950 and by the U.S. Bureau of Reclamation in 1948, 1952, 1961, and 1974. The 1952 USBR report indicated 12 potential hydropower sites in the basin; of these, the five damsites studied in the upper Susitna basin showed the highest potential. These studies showed the environmental impact from projects in the Upper Susitna River Basin would not be as severe as those from other basins, and the firm energy potential could contribute substantially to satisfying the needs of the Southcentral Railbelt area.

6.04 Alternative Hydroelectric Plans in the Upper Susitna River Basin:

6.04.1 General: Eight plans for hydroelectric development of the Susitna River basin including the proposed actions were studied as follows:

6.04.2 Devil Canyon. The possibility of a single dam development of the Upper Susitna basin located at the Devil Canyon damsite was investigated. The proposed thin-arch dam with a structural height of about 635 feet would have a water surface area of about 7,550 acres at the normal maximum pool elevation of 1,450 feet, m.s.l. The project would produce 0.9 billion kilowatt-hours of firm annual energy from an installed capacity of 220 megawatts. Because of the very limited storage capacity, the project has a low firm energy capability and is not considered economically viable.

6.04.3 Watana. This single dam development of the upper Susitna basin located at the Watana site would be an earthfill dam with structural height of about 810 feet. The reservoir would have a normal maximum pool elevation of 2,200 feet, would have a surface area of approximately 43,000 acres, and would extend about 54 river miles upstream to a point between the Oshetna and Tyone Rivers. The annual firm electrical production of Watana would be 3.1 billion kilowatt-hours from an installed capacity of 792 megawatts. Although feasible, the project develops less than half of the basin potential and is not viable in itself since more productive feasible plans are available.

6.04.4 Devil Canyon High Dam. In September 1974, Henry J. Kaiser Company prepared a report proposing an alternative hydroelectric development project on the upper Susitna River. The report states that preliminary investigations indicated that an 810-foot-high, concrete-faced rockfill dam located about five miles upstream from the proposed Devil Canyon site would provide 3.7 billion kilowatts of average annual energy, or 2.6 billion kilowatt-hours of firm annual energy (figures converted to standard Corps of Engineers evaluation parameters). This dam would inundate about 58 miles of the Susitna River with a reservoir of approximately 24,000 surface acres at a full pool elevation of 1,750 feet.

This project would be located in much of the same area of the Susitna River canyon occupied by the proposed Devil Canyon-Watana project and would have similar environmental impacts with some exceptions. Whereas the Devil Canyon reservoir in the two-dam proposal would remain nearly full all year, the Kaiser reservoir would fluctuate substantially.

Kaiser's proposed Devil Canyon High Dam, located about 25 miles downstream from the Watana site, would have proportionately fewer miles of permanent roads and transmission lines than the Devil Canyon-Watana project, therefore less environmental impact on resources affected by these facilities.

The recreation opportunities would be fewer for the one-dam proposal. The substantial fluctuation of the reservoir would reduce some recreation potential and reduce resident fish populations while increasing the adverse visual impact associated with reservoir drawdown. The plan was found to lack economic feasibility.

6.04.5 Devil Canyon-Denali. This alternative two-dam system would include the thin arch concrete dam at Devil Canyon and a 260-foot-high earthfill dam in the vicinity of Denali. The Denali Dam would provide storage only and would have no powerhouse. This system would generate 2.5 billion kilowatt-hours of firm annual energy from an installed capacity of 575 megawatts at Devil Canyon Dam. The surface acres flooded would total about 62,000 acres (Devil Canyon, 7,550; Denali 54,000). The plan would entail significant environmental impacts on waterfowl nesting areas, moose range, and archaeological/historical values in the Denali reservoir area. Economic feasibility is lacking.

6.04.6 Three-dam System. A three-dam Devil Canyon-Watana-Denali hydroelectric development on the upper Susitna River could be built as an extension of the two-dam Devil Canyon-Watana project if the Denali storage site proved feasible. Such a dam system would provide a total of 6.8 billion kilowatt-hours of firm annual energy.

If a three-dam Devil Canyon-Watana-Denali project were constructed, it would include Devil Canyon and Watana dams previously described, and a 260-foot storage dam at Denali. This three-dam system would inundate approximately 104,550 acres and would take 13 to 17 years to construct. With a three-dam system, the 100-year storage capacity in Watana reservoir would be reduced by less than 3 percent due to sedimentation.

Environmentally, this plan would result in the adverse impacts associated with the Devil Canyon-Denali two-dam system, plus the added impact of inundating some additional moose range and bisecting a seasonal caribou migration route. Though the latter impact should not seriously impede summer caribou migration, it could result in some caribou mortality if animals attempted to cross the reservoir during adverse ice conditions, including the possibility of ice-shelving during periods of reservoir drawdown.

TABLE II

DATA ON THE PROPOSED PROJECT AND SELECTED SUSITNA ALTERNATIVES

	Type of Construction	Structural Height	Normal Full Pool Elevation	Surface Acres	Total Storage Acre-Feet	Miles of River Inundated	Billion Kilowatt-Hours of Firm Annual Energy
Selected Plan:							
Devil Canyon	Concrete, thin-arch	635'	1450'	7,550	1,050,000	28	
Watana	Earthfill	810'	2200'	43,000	9,400,000	54	
Totals				50,550			6.1
Alternatives:							
Kaiser's High Devil Canyon	Earthfill	810'	1750'	24,000	4,700,000	58	(2.6)
Olson	Concrete, gravity	200'±	1020'	1,000	83,000	8	
Vee	Earthfill	455'	2300'	9,400	920,000	32	
Denali	Earthfill	260'	2535'	54,000	3,850,000	34	
Totals				88,400			5.6
Devil Canyon	Concrete, thin-arch	635'	1450'	7,550	1,050,000	28	
Watana	Earthfill	810'	2200'	43,000	9,400,000	54	
Denali	Earthfill	260'	2535'	54,000	3,850,000	34	
Totals				104,550			6.8
Devil Canyon	Concrete, thin-arch	635'	1450'	7,550	1,050,000	28	
Watana	Earthfill	515'	1905'	14,000	2,420,000	40	
Vee	Earthfill	455'	2300'	9,400	920,000	32	
Denali	Earthfill	260'	2535'	54,000	3,850,000	34	
Totals				84,950			6.2

This alternative has significantly greater total adverse environmental impacts than the recommended plan (Devil Canyon and Watana development) and is economically feasible.

6.04.7 Four-dam System. In May 1974, the Alaska Power Administration updated a March 1961 report of the Bureau of Reclamation which proposed development of the hydroelectric resources of the Upper Susitna River Basin. The report proposed an initial plan to build the Devil Canyon Dam and powerplant and an upstream storage dam and reservoir at Denali. Subsequent development of a four-dam system would include dams at both the Watana and Vee sites. The four-dam system would generate a total of 6.2 billion kilowatts of firm annual electrical energy. The Watana Dam under this plan would be about 300 feet lower than in the selected Devil Canyon-Watana proposal, and the Vee Dam would be about 55 feet lower than in the original Bureau of Reclamation 4-dam proposal.

Initial development of the four-dam system, Devil Canyon-Watana-Vee-Denali, would include only the construction of the hydroelectric dam at Devil Canyon and the storage dam at Denali. This combination of two dams would produce 2.5 billion kilowatt-hours of firm annual energy. This initial two-dam stystem would also be compatible with the three-dam Devil Canyon-Watana-Denali, alternative proposal.

The four reservoirs considered in this development would inundate approximately 85,000 acres of land and river in the upper Susitna basin, compared with about 50,550 acres flooded in the selected two-dam proposal. The two reservoirs proposed in the lower section of the upper Susitna River would have substantially fewer known adverse environmental impacts than the two upper area reservoirs at the Vee and Denali. Generally the further upstream a reservoir is located in the four-dam system, the greater the overall adverse environmental impact would be on fish, wildlife, and esthetic resources.

In a four-dam plan, Watana reservoir would cover a surface area of about 14,000 acres behind a 515-foot-high dam with a pool elevation of 1,905 feet. The reservoir would extend over 40 miles upstream from the damsite and would be contained in the narrow canyon for most of its length.

Under either Watana alternative, the reservoir would flood areas used by migrating caribou and would flood some moose winter range in the river bottom. It would also cover existing resident fish habitat at the mouths of some of the tributaries in this section of the river and possible would create additional stream habitat at higher elevations.

The 455-foot-high Vee Dam would be built only under the four-dam plan in conjunction with the lower height Watana Dam. Vee reservoir would inundate about 32 miles of glacial river and would have a pool elevation of 2,300 feet with a surface area of approximately 9,400 acres. The reservoir would flood a substantial amount of moose habitat on the main Susitna and on the lower reaches of the Oshetna and Tyone Rivers. Caribou migration routes along the south bank of the Susitna River would also be affected as would some waterfowl habitat of minor significance. Present resident fish habitat, especially grayling, would be flooded at the mouths of many of the clearwater tributaries in the area covered by the Vee reservoir.

Any road to the Vee damsite would open up larger areas of wild lands that are prime wildlife habitat and escapement areas (inaccessible to man) for caribou, bear, and moose, and would have a significant impact on these and other fish and wildlife resources within these areas.

Denali Dam, with a structural height of 260 feet, would form a 54,000-acre storage reservoir with a pool elevation of 2,535 feet. Large areas of wildlife habitat, especially for moose, caribou, and waterfowl, would be inundated in an area between 2 and 6 miles wide and approximately 34 miles long. Many clearwater streams entering the Susitna River in this area have varying populations of arctic grayling; how the fluctuating reservoir would affect this fishery is generally unknown at this time. Substantial areas of lands would be exposed during the seasonal drawdowns of this storage reservoir; from an esthetic standpoint, this would be a substantial adverse environmental impact, especially when viewed from the well-traveled Denali Highway during the earlier summer months when the reservoir would be low.

The relocation of 19 miles of the Denali Highway necessary with the construction of a dam at the Denali site would provide additional access to this area with increasing pressures on the fish and wildlife resources in Coal Creek, Clearwater Creek, lower Maclaren River, Butte Creek, and the eastern slopes of the Watana Hills. There would be substantially less developed recreational potential at the Vee and Denali sites than at Devil Canyon because of travel distances involved and reservoir drawdown, especially at the Denali damsite.

It is expected that construction of the Vee project would take 5 to 6 years, while the Denali dam and reservoir would take between 3 and 5 years to construct. The construction period of the four-dam system would be between 18 and 23 years, if the dams were constructed in sequence. The magnitude of environmental impacts resulting from a four-dam system in the Upper Susitna River Basin clearly makes this a less desirable alternative than the one-, two-, or three-dam plans.

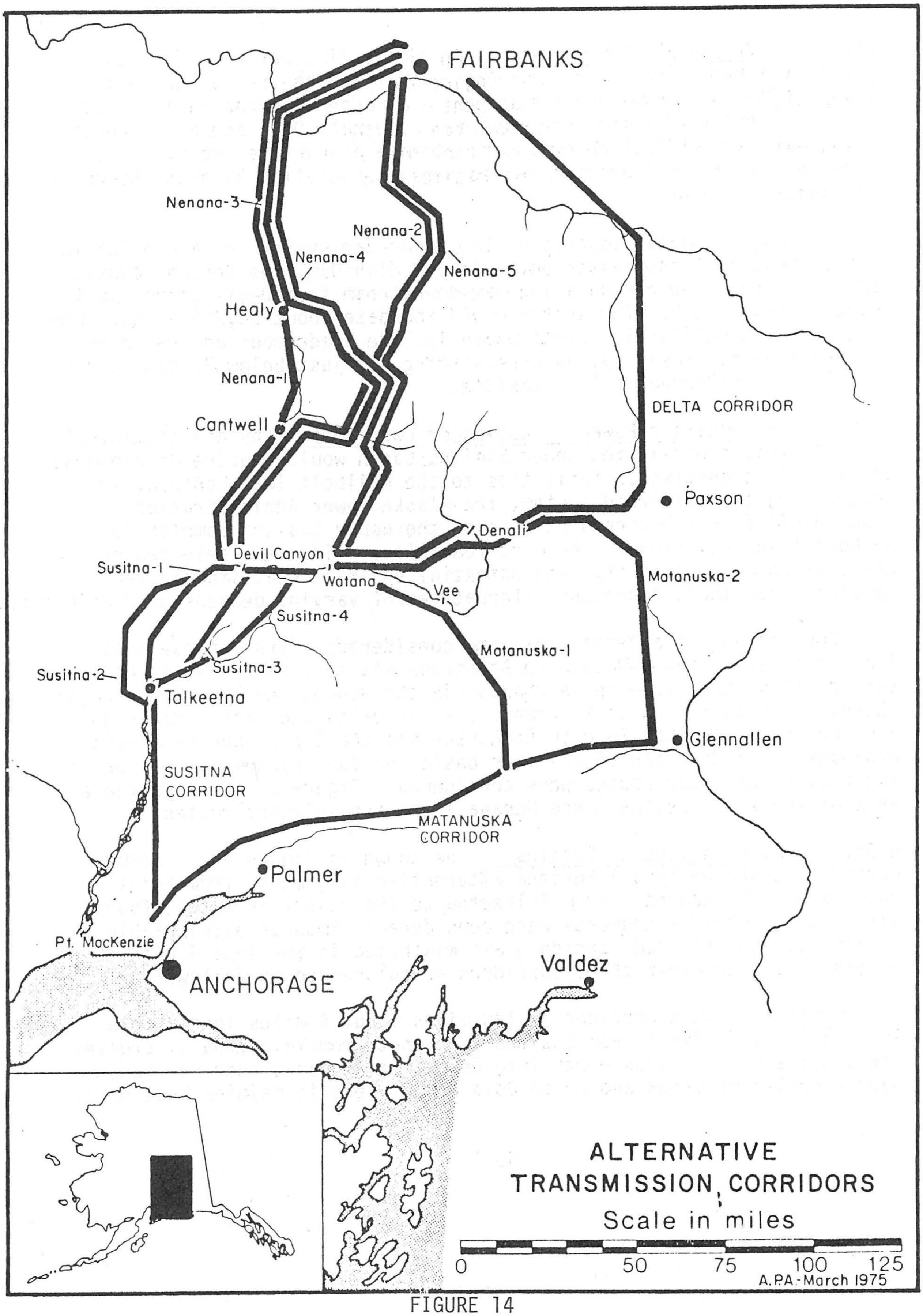

FAIRBANKS
Nenana-3
Nenana-2
Nenana-4
Nenana-5
Healy
Nenana-1
Cantwell
DELTA CORRIDOR
Paxson
Denali
Devil Canyon
Susitna-1
Watana
Vee
Matanuska-2
Susitna-4
Matanuska-1
Susitna-3
Susitna-2
Talkeetna
Glennallen
SUSITNA CORRIDOR
MATANUSKA CORRIDOR
Palmer
Pt. MacKenzie
ANCHORAGE
Valdez
ALTERNATIVE TRANSMISSION CORRIDORS
Scale in miles
0
50
75
100
125
A.P.A.-March 1975

FIGURE 14

6.04.8 Kaiser Four-Dam System. An additional study of a four-dam system was made by the Corps of Engineers utilizing the Kaiser Devil Canyon High Dam as the main component in an upper Susitna basin system. This alternative included both the Vee and Denali Dams and a low reregulating dam (Olson) just below the confluence of Portage Creek. This four-dam system could provide an estimated 5.6 billion kilowatt-hours of firm annual energy.

The environmental impacts of this four-dam system are a combination of the impacts of the Kaiser Devil Canyon High Dam, the Vee and Denali damsites, and a low reregulating dam downstream from Devil Canyon just below Portage Creek. The system would inundate about 88,250 acres. One of the major additional impacts would include anadromous and resident fishery impacts caused by the reregulating dam just below Portage Creek. The plan is not economically feasible.

6.05 Alternative Power Transmission Corridors. Any development of hydroelectric power in the upper Susitna basin would require development of electric transmission facilities to the Railbelt load centers. In determining the preferred system, the Alaska Power Administration studied all feasible corridors joining the upper Susitna complex to Anchorage and Fairbanks. The most feasible corridor was selected on the basis of cost, reliability, and potential environmental impact; the remaining corridors represent alternatives of varying degrees of feasibility.

Four groups of alternatives were considered: first, those that lead from Devil Canyon-Watana to Anchorage via the Susitna watershed; second, those that lead to Fairbanks via the Nenana and Tanana drainage; third, those that lead to Fairbanks via the Delta and Tanana drainages; and fourth, those that lead to Anchorage via the Copper and Matanuska drainages. Within each of the four basic corridor systems, a number of alternative corridor routes were considered. Figure 14 displays these various routes. Susitna 1 and Nenana 1 are the selected routes.

6.05.1 Alternatives to Susitna 1. As shown in Figure 14, a common corridor is shared by all Susitna alternative alignments from Point MacKenzie to Talkeetna. From Talkeetna to the reservoir sites, four alternative corridor segments were considered. Impacts attributable to Susitna 1, the selected corridor, are discussed in Sections 4.0 and 5.0 of the EIS. The other three corridors are discussed as follows:

Susitna 2 This corridor is 140 miles long, 4 miles longer than Susitna 1. It differs from Susitna 1 in that from Talkeetna it crosses the Susitna River, leads north into Denali State Park, then northwest over Troublesome Creek and on to Gold Creek where it rejoins Susitna 1.

This alternative segment is 42 miles long. Alpine and moist tundra are crossed in addition to those ecosystems crossed by Susitna 1; however these are limited in extent. In comparison to Susitna 1, this alternative also requires clearing 100 more acres. It traverses 26 miles of Denali State Park, and conflicts with trail systems in the Park.

Susitna 3. This corridor is 129 miles long, 7 miles shorter than Susitna 1. It is basically a more direct corridor from Talkeetna to Devil Canyon, bypassing the Alaska railroad between Talkeetna and Gold Creek. The length of the alternative segment is 45 miles. It crosses over a plateau of almost 4,000 feet elevation as compared to maximum elevations of about 2,000 feet for Susitna 1 and 2. It also crosses about 25 miles of moist tundra and 20 miles of upland spruce-hardwood. In comparison to Susitna there would be 1,610 acres less clearing of vegetation required, there would be possible impacts on caribou winter range, sizeable amounts of land would be opened up to vehicular access, primitive values would be adversely affected, and the transmission line would be highly visible.

Susitna 4. This corridor is 147 miles long, 11 miles longer than Susitna 1. It leads from Talkeetna, up the Talkeetna River and Prairie Creek to Stephen Lake, then west to Devil Canyon damsite. This segment is 63 miles, versus 52 miles for the comparable Susitna 1 segment. This segment traverses upland spruce-hardwoods for most of its length, and crosses a few miles of moist tundra. Permafrost is present at the higher elevations, which rise to about 2,200 feet. Compared to Susitna 1, this alternative would result in permafrost and soil erosion problems, 75 acres less vegetative clearing, penetration of a moose concentration area, impact upon recreational use near Stephen Lake by creating vehicular access, and be highly visible in the upland area which is relatively intensively used by recreationists.

6.05.2 Alternatives to Nenana 1. There are five alternative corridors connecting the project area with Fairbanks by way of the Nenana River. Nenana 1 parallels the highway and railroad and comprises the northern half of the selected corridor system. Nenana 1 is described in Section 2.0 and impacts are discussed in Sections 4.0 and 5.0 of the EIS. The other four Nenana corridor alternatives are discussed and compared to Nenana 1 as follows:

Nenana 2. This corridor is 220 miles long, 22 miles longer than Nenana 1. It departs Nenana 1 at Cantwell, leads east to Wells Creek, north to Dean Creek and the Wood River, and follows the Wood River north to Ester. This segment is 158 miles. The corridor rises to 4,000 feet on the Dean Creek-Wood River pass. A wide variety of ecosystems is traversed, from alpine tundra to bog and muskeg. Permafrost can be assumed to be prevalent. For 25 to 30 miles the corridor runs adjacent to or through the Blair Lake Air Force Range. Habitats of moose, caribou, and Dall sheep are traversed. The following conditions or impacts are of greater magnitude along this corridor than along Nenana 1: Peaty, permafrost soils are more prevalent and would cause greater problems related to access road construction and erosion prevention or control; about 90 more acres of clearing would be required; and disturbed areas in moist and alpine tundra would be very slow to recuperate. Dall sheep and caribou, in addition to moose, would be disturbed by construction activity, and most of the corridor would provide vehicular access to areas now accessible only by foot. Viewer contact would be relatively low because of the isolation from existing transportation routes.

<u>Nenana 3</u>. This corridor is 231 miles long, 33 miles longer than Nenana 1. It is identical to Nenana 1 from Devil Canyon to Cantwell where it then loops east and north through the Alaska Range, rejoining Nenana 1 at Healy. This segment is 72 miles long while the comparable segment of Nenana 1 is 39 miles. Terrain along the alternative segment varies from rolling hills and valleys to high passes and sharp ridges, the highest of which is about 3,900 feet. The alternative segment traverses moist and alpine tundra, upland spruce-hardwood, muskeg, and bog; however, rocky thin soils and bedrock predominate. Erosion would generally be low. Valley floors have continuous permafrost. As compared to Nenana 1, nearly 200 acres less clearing would be required, and increased access would cause a potential increase in hunting pressure on Dall sheep, caribou and moose. Construction of the transmission line within the alternative segment between Cantwell and Healy would be technically difficult and expensive, and it would be difficult to maintain. However, since it would not be visible from existing transportation routes, it would have low viewer impact.

<u>Nenana 4</u>. This corridor is 223 miles long, 25 miles longer than Nenana 1. From Devil Canyon it leads east and north, tying in at Healy to Nenana 1. The length of this separate segment is 126 miles; the comparable segment of Nenana 1 is 101 miles. From Devil Canyon, the corridor leads east to Watana Damsite and then north up Deadman and Brushkana Creek to Wells Creek where it continues over a 3,900-foot pass to Louis Creek and Yanert Fork, then over another pass (2,900 feet) to Moody Creek which it follows to Healy. Ecosystems traversed are moist and alpine tundra, muskeg and bog, and upland spruce-hardwood. Moose, caribou, and Dall sheep inhabit this corridor. Between Watana and Wells Creek, soils are very vulnerable to permafrost degradation and frost heaving. Erosion would be a serious problem related to powerline and road construction and would result in degradation of water quality in the clearwater streams encountered. From Wells Creek to Healy,

soils are rocky and thin. Erosion would be relatively low in this reach. Permafrost is continuous in the valley floors. As compared to Nenana 1, this corridor would require about 380 acres less clearing. Little modification of habitat would be required on this differing segment. Vehicular access would be provided which would potentially increase human pressures on Dall sheep and caribou, and to a lesser degree on moose. Most of this segment would have low viewer contact because of its isolation from existing transportation systems.

Nenana 5. This corridor is 212 miles long, 14 miles longer than Nenana 1. It is totally separate from Nenana 1, being a parallel corridor lying to the east of the proposed corridor. It is identical to Susitna 4 from Devil Canyon to Yanert Fork where it becomes separate as it leads up Dean Creek and crosses over a 4,000-foot pass into the Wood River drainage. It then leads north along the Wood River to Ester. Permafrost is prevalent. Alpine and moist tundra, upland spruce-lowland spruce-hardwood, and bog and muskeg ecosystems are traversed by the segment which differs from Nenana 4. Significant numbers of Dall sheep and moose are encountered as well as important winter range for caribou. Construction problems along the Wood River and Tanana River valleys would result from the lack of well drained soils and the presence of continuous shallow permafrost. Soil erosion and permafrost degradation would pose serious siltation threats to clear-water streams. This corridor would require clearing of about 100 acres less than Nenana 1; Dall sheep and caribou habitat would be adversely affected. Increased access to relatively inaccessible areas would be provided. Viewer contacts would be relatively few as a result of the remoteness of the corridor.

6.05.3 Alternatives to Susitna and Nenana Corridors. In addition to the Susitna and Nenana alternative corridors previously described, consideration was given to an alternative routing system for transmitting electricity to the two major load centers, Anchorage and Fairbanks (see Figure 14). Two other corridors were considered as access to Anchorage via the Matanuska Valley. These are referred to as Matanuska Corridors 1 and 2. Essentially only one other corridor is deemed feasible from the hydropower sites at Devil Canyon and Watana to Fairbanks. This is called the Delta Corridor.

Matanuska 1. This corridor differs radically from Susitna 1 in that it loops to the east and south, and approaches Point MacKenzie from the east. Its total length is 250 miles, 122 miles longer than Susitna 1. A considerable portion, 125 miles, parallels the Glenn Highway or other secondary roads or planned transmission corridors. From Devil Canyon the corridor leads east to Watana Damsite thence southeasterly over a sparsely forested, poorly drained plateau to the head of the Little Nelchina River. Here, the terrain is fairly open and gentle with predominantly rolling hills. The corridor, on passing just to the west of Slide Mountain, turns west to parallel the Glenn Highway. It crosses over Tahneta Pass into the Matanuska drainage, which it follows to the flat land at the mouth of the Matanuska Valley. It continues southwest along the northern shore of Cook Inlet, traversing considerable amounts of forest and muskeg as it approaches Point MacKenzie. Permafrost in this corridor is continuous from the upper end of Watana reservoir to Tahneta Pass, discontinuous in the Upper Matanuska Valley, and sporadic in the lower valley. Ecosystems traversed include spruce-hardwoods and moist tundra between the Watana Damsite and the Little Nelchina River, and upland spruce-hardwood in the lower valley. Between Devil Canyon and the Little Nelchina River, the corridor generally runs between caribou calving and wintering ranges. Also, some wintering range is traversed along the Little Nelchina River and Glenn Highway to Tahneta Pass. Some Dall sheep habitat exists in Tahneta Pass and Moose concentrations are encountered in the Point MacKenzie area. Between Watana reservoir and Slide Mountain, the potential for permafrost degradation is very high. Frost heaving in the poorly drained fine-grained soils would require heavy maintenance of both line and access road. Erosion would contribute sediment to clearwater streams in the area. Erosion potential is relatively low along the remainder of the corridor. This route would require approximately 750 acres more clearing than Susitna--mostly in the lower Matanuska Valley. Moose would generally benefit from clearing, whereas caribou range would suffer loss. Lake Louise and some other high recreational use areas would be impacted upon. Increased access would be provided to areas north of the Glenn Highway. The scenic quality along the highway would generally be lowered, since concealment of the line would be a problem along most of its route.

Matanuska 2. Alternative corridor Matanuska 2 is 385 miles long, 120 miles longer than Matanuska 1 and 249 miles longer than Susitna 1. From Watana Damsite it loops much further to the east than Matanuska 1, rejoining it at Slide Mountain. This segment of Matanuska 1 is 217 miles long, versus 97 miles for the comparable segment of Matanuska 2. From Watana Damsite the corridor crosses the Susitna River and leads northeast toward Butte Creek and the Denali Highway, which it parallels to Paxson. Here it turns south, paralleling the Richardson Highway and the Aleyska Pipeline to Glennallen. From Glenallen it parallels the Glenn Highway up the valley of the Tazlina River to Slide Mountain and the junction with Matanuska 1. Most of the corridor traverses flat terrain. Highest point on the corridor is a plateau of about 4,000 feet elevation in the Tangle Lakes - Rock Creek area between the Maclaren River and Paxson. This area is poorly drained and covered with post-glacial features such as eskers and terminal moraines, and many small lakes. Permafrost is prevalent. The predominant ecosystem is moist tundra. From Paxson to Slide Mountain the corridor lies within the Copper River lowlands, a basin underlain by nearly continuous permafrost.

Generally poorly drained, this basin is dominated by upland and lowland spruce-hardwood and muskeg ecosystems. Except for the area around Glenallen, the entire corridor runs through the winter range of the Nelchina caribou herd. Moose concentrations are found along the Copper, Gulkana, and Tazlina Rivers. Most of the corridor traverses medium density waterfowl habitat. Within the segment from Watana Damsite to Slide Mountain the potential for permafrost degradation is very high. Frost heaving would entail high maintenance of this line and road. Subsequent erosion could cause significant impact on clearwater streams in the area. Clearing would be required for about 2,200 acres more than the Susitna 1 corridor. Moose would generally benefit from clearing while some caribou range would suffer damage and loss. Existing recreational uses in the Lake Louise area would not be significantly impacted by this corridor. The archaeological richness of the Tangle Lakes area makes it likely that presently unknown sites would be discovered, and possibly disturbed, as a result of the project. Impact on scenic quality along the Denali Highway to Paxson would be high as a result of large numbers of viewer-contacts and little opportunity for line concealment.

Delta Corridor. This corridor is 280 miles long, 82 miles longer than Nenana 1. From Devil Canyon, it follows essentially the same path as Matanuska 2 to Paxson. Here it turns north, following the Richardson Highway - Alyeska Pipeline corridor over Isabel Pass, a wide, gentle divide at 3,000 feet of elevation. It continues along the pipeline corridor through the Alaska Range, following the Delta River. North of Delta River canyon the terrain consists of rolling hills until the Tanana Valley is reached. The terrain here is flat to Fairbanks. Shallow rocky soils dominate the Delta River Canyon stretch, followed north by mixed poorly and well drained soils. This segment traverses upland spruce-hardwood northeast of the Delta and Tanana Rivers. Along the Tanana floodplain, bottomland spruce-poplar forest predominate. Some lowland spruce-hardwood occurs immediately south of Fairbanks. Bison range would be traversed between the Delta River Canyon and Big Delta. Sporadic moose concentrations occur along the Tanana River. Dall sheep range occurs in the Delta River Canyon. Ice-rich permafrost is found throughout the corridor, and the soil is vulnerable to permafrost degradation, frost heaving, rutting and scarring. Generally well drained upland soils between Shaw Creek and Fairbanks are subject to gulleying, unstable slopes, and wind erosion. Clearwater streams are subject to sediment pollution from construction and maintenance activity. Thixotrophic soils in Isabel Pass would expose transmission towers to higher than normal seismic risk. Clearing required in this corridor would be about 430 acres more than in Nenana 1. The Nelchina caribou herd south of the Alaska range would be adversely impacted by this alternative. Additional access to hunters would be provided. The areas of highest scenic value along the Denali and Richardson highways coincide with the least opportunity for transmission line concealment.

Denali Highway bridge across upper Susitna River. This area would have been inundated by a dam at the Denali site.

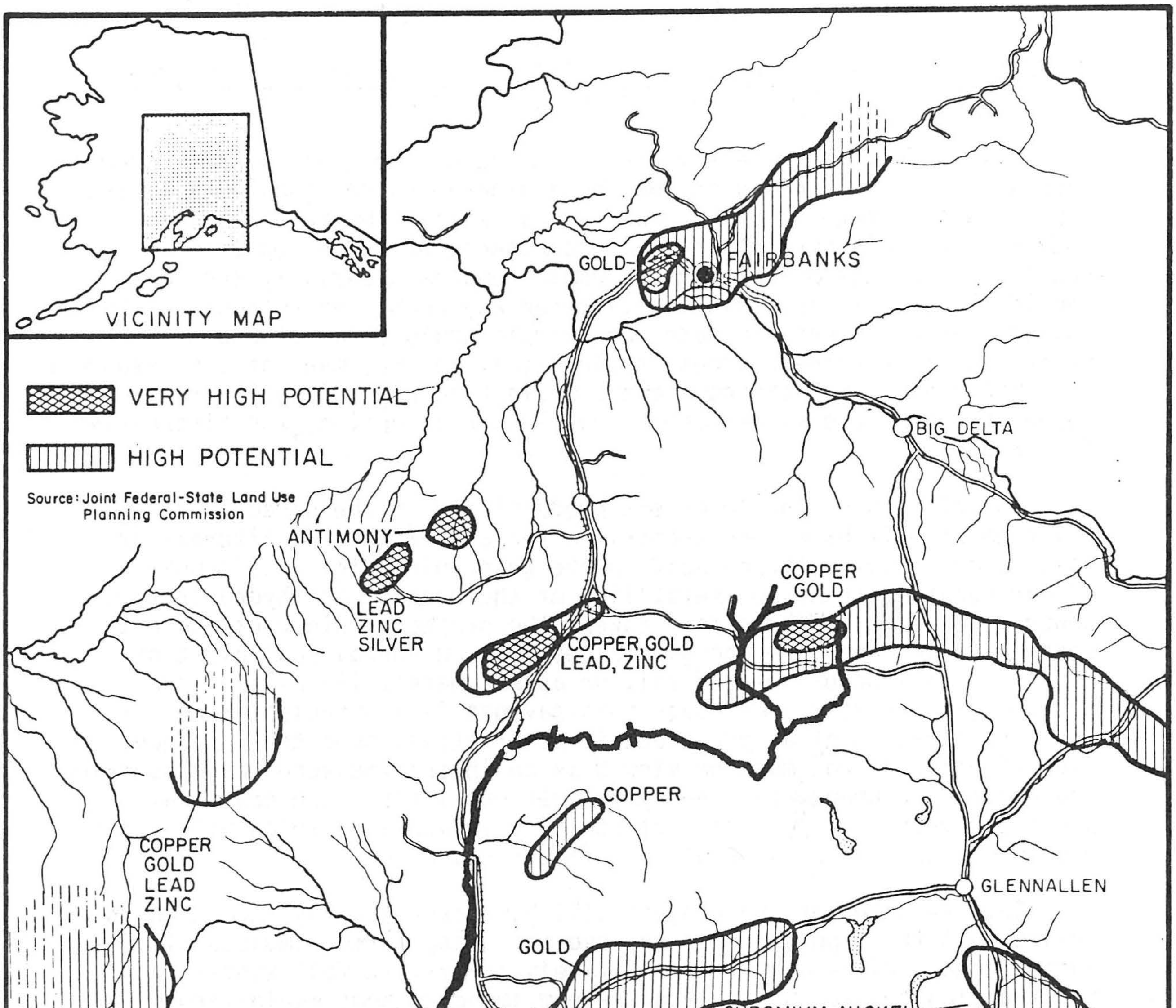
7.0 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The project as presently conceived could have a useful life span in excess of 500 years based on the "dead storage space" (space below the lowest water intakes for the powerhouses) within the reservoirs for sediment accumulation. Individual components would be replaced as necessary, but the overall system would remain essentially the same. Should the system last this long, or for any number of reasons be made inoperative at an earlier date (an example would be development of more desirable alternative sources of electrical power), many of the resources described above in Sections 4 and 5 would have been, for all practical purposes, committed to permanent foreclosure of options for alternative future uses.

In this sense, the long-term productivity of the directly affected environment will have been sacrificed for a shorter-term alternative use, since impacts attributable to the reservoirs will be of much longer duration than the useful life of the project for hydroelectric power production. By the same token, the project would contribute to a savings in nonrenewable energy sources with an energy equivalent of about 15 million barrels of oil, or approximately 112 billion cubic feet of gas per year. Although this savings is a principal factor in the consideration of a hydroelectric alternative, over the long haul, hydroelectric energy must be viewed as an interim measure for conserving the nation's nonrenewable energy sources until some more practical, permanent method of producing electricity is achieved which will not overburden the nation's or world's finite resources.

Some features of the project will have less lengthy impact on the environment than the dams and reservoirs. Many of the impacts will be encountered during--and for a relatively brief time following--the construction phase. Of the longer-term impacts, some would terminate or lessen immediately or shortly after retirement of a given project component. For instance, if the transmission line were to be removed, many of its impacts would soon disappear. Maintenance activity, noise and electromagnetic interference, and visual impacts associated with the lines and towers would be immediately eliminated. Roads could be removed, top soils replaced, and eventually natural revegetation processes would largely obscure the previous existence of the transmission system. Other impacts would, to varying degrees, be "imprinted" into the environment. Wildlife patterns may have been affected by continual hunting or habitat modification. Vegetative patterns, altered by continual maintenance or introduction of nonnative plants, may continue for a long time. Land use patterns influenced by the project would linger after it ceased to function.

No extremely short-term benefits from the project are the basis for justifying the long-term, if not permanent, commitment of the productivity of the affected areas. The trade-off is essentially a long-term benefit which can be achieved only at the expense of an even more extended commitment of the affected resources.



A.P.A.-JULY 1975

FIGURE 15

8.0 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES IN THE PROPOSED ACTION.

8.01 Changes in Land Use. The development of hydroelectric dams on the upper Susitna River would present an irreversible change of land use from an existing wilderness type land-use situation, along a free-flowing river with limited access, to a land-use situation where public access would be provided to a series of manmade lakes created by the construction of hydroelectric dams within the river corridor and to recreation sites within the project area.

Proposed transmission lines and permanent roads would also be located in areas of existing wild lands or where transportation corridors presently exist.

8.02 Destruction of Archaeological or Historic Sites. At the present time, no archaeological sites are known to exist within the areas of the proposed impoundments, damsites, power line routes, or road locations. Should such sites be located during on-the-ground reconnaissance during the detailed study phase, measures will be taken to avoid disturbance where possible. Should they fall within the reservoir pools, salvage will be undertaken. In the latter event, however, the sites would be permanently lost to alternative future uses.

One old cabin site, probably related to early mining exploration, is located at the mouth of Kosina Creek within the Watana reservoir impoundment area. This site is designated as a historical site by the Alaska Division of Parks.

8.03 Change in River Use. If the proposed project is developed, the 84-mile portion of the river above the dams would be converted from a free-flowing river to a series of manmade lakes totaling about 50,000 surface acres. Such development would preclude any consideration for Wild and Scenic River classification.

The "whitewater" section of the river through Devil Canyon would be substantially inundated, as would sections of the river bottom now used for wildlife habitat.

Downstream the initial 50-mile section of the river would be changed from an uncontrolled natural river, with very high summer flows and heavy glacial sedimentation and low winter flows with practically no sedimentation, to a river with regulated flows and a small amount of suspended glacial sediment. The 80-mile section of the river between Talkeetna and Cook Inlet would be affected to a lesser degree because of major tributaries.

8.04 Construction Activities.

8.04.1 Fuel Requirements. Significant amounts of fuel oils and gasoline for use in transportation and construction activities related to project construction would be irretrievably committed.

8.04.2 Manpower. Manpower resources during the construction and operation phases of the project would be irretrievably committed. The majority of these man-hours would be committed over a 10-year period, depending on the final development program.

8.04.3 Material. All the material used in project-related construction would constitute an irretrievable commitment of resources, as this material would not be available for other uses. Some amounts of material might be salvaged if the facilities were removed at some later date.

8.04.4 Land. Any land committed to project development such as reservoir impoundment areas, damsites, roads, etc., would be unavailable for other than project-related uses until such time as the facilities were no longer needed.

9.0 COORDINATION WITH OTHER AGENCIES

9.01 General. A public participation program was maintained throughout the investigation. Coordination with various agencies and groups was made to provide and to obtain pertinent information, and the following methods were used: public meetings, workshop meetings, and informal meetings.

9.02 Public Participation Program. A workshop meeting was held in Anchorage on 30 April 1974 to discuss the study with interested environmental groups. Representatives of the consultant firm of Jones and Jones, which was contracted by the District to conduct an inventory and evaluation of environmental, esthetic and recreational resources of the study area, presented and discussed results of their studies. A similar workshop meeting was held with Federal and State agency representatives on 29 October 1974, and another was held with Native Corporations on 12 March 1975.

Initial public meetings were held on 6 May 1974 in Fairbanks and 8 May 1974 in Anchorage to notify the public that the study had been initiated, and to furnish available information and receive comments. Several environmental groups stated that they would reserve judgement of the project until the Draft Environmental Impact Statement was available for review. Concerns expressed by these groups (the Alaska Center for the Environment and the Sierra Club) included impacts upon the future quality of life in Alaska which would be caused by hydroelectric development. They also questioned the Alaska Power Administration's projection of power needs, the examination of alternatives, and the shipping of Alaska's fossil fuels elsewhere. They stressed the need for coordination with the Alaska Land Use Planning Commission, and suggested public hearings on the Final Environmental Impact Statement.

Interim public meetings were held in Anchorage on 27 May 1975 and Fairbanks on 29 May 1975. Environmental groups represented included the Alaska Conservation Society, the Sierra Club, and the Alaska Center for the Environment. Comments of these groups included the opinion that the project would spur more growth, but that nuclear energy was believed not to be an acceptable energy source at this time. They further recommended the alternative of burning solid wastes to produce power. They were troubled by the location of transmission lines, and stated that we may have a greater need for hydroelectric power in 50-75 years. They questioned hydroelectric power as being a renewable resource. Other concerns included land status of the affected areas, siltation, costs of power, and the need for considering alternative sources of power.

Late stage public meetings were held in Anchorage on 7 October 1975 and Fairbanks on 8 October 1975 to present and discuss the selected plan. A number of environmental groups were represented at one or both of these meetings. They included: the Isaac Walton League, the Mountaineering Club of Alaska, the Alaska Conservation Society, Knik Kanoers and Kayakers, and Fairbanks Environmental Center. Comments included the need for Corps funding for fish and wildlife studies and data processing of environmental information. Expressed concerns included the inundation of a scenic, white-water river, location of the project area too close to a proposed Talkeetna State Park, too much human use in the area, impacts on moose habitat and downstream salmon runs, differences reflected in the 1960 and 1975 cost estimates, the low interest rate used in computing project benefits, who would operate the dams and sell the power, reservoir siltation, turbidity, fluctuations in stream flows, impacts on permafrost, the possibility of earthquakes, the formation of frazil ice, the geology of the area, benefits claimed for flood control, the location of transmission corridors and construction of transmission lines, land status, impacts upon population growth, recreational development, the production of secondary energy, and others. Most of these groups voiced either strong opposition to the project or reserved judgement pending further studies and specific project recommendations.

Many organizations, groups, and individuals expressed support of the selected plan. An informal poll of people attending the late stage public meetings indicated support for the project by about 5 persons for each person who opposed it.

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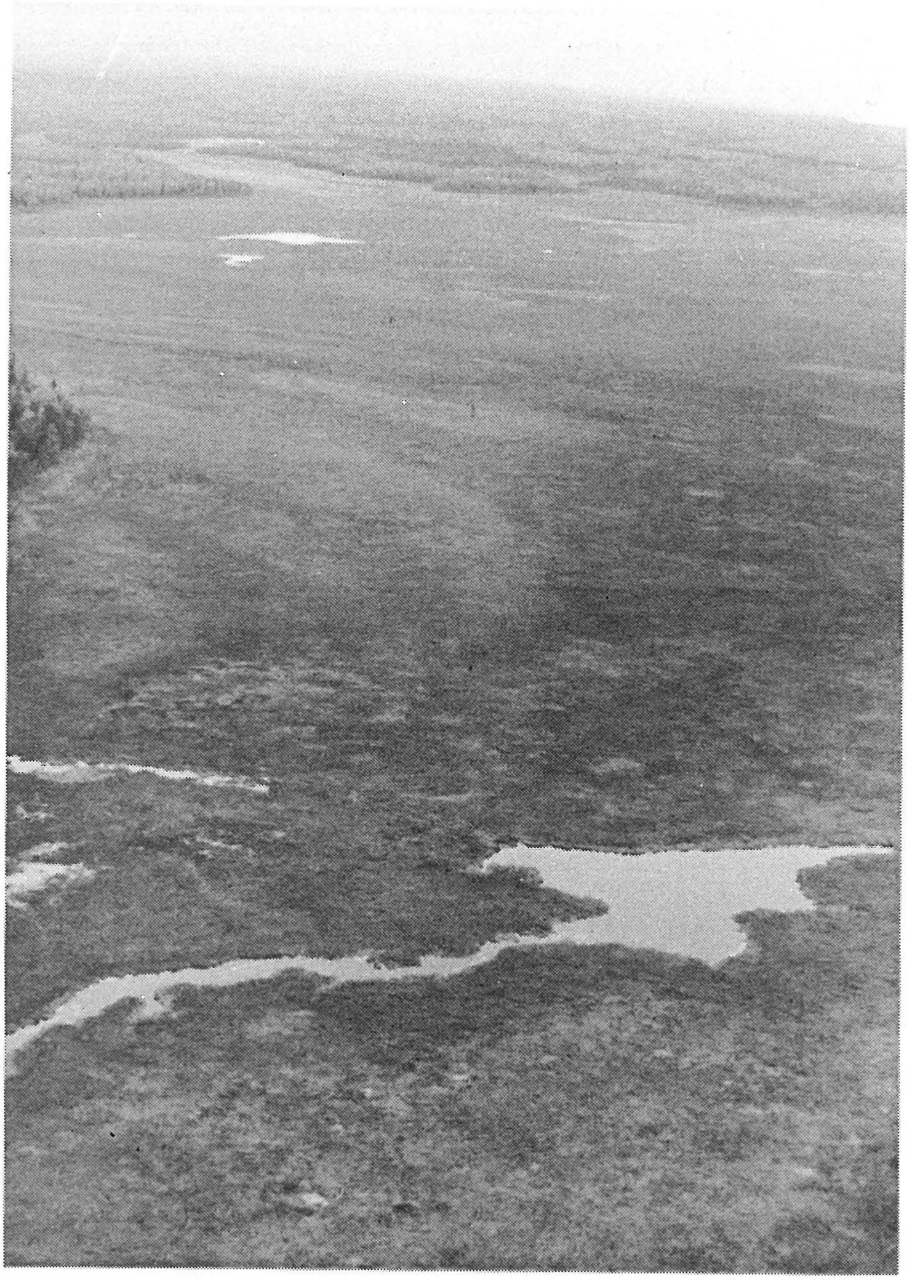
ECONOMIC DATA EXTRACTED FROM U.S. ARMY CORPS OF ENGINEERS INTERIM FEASIBILITY REPORT COMPLETE DOCUMENT IS AVAILABLE AT U.S. ARMY ENGINEER DISTRICT, ANCHORAGE, ALASKA

Estimated First Cost (Includes Non-Federal Recreation)	$1,520,000,000
Estimated Value of Public Domain (Land transferred without Cost)	$ 11,800,000
Average Annual Cost	$ 104,020,000
Average Annual Benefits	$ 137,876,000
Power (Includes Transmission Line Intertie)	$ 128,153,000
Recreation	$ 300,000
Flood Control	$ 50,000
Area Redevelopment	$ 9,373,000
Net Annual Benefits	$ 33,856,000
Benefit to Cost Ratio	1.3 to 1

PROPOSED TRANSMISSION LINE CORRIDOR

(Photos courtesy of Alaska Power Administration)



Lower Susitna River Valley. This area is characterized by extensive muskegs, intermingled with bottomland spruce-poplar forests. Permafrost is absent or discontinuous in this area, although the soils are generally poorly drained.

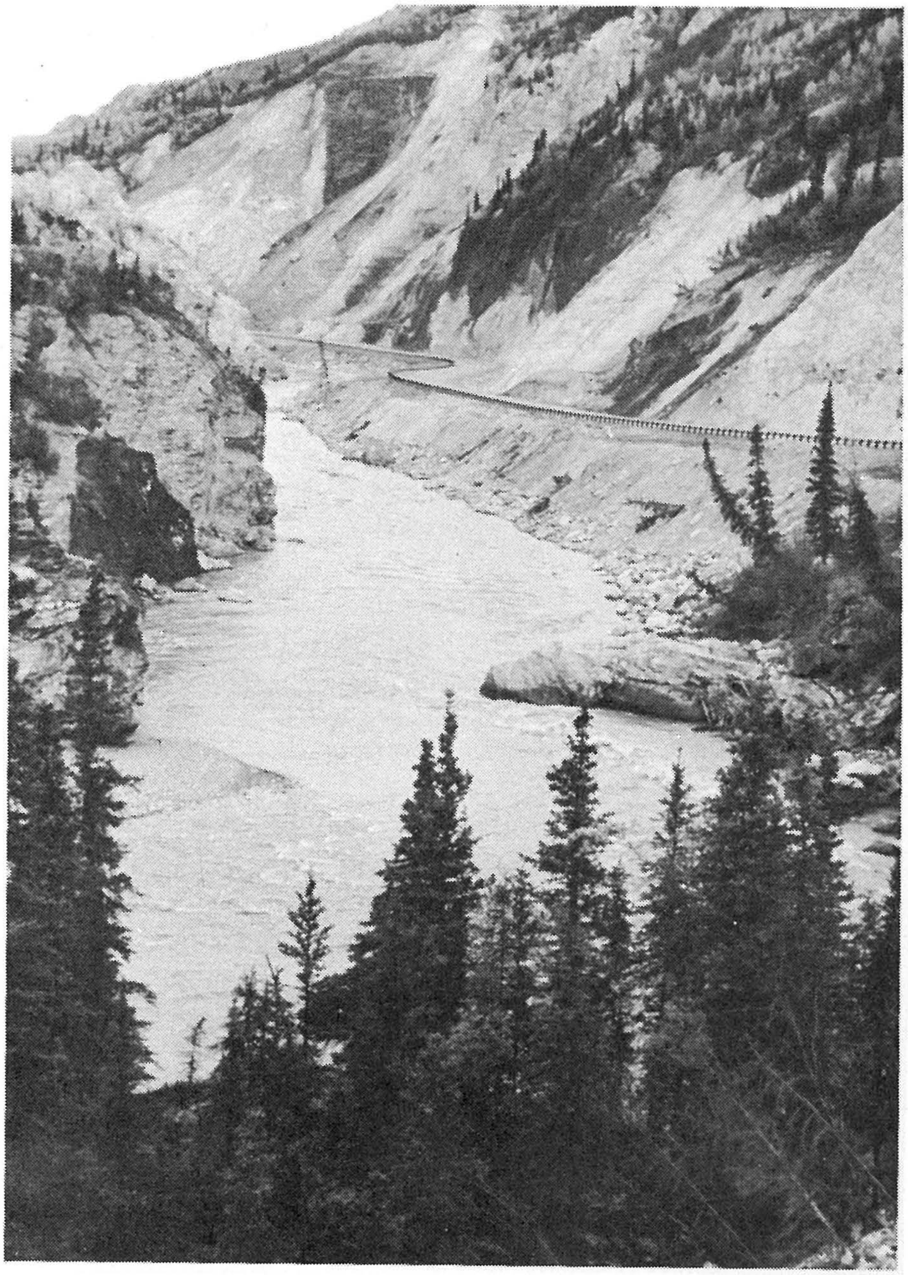
Susitna River Valley. Lakes are prevalent and associated with muskegs, which succeed them in formation. Muskegs are succeeded in turn by forests dependent upon well-drained soils. The three stages of succession are shown here.

Town of Talkeetna. This town is at the confluence of the Talkeetna, Susitna, and Chulitna Rivers. The Alaska Railroad can be seen crossing the Talkeetna River near the right edge of the picture.

Near Honolulu on the Anchorage-Fairbanks Highway. Biomes shown on low brush muskeg in foreground and upland spruce-hardwood in background. Black spruce in foreground are associated with poorly drained soils and/or shallow permafrost tables.

Alaska Range from Anchorage-Fairbanks Highway near Broad Pass, late spring. Vegetation biome is lowland spruce-hardwood. Soils here are basically glacial deposits.

Looking south along Nenana River to Upper Nenana Canyon. The Anchorage-Fairbanks Highway parallels the left bank. Mount McKinley National Park and the Alaska Railroad are on the right bank of the river.



Very restricted canyon along Nenana River north of McKinley Park. Alaska Railroad is off left-hand edge of photo. Land left of river is within Mount McKinley National Park.

The Tanana River flood plain. This area is extremely flat and poorly drained. Three types of biome are represented in this picture: muskeg, lowland spruce-hardwood, and bottomland spruce-poplar. The dark forests are mainly black spruce. The sinuous lighter forest is white spruce, aspen and birch. This forest type prefers well-drained soils, and so is found on old levees of existing and extinct channels.

COMMENTS AND RESPONSES

FEDERAL COMMENTS AND RESPONSES

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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
204 East 5th Avenue, Room 217, Anchorage, Alaska 99501

December 2, 1975

Charles A. Debelius
Colonel, Corps of Engineers
District Engineer
Alaska District, Corps of Engineers
P. O. Box 7002
Anchorage, Alaska 99510

Dear Colonel Debelius:

We have reviewed the draft environmental impact statement, "Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska." We offer the following comments for your consideration: This represents all comments of the Soil Conservation Service.

GENERAL COMMENTS

1 The statement represents considerable effort in the assembly of available data and in effective presentation of pertinent facts throughout the report. The statement appears to appraise impacts adequately for a feasability stage study. We have previously reviewed and commented on the environmental assessment of the transmission line proposal that is an integral part of this proposal.

SPECIFIC COMMENTS

2 The statement contains no information on soils involved with the proposal, except for some brief statements in the captions at the end of the volume. The caption of the second photo, implying that well drained soils succeed muskegs, is erroneous. The absence of soils information at the dam site or in the transmission corridors is a serious deficiency of the statement.

3 In the discussion of aesthetics, mention is given to landscape management practices being considered. It is suggested that following construction, consideration be given to mitigating unpleasant aesthetic results by planned use (landscaping) of adaptive plant species. The "Vegetative Guide for Alaska", attached, may be of value to you.

4 This discussion of "adverse environmental effects which cannot be avoided" notes the need for temporary and permanent facilities for project workers. We suggest that a soil survey, and the interpretations therein should be useful in locating facilities on suitable soils.

We appreciate the opportunity to comment.

Sincerely,

Weymeth E Long

Weymeth E. Long
State Conservationist

enclosure

cc: Council on Environmental Quality (5 copies)
Office of Coordinator of Environmental Quality Activities
R. M. Davis, Administrator, SCS, Washington, D. C.
K. L Williams, Director, WTSC, SCS, Portland, Oregon
District Conservationist, SCS, Fairbanks, Alaska

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

1 Comment noted.

2 Comment noted. Detailed soils information at the damsite and in the transmission corridors is not presently available. Such studies would be the subject of future investigations required for facilities siting, construction techniques, etc. The SCS letter was received too late to change the referenced photo caption, since that portion of the EIS had already gone through final printing. However, the statement that "muskegs are succeeded in turn by forests dependent upon well-drained soils" is acknowledged as an error. Obviously, muskeg areas do not rapidly, if ever, evolve into well-drained soils. They may, however, eventually support water-tolerant tree species.

3 Concur. Unavoidable construction scars related to project features, such as roads and borrow areas, will be rehabilitated, including dressing with topsoil and appropriate landscaping and vegetative planting. The Soil Conservation Service will be consulted with regard to these efforts.

4 Concur. Temporary and permanent facilities will be designed and located with a view to aesthetics, erodibility of soils, and other relevant factors.

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230

November 25, 1975

Colonel A. Debelius
District Engineer - Alaska District
Corps of Engineers
U. S. Department of the Army
P. O. 7002
Anchorage, Alaska 99510

Dear Colonel Debelius:

This is in reference to your draft environmental impact statement entitled "Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska". In order to expedite transmittal of the enclosed comments from the National Oceanic and Atmospheric Administration, we are sending them to you as they were received in this office.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving eight (8) copies of the final statement.

Sincerely,

Sidney R Galler

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosures: Memo from NOAA - National Marine Fisheries Service
Memo from NOAA - National Ocean Survey
Memo from NOAA - National Weather Service

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
Silver Spring, Md. 20910

Date :

Reply to Attn. of: W2x2/AI

To : Dr. William Aron
Director, Office of Ecology and Environmental Conservation (EE)

ORIGINAL SIGNED BY
R. E. HALLGREN

From : Dr. George P. Cressman
Director, National Weather Service (W)

Subject: DEIS 7509.61 - Upper Susitna River Basin, Alaska

The plan proposes the construction of dams and power plants on the upper SUSITNA River. The operation of these facilities will impact upon the public river and flood forecast warning service provided by the National Weather Service in this basin. These services emanate from NWS offices at Anchorage and Fairbanks as described in the enclosures. This should be made a part of the EIS. 5

Encl.

Weather Service Statement on Flood Warning Program

The National Oceanic and Atmospheric Administration (NOAA) National Weather Service provides flood forecasting service for major river basins. This system involves predictions of anticipated stages at a particular gage or gages in the basin. These forecasts are based on observed precipitation and stages at upstream points and anticipated weather conditions. The flood forecast is transmitted to City officials, newspapers, and radio and television stations in the basin. These media disseminate the information to residents of the flood plain in the form of a flood warning. This timely forewarning permits protective measures to be undertaken by industrial plants, public utilities, municipal officials, and individuals with property in the lowlands. Services available are of the following types:

1. Flash Flood: The responsible Weather Service Forecast Office supplies weather forecasts twice daily for the State. In addition to the routine forecasts, special forecasts of severe storms and general flash flood watches for small streams are issued as required. WSR-57 Weather Radar installations have capability for immediate detection and evaluation of rainfall intensity, location, and storm movement. Information is promptly relayed by teletype circuits and telephone to news media and community officials and law enforcement agencies. The Weather Service Office issues Flash Flood Warnings as required for small streams in its area of responsibility.

2. Major Floods: River stage forecasts are based on radar coverage, reports from river and rainfall reporting stations and telemetry in or near the basin. The River Forecast Centers are staffed with professional hydrologists responsible for the preparation of river forecasts based on water equivalent of snow cover, rainfall-runoff relations, streamflow routing, and a working knowledge of anticipated weather conditions. The lead time between distribution of the forecasts and the flood crest may be short; however, lead time normally ranges from 12 hours for rainfall and up to several weeks for snowmelt. Specific crest forecasts are issued as required. River District Offices are responsible for the interpretation and distribution of flood forecasts and the operation of the hydrologic reporting substation network in its area of responsibility.

3. Hydroclimatic Data: Most of the data from the network is published. These records provide the basis for forecasts as well as for the planning and design of protective works and their operation during floods. River and flood forecasting is fundamental in the design and essential in the operation of a levee or reservoir system.

RESPONSE TO COMMENTS BY U.S. DEPARTMENT OF COMMERCE NATIONAL WEATHER SERVICE

5 Comments of Dr. George P. Cressman, Director of the National Weather Service, are acknowledged. As suggested, the Weather Service Statement on Flood Warning Program, as appended to Dr. Cressman's letter, is reproduced in the EIS.

C52/JLR

OCT 31 1975

TO: Dr. William Aron
Director
Office of Ecology and Environmental Conservation

FROM: Dr. Gordon Lill (signed) GORDON LILL
Deputy Director
National Ocean Survey

SUBJECT: DEIS #7509.61 - Upper Susitna River Basin South Central Railbelt Area, Alaska

The subject statement has been reviewed within the areas of NOS responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

The following comment is offered for your consideration.

6 Geodetic control survey monuments may be located in the proposed transmission line routes. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for these monuments.

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEAN SURVEY

6 We concur. Every effort will be made to avoid disturbing geodetic control survey monuments in locating the proposed transmission lines. In the event that disturbance is unavoidable, the National Ocean Survey will be given at least 90 days advance notice, and costs of relocation will be borne at project expense.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
P. O. BOX 1668 - JUNEAU, ALASKA 99801

November 19, 1975

Colonel Charles A. Debelius
District Engineer
Alaska District, Corps of Engineers
P. O. Box 7002
Anchorage, Alaska 99510

Dear Colonel Debelius:

The National Marine Fisheries Service has reviewed the draft environmental impact statement for "Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska."

In order to provide as timely a response to your request for comments as possible, we are submitting the enclosed comments to you directly, in parallel with their transmittal to the Department of Commerce for incorporation in the Departmental response. These comments represent the views of the National Marine Fisheries Service. The formal, consolidated views of the Department should reach you shortly.

Sincerely,

for Harry L. Rietze
Director, Alaska Region

Enclosure

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P. O. Box 1668, Juneau, Alaska 99802

Date : November 19, 1975

Reply to Attn. of: FAK/RJM/

To : Director, Office of Ecology & Environmental Conservation, EE

Thru: Associate Director for Resource Management, F3

From : for Harry L. Rietze
Director, Alaska Region

Subject: Comments on Draft Environmental Impact Statement--Hydroelectric Power Development-Upper Susitna River Basin, Southcentral Railbelt Area, Alaska. Corps of Engineers DEIS #7509.61

The draft environmental impact statement for Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska, that accompanied your memorandum of September 30, 1975, has been received by the National Marine Fisheries Service for review and comment.

The statement has been reviewed and the following comments are offered for your consideration:

General Comments

It is estimated that approximately 3,300,000 salmon, which include all five Pacific species, are produced in the Susitna River for the Alaska commercial catch. Based on 1975 prices, the annual value to fishermen would be nearly $9,000,000.[1/] It should be noted that the Southcentral Railbelt Area plays a significant role in the recreational activities of the resident and tourist fishing industry. Presently, there is no data available on salmon recreational fishery values accruable to the Susitna River. However, we would expect this value to increase proportionately to projected increases in population and tourism in the project area. 7

As outlined by the Alaska Department of Fish and Game at recent public meetings regarding the DEIS, much of the information needed to make a systems analysis of the living resources of the river environment has never been collected. We believe it would be imprudent to make any objective comments regarding the fishery aspects within the various sections of the DEIS, because of the lack of any substantial data on which to base our conclusions and because inventories and evaluations are still being conducted by resource agencies. 8

[1/] U.S. Fish and Wildlife Service. 1975. Southcentral Railbelt Area Upper Susitna River Basin Hydroelectric Project Two Dam Plan. U.S. Department of the Interior. October 1975. 28 pp.

Specific Comments

4.0 Environmental Impacts of the Proposed Action
4.02 Fish

9 Page 49, paragraph 7. We believe the collection of one field season's data is not sufficiently definitive to make any assumptions regarding the relationships between salmon spawning and rearing sloughs and any regulated flows within the proposed project.

10 Page 49, paragraph 8. The statement regarding the elimination of salmon egg destruction should be qualified by noting that it is based on an inconclusive single-year observation. 2/

Page 50, paragraph 1. The statement regarding salmon disorientation by initial project startup should be expanded to include the effects of project construction. Water quality degradation, diversion, etc., would all serve to confuse salmon returning to their natural spawning areas.

11 Page 50, last paragraph. This paragraph should be written to qualify the status of future fisheries studies noted. The Corps of Engineers has no assurance that any proposed fish and wildlife studies will be funded or carried out in time to be of value in making any feasible project modifications.

6.0 Alternatives to the Proposed Action
6.02 Alternative Sources of Power
6.02.3 Oil and Natural Gas

12 Page 72. Because the proposed El Paso Alaska natural gas line could be constructed to bring fuel from the known Prudhoe Bay field to the Anchorage-Fairbanks area, it should be given consideration as a possible alternative source of power.

We would appreciate receiving two copies of the final environmental impact statement.

2/ Barrett, Bruce M. 1974. An Assessment of the Anadromous Fish Populations in the Upper Susitna River Watershed Between Devil Canyon and the Chulitna River. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage. November 1974. 56 pp.

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL MARINE FISHERIES SERVICE

7 Comment noted.

8 The need for additional environmental data to make an objective analysis of the proposed projects is a recognized concern of the Corps. During the post-authorization phase, environmental studies will be made to obtain the needed data to develop both design and mitigation measures to minimize or delete the chances of environmental impact. The preliminary data presently available is a basis for identifying areas of concern that need detailed analysis. As post-authorization studies proceed, supplements to the statement will be prepared and coordinated.

9 Noted.

10 Water quality degradation during construction would be limited to possible increase in turbidity. However, this condition would only be minor since the runoff in those areas that would produce turbid conditions will be diverted into settling basins prior to returning to the river. During construction natural river flows will be diverted around the construction area above any known spawning areas and would have no impact on downstream fish populations. At the time of initial storage, the fish and wildlife agencies will be requested to furnish necessary flow releases to prevent any downstream impacts.

11 Future studies identified in referenced paragraph are those that would be considered if congressional authorization is received for the proposed project. These studies would be accomplished during the post-authorization and design phases of the projects. No assurances can be given at this time that these studies would be funded since funding will be dependent upon congressional appropriations:

12 The proposed new natural gas pipeline from the Prudhoe Bay field, although not specifically identified in the alternative discussion of Oil and Gas, was taken into consideration when this alternative was investigated.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
ARCADE PLAZA BUILDING, 1321 SECOND AVENUE
SEATTLE, WASHINGTON 98101

REGION X
Office of Community
Planning & Development

IN REPLY REF:
10D

Charles A. Debelius
Colonel, Corps of Engineers
Alaska District Corps of Engineers
PO Box 7002
Anchorage, AK 99510

Dear Colonel Debelius:

Subject: Draft Environmental Impact Statement
Hydroelectric Power Development, Upper Susitna River Basin

We have reviewed the draft statement submitted with your September 22, 1975 letter requesting comments within 45 days.

The proposed action is to construct dams on the upper Susitna River at Watana and Devil Canyons, power plans, transmission facilities, access roads, and operating and recreational facilities.

13 At this point we do not see any significant impact in our areas of concern. As plans develop, we would like to be kept up on possible changes in population projections and related housing and community facilities needs. Your plans appear to be consistent with the Alaska Water Study Committee's assumptions that there would be initial and continued hydropower development in the Susitna River Basin. Since both our agencies as well as the State, is represented on this Committee, there should be no problem in adequately coordinating water related project plans.

Thanks for the opportunity to review your statement.

Sincerely,

Robert C. Scalia
Assistant Regional Administrator

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

13 Comment noted.

United States Department of the Interior
ALASKA POWER ADMINISTRATION
P. O. BOX 50
JUNEAU, ALASKA 99802

December 1, 1975

IN REPLY REFER TO:
700

Colonel Charles Debelius
District Engineer
Corps of Engineers
Box 7002
Anchorage, AK 99510

Dear Colonel Debelius:

The Interior Department, Office of Environmental Project Review, requested that we furnish you comments on your draft EIS, "Hydroelectric Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska."

General Comments

14 We believe the draft statement does not provide adequate information on the proposed project transmission system, and impacts, alternatives considered, and measures to mitigate potential adverse impacts of the transmission system. Such material could be included by extract or by appropriate reference to the Alaska Power Administration's Environmental Assessment of the project transmission system.

15 The statement includes a list of references cited, but for the most part, the text of the statement does not indicate sources of data. We believe a more complete citation of data sources is needed.

16 We believe the draft substantially overstates potential adverse impacts of the identified upstream dam and reservoir sites at Vee and Denali (see, for example, the 1965 report of the Fish and Wildlife Service, "A Detailed Report on the Fish and Wildlife Resources Affected by the Vee Project, Alaska"). We believe it is very likely that a full development of the Upper Susitna River hydroelectric potential, including one or both of the upstream reservoirs, would result in significantly less adverse environmental impacts than would development of available alternatives outside the Susitna basin.

If the Corps' proposed development plan is authorized (Devil Canyon and Watana), we believe it is probable that the Denali Dam would receive further consideration as a potential additional development. The data generated in your current studies indicates additional reservoir capacity would be beneficial; we feel this is particularly significant in view of very heavy winter energy demands in the Railbelt. We believe this matter should be discussed in the final statement. 17

Specific Comments

These are referenced to section numbers in the draft EIS.

1.03. Description of Action. Suggest including a concise description of actions involved in constructing and operating the transmission system (clearing, access, towers, lines, substations, maintenance). 18

2.02.2.2. Raptors. The Fish and Wildlife Service made aerial surveys to determine relationships of the proposed transmission facilities to raptors. The data should be referenced in the EIS. The attached letter of July 14, 1975, from Dr. Clayton R. White discusses findings. 19

2.03.6. Archeological Resources. Based on informal consultation with the Alaska Division of Parks on the transmission corridor studies, we understand that there are known and potential archeological and historical sites along the proposed transmission corridors. To avoid possible disturbance, these sites cannot be identified in the project reports. We believe the project report and EIS should recognize needs for pre-construction archeological surveys under applicable regulations.

4.03. Wildlife. We believe that experience with the existing Healy to Fairbanks transmission line, and CEA and APA lines in the lower Susitna Valley and Anchorage-Palmer areas is pertinent with respect to potential impacts on caribou and waterfowl. We are not aware of any experienced or alleged problems with caribou on the Healy-Fairbanks line. Similarly, the existing lines in the Cook Inlet area have apparently not caused significant problems for migrating birds.

6.02.11. Hydropower. The referenced 1948 report of the Bureau of Reclamation was but one of the early evaluations of Alaska hydro potential. Subsequent studies, including the Statewide Inventory published in the 1969 and 1974 Alaska Power Survey reports, and the June 1967 Interior Department report, "Alaska Natural Resources and the Rampart Project," provide a great deal of further definition of these resources.

20 We believe these more recent studies should be referenced as the basis for selecting the Upper Susitna project as the most desirable near-future major hydro project for the Railbelt. The existing data are adequate to demonstrate that the very large alternatives such as Rampart and Wood Canyon would involve greater environmental problems. An alternative plan to replace Susitna with equivalent power supplies from other potential hydro projects would require developing several projects in different basins with attendant impacts.

21 6.04.5. Devil Canyon-Denali, and 6.04.6., Three-Dam System. We do not concur in the statements that economic feasibility is lacking for these plans, since we believe this finding is premised on unreasonably conservative evaluations of costs involved in the Denali Dam. As indicated in the "General Comments," we believe the Denali Dam may ultimately prove to be a desirable future addition to the proposed Watana-Denali Canyon Plan, considering need for winter energy, environmental aspects, and available alternatives.

Sincerely yours,

R. J. Cross

Robert J. Cross
Acting Administrator

Enclosure

cc: Office of Environmental Project Review

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JUL 21 [illegible] 75
ANCHORAGE, ALASKA

1875 • Brigham Young University Centennial • 1975

July 14, 1975

Mr. Melvin Monson
U. S. Fish and Wildlife Service
813 "D" Street
Anchorage, Alaska 99501

Dear Melvin:

I am sending this brief letter for your use in discussion with the Alaska Power Administration concerning the proposed Susitna Dam Site and associated Power transmission lines. A full report will be sent to you which will include the entire summer's findings. This, however, will require some time to complete and I am desirous of you and the power administration receiving the following information as early as possible.

We use both helicopter and fixed wing (helio) to search for falcons. The transmission lines that form the basic figure 8 configuration of the Alaska-Fairbanks, Fairbanks-Big Delta, Big Delta-Anchorage, Denali Highway were investigated. These routes basically parallel existing highways.

Within this area there is considerable habitat for cliff nesting raptors. However, as I indicated in my 1974 interim report to Fish and Wildlife Service, I found no nesting Peregrine Falcons within the confines of any of the 4 proposed dam sites. Historically there may have been Peregrines there, but in the year of the survey none was found. The transmission routes also traverse areas that look excellent for Peregrine Falcons, however, the only area of concern at the moment, as regards Peregrines, would be that portion of the proposed transmission line route which basically parallels the highway and Tanana River from Fairbanks to Big Delta. There are several historical Peregrine sites along the Tanana River and Sulcha River.

One should be mindful, however that aside from the Peregrine, the Gyrfalcon is also found in limited numbers within that portion of Alaska and because of its overall restricted range in the Arctic, one should be cautious of this species. Several nesting pairs are found from Summit Lake region to the Denali Highway region, thence, north along the Anchorage-Fairbanks Highway in the area of the Healy-Cantwell region. To produce least impact in terms of raptors, the transmission lines should probably be placed along the south side of the Denali Highway and the west side of the new Fairbanks-Anchorage Highway.

Department of Zoology, 575 WIDB, Brigham Young University, Provo, Utah 84602
(801) 374-1211, Extension 2006

The only conceivable area, then, of impact with the Peregrine Falcon would be that part of the transmission route from Fairbanks to Big Delta, thence, south along the Big Delta region to about Summit Lake. In this region no recent Peregrine Falcon nestings (since 1972) have been made. The Peregrine is indeed in trouble in this region. Further impact can be avoided by perhaps running the transmission lines across the flats south of the Fairbanks-Big Delta Highway keeping, perhaps, 2 to 3 lines away from the Tanana River.

Hopefully, these data will suffice until the entire report can be submitted to you.

Sincerely,

Clay White

Clayton M. White, Ph.D.
Associate Professor of Zoology

mp

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF THE INTERIOR
ALASKA POWER ADMINISTRATION

14 The portion on alternative transmission systems has been expanded. The cooperation of APA in evaluating potential hydroelectric facilities on the Upper Susitna River has been extremely helpful. The environmental assessment of transmission facilities has been used as a supporting document in compiling the EIS and has been incorporated into the Appendix of the technical feasibility report.

15 The Selected Bibliography has been expanded to list sources not previously cited as well as additional sources utilized in revising the document.

16 The environmental impacts stated for the upstream damsites are in relation to those in the lower portion of the basin. But when compared to impacts of hydroelectric alternatives outside the basin, i.e., Rampart and Wood Canyon, they are significantly less overall.

17 The alternative three-dam scheme does show a net benefit, but under an incremental analysis the third dam add-on is not economically viable at this time.

18 Comment noted.

19 Comment noted. Referred letter is included in the EIS as an attachment to APA's letter.

20 Comments noted.

21 Comment noted. See response number 17.

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

ALASKAN REGION
632 SIXTH AVENUE
ANCHORAGE, ALASKA 99501
TELEPHONE 272-5561

OCT 30 1975

Colonel Charles A. Debelius
District Engineer
Department of the Army
Alaska District Corp of Engineers
P. O. Box 7002
Anchorage, AK 99510

Dear Colonel Debelius:

We have completed our review of the draft EIS on the Hydroelectric Power Development for the Upper Susitna River Basin Southcentral Railbelt Area.

The following comments are offered for your consideration as you prepare your final EIS.

22 We recommend using the word "airplane" in place of the term "bush plane" as it is used in paragraph 2.03.3.3 Air. The term may be misleading or confusing since many of the locations that are only accessible by air are served by large jet aircraft.

23 Section 2.0 Environmental Setting without the Project, covers the existing Air Transportation in paragraph 2.03.3.3 Air. Section 4.0 Environmental Impact of the Proposed Action, makes no mention of any aviation impact related to the project. As a minimum, the potential impact of the helicopter construction mentioned in paragraph 4.10 Roads should be covered.
24 Also, we have noted that on other construction projects, even when there is road access, there has been a tendency to provide helipads or landing strips for air evacuation of injured workers or the convenience of reduced travel time. If these aspects have been reviewed, it appears that Section 4.0 would be enhanced by including some comment on the potential for impact or the lack of it from air operations.

Thank you for the opportunity to review and comment on your draft EIS.

Sincerely,

LYLE K. BROWN
Director

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ALASKAN REGION

22 The suggested change has been made in the appropriate section in the Statement.

23 Section 4.10 has been revised to indicate that any helipads constructed would be of a temporary nature and would be rehabilitated when no longer needed.

24 Section 4.10 has been revised to discuss the need for facilities to provide for air evacuation of injured personnel.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
ALASKA AREA OFFICE
813 D STREET
ANCHORAGE, ALASKA 99501

NOV 14 1975

Colonel Charles A. Debelius
District Engineer, Corps of Engineers
Alaska District
P. O. Box 7002
Anchorage, AK 99510

Upper Susitna Hydroelectric
Power Development ER 75/942
NPAEN-PR-EN

Dear Colonel Debelius:

The Alaska Area of the U. S. Fish and Wildlife Service has the following comments to offer on this environmental statement.

GENERAL

25 We regret that there was no general discussion included on possible mitigating measures to be employed in the project. We understand that detailed studies undertaken by the Corps later in the authorization process will provide the bases on which mitigating measures will be developed; however, a general outline of possible ameliorating measures at this point would be informative. Loss of habitat, for example, might be mitigated by acquisition or protection of similar acreage elsewhere. Anticipated heavy use by recreationists might be alleviated by placing access roads so as to discourage such use or by ORV regulations enforced by the land-managing agency. An outline presentation such as this would clearly demonstrate the forethought given this subject by the Corps without requiring detail which is unavailable yet.

26 We are pleased to note that consideration will be given to improving fish access to and from some of the sloughs and tributaries downstream from Devil Canyon . We are also pleased that the results of ongoing studies under the direction of the Fish and Wildlife Service will be used during the final design phase studies for feasible project modification and mitigating measures.

SPECIFIC

27 Summary, 3B and page 53, para. 3 - the present document tends to minimize impacts to moose habitat. Especially on page 53, the effects of the loss of moose habitat should be described in detail and the terms "preferred" and "critical" defined. The number of acres to be inundated and secondary adverse effects, if any, should be discussed. A small loss of habitat may not appear to be significant when assessed alone, but when added with all the statewide losses of similar size, the loss may be signficant.

Page 23, para. 3 - Other Birds. The statement "Some incidental hunting takes place along the Denali Highway" is misleading, though this is presumably a reference to game bird hunting. Hunting pressure generally is heavy along the Denali Highway and this statement needs to tie more closely with bird hunting only. 28

Page 37, first para. - Other Forms of Transportation. The statement concerning shallow-draft river boats, small boats, canoes, rubber rafts and kayaks needs expanding, since Lakes Louise, Susitna, Tyone and the Tyone River complex in the Upper Susitna drainage receive heavy boating and floatplane use by hunters and fishermen from the Glennallen and Anchorage area. 29

Page 48, para. 3 - The statement "...and a minimal amount of resident fish habitat at the mouths of a few of the tributaries that enter the Susitna River in the 28-mile section of the proposed damsite" should be expanded to identify how many tributaries enter the Susitna River in the affected reach of river and to discuss more fully the "minimal fish habitat". 30

Page 48, para. 5 - This paragraph should be expanded to include the anticipated number of "rare occasions" when excess water would be diverted over the spillway, the climatic or engineering factors precipitating these occasions, and the degree of significant adverse impacts on fish and vegetation. 31

Page 48, para. 6 - This paragraph should specify the acres of moose habitat inundated and its importance to moose. Likewise, the fish habitat inundated should be described in greater detail. How much fish habitat will be inundated and what species will be affected? What types of fish habitat will be created at higher elevations and what species are expected to use the "new" habitat? 32

Page 51, last para. - We suggest substitution of the word "fragile" for the word "simple" in the statement, "However, the aquatic food chain in the taiga (boreal forest) and tundra is extremely simple, and as a result, disruption of habitat for one species quite often indirectly affects many other species." 33

Page 53, para. 3 - "Although moose habitat does exist within the pool areas of the proposed Devil Canyon and Watana reservoirs, the overall loss of preferred or critical winter forage areas would affect but a small percentage of the Upper Susitna moose population." (emphasis added). We do not believe there is sufficient information available at this time on the Upper Susitna moose population to categorically imply only a small percentage of moose will be affected. Anticipated studies by the Fish and Wildlife Service in cooperation with the Alaska Department of Fish and Game should provide the needed information for a determination within the next four years. 34

Page 64, para. 1- the background data supporting the assertion that large blocks of excess power will not be created by the project should be presented. Obviously, the impact on the State of Alaska would be profound and long-lasting if a large surplus of power became available and industrial development were stimulated by this. Since this would be viewed by many as an adverse impact, or at the least a secondary impact of magnitude, it should be explored here. 35

Thank you for the opportunity to review this draft statement. As an agency with specific responsibilities related to the project, the Fish and Wildlife Service looks forward to reviewing the other documents as the project goes through its authorization procedure and offers to assist at any time.

Gordon W Watson

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

25 An outline presentation of possible ameliorating or mitigating measures can not be made until a determination as to what types and to what extent such measures will be required. As stated at the end of Section 1.0: "Examples of problems expected to be addressed during the detailed design study phase include identification of significant adverse impacts to important fish and wildlife species, and specific actions which should be taken to prevent, ameliorate, or mitigate these impacts." The provisions of the 1958 Fish and Wildlife Coordination will be fully complied with in the consideration of project damages to fish and wildlife resources, and the implementation of appropriate ameliorative or mitigative measures.

26 Comment noted.

27 True, past fish and wildlife reports generally discounted moose habitat in Devil Canyon and showed comparatively low moose populations in the Watana reservoir area. A definition of "preferred" and "critical" in relation to moose habitat has not been defined in the EIS at this time. Future wildlife studies should determine and define critical moose habitat and number within the proposed impoundment areas.

28 The words "game bird" have been added to the statement to clarify this discussion of hunting pressure.

29 In Section 2.03.3 (Transportation), the EIS indicates boating and floatplane use in areas of the Upper Susitna River Basin.

30 The fish habitat at the mouths of clearwater tributaries which would be inundated by the proposed impoundments is more fully discussed in Section 2.0 under the heading Resident Fish. According to a survey conducted jointly by the Fish and Wildlife Service and the Alaska Department of Fish and Game in May and September 1974, only Fog Creek and Tsusena Creek provide good resident fish habitat within the reservoir impoundment areas. Some of the other tributaries provide poor habitat, while others indicated no presence of fish.

31 The EIS has been expanded to indicate that excess water would be diverted over the spillway once in approximately 50 years. The factors precipitating these occasions would consist of a full reservior concurrently with inflow in excess of the combined turbine and regulatory outlet works capacity. Impacts on the 2.5-mile reach of Tsusena Creek would consist of channel and streambank erosion,

flushing of fish and other stream organisms, and damage to streamside vegetation.

32 A discussion of the importance of inundated moose habitat has been added to Section 4.0 of the EIS. Acres of significant moose habitat can only be determined from studies which are proposed to be conducted during the pre-construction stage of planning. These studies will determine the extent and types of ameliorating measures required to offset any unavoidable damage to moose habitat and populations. As stated in Section 2.0 of the EIS, grayling, rainbow trout, lake trout, Dolly Varden, whitefish, sucker, sculpin, and burbot comprise the principal resident fish population of the Susitna drainage. As also stated, grayling is the principal sport species inhabiting the mouths of clearwater tributaries. It is expected that this would be the predominant species inhabiting any new habitat created at higher elevations by the reservoirs, since habitat conditions would probably be similar at the higher elevations. As with the case of moose, such eventualities can only be ascertained by detailed future studies.

33 We disagree. Admittedly, the taiga and tundra are "fragile" ecosystems. However, an ecosystem could be fragile and still have a complex aquatic food chain. Such a food chain would probably be less severely damaged by a given action than would a "simple" food chain in which loss of one link might directly affect the entire system.

34 Comment noted, but past studies indicate low numbers of moose are found within the proposed reservoir areas.

35 See response number 255.

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

OFFICE OF THE DIRECTOR

ER-75/942

NOV 17 1975

Colonel Charles A. Debelius
Alaska District, Corps of Engineers
P.O. Box 7002
Anchorage, Alaska 99510

Dear Colonel Debelius:

We have reviewed your draft environmental statement on the Upper Susitna hydroelectric development and offer the following suggestions.

It has been noted that impacts will be analyzed after project authorization and prior to project design (p. 8, par. 1). Information conspicuously absent in the present statement, but which should be incorporated in a revised or final environmental statement, includes the geology of the proposed dam sites, including permafrost conditions, and related impacts. Much pertinent information can be found in a recent Geological Survey report, "Preliminary geologic and seismic evaluation of the proposed Devil Canyon and Watana Reservoir areas Susitna River, Alaska," by John C. Lahr and Rueben Kachadoorian. That report notes that the Devil Canyon damsite is underlain by argillite and graywacke of Cretaceous age, and describes joint sets and shear zones in the damsite area (p. 5-6). The Watana damsite is described as being underlain by granitic rock which has intruded the Cretaceous argillite and graywacke.

In discussing potential geologic and seismic hazards to the project, the Survey report states that "one must assume that the proposed Devil Canyon and Watana Reservoirs could be subjected to earthquake generated landslides" (p. 14, par. 1). It has also been observed that unconsolidated sediments high above the river on the canyon walls would be inundated when the reservoirs are filled and "during a major seismic event these sediments may slide and generate waves in the reservoir" (p. 14, par. 2). Another hazard discussed in the preliminary report is that of the runup against the dams of waves that might conceivably be generated by blocks falling into the reservoirs or by subaerial or subaqueous landslides; additionally, the possibility

36 of damage by seiches that might develop in the reservoirs during earthquakes has been briefly discussed (p. 14-15). Possible hazards of earthquakes induced by reservoir filling have also been discussed (p. 15-16). It is concluded that all of the foregoing possible hazards should be carefully assessed in the siting and design of the proposed dams (p. 17). Recommendations are presented for geologic and geophysical studies (p. 18-19; p. 21-24).

37 Daily fluctuations of up to two feet in the river below the proposed Devil's Canyon dam are compared to the natural fluctuations of about one foot (p. 46, par. 5). However, the natural daily fluctuations occur during the spring and summer runoff of snow-melt at high flows while those after construction of the project would occur at lower flows, be more abrupt, and occur in winter. Thus, some different effects might be expected and these should be discussed in the final statement.

38 The spillway design at the upper dam would divert flows that cannot be taken through outlet structure into Tsusena Creek, 2.5 miles above the confluence with the Susitna River. It is indicated that on the rare occasions when this diversion would take place, the impacts on Tsusena Creek could be significant (p. 48). The frequency at which damaging diversions might occur should be given as well as estimates of extent of the resulting effects.

39 The occurrence of ground-water resources in the project area is not addressed in the environmental statement, although bits of information on geology (p. 14-15) and the suggested ground-water impacts of the coal alternative (p. 71) indicate that appreciable ground-water resources exist in the area. It is not possible to evaluate the impacts of the proposed project on ground water without more information. Although we realize that this document represents only a feasibility stage, we believe that impacts on ground water should be evaluated for each major component of the recommended development plan, especially for the proposed dams, powerplants, transmission facilities, roads and recreational facilities. These evaluations might be presented in detail after the project is authorized, but current knowledge should be sufficient for evaluation in general terms.

40 There is some apparent conflict in the interpretation of the Alaska Native Claims Settlement Act which is not resolved (p. 43-44). A further statement seems necessary to say that this difference between the intent of the law and the understanding of the Bureau of Land Management is yet to be settled.

We thank you for the opportunity to comment on the draft environmental statement.

Sincerely yours,

Henry W. Coulter

Acting Director

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

36 The geology of the foundations for Devil Canyon is a phyillite complex with joint sets crossing the river at a slight diagonal. Due to the steep cliffs there is no overburden. Foundation rocks at Watana are granitic types with joints crossing the river at a slight diagonal. Overburden varies greatly and is expected to be 1 to 10 feet deep in the vicinity of the axis. Depth of bedrock in the river channel could be as much as 70 feet according to seismic studies. The bedrock formation of the canyon walls changes from igneous complexis to metamorphized sediment complexes. The exact boundaries will not be known until later design studies are authorized. Detailed seismicity studies will be required in determining the exact siting and final design of the dams. The Corps concurs with the Geological Survey that the geology of the project area must be studied in depth to identify hazards which the dams and reservoirs could be subjected to.

37 The hydro projects will be operated in a manner similar to the normal load demand of the railbelt area which presently has an annual load factor of 50 percent. Monthly load factors throughout the year have ranged between 70 to 76 percent, and weekly load factors are frequently above 80 percent. Therefore, under the normal energy demand makeup, the Watana turbines would have adequate capacity to meet all peaking requirements, and the Devil Canyon project would serve the baseload, thus regulating the Watana discharges and maintaining a relatively stable downstream discharge. However, if the Devil Canyon projects were operated within a 70 to 80 percent plant factor range on a monthly basis, the respective river fluctuations would be minimal (on the order of less than a foot on a monthly basis). Under extreme conditions when a railbelt system failure of existing thermal units may require heavy hydro usage, abrupt fluctuations could occur. Spring, summer, and fall stage increases would have relatively the same effect as natural stage fluctuations brought on by flooding. Generally, however, system failures at this time of the year could be met by other thermal units held in reserve. Therefore, a winter system failure would probably provide the most adverse river effect.

In regard to premature ice breakup brought on by river fluctuations, studies conducted by the Missouri River Division, Corps of Engineers, have found that stage increases of up to 7 feet at moderate rate can be tolerated without premature breakup. A 7-foot fluctuation is far in excess of the maximum stage increases anticipated for the proposed hydro projects.

38 This paragraph has been expanded on page 48 of the EIS. The spill frequency is approximately once every 50 years.

39 Groundwater within the confines of the proposed reservoirs and dam structures is limited to the shallow aquifer which discharges to the Susitna River and to local benches perched on bedrock. The aquifer is roughly 80 feet deep and is underlain by bedrock. Because the stream channel and subsequent bedrock are "river cut," the lateral extent of groundwater is intermittent and confined to benches shaped by glacial scour. The flood plain of the Susitna River upstream from the proposed Devil Canyon damsite but below the upper reaches of the Watana reservoir is confined to a steep-walled, narrow canyon.

Groundwater within the study area has no existing or planned human use. From an engineering standpoint, few problems are anticipated from groundwater interference during or after construction. Conversely, although inundated within reservoir areas, downstream groundwater impact is expected to be minimal. Adequate freshet recharge coupled with the influent nature of the winter flow regime should maintain existing downstream water tables.

Access roads will traverse the basin on relatively high ground outside of the canyon confines. While some groundwater may be encountered, the general route of the roads has been chosen to minimize design problems such as groundwater. The topography of the area would not indicate that the roads would have any significant groundwater impact. The same general observations hold for the transmission system; however, considerably more terrain would be crossed and a greater potential for groundwater impact may exist. Much of the transmission system will follow existing transportation and utility corridors and an analagous observation of groundwater interference along these routes would indicate few potential problems.

40 The discussion of the Alaska Native Claims Settlement Act has been expanded and updated in the EIS to reflect the latest status of the lands in the project area and to indicate that some of the matters concerning the ultimate disposition of these lands have not yet been resolved. See Section 3.02 in EIS.

IN REPLY REFER TO

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
Juneau Area Office
P. O. Box 3-8000
Juneau, Alaska 99802

November 3, 1975

Memorandum

To: District Engineer, Department of the Army
Anchorage

From: Area Director

Subject: Review of draft environmental impact statement for Hydroelectric Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska (ER 75/942)

General Comments:

The document is presented in a good format so the document is readable and easy to follow through. There appear to be provisions made to avoid any future land conflicts under the Alaska Native Claims Settlement Act. 41

Specific Comments:

We have no further comments.

Area Director

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

41 Comments noted.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
State Office
555 Cordova Street
Anchorage, Alaska 99501

IN REPLY REFER TO.
1792.5 (911)

Colonel Charles A. Debelius
District Engineer
Corps of Engineers
Alaska District
P.O. Box 7002
Anchorage, Alaska 99510

Dear Colonel Debelius:

We have reviewed the draft environmental impact statement titled "Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska" ER 75-942. Our concerns basically center around the lack of assessment of the effects of the proposed project on the downstream portion of the Susitna River. We are also concerned that since the project is only in the feasibility stage, future design efforts and ongoing studies may uncover additional environmental data. Thus, another impact statement or an update would be desirable at the time the project became more specific. 42

General Comments

The proposed Devils Canyon-Watana Dam project is being placed on one of the major river drainages in southcentral Alaska, but the DEIS does not provide a comprehensive overview of the impacts of this proposed hydroelectric complex on the stream ecosystem and associated resource values. 43

Consideration of the environmental impacts of the project and affects on recreation, navigation and fisheries, for example, need to be expanded to include the lower Susitna River from Devils Canyon to its mouth on Cook Inlet. In this regard, the DEIS is deficient, and adverse impacts in the lower river may outweigh potential beneficial aspects of the proposal in opening up access to the Upper Susitna Basin. 44

Specific Comments

Summary Page

2. Description of Action - The draft states that all impacts were not exhaustively evaluated since the project is only in the "feasibility study" stage. However, it appears that the proposal has gone

45 far beyond the feasibility stage and should require a detailed EIS Which evaluates all possible impacts. If another impact statement will be prepared after design and further studies, this should be so stated or explained.

3. a. Environmental Impacts - Increased turbidity of the Susitna River downstream from the project area during the winter months is listed as a major adverse environmental impact. Yet, no analysis is made in any of the remaining sections of the EIS of the potential impacts of this water quality change upon overwintering resident and anadromous fish in the main stem Susitna River below the site. 46

47 The recreational opportunities would more than likely be altered rather than increased. Use patterns would shift from de facto wilderness oriented activities to more intensive activities adjacent to the new roads and reservoirs.

48 The project would also promote the development of adjacent private (Native) lands.

Page 1, paragraph 1.02

49 It is suggested that it is premature to consider the subject project without first completing the Stage 2 comprehensive report on the feasibility of developing other hydroelectric sites in the area.

Page 6, paragraph 1.03

50 The discussion of access road design/location should be strengthened, if possible. Mention is only made that such construction will include consideration of environmental factors. It would appear appropriate for such considerations to be discussed in detail.

51 It is understood that the operation and maintenance of project-related, recreational developments will be assumed by the land managing agency having responsibility for the major portion of adjacent public lands; and, as such, it would seem best to resolve that matter at an early date and incorporate that organization's goals/plans into the design of any recreational developments.

Page 15, paragraph 2.01.4.3

52 It is impossible to consider the environmental impacts of the transmission corridor as described. A considerable expansion of this section is warranted.

Pages 18-21, paragraph 2.02.1

The draft would benefit in this section by the inclusion of a fisheries habitat map detailing the distribution and the spawning and rearing habitat, by species, of both anadromous and resident fish in the immediate area of the dam proposals (Chulitna River confluence to the upper end of the Watana impoundment). 53

Page 23, paragraph 2.02.3.1

Rather than state that ATV access to the back country has improved hunting access in spite of a rapidly declining caribou population, it might be justified to state that increased access, whether via ATV's or roads, coupled with an increasing human population, may be a contributing cause of the rapidly declining caribou population. 54

Page 36, paragraph 2.03.3.4

River boats and airboats are a common form of transportation to recreational cabins, homesites, and the hunting and fishing opportunities of the lower Susitna River. Due to the braided and often shallow character of the Susitna River in the area between the mouths of the Kashwitna and Deshka Rivers, the 3,252 and 19,160 cfs reductions in flow created by the proposed project during May through July (as shown in Table 1, page 45) could have a considerable impact on the navigation of the lower river, particularly for boaters using propeller-driven outboard craft. 55

The impact of flow reductions on current transportation to recreational opportunities in the lower river should be examined and weighed against the suggested advantages of increased access to the Upper Susitna Basin (Page 54, paragraph 4.04).

In winter, the lower Susitna River is also a highway for travel by snowmachine for homesteaders and recreational tract owners. It should be determined if regulated discharges ranging from 6,038 to 7,428 or 481% to 657% increases over natural flows in January through April will result in hazardous travel due to thinner ice formations or their complete absence in the lower segment of the river. 56

Page 37, paragraph 2.03.4.1

It is incorrect to state that floatplane access is relatively minor and restricted to a few large lakes. Such use is actually quite common and in all probability, most lakes large enough to accommodate a Super Cub are utilized. 57

58 It is also incorrect to say that the Upper Susitna River Basin has very little recreational activity. As noted previously, floatplanes and ATV's are utilized quite heavily by hunters, fishermen and other recreationists. Preliminary studies indicate significant populations of hunters, fishermen and miners utilizing the Susitna River Basin. Reference: University of Alaska 1975 ORV Study (report being prepared).

Page 37, paragraph 2.03.4.2

59 Reference to the hunting of sheep and goats being minimal, even along the Denali Highway, implies a general lack of interest in that direction; however, the real reason for minimal hunting pressure along the highway is probably the result of minimal sheep populations.

Page 43, paragraph 3.01

60 Although the general project area is presently under the jurisdiction of BLM and the area to be inundated is classified as a power site, the entire area is withdrawn under ANCSA for possible selection by Native corporations. Selections have already been filed for lands in the immediate area of the proposed sites. We suggest you contact the Land Office, 555 Cordova Street, for the specific locations.

Pages 45-52, paragraphs 4.01 and 4.02

61 The present relationship of food supply, water temperatures, turbidities, velocity of flow and dissolved oxygen levels currently found in the lower Susitna River provide a balance which permits the existence of overwintering fish populations migrant to the stream from clearwater sloughs and tributaries which have diminished water flows or are frozen to the bottom. Alteration of any one of these conditions produces changes in the others which degrade the lower Susitna River's capability to support wintering and will result in a decline of resident and anadromous fish populations.

62 Any attempt through engineering design and discharge management to maintain the lower Susitna River is subject to failure because of the harsh climate and the complex interaction of the above factors.

Assuming, for example, that discharges from the Devils Canyon Dam are increased 657% above the natural flow level during the winter period and all other of the above factors remain at the natural level, the following will happen:

1. Temperatures remain at natural level of 32° F. Fish, being cold blooded organisms, have their basic activity level "set" by temperature--in this case their lowest. Stream velocities have been increased and fish cannot maintain their station in the river currents. By their inability to maintain or produce a higher activity level, they are subject to stress and mortality.

2. Food supply is presently limited, and for this exercise, is presumed to remain the same. Utilization of available food supply by fish is decreased because more of their basic energy expenditure must go into swimming rather than into the activity cost to capture prey organisms. Fish lose condition, are stressed and subject to mortality. 63

3. Dissolved oxygen is presently above 5 mg/L. At this level, oxygen is in sufficient supply to maintain the low metabolic rate of the fish. Much lower levels would be required to cause fish stress and mortality. Discharge-stream velocity would have no impact.

4. The waters are presently clear in the winter situation. With increased flow, there would be no impact on fish life, adverse or beneficial.

In the above case, alteration of stream velocities affects swimming performance of fish and utilization of their food supply introducing stress and mortality. If all the possible permutations and combinations of change and interaction of the above factors are worked through, it can be realized that construction of the Devils Canyon project will affect the lower Susitna River's suitability as critical winter habitat for resident and anadromous fish with little hope for mitigation. This should be clearly and positively outlined by the Corps of Engineers as an adverse impact of the project. The effect on fish production and stream ecology should be expanded to include the entire lower Susitna River. 64

Page 50, paragraph 4.02

What is the basis for the readjustment of fish? Presumably some sort of evolutionary adaptation is to be accomplished in a short period of time to complex habitat changes and alteration of natural biological cues. More likely, the adjustment will be a substantial decline in fish population numbers. This should be positively stated. 65

Page 50, paragraphs 4-6

Presently, it is doubtful that spawning by salmon occurs in the main stem Susitna River. This paragraph is irrelevant to the true fisheries

66 value of the river, namely winter habitat for fish from sloughs and tributaries. Additional spawning habitat will not be of any value, provided the critical winter habitat for fish survival is not available.

Pages 55-56, paragraph 4.04

67 The lower Susitna Basin encompasses one of the largest blocks of land currently patented to the State of Alaska. The area will see increased public use in recreation due to the fact that many areas of the state will shortly be turned over to the private ownership of Native regional corporations and villages which will restrict access to lands previously used by recreationists from the densely populated Anchorage area. Also, as suggested, a new capital may be constructed close to the lower Susitna River. The impacts of reduced discharges in the Susitna River during the summer months should be examined to determine the effect on current modes of transportation and navigation for recreational purposes in an area which has a growing demand.

68 The draft estimates an annual visitation to the project area of 77,000 people. The methodology for arriving at this figure should be shown, since there are no previous similar situations or case analyses in Alaska.

Page 59, paragraph 4.10

69 It would be of value for the reader to know the actual locations of proposed roads and the conditions under which it would be considered necessary to accomplish revegetation of temporary roads and other disturbed areas.

Page 61, paragraph 4.13

70 Care should be exercised in locating the transmission line between Point MacKenzie and Cantwell so as to avoid a degradation of the scenic views of Mt. McKinley.

71 An expansion of the brief discussion of planned landscape management techniques would be appropriate.

72 The last sentence in the first paragraph should read positively, "That would (delete probably) qualify for wilderness classification" (delete rest).

We suggest qualification as to what extent roads and transmission lines will impact aesthetics. 73

The third paragraph reads as a justification statement. 74

Page 68, paragraph 6.0

It is suggested that alternatives to the proposal might surface in the feasibility study (Stage 2) for the development of other hydroelectric sites in the Southcentral Railbelt area which is scheduled to be completed in 1978. 75

Pages 69 and 78, paragraphs 6.02, 6.03

Development of the Beluga Coal Fields will probably occur regardless of the presence or absence of the Upper Susitna Hydroelectric Project. Considering the adjacency of the Beluga Coal Fields and the potential Chakachamna Hydroelectric Project, some consideration should be given to potential power production based on a blend of these two systems. Other factors in favor of concentration of power production in the area are the potential for industrial development, deepwater port capabilities and the presence of some power transmission lines at present. 76

Oil and gas field development has already occurred throughout the Beluga area and a major timber operation exists, so the projects would not be affecting a de facto wilderness like the Upper Susitna Basin.

Page 71, paragraph 6.02.2

Reference is made to the lack of recreational and flood control benefits in a coal-thermal facility. There are no known flooding problems along the river which require control; hence the flood control "benefits" of the two-dam proposal are of little value. 77

Page 89, paragraph 6.05

A transmission corridor is indicated in figure 15 as possibly passing through the Copper River Basin served by the Copper Valley Electric Association which has plans to increase their service by a new hydroelectric project at Solomon Gulch near Valdez with a transmission line to the Copper River Basin. The coordination of these two transmission or power systems should be explained in the final. 78

Sincerely yours,

Curtis V. McVee
State Director

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

42 The purpose of future design efforts and ongoing studies is to obtain additional environmental data. The EIS will be amended or updated periodically during the course of these studies to reflect all significant impacts identified.

43 As acknowledged in the first paragraph of BLM's letter, the project is currently in the feasibility stage. A comprehensive and detailed overview of the impacts of the project cannot be ascertained until the detailed, pre-construction stage of planning is authorized and funded by the Congress. The FEIS will be revised and updated to include all additional information received during the EIS review process.

44 The need for further studies to determine detailed impacts of the project is acknowledged in the EIS. The Corps does not view opening up access to the Upper Susitna Basin as being beneficial. The EIS fully addresses the general impacts expected to result from such access--both adverse and beneficial. Any "benefits" from such access are not weighed as a trade-off to adverse impacts which may or may not occur downstream.

45 All Corps project studies are in a feasibility stage prior to being authorized and funded by the Congress for advancement to detailed studies, which are made prior to--and results of which are a determining factor in--a determination by the Congress that the project should be authorized and funded for construction. Thus, this proposal is currently in a feasibility stage, and will remain so until such time that Congress may approve authorization for pre-construction studies and appropriation of funding therefore. On the basis of detailed studies made during the next stage, the EIS will be appropriately amended or updated.

46 Increased turbidity which is expected to occur downstream from the project during the winter months is not listed as a major adverse environmental impact in the EIS. It is discussed as an unavoidable adverse impact, the significance of which presently is not wholly known. There is some evidence to support a view, however, that the impact may be relatively minor. Estimates of 15 to 35 ppm of suspended sediment are based on concentrations below glacial-fed natural lakes in Alaska. One of these is Skilak Lake. The Kenai River, which flows from this lake, is generally recognized as one of the more important salmon streams in Alaska.

47 Comment noted.

48 Comment noted.

49 The most feasible alternative hydroelectric sites in the Southcentral Railbelt and Yukon regions were considered during the Stage 1 Interim Report. Stage 2 studies would consist primarily of a more in-depth evaluation of the alternatives already considered.

50 Considerations of environmental factors related to road construction will be considered in great detail when and if studies for such roads are authorized and funded. At the present feasibility stage of planning, the exact location of access roads is not known.

51 Concur. As soon as it is determined--as a result of consumation of the provisions of the Native Claims Settlement Act--what agency or organization will have the management responsibility for the major portion of adjacent lands, efforts will be made to incorporate recreational development into that organization's plans and goals. These lands are presently in a state of flux, having been designated as Native Village Deficiency Lands.

52 Impacts of the transmission lines, insofar as can be presently predicted with a reasonable degree of accuracy, are discussed under appropriate resource categories throughout the EIS. A comprehensive environmental assessment of the impacts of all the alternative transmission line corridors has been made by the Alaska Power Administration. This document is included in the appendix to the Corps' interim feasibility report, and is available for public review in the District office.

53 We agree. Such a map would have been included had it been made available by any of the responsible fishery resource agencies. This type of information will not be available until fishery studies currently underway are completed.

54 The statement describes suspected and known impacts of ATV access to basin moose and caribou herds. It also acknowledges that road access will increase the potential for additional hunting pressure. As stated by the Alaska Department of Fish and Game, in commenting on the EIS, that agency has the statutory authority and capability to control hunting pressure.

55 This could conceivably happen, particularly during the early years following project completion while the river is still divided amongst a series of braided channels. However, the river is expected, through regulated flow and elimination of high flood stages, to eventually assume a basically single, meandering channel. When this occurs, with water having been concentrated in a single channel, the summer navigability of the stream might well improve. Concurrently

with this, downstream recreational opportunity may well improve during the summer months. Heavy sediment loads and high flood stages which now characterize the river during the height of the outdoor recreational season will be significantly diminished, thus making the area more attractive to general outdoor recreationists.

56 As stated in the EIS, winter ice conditions are not expected to be significantly changed downstream from Talkeetna. Above Talkeetna the river may become more hazardous for winter travel. Such use above Talkeetna, at the present time, is minor.

57 The extent of floatplane use is described in more detail in a previous paragraph entitled Air. The terms "minor" and "common" are relative in context. In comparison to known areas of common or high floatplane use in Alaska, such use in the Upper Susitna Basin is considered to be relatively minor.

58 Again, "very little" is a relative term. The use of ATV's and floatplanes by hunters, fishermen, and other recreationists in the remote setting of the Upper Susitna Basin is miniscule compared to areas near human population centers where easy access is provided by roads.

59 The first half of this comment is not clear as to what is meant by "implies." It is agreed, however, that minimal sheep and goat hunting along the Denali Highway may well indeed be the result of minimal populations.

60 This section has been updated to reflect the current status of lands affected by the project. The status of filing on these lands is not cogent at this time, since exchanges presently proposed are subject to an amendment to PL 92-203 and possibly to Alaska statutes.

61 This is a purely conjectural statement. No such assertion has been made by any of the responsible fish management agencies, since such a determination can only be made based on detailed studies, which are currently underway. It would be just as valid to state that the opposite condition could occur; i.e., alteration could improve overwintering capability of the main stream.

62 Comment noted.

63 Comment noted.

64 There appears to be a conflict between the first sentence of this paragraph which states: ". . .alteration of stream velocities affect swimming performance of fish and utilization of their food supply introducing stress and mortality."--and subparagraph 4 of the previous paragraph which states: "With increased flow, there

would be no impact on fish life, adverse or beneficial." The content of the remainder of this paragraph is noted.

65 The statement has not been modified. Comment noted.

66 Comment noted.

67 The subject of reduced discharges during the summer months as related to recreational transportation (navigation) is discussed in response to an earlier BLM comment. We agree that if lands in the project area are turned over to the Natives, recreational usage in the Upper Susitna Basin will likely be restricted, and that if a new State capital is constructed close to the Susitna River, recreational demand will increase. The project, by providing public use on lands which would otherwise be restricted to such use by Native ownership, will contribute significantly to the recreational needs of people living in the new capital.

68 The visitation figures were developed by a private consultant in coordination with the Bureau of Outdoor Recreation and the Alaska Division of Parks, and are included in the Recreation Section of Appendix I of the feasibility report.

69 Comment noted.

70 Comment noted.

71 Comment noted.

72 The sentence referring to "probable" wilderness classification is accurate.

73 It is stated in the EIS: "Degradation of visual quality in general would be a major adverse effect of project construction. This would be attributable primarily to roads, dam construction, right-of-way clearing for the transmission line, and the obtrusiveness of the transmission line itself." No meaningful qualification as to what extent roads and transmission lines will impact upon esthetics can be made, since such impacts are wholly subjective in nature, and are dependent upon each individual's sense of what constitutes esthetic impairment.

74 Comment noted.

75 See response number 49.

76 Coal and other hydroelectric alternatives, including Lake Chakachamna, are sufficiently addressed in the EIS to explain why they were not selected as the recommended plan. Development of the Beluga Coal Fields may indeed be developed regardless of the presence or absence of the Upper Susitna hydroelectric project.

77 On the contrary, there are existing flooding problems along the Susitna River which require control. One involves the town of Talkeetna which is being threatened by riverbank caving, and the other involves nearly annual damage to the Alaska Railroad tracks. "Benefits" from flood control are indeed small, thus very little of project benefits are attributed to it (0.03 of 1 percent of average annual benefits).

78 The EIS makes it perfectly clear that the depicted transmission corridors are all alternatives which were considered and all but one of which were rejected. There are no transmission line planned for construction in relation to this project which would pass through the Copper River Basin.

March 3, 1849

United States Department of the Interior

NATIONAL PARK SERVICE
Alaska Task Force
524 West 6th Street, Room 201
Anchorage, Alaska 99501

IN REPLY REFER TO:

November 11, 1975

Colonel Charles A. Debelius
District Engineer
Alaska District
Corp of Engineers
P.O. Box 7002
Anchorage, AK 99510

Dear Colonel Debelius:

We have been asked to submit our comments on the draft environmental statement, "Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska" directly to your office. Our comments are as follows:

A section should be included to show projected future power requirements of the railbelt area. This section should provide a comparison of existing requirements and projected needs. 79

The impacts concerning recreational opportunities need expansion. In a land of so many natural lakes it seems that a reservoir of the proposed design (long and narrow) would be of little recreational attraction. The attraction would be the fish that were planted and the facilities provided (which could be done for natural lakes, thus not requiring the project). 80

The document states that very little recreational use is now made of the upper Susitna basin. Future needs (1986) should be shown. This area will receive increased pressure by 1986 and will be significant when the Susitna flats are further developed. The summer draw down of the Watane project will impair the recreation use of the project and leave a barren area which will not be available for any use or provide wildlife habitat. Does this activity balance the loss of white water and river boating due to the impoundments? Aside from access to a previously primitive area, how do the recreational improvements compliment or blend with those of the region e.g., Mt. McKinley National Park and Denali State Park? How was the figure of 77,000 potential visitors arrived at? 81

The power line should not be built to Fairbanks. Such an approach would eliminate the severe impacts of such a line through the Broad

82 Pass area and the Nanana Canyon. Why is it necessary to transmit power north to the Fairbanks area? The esthetic damage caused by transmission line construction should be more carefully examined. Consideration of underground lines in certain stretches should be carefully considered. Economic costs should not be the only consideration for those sections where ethetics are most important.

6.02 Alternatives

83 All alternatives need expansion. On page one of the draft EIS, the resolution states in part an investigation of "any competitive alternative." Can this really be done if on the one hand oil and gas alternatives are dismissed in view of a "national effort," and coal is discounted on the basis of extensive adverse environmental impacts even though statements such as on page 71 indicate that extensive studies of the impact of coal mining have not been conducted. An alternative consisting of the development of several sources combined to produce the power requirements of the State should be considered.

6.02.2 Coal

84 It should be stated that the Healy Coal fields have been developed and that the strip mining damage in this area has been taking place for a number of years.

Roads from the Healy coal fields have been built and the transportation problem is minimal when the generating plant is adjacent to the coal source. Higher local employment will be realized by development of coal energy sources.

6.02.3 Oil and Natural Gas

85 These fuel sources need to be considered in more detail. What will be available in the Fairbanks area by 1986 and what are the cost benefits in relation to the $1.343 billion 1975 required for the two dam project.

6.04.2 Devil Canyon

86 This alternative should be more carefully examined. Even with a low firm energy capability it appears that this project would produce power during the season when it is most needed. The impacts from this single dam project are minor as compared to the two dam project. Less transmission line construction would be required with this alternative combined with other projects. This project appears to have the highest recreation potential.

87 We recommend that the question of environmental impact versus cost benefit of development for a number of energy sources be explored.

88 Not enough discussion of the intertie and the secondary social-economic impacts of the intertie, i.e. encouragement of strip development all along the power line. Do we really need/want an intertie in Alaska? How much energy is lost through transmission lines?

89 Water for domestic/agricultural use will soon be in short supply. How does this use of water fit in with long range water needs.

90 Under section 4.0 the impact of the material sites to construct the dams has not been evaluated. Gravel, limestone for cement, and earth for land fill if taken from sites not be to flooded will have a major impact on the areas esthetics and important sightseeing use. If local limestone is used to make the cement necessary for the Devil's Canyon Dam, this will create scars on the landscape and considerable air and noise pollution in an area critical to the visitor to this Mt. McKinley region. Limestone sources near Cantwell if utilized and processed there would create visual and air pollution impacts to the Mt. McKinley National Park visitor, as well as the residents of Cantwell. This impact must be evaluated and mitigated in this EIS.

Sincerely,

Albert G. Henson
Project Leader

AGHenson:jkm

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
ALASKA TASK FORCE

79 An entire section (2.04) is devoted to a discussion of energy needs. Figure 9 is a graph which illustrates a five-year record of energy consumption (1970-1974) plus projected load growth through the year 1999.

80 Recreation is not the purpose of the reservoirs. However, they will inevitably attract some visitation for recreational purposes. Recreational usage, as estimated in the EIS, is claimed as a project benefit, but its contribution to project justification is infinitesimal--being less than 0.2 of 1 percent of total project benefits.

81 The reservoirs, either directly or indirectly, afford more recreational opportunity in the Upper Susitna Basin than would otherwise exist, both as a result of the flatwater recreational opportunity afforded by the reservoirs, and access provided by the road system which will be necessary to construct and operate the project. Most of the reservoir recreational visitation will be associated with the Devil Canyon site. Watana will be much less attractive as a result of its drawdown. The loss of white water, itself, cannot be measured in terms of trade-offs to recreational uses afforded by the hydropower project. Recreational uses of the white water, on the other hand, can be directly related to post-project recreation. Present and future boating uses of Devil Canyon would not begin to compare to other forms of recreation uses in the Upper Susitna Basin (primarily hunting and fishing), with or without the project. The visitation estimate was provided by a private consultant who closely coordinated his procedures and methodology with the Bureau of Outdoor Recreation and the Alaska Division of Parks, and is included in the Recreation Assessment section, Appendix I, of the feasibility report.

82 The purpose of the hydropower project would be to provide projected energy load requirements to the Southcentral Railbelt area and particularly to the two large demand centers of Fairbanks and Anchorage. The esthetic impact of the transmission line will be carefully examined, and every effort made to minimize its visual impacts in determining the exact alinement of this facility. Consideration of underground cables has been made, and a discussion of this alternative has been added to the EIS.

83 Achievement of national energy goals was not the only criterion upon which the selection of the hydropower alternative was based. Neither were environmental impacts the sole basis for the rejection of the coal alternatives. Economic factors played a large role in these determinations.

84 The development of coal as a means of producing electrical power was the economic standard against which each of the hydroelectric plans was tested. That is, the power benefits used in computing the benefit-to-cost ratio represented the cost of producing the same amount of power by constructing and operating a generating system using coal as the fuel. For purposes of simplification and more direct comparability to each hydro system alternative evaluated, a single large coal-find complex located in the Healy area was utilized. The Healy Creek coal district has available reserves approximately equal to the energy production requirements of the 100-year period of analysis. Since this coal field has already been developed for this very purpose, it is a logical choice for comparison. Socioeconomic impact would develop each time a generating facility was constructed in the area, but the overall permanent jobs arising from operation would have a minimal effect on the overall economy of the area.

85 Oil or natural gas, from whatever source, is expected to be an expensive source of energy in the future. A major consideration in the hydropower proposal is the conservation of nonrenewable resources. The benefit/cost ratio of the proposed hydropower project would be comparable to near future oil and natural gas alternatives.

86 As stated, the project--by itself--has a low firm energy capability and, therefore, is not economically viable when compared with the economic standard of coal. That is, in order for the project to pay for itself, the wholesale mill rate would be greater than that of an alternative coal system. A fluctuating pool has less recreation potential than a steady reservoir as proposed in the selected plan for the Devil Canyon facility. This alternative is discussed in Section 6.04.02 of the EIS.

87 During the process of plan formulation, the objective of Environmental Quality was considered along with the objective of National Economic Development in the development and evaluation of alternative plans, as prescribed by the Water Resource Council's Principles and Standards. Thus, environmental impacts were weighed against the monetary benefits for each of the alternatives explored.

88 The discussion of the transmission systems has been expanded in the EIS. Since essentially all of the corridor system traverses either public lands or lands which may be assigned to the Natives, there should be no significant potential for uncontrolled "strip" development. An intertie is essential if the proposed hydroelectric project is constructed. It also has other advantages related to reliability of energy supply to the State's two largest load centers. Average energy loss through the transmission lines will be 0.7 percent of the total energy transmitted, but the 6.1 billion kilowatt-hours of firm annual energy is the net energy available at the delivery points near Anchorage and Fairbanks.

89 Should the proposed plan be implemented, the summer flows of the Susitna River will be regulated, and water in excess of summer power needs

will be stored for release during the fall and winter months. There would not appear to be any future water supply shortages for domestic/agricultural use in the Lower Susitna River Basin, and the proposed dams only temporarily store the water for hydroelectric power generation.

90 Restoration of material borrow areas outside the reservoir pools will be conducted to blend the sites into the surrounding area as much as possible to minimize the esthetic impact. In compiling the construction costs for all alternatives, the utilization of cement manufactured outside of Alaska was used. If local areas are developed as limestone sources, appropriate measures will be taken to minimize the adverse impacts of such action.

March 3, 1849

United States Department of the Interior

NATIONAL PARK SERVICE

Pacific Northwest Region
Fourth and Pike Building
Seattle, Washington 98101

IN REPLY REFER TO:

L7619
(PNR)CAE

October 22, 1975

Colonel Charles A. Debelius
District Engineer
Alaska District, Corps of Engineers
P.O. Box 7002
Anchorage, Alaska 99510

Dear Colonel Debelius:

We have reviewed the draft environmental impact statement for Hydroelectric Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska, and have the following comments.

We are quite concerned about the possibility of an above-ground, high-voltage power line paralleling the eastern boundary of Mount McKinley National Park. The statement does not give specific information on routing, tower design, or vegetational and scenic impacts, so it is difficult to determine the extent of impacts on the Park and its visitors. We request that contact with our office in Anchorage be maintained regarding the progress of this project and that we be informed of decisions regarding the Cantwell to Healy transmission corridor. 91

We feel that the alternatives for power transmission corridors on page 89 are inadequate. Firstly, underground systems are not considered--especially in the Cantwell to Healy section. Certainly the cost for underground lines would be more, but the statement should weigh economic considerations against the other impacts involved. Impact on scenic values near Mount McKinley National Park and in the Nenana Canyon will be substantial, and thus we feel that undergrounding must be seriously considered. 92

The second reason we consider the alternatives for power transmission corridors inadequate is that there is no analysis of impacts. Figure 15 graphically presents the alternatives. The text then states that the proposal was selected on the basis of cost, reliability, and potential environmental impact, but none of the needed information is presented. An environmental statement should present enough information for the reader to understand why the proposal was selected over the alternatives. 93

94 The National Register Criteria (36 CFR 800) should be applied to the cabin which was identified by the Alaska Division of Parks and would be inundated by the Watana reservoir. These procedures were printed in the *Federal Register* of February 4, 1975, and should be consulted.

Sincerely yours,

Edward J. Kurtz
Acting Regional Director

RESPONSE TO COMMENTS OF
THE NATIONAL PARK SERVICE
PACIFIC NORTHWEST REGION

91 A map has been added to the EIS which more clearly indicates the location of the transmission line corridor. The exact alignment within this corridor, and tower design, have not yet been determined, but esthetic impacts will be a primary consideration in powerline location and tower design. In any event the transmission line will be located on the east side of the George A. Parks highway and the Alaska Railroad through the Broad Pass--Mount McKinley National Park area, and every effort will be made to either entirely conceal the line or minimize its visual obtrusiveness. The National Park Service will be kept fully informed of decisions regarding the Cantwell to Healy segment of the transmission line corridor.

92 The EIS has been expanded to include a discussion of underground cables as an alternate made of transmitting electricity. Economic considerations will not be the basis for selecting overhead trans mission lines in lieu of underground cables. Other factors which will be considered include environmental impacts, technical problems, maintenance, and reliability.

93 The EIS has been expanded to include a discussion of the relative impacts of the alternate transmission line corridors.

94 As stated in the EIS, the current National Register of Historical Places was consulted, and revealed no National Register properties which would be affected by the project. National Register criteria (36 CFR 800) will be applied not only to the cabin identified in the preliminary reconnaissance study made by the Alaska Division of Parks under contract to the Corps, but to the entire area affected by the project. This includes thorough archaeological and historical surveys along all access road routes, transmission line corridor, and the dam and reservoir sites.

March 3, 1849

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
NORTHWEST REGION
~~1000 SECOND AVENUE~~ 915 SECOND AVENUE, RM. 990
~~SEATTLE, WASHINGTON 98104~~ SEATTLE, WASHINGTON 98174

IN REPLY REFER TO:
E3027

Colonel Charles A. Debelius
District Engineer
Alaska District, Corps of Engineers
P.O. Box 7002
Anchorage, Alaska 99510

NOV 11 1975

Dear Colonel Debelius:

The Draft Environmental Statement, "Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska," has been received in this office for review and comment. The following comments are provided for your consideration.

We recognize that environmental studies are not complete; nonetheless, we would like to mention two subjects which we feel should be covered in more detail.

95 The whole subject of roads to the hydroelectric developments, to the recreation facilities, and to and along the transmission corridor has not been adequately addressed. Locations and impacts of roads whether permanent or only for the construction period need to be discussed in greater detail.

96 The intrusion of man as construction worker and later as recreationist may have significant impacts on the ecology of this area. The effect of man and his machines and the impacts associated should be discussed in greater detail also.

97 It should be noted that this is the view of our office and does not necessarily represent the official view of the Secretary of the Interior.

We appreciate the opportunity to comment and hope our comments will assist in the preparation of the final statement.

Sincerely yours,

Maurice H. Lundy
Regional Director
by Richard L. Winters

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION

95 Specific location of roads, both permanent and temporary, has not been determined at this stage of planning for the proposed projects. Detailed planning and design for this transportation network will be accomplished in the post-authorization stage. A proposed road corridor has been identified for the approximate 64-mile road to the Watana damsite (Figure 4). Location, design, construction, rehabilitation, and maintenance of the project road system will be given prime consideration with the utilization of good landscape management practices. When the specific road system has been developed, this system and its related impacts will be discussed in future supplements to the statement.

96 The opening up of the Susitna Basin to man and his machines is considered one of the major adverse impacts of the proposed projects. This action will increase the need for institutional regulations in an area that presently has few to control activities that would be magnified because of easy access. This, in turn, will have both social and economic impacts in that man may not be able to do things in the future that he was used to doing in the past, and would cost more because of the need to enforce the regulation to protect the environment.

97 Noted.

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
Room 412 Mohawk Building
222 S.W. Morrison Street
Portland, Oregon 97204

November 24, 1975

IN REPLY REFER TO
10ED.3

Colonel Charles A. Debelius
District Engineer
Alaska District, Corps of Engineers
P. O. Box 7002
Anchorage, Alaska 99510

Re: Draft Environmental Impact Statement
Hydroelectric Power Development
Upper Susitna River Basin
Southcentral Railbelt Area, Alaska

Dear Colonel Debelius:

We have the following comments on the above DEIS which you may wish to consider:

98 1. The report depicts that the general choice of the routes to place the transmission lines is within the existing highway corridor from Summit to Healy. At present, there is nothing to mar the pristine beauty of the valley except for the railroad on one side and the highway on the other. The Nenana River meanders through a pass in the Alaska range. The beauty is stunning viewed from both the railroad and the highway. To add a transmission line through this corridor would certainly destroy the unusual natural beauty. The Broad Pass area south of Cantwell is without trees and transmission lines would be difficult to hide.

99 2. We have noted there is no mention of the recent archeological find near Carlo Creek. You may wish to include this in your discussions on page 93.

100 3. A discussion of impacts to the existing highway system that may occur as a result of this project is needed. This should include the potential need for reconstruction or added maintenance costs resulting from transporting necessary construction materials. Also, any hazards to traffic that may occur during construction should be discussed.

We appreciate the opportunity to comment on this draft EIS.

Sincerely yours,

Richard C. Cowdery, Director
Office of Environment and Design

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

98 Comment noted.

99 The recent archeological find near Carlo Creek was excavated in a road cut on the Parks Highway near Mt. McKinley National Park. The remains of both fossils and artifacts were found in this buried site. Thorough archeological reconnaissance will be made of the entire transmission line corridor prior to establishing the exact alinement of the transmission line. It is expected that most sites can be avioded by judicious alinement. If and where this should be impossible, appropriate salvage or other mitigative measures will be taken.

100 The total impact of this project on the existing highway system has not yet been evaluated. the impact would include additional vehicle travel due to the project construction phase. Only a moderate increase in vehicle traffic over normal highway travel due to the use of project facilities is expected after project construction. Studies required to evaluate the potential need for reconstruction or added maintenance costs will be made during the detailed planning phase. No such needs have been identified during the feasibility stage of planning. Impacts on the highway system, overall, should be minor.

Form DOT F 1320.1 (1-67)

UNITED STATES GOVERNMENT

DEPARTMENT OF TRANSPORTATION

OFFICE OF THE SECRETARY

Memorandum

DATE: November 11, 1975

In reply refer to:

SUBJECT: Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska

FROM : Secretarial Representative, Region 10

TO : District Engineer
Corps of Engineers
Anchorage, Alaska

Attached is the only comment received from DOT agencies on the subject EIS.

RHBrown
for DON SAMUELSON
Regional Representative of the
Department of Transportation, Region 10

Attachment

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
COMMANDER (dpl)
17TH COAST GUARD DISTRICT
FPO SEATTLE 98771

1 October 1975

From: Commander, Seventeenth Coast Guard District
To: Secretarial Representative, Region 10, Seattle, WA.
Attn: CAPT R. T. BROWER

Subj: Review of EIS for Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska; comment concerning

1. Subject EIS has been reviewed and the only significant Coast
Guard impact would be the increase in recreational boating activity **101**
on the newly created lakes behind the dams. No other areas of
Coast Guard interest were revealed.

A. D. GRANTHAM
By direction

RESPONSE TO COMMENTS BY
U.S. DEPARTMENT OF TRANSPORTATION
COAST GUARD

101 Comment noted.

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

DEPARTMENT OF THE ARMY
U.S. ARMY COLD REGIONS RESEARCH AND ENGINEERING LABORATORY
HANOVER, NEW HAMPSHIRE 03755

CRREL-RE 12 November 1975

SUBJECT: Review Draft Susitna Impact Statement

District Engineer
U.S. Army Engineer District, ALASKA
P.O. Box 7002
Anchorage, AK 99510

1. USACRREL staffs both in Fairbanks and Hanover have reviewed the Draft Environmental Impact Statement, "Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska." We find the report a comprehensive assessment of the proposed project and one which deals realistically with the adverse environmental effects.

2. Our comments are more specifically directed at questions requiring further investigation and which should be kept in mind as the project develops. These are briefly stated:

a. The influences and constraints of permafrost at the dam sites for design purposes and in the reservoirs, particularly as related to erosion along shorelines. The need for proper assessment of permafrost conditions and how the impoundment will modify ground temperatures is apparent.

b. The influence of a fluctuating river level below Devil Canyon on winter ice formation. Ice production is likely to increase as a result of the fluctuating water levels (breaking up of the ice cover due to peak power releases). This may cause down river ice problems due to natural or man-made obstructions.

c. The production of frazil ice in the white water section of Devil Canyon and earlier ice formation in the reservoir. These may result in restricted flow conditions and greater ice formation in the impoundment.

d. The change in reservoir and down river water qualities particularly under winter, ice-covered conditions. The question of modified sediment load and its significance to both fish productivity and flood plain ecology requires additional investigation.

102 e. Modification in flood plain and reservoir shoreline vegetation as a source of high quality forage for moose and waterfowl and methods to reduce adverse visual impacts. The question of large, seasonal fluctuation in the Watana impoundment and how to stabilize the shoreline for wildlife and recreational use and erosion control requires further investigation.

f. Site investigations related to transmission line corridors. These are required to resolve questions of large mammal impacts and optimal restoration techniques for erosion control and visual impacts.

103 3. We also note an apparent discrepancy in the calculation of the annual production of 3.0 billion KWH for the Devil Canyon (180MW/4400 cfs/Francis unit is given on p. 3; on p. 45, Table I, average regulated flow is approximately 4200cfs/month; 9200cfs/4400cfs/180MV ≈ 376MW per month or 4.5 billion KWH per year). Is this a real difference or due to assumptions made in arriving at the 3.0 billion figure?

4. I look forward to receiving copies of the final statement and in providing the District with continued input from our staff.

ROBERT L. CROSBY
Colonel, CE
Commander and Director

RESPONSE TO COMMENTS BY
DEPARTMENT OF THE ARMY
CRREL

102 The Corps generally concurs with the needs for further investigations as itemized under paragraph 2 of the CRREL letter. All necessary additional engineering and biological studies will be conducted during the pre-construction stage of planning.

103 The 4,400 cfs relates to the maximum discharge per each 180 mw (name plate) unit, and in no way enters into the energy potential of the river. The actual dependable capacity of each unit is roughly 171 mw based on the firm annual energy and a 50 percent plant factor. It must be realized that only under peak load requirements or heavy reservoir inflow would all 4 turbines be operated simultaneously. For example, if all 4 turbines were operated at full overload capacity for an entire year (4 X 180 mw X 1.15 = 828 mw), the energy produced would be 7.25 billion kilowatt hours of energy. By applying the Devil Canyon maximum head to the basic power equation, the resulting average monthly streamflow required to produce the hypothetical 7.25 BKwh energy would be in excess of twice the average monthly streamflow of 9,200 cfs.

Subsequent estimates of dependable capacity based on average annual evergy have resulted in a re-sizing of the Devil Canyon units to 194 mw, each with a maximum hydraulic capacity of roughly 6,200 cfs.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION X
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

REPLY TO ATTN OF: 10FA - M/S 623

November 13, 1975

Colonel Charles A. Debelius
Department of the Army
Alaska District, Corps of Engineers
P. O. Box 7002
Anchorage, Alaska 99510

Dear Colonel Debelius:

We have completed review of your draft environmental impact statement, "Hydroelectric Power Development, Susitna River Basin" and submit the following comments.

104 The increased river turbidity during the winter months caused by releases from the reservoir is of particular concern. The statement, on page 46, says "preliminary studies by the Corps of Engineers indicate that the suspended sediment would be at low levels (15-35 ppm)." These levels of suspended sediment are sufficiently high to warn of potential violations of water quality standards. These Joint Federal-State Water Quality Standards (18AAL·70.020) limit suspended solids by prohibiting deposits which adversely affect fish and other aquatic life reproduction and habitat. The standards limit turbidity to less than 5 Jackson Turbidity Units (JTU) above background.

We recognize the high natural suspended solids load carried by the Susitna River. During the winter, however, the Susitna contains relatively clear water. The absolute value of the solids level is not as important as the change in timing of the higher solids level from summer to winter. The magnitude of this change and potential standards violations should be discussed in the final impact statement.

Another concern would be possible altered temperatures due to releases from the reservoir. According to the statement, by using multiple level discharge outlets, the temperature of the released water could be made to approximate natural conditions. We are interested in the operational details of this procedure. How will natural temperatures be established once the project is in operation? 105

The discussion of supply and demand of electric power on pages
40 and 64 implies no large excess of power not needed by the projected
population increase. That is, no large amounts of power would be
available to promote large scale industrial projects with their
secondary environmental effects. A more quantitative discussion is
needed to show the approximate equivalence of future demand and supply 106
of energy.

Under "Sedimentation" on page 62 mention is made of deposits of
heavier sediments in the upper reaches of the Watana reservoir. Would
the higher drawdown at Watana combined with gradual bottom slope and
sediment accumulation form large mud areas devoid of vegetation? 107
Would these areas tend to increase as the age of the project increased?
These questions and possible remedies need to be addressed.

Additional environmental studies are promised when congressional
authorization for the project is obtained. Because of the present
insufficiency of information in some areas, the statement is not adequate
for review purposes at this time. Consequently, we are classifying
our comments on this project as ER-2 (Environmental Reservations-
Insufficient Information). The ER rating is based on the potential
violation of Water Quality Standards. This issue must be addressed
in the final statmeent. The Insufficient Information rating is based 108
on the anticipated future studies. This classification of the Environmental Protection Agency's comments will be published in the <u>Federal
Register</u> in accordance with our responsibility to inform the public of
our views on proposed Federal actions.

Our rating of the project relates solely to its water quality aspects and does not indicate either our opposition or support. The Environmental Protection Agency's responsibility is to make certain that adverse impacts within our area of expertise are clearly documented.

Thank you for the opportunity to comment on this draft environmental impact statement. If you have any questions concerning our comments or categorization procedures, please let us know.

Sincerely yours,

Walter D Jaspers

Walter D. Jaspers
Director
Office of Federal Affairs

RESPONSE TO COMMENTS BY
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION X

104 Due to the sediment retention characteristics of the reservoirs, suspended sediments downstream from the Devil Canyon Dam would be significantly reduced overall. This reduction would be most apparent during the summer months when glacial melt results in extremely high sediment loads. This presently occurs during the salmon spawning period, when siltation and turbidity are likely the most critical to aquatic life reproduction and habitat. The EPA estimated increase in turbidity during the winter months may be high. These estimates of 15 to 35 ppm in the releases at Devil Canyon Dam are based on measured suspended sediment concentrations below glacial-fed natural lakes in Alaska, including rivers flowing from Skilak, Tustumena, Eklutna, and Long Lakes. The proposed projects will have multiple-level discharge outlets which will permit selective withdrawal of outflows from a range of reservoir elevations. As stated in Section 4.01 of the EIS, sediment samples taken by the Alaska Department of Fish and Game during the winter of 1974-75 in the Susitna River between Gold Creek and Talkeetna indicated a range of 4 to 228 ppm.

105 One of the major reasons, along with control of oxygen content, for incorporation of multiple-level discharge outlets into the dam structures is to provide for temperature regulation of water released from the reservoirs. Since there will be thermal stratification in these deep pools throughout the year, water can be released from various heights, or combination of heights above the "dead" storage space, to provide a mix of waters approaching natural streamflow temperatures.

106 See response number 255.

107 The answer to both questions is "yes." These are phenomena characteristic of any reservoir receiving heavy sediment loads and having significant periodic drawdown. Mudflats would become most extensive in areas immediately above the low-water pool. As the water level falls from the high pool elevation, much of the sediment accumulated within the inundated streambed would be flushed down into the reservoir. Lands immediately above the low pool elevation would become inundated too early in the spring for plant growth to establish. However, the higher elevations within the drawdown area would probably develop a growth of annual grasses and forbs prior to being inundated late in the summer or early fall.

108 Comments noted.

FEDERAL POWER COMMISSION
REGIONAL OFFICE
555 BATTERY STREET, ROOM 415
SAN FRANCISCO, CALIF. 94111

December 4, 1975

Colonel Charles A. Debelius
District Engineer
Alaska District, Corps of Engineers
P. O. Box 7002
Anchorage, Alaska 99510

Dear Colonel Debelius:

We have reviewed your Draft Environmental Impact Statement on the Hydroelectric Development Upper Susitna River Basin, Southcentral Railbelt Area, Alaska, dated September 1975.

These comments of the San Francisco Regional Office of the Federal Power Commission's Bureau of Power are made in accordance with the National Environmental Policy Act of 1969, and the August 1, 1973, Guidelines of the Council on Environmental Quality.

Our comments are primarily directed toward the need for power that would be produced by the Upper Susitna Development, the alternative power sources, and the fuel situations relative to non-hydroelectric power alternatives.

The recommended plan is to construct dams and power plants at the Watana and Devil Canyon sites and electric transmission facilities to the Railbelt load centers. The proposed plan for the Watana site would include the construction of an 810-foot high earthfill dam and power plant which would contain three Francis turbines with a nameplate capacity of 250 MW each. The firm annual generation would be 3.1 billion kWh. Development of the Devil Canyon site would include a 635-foot high thin-arch dam and power plant with four Francis turbines, each rated at 180 MW. The firm annual generation would be 3.0 billion kWh with regulated streamflow from Watana storage. The electrical power generated would be transmitted to the Fairbanks - Tanana Valley and the Anchorage - Kenai peninsula areas. The recommended development is shown to be economically feasible.

(1) The Need for Power

We agree with and endorse the subject report's assertion in Section 2.04 that substantial amounts of new generating capacity will be needed to meet future power requirements of the Southcentral Railbelt area. Recent studies of the Southcentral and Yukon region (which includes the Southcentral Railbelt as its main component), as defined in the 1974 Alaska Power Survey Report of the Executive Advisory Committee, indicate that rapid rates of increase in power requirements will continue at least for the balance of the 1970's, reflecting economic activity associated with North Slope oil development and expansion of commercial and public services. Estimates beyond 1980 reflect a range of assumptions as to the extent of future resources use and industrial and population growth. All indications are that accelerated growth will continue through the year 2000, with economic activity generated by North Slope oil and natural gas development being a major factor - but only one of several important factors. It is generally considered that the Southcentral-Yukon regional population will continue to grow at a faster rate than the national and state averages, that future additional energy systems and other potential mineral developments will have a major effect, and that there will be notable expansion in transportation systems. Significant economic advances for all of Alaska and especially for the Alaska Native people should be anticipated as a result of the Alaska Native Claims Settlement Act. Other influencing factors could be cited, but the general outlook is for further rapid expansion of energy and power requirements in the Southcentral-Yukon area.

A range of estimates for future power requirements of the Southcentral and Yukon regions is presented in the 1974 Report of the Alaska Power Survey Technical Advisory Committee on Economic Analysis and Load Projections. The range of estimates attempts to balance a myriad of controlling factors including costs, conservation technologies, available energy sources, types of Alaskan development, et cetera. The higher growth range anticipates significant new energy and mineral developments from among those that appear more promising. The lower growth range generally assumes an unqualified slackening of the pace of development following completion of the Alyeska pipeline and, in our opinion, is not considered realistic. The mid-range growth rate appears to be a reasonable estimate which we adopt as most representative based on recent manifestations and our assessment of future conditions. It should be noted that there are several responsible advisory committee members who feel that recent acceleration of mineral raw material shortages of all kinds indicates a possibility that even the high range estimates could be exceeded. Table 1, which is a condensed extract of information contained in the aforementioned advisory committee report, summarizes load estimates for the Southcentral and Yukon Regions. Indicated load increments by decade are as follows:

Increments of Southcentral-Yukon Power Requirements

	1972-1980		1980-1990		1990-2000		1972-2000	
	Peak Demand MW	Annual Energy GWh	Peak Demand MW	Annual Energy GWh	Peak Demand MW	Annual Energy GWh	Peak Demand MW	Annual Energy GWh
Higher Estimate	888	4 623	4 460	28 110	2 800	13 070	8 148	45 803
Mid-Range	638	3 093	930	4 570	1 950	10 240	3 518	17 903

According to the subject report, a total of 6100 GWh of firm annual energy would be produced by the combined Devil Canyon-Watana system which would have a nameplate capacity of 1470 MW. Although the report does not indicate proposed commercial operation dates, based on information in our files the project would be staged and the initial Devil Canyon installation (3000 GWh and 720 MW) could become operable in 1985 and the ultimate installation in 1990. Under this timetable it is apparent that there is a need for power in the Southcentral-Yukon Region by 1985 and 1990 in the order of magnitude of at least as much as the proposed subject development. Therefore, operation of the proposed project would help meet the power needs of the Southcentral Railbelt area by 1985 and beyond.

(2) Alternative Power Sources and Fuel Situation

Our recent estimate of power values for the Devil Canyon-Watana project indicates that the most economical alternative to the project's output would be power from a combined cycle generating plant using natural gas as an operating fuel. We acknowledge the subject report's premise that there are many questions concerning future availability and costs of natural gas and oil for power production. It is the policy of this Commission to discourage use of natural gas as an operating fuel for power generation in the contiguous United States. Due to changes in requirements, other Federal and/or State agencies may impose restrictions on the future usage of natural gas and oil for electric power production throughout Alaska. Recognizing the undertainty of the future availability of natural gas and oil after 1985 for new generating capacity, the possibility of its restrictive use if available, and its sensitivity to worldwide pressures, coal may be the most likely alternative fuel for thermal-electric plants to be constructed in the mid-1980's and beyond. Essentially, we agree with the discussion of alternative sources of power in paragraphs 6.02.1 - 6.02.10 of the subject report.

(3) Other Alternatives to the Proposed Action

The Corps' DEIS discusses several potential alternative hydroelectric developments within the Southcentral Railbelt Area. All of these alternatives either have a greater adverse environmental impact than the proposed plan, or are not considered feasible at the present time.

Very truly yours,

109 George R Bell (Deputy)
M. FRANK THOMAS
(Acting) Regional Engineer

Attachment
(Table 1)

TABLE 1

Total Power Requirements

Southcentral and Yukon Regions 1/

	Actual Requirements		Estimated Future Requirements					
	1972		1980		1990		2000	
Region	Peak Demand MW	Annual Energy GWh	Peak Demand MW	Annual Energy GWh	Peak Demand MW	Annual Energy GWh	Peak Demand MW	Annual Energy GWh
			Higher Rate of Growth					
Southcentral	317	1 465	990	5 020	5 020	30 760	7 190	40 810
Yukon (Interior)	115	542	330	1 610	760	3 980	1 390	7 000
Total	432	2 007	1 320	6 630	5 780	34 740	8 580	47 810
			Likely Mid-Range Growth Rate					
Southcentral			790	3 790	1 530	7 400	3 040	15 300
Yukon (Interior)			280	1 310	470	2 270	910	4 610
Total			1 070	5 100	2 000	9 670	3 950	19 910

1/ As defined in the 1974 Alaska Power Survey

RESPONSE TO COMMENTS BY
FEDERAL POWER COMMISSION
REGIONAL OFFICE

169 Statements and comments from the Federal Power Commission are noted, including the general agreement on power needs and alternatives.

STATE COMMENTS AND RESPONSES

	Comments
State of Alaska	
State Policy Development and Planning	110-111
Department of Environmental Conservation	112-125
Department of Commerce and Economic Development	126-128
Department of Fish and Game	129-160
Department of Natural Resources	161
Department of Public Works	162-169

STATE OF ALASKA

OFFICE OF THE GOVERNOR

STATE POLICY DEVELOPMENT AND PLANNING

JAY S. HAMMOND, GOVERNOR

POUCH AD – JUNEAU 99811
PHONE 465-3512

November 10, 1975

Colonel Charles A. Debelius
Corps of Engineers
District Engineers
Department of the Army
Alaska District
P.O. Box 7002
Anchorage, Alaska 99510

Subject: Southcentral Railbelt Hydroelectric Project
State I.D. No. 75091103

Dear Colonel Debelius:

The Alaska State Clearinghouse has completed review on the subject project.

The following agencies were invited to review and comment:

- State of Alaska
  - Department of Community & Regional Affairs
  - Office of Planning & Research (H&SS)
  - Department of Environmental Conservation
  - Department of Fish & Game
    - Anchorage
    - Fairbanks
  - Department of Highways
  - Department of Law
  - Department of Natural Resources
    - Division of Lands
    - Division of Parks
  - Department of Public Works
  - Department of Commerce & Economic Development
  - Alaska Energy Office
    - Division of Policy Development

Five of the above agencies responded and their comments are attached.

110 The State does not object to this project at this time, however, our final position cannot be determined until a more comprehensive review of this project has been completed by the State.

It is obvious from the responses received in this office that a great deal of additional studies will have to be done before the real impact can be determined. The Governor has created a multi-agency State Task Force to conduct a thorough assessment of the Susitna River hydroelectric power development proposals. This group will make recommendations to the Governor on a number of critical aspects of the proposal, including an analysis of demand projections, alternate energy sources, growth impacts, and environmental effects. The Corps should consider this Task Force as its basic contact with the State on this project. 111

The Clearinghouse finds this project to be consistent with State long-range planning goals and objectives. Therefore, this letter will satisfy the review requirements of the Office of Management and Budget Circular A-95.

Sincerely,

Raymond W. Estess

Raymond W. Estess
State-Federal Coordinator

Attachment

cc: Commissioner Langhorne Motley

RESPONSE TO COMMENTS OF
STATE OF ALASKA
STATE COVER LETTER

110 Subsequent to receipt of the Alaska State Clearing House letter of 10 November 1975, the Corps met with the Governor's multi-agency State Task Force on 12 December 1975. This group was established to conduct a thorough assessment of the Susitna River hydroelectric power development proposal, and to make recommendations to the Governor on a number of critical aspects of the project. The purpose of this initial meeting, which was considered very fruitful by Task Force members, was to provide a more comprehensive review of the project. Subsequent coordination will be conducted with the Task Force to provide them with additional information on which to base their recommendations.

111 Detailed studies will be conducted in the future to evaluate, in depth, the impact of the project before recommending funding of construction should the additional studies indicate the project is still viable.

MEMORANDUM State of Alaska

RECEIVED
NOV 4 1975
[illegible]

TO: Raymond W. Estess
State-Federal Coordinator
Division of Policy Development
and Planning
Office of the Governor

DATE: November 3, 1975

FILE NO:

TELEPHONE NO:

FROM: Ernst W. Mueller
Commissioner
Department of Environmental Conservation

SUBJECT: Draft EIS--Hydroelectric Power Development, Upper Susitna River

The Department of Environmental Conservation is aware that the proposed activity is a legislative action. However, if the Congress does authorize the construction of this project as the Corps of Engineers is requesting, the Corps must initiate detailed studies culminating in the formulation of a comprehensive environmental impact statement on the proposed hydroelectric power project. Rather than simply commenting on the draft EIS, it is essential that this Department and other interested State and Federal agencies participate in all stages of the planning, research, and construction review phases of this activity. 112

To implement this proposal, the Department of Environmental Conservation proposes that a joint Federal-State task force be formed and meet on a regular basis to review, comment, and advise the Corps on the environmental implications of each phase of the proposed hydroelectric power project in the Upper Susitna Basin. Members of this task force should include representatives from the Governor's Energy Office, the Department of Environmental Conservation, the Department of Fish and Game, the Department of Natural Resources, the United States Fish and Wildlife Service, the National Marine Fisheries Service, the Bureau of Land Management, and the Alaska Power Administration. 113

By utilizing such an interdisciplinary planning team, the environmental, social, economic, and engineering aspects of this project can be fully analyzed and researched, and appropriate mitigating measures taken. 114

The following are our comments on the draft EIS:

The figure of 35% salmon fry mortality in turbines (p. 51, EIS) should be footnoted and referenced as there are a large number of variables that may affect this figure. In addition to fish mortality in turbines, there are several other project-associated conditions listed which, if considered collectively, might represent potential for significant impact to resident and anadromous fish. They are as follows:

a. The unspecified effects of cooler summer and winter water temperatures on anadromous and resident fish (p. 67 of the Feasibility Study).

b. The effects on migrating fish caused by the reduction of natural river flows during late June and early July (p. 69).

115
c. Effects of the spilling of water over Devil's Canyon Dam (pp. 66-67).

d. The possibility that reduction in flow, turbidity, and temperature below Devil's Canyon Dam might cause disorientation of migrating salmon during an "initial period" during and after construction (p. 70).

e. The feasibility of passing migrating fish over and through the high dams (p. 72).

116 On page 75 of the Feasibility Study, there is the possibility, however small, that transmission lines might impede migrating big game through its inherent characteristics, such as constant noise (line hum) and "smell" (ozone). Any in-depth studies of impacts resulting from this project's transmission line routings, including alternate routes, should be referenced. In addition to direct impacts such as on scenic-visual quality and archeological sites, such studies should deal with indirect impacts such as new residences, for example, the new capital site and industries that otherwise could not locate in the region without the available power.

117 The figure cited for frequency of spilling excess water at the Devil's Canyon Dam on page 46 (once every 10 years, three-day duration) can also be contested. The magnitude of the nitrogen super-saturated water problem on the Columbia River suggests that resident and anadromous fishes could be adversely affected on a much more frequent basis. The reduced flow velocity downstream from the dam will more than likely allow passage of fish upstream into previously inaccessible areas adjacent to the dam, subjecting them to the problems cited above. Precautions taken to mitigate these problems are not stated and one has to assume that few, if any, measures will be taken in dam construction to accommodate these concerns.

118 In reference to page 58, EIS, the climax or near climax vegetation, in this case predominately white spruce, is also preferred nesting for a number of important avian species.

119 One major potential adverse impact not mentioned (p. 67, EIS) is failure of the dam structure. With regard to this, more detail is needed on the high potential in the region for severe seismic activity. What, in addition to seismic shocks, are the chances for landslides generating surges of displaced water, fault displacement, and other responses to seismic activity exceeding structural limits? The effect of inundated areas of seismic activity is only now being understood, and must be fully addressed in the EIS.

Attention should also be given to any landslide potential resulting from inundation and subsequent saturation and/or erosion of slopes. This is particularly true where permafrost exists. Little is known and less is understood about the behavior of permafrost around and under an inundated area, but one certainty is that it will thaw under water and where exposed at shoreline. This could lead to mass wasting on even moderate slopes, creating an unstable condition that could then migrate uphill. A detailed treatise on the behavior of permafrost is strongly recommended for this project. The threat of massive erosion resulting from liquification of permafrost constitutes a priority impact consideration. 120

What volume of sediment annually do the ppm load figures represent, i.e., what is the basis for projecting a "500 year" project life? (p. 91.) 121

One failing of the environmental impact statement is a more detailed analysis of Alternative Hydrologic Basins in the Southcentral Railbelt Area (6.03) and Alternative Power Transmission Corridors (6.05). While the case for the Upper Susitna River site is convincingly and completely presented and acknowledging that the DEIS is written specifically for this site, the alternative areas are not developed in sufficient detail. Phrases like "tremendous financial investments" and "substantial environmental impacts" (p. 78) are used to justify rejection of specific alternatives. These comments are highly subjective and should not be substituted for factual data. 122

It is also a point of conjecture that alternative exotic energy sources, particularly geothermal, should be categorically dismissed as being economically and technologically impractical in this region. This is not necessarily so and may represent a serious underestimation of their long-term potential. For example, hydrogeneration from non-constant energy sources is showing much promise. Also, tidal power was understated as there is potential for using Cook Inlet's large tide range in an environmentally acceptable manner. 123

The use of different scales for the map series Figures 4-8 makes easy comparison of competing land use values difficult. This is especially true where the major landmarks (e.g., Susitna River and tributaries) are not included on the map. For example, compare Figures 4 and 7. The Upper Susitna River, Watana, Devil's Canyon Damsites, and proposed transmission corridors should be highlighted on the habitat map so that the impacted area can be easily seen. It would also be helpful to incorporate more detailed information on wildlife distribution and seasonal movements in the final environmental statement than that provided by the map series of the Joint Federal-State Land Use Planning Commission. One major source in this regard could be the Alaska Department of Fish and Game's Alaska Wildlife and Habitat Atlas. This information base could be further expanded through informal discussions with wildlife biologists of the State and the U. S. Fish and Wildlife Service. 124

One point that has not been adequately addressed in the DEIS is the following question: Will the proposed hydroelectric power development act as a catalyst for unwanted growth in Southcentral Alaska? The literature is replete with cases which clearly indicate that highways and sewer and water systems can induce unwanted growth. Does the same rationale hold true for the proposed hydroelectric facility in the Upper Susitna Basin? These questions have been only weakly addressed on pages 63 and 64 of the DEIS. 125

RESPONSE TO COMMENTS BY
STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

112 Concur.

113 Concur. We suggest that local government entities also participate.

114 Comment noted.

115 The 35 percent mortality rate on fish, such as young salmon, is a figure based on Corps of Engineers experience at other high dams.

a. This will be a factor. Alteration of temperature regime will certainly influence salmon egg development, and possibly outmigration time. As stated in Section 4.01 of the EIS, the use of multi-level discharge outlets at the dams would allow for some adjustment in temperature to approach the natural river temperatures.

b. The EIS acknowledges in Section 4.02 the possible impact on migratory salmon.

c. Supersaturation of gases requires more than spill. Temperature, distance, and volume are also factors. This impact is discussed in the EIS and will be the subject of detailed design studies.

d. Same as b.

e. Based on extensive studies on the Columbia River and in British Columbia, cost, engineering, and biological considerations cumulatively make fish passage over high dams infeasible.

116 Concur. These considerations will be studied and evaluated in detail prior to any recommendation for project construction.

117 A change in design of outlet and generating facilities at the dam has revised the spill frequency at Devil Canyon as shown in the EIS. Salmon are not likely to attempt to migrate to the dam, even if passage is possible (which appears unlikely)since the last tributary in which they are able to spawn is Portage Creek--several miles below the dam. Contrary to the stated assumption, features will be incorporated into the dam outlet works to minimize nitrogen supersaturation.

118 Comment noted.

119 Dam design will incorporate features to withstand earthquakes of

An extreme magnitude of 8.5 with an epicenter of 40 miles which is greater than the maximum credible earthquake that could be expected to affect these damsites. No dams designed by the Corps of Engineers have ever failed, and the Corps has a record of being very conservative in designing safety features into dams.

120 For a discussion of landslide potential resulting from thawing of permafrost, see response Number 173.

121 Additional sediment information can be found in Appendix I of the feasibility report. Project costs and benefits are based on a standard 100-year period for this type of project. Actual useful life of the project would be substantially more than 100 years, and, based on sedimentation studies alone, the project would have a useful life in excess of 500 years.

122 The alternative hydrologic basins and power transmission corridors were studied in sufficient depth to determine their economic, social, environmental, and engineering feasibility. All alternatives rejected for further consideration failed to meet standards of acceptability under one or more of these criteria. A more thorough analysis of each of these alternatives is displayed in the Feasibility Report and its technical appendices. Phrases such as "tremendous financial investments" and "substantial environmental impacts" are supported by the results of previous studies on many of the alternative damsites. Reports of these studies are available in the District office. These terms are not the basis for rejection of specific alternatives. The Congressional mandate specifically directed the Corps to evaluate the Devil Canyon Project.

123 "Exotic energy sources" were not categorically dismissed. The long-term potential of geothermal energy is clearly acknowledged in the first sentence of the discussion of this alternative, which states: "Geothermal resources may eventually provide significant power generation in Alaska;....." (emphasis added). However, as clearly stated in the EIS, this alternative depends on technological development and economic feasibility. Futhermore, it is considered to be a future supplemental means of generating power. It is not considered to be a reasonable alternative to proven types of power generation within the time-frame of projected future electrical needs. Tidal power is not rejected on the basis of technical feasibility. We do not agree that it could be developed in Cook Inlet in either an economically or environmentally acceptable manner within the foreseeable future.

124 The Susitna River and the damsites have been emphasized in figures showing the various resources within the Railbelt area. Information in the Alaska Wildlife and Habitat Atlas is similar to data in the

Southcentral Regional Profile printed September 1974 in cooperation with the Joint Federal-State Land Use Planning Commission for Alaska. The Corps of Engineers also had the close cooperation of the State and Federal fish and wildlife agencies in developing the EIS.

125 As stated in Section 4.18 of the EIS: "The population of the area will increase with or without the development of hydroelectric projects proposed for the Susitna River; construction of this project is not expected to have any significant long-range effect on overall population growth, but is rather designed to fulfill presently projected needs of a growing population as one alternative means of producing power which will have to be provided in one way or another." For further response to this comment, see response No. 255,

STATE
of ALASKA

MEMORANDUM

DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT

OCT 24 1975

OPR: Mike Ford
465-2022

TO: Raymond W. Estess
State-Federal Coordinator
Division of Policy Development
and Planning
Office of the Governor

DATE: October 16, 1975

FROM: Langhorne A. Motley
Commissioner
Department of Commerce and
Economic Development

SUBJECT: Southcentral Railbelt Hydroelectric Project
State I.D. No. 75091103

The hydroelectric project proposed by the Alaska District Corps of Engineers is a key element in meeting Alaska's future power needs. 126

At present, the project needs to receive an intensive and detailed study of several potential adverse impacts on the environment. These include further examination of the dam's effect on the anadramous fish, the increased turbidity of the Susitna River during winter months, and the inhibition and higher mortality of the caribou population. 127

However we believe the project should, at this point, receive the full support of the State for the following reasons:

a) It utilizes a renewable resource;
b) environmental impact is comparatively less than alternative power sources;
c) federal approval would result in the Corps receiving needed funding to obtain the answers to the necessary questions of adverse environmental impact, through further detailed analysis and study. 128

In summary, project is definitely necessary if Anchorage and Fairbanks are to receive low-cost, dependable power, and the subsequent lack of heat, noise, and air pollution problems add to its feasibility. The draft environmental impact statement raises several pertinent questions, but the answers will only be achieved through State and Federal support of the project.

RESPONSE TO COMMENTS BY
STATE OF ALASKA
DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT

126 Comment noted.

127 Concur. Such studies are proposed for the pre-construction stage of detailed planning.

128 Comments noted.

MEMORANDUM State of Alaska

TO: Pete Cizmich
Regional Supervisor
Habitat Protection
Department of Fish & Game
Anchorage

DATE: October 2, 1975

FILE NO:

TELEPHONE NO:

FROM: Larry J. Heckart
Mgt/Research Coordinator
Division of Sport Fish
Department of Fish & Game
Anchorage

SUBJECT: Susitna (Devil's Canyon)
E.I.S. Comments

Following are the consolidated comments on the Corps of Engineers draft E.I.S. pertaining to the Susitna River Hydroelectric development:

Page 18, last paragraph - It is significant that some salmon species rear juveniles for several years in fresh water prior to seaward migration. This paragraph implies they originate in salt water. The fresh water rearing segment may be the most critical. 129

Page 19, paragraph 1 - Should mention what surveys and the year(s) they were conducted to determine that fish do not migrate beyond Devil Canyon. 130

paragraph 2 - This is not indicative of Northern District Cook Inlet (Susitna River Basin) as a whole. 131

paragraph 3 - ADF&G currently has escapement goals for Kenai and Kasilof rivers. We cannot conclude that adequate escapement occurs into the Susitna River because escapement goals have been reached in the Kenai and Kasilof rivers. 132

paragraph 4 - This paragraph should be rewritten as it is misleading as written, i.e.,: according to the ADF&G, a significant percentage of the Cook Inlet salmon run migrates up the Susitna River. Spawning is found to occur as far upstream as Portage Creek, approximately three miles downstream from the Devil Canyon dam site. Spawning and rearing salmonids occur in many clearwater sloughs and tributaries from Portage Creek downstream to the confluence of the Susitna Chulitna rivers. 133

Last two sentences in paragraph are okay.

paragraph 5 - Should identify study (first sentence) as 1974 assessment study by ADF&G.
Omit last sentence.
Also, king salmon are excluded. Barrett's 1974 report indicates king salmon present. 134

135 Page 20, paragraphs 1-5 - Trying to relate Cook Inlet catch to Susitna River stocks may be misleading. The Department does not have a method of differentiating salmon stocks in upper Cook Inlet that are landed in the commercial fishery. We do know that the majority of salmon landed in the Northern District commercial fishery are produced in the Susitna basin. However, we do not know what proportion of the commercial catch landed between the latitudes of Anchor Point and the Forelands are produced in the Susitna basin.

In certain years, primarily even years, a substantial per cent could be from the Susitna River. Therefore, to use the Northern District catch as an indicator of the Susitna production would be invalid.

The case pack for Cook Inlet as an indicator of Susitna production is also worthless in that it reflects the total cases of salmon packed in all districts of Cook Inlet and in some years includes fish packed from Bristol Bay and other areas.

In essence there is no present method of affixing a value to the Susitna River salmon production. We do have a "gut feeling" based on experience, that a substantial proportion of Cook Inlet salmon production is from the Susitna watershed.

136 Page 21, paragraph 1 - Why not a life history section for resident species, as given for anadromous species?

137 Page 23, paragraph 3 - Omit "limited". The numbers of game birds is unknown.

138 Page 24, Figure 7 - The white (unmarked) area in the center of the caribou range map is both summer and winter range. This area should be so indicated.

139 Page 27, paragraph 3 - Not true! Bears occur in both directions along the transmission corridor.

140 Page 37 & 38 - Recreation in the areas affected downstream of Devil's Canyon would appear to warrant mention.

Page 46, paragraph 1 - What is the source of information indicating unregulated summer silt loads? Again, while summer siltation is decreased and the effects may be beneficial, the increased winter silt load may cause deleterious effects.

At what point is the (15-35 ppm) sediment load calculated and at what seasonal period?

If multiple level discharge outlets are utilized to approximate normal stream temperatures it may be implied that in the winter water will be drawn from the bottom of the reservoir. It is logical to assume release from these levels would carry a greater silt load than those closer to the surface.

If this is so, discussions referring to a winter milky textured "glacial flow" may be extremely optomistic.

141 If the 15-35 ppm winter sediment load is calculated at the release sits it can be expected to increase rapidly as the downriver flows replace the sediment load lost upstream in the reservoir.

Estimates of 15-35 ppm winter sediment load appear extremely low and likely would not apply for any distance below Devel Canyon. Winter turbidity may well exceed the indicated estimate.

Page 49, paragraph 1 - If regulated flows are not great enough adults may be unable to enter sloughs and tributaries to spawn. Concern is expressed for extremely low water years and planned regulated flows under these conditions. 142

paragraph 2 - What flow reductions will occur during construction and the subsequent fill period and for what duration? 143

paragraphs 3 & 4 - More current data is now available re numbers of sloughs and tributaries utilized by salmon and other mainstem migrational characteristics. 144

The clear water condition of the Susitna River during winter months could be a contributing factor to salmon fry utilizing the mainstem. If a year-round somewhat milky-textured "glacial floor" condition is introduced because of controlled water releases below the dam, fry may not be able to rear in the mainstem Susitna River. 145

paragraph 7 - It is likely that a program to improve fish access to the sloughs as a result of decreased summer flows will not only be feasible but "necessary" and required. 146

Page 50, paragraph 1 - Previously (page 46) it was stated downstream water temperatures would approximate normal winter regimes. This paragraph implies decreased temperatures.

Green stated in his paper, entitled Ecological Consequences of the Proposed Moran Dam on the Fraser River that reduction in downstream discharge and resultant water velocities during the spring seaward outmigration could adversely affect survival of young salmon by extending the period required to make the migration.

He also suggested reductions in turbidity would likely limit daily migration to the darker hours, further extending the total migrational period.

Columbia River data indicates mortality of salmon increases with the time required to complete the downstream migration.

(see further comments following re increased mortalities dependent on silt loads).

147 Reductions in summer flow temperatures can be expected to reduce the speed of upstream migrating salmon. The degree to which this may affect maturation and eventual spawning must be determined.

Increased winter temperatures downstream of Devil Canyon can be expected to increase the rate of development and may load to premature fry emergence and downstream seaward migrations. These effects must be determined.

148 paragraph 2 - Should indicate what flows will be during this period. What about other water quality parameters?

paragraph 4 - This agency currently has available little evidence of significant mainstem Susitna River spawning downstream of Devil Canyon. Therefore, unless flows are high enough to flood the slough and tributary areas where spawning is known to occur, benefits are likely to be of little value.

149 paragraph 5 - While Green made this statement as re improved egg survival, he also suggested further increases in mortalities due to predation were possible due to decrease in turbidity.

It was also suggested that altered temperature, discharge, and turbidity regimes could significantly reduce the survival of outmigrant juvenile salmon.

There is no solid evidence available that adult salmon can adequately adjust to altered flow, temperature, and turbidity regimes.

150 paragraph 6 - final sentence - There is no evidence of mainstem spawning so it is doubtful there is anything to enhance. The reduction in summer flows may cause a reduction in both tributary spawning areas and tributary and/or mainstem rearing.

151 Page 51, paragraph 7 - This also applies to downstream areas. Insects are found to provide an important part of rearing fry diets.

152 Page 52, paragraph 3 - This sentence sounds theoretical. Cite evidence supporting this statement.

153 Page 53, paragraph 4 - Paragraph meaningless. Sample size too small to be significant.

paragraph 5 - Improvement of habitat quality through construction of transmission lines is theoretical. 154

Page 56, paragraph 1 - Hunting pressures will not <u>increase</u>, only the <u>potential</u> for hunting pressure increases. ADF&G has the statuatory capabilities to control the actual pressures. 155

Page 65, paragraph 2 - Will the summer silt loads during the 10-12 year construction period actually be decreased, or perhaps increased as a direct result of excavation, road building, etc.? 156

Page 66, paragraph 3 - Again, only the <u>potential</u> for hunting pressure is increased. 157

General Comments:

Findings indicate the lower reaches of the Talkeetna River are very important to adult and fry salmon. Changes in the Susitna River could potentially have a great effect on this area, too.

Another area not mentioned in the report is the possibility of the Susitna River just north of Talkeetna being a major milling area for salmon spawning downstream as is indicated by two seasons of tagging studies. The changes in the Susitna River could affect fish returning to the Talkeetna, Chulitna, and lower clearwater tributaries of the Susitna River. 158

Mention is not made of the loss of game habitat downstream of Devil Canyon due to flow regulation, thus eliminating the periodic flooding necessary for maintenance of riparian bar areas. Moose habitat can be expected to be adversely affected due to resultant successional changes in the downstream areas from Devil Canyon to Talkeetna. 159

This statement refers only to regulation versus non-regulation. The 12-year period of construction and resultant effects on the fish, wildlife, and recreational resources are not addressed. 160

RESPONSE TO COMMENTS BY
STATE OF ALASKA
DEPARTMENT OF FISH AND GAME

129 A sentence has been added establishing the fact that juvenile salmon may spend several years in freshwater before migrating to saltwater.

130 The paragraph is considered factual as presently stated. No data have been provided from any authoritative source, including the Alaska Department of Fish and Game, that salmon have ever been recorded upstream from Devil Canyon.

131 The statistics presented in this paragraph of the EIS are taken, as indicated by reference, from Leaflet #26 prepared by the State of Alaska Department of Fish and Game.

132 Comment noted.

133 A statement has been added that a significant percentage of the Cook Inlet salmon run migrates into the Susitna River Basin.

134 The paragraph has been revised as suggested with exception of omitting the last sentence. The statement made in the 1975 Alaska Department of Fish and Game assessment that a portion of the pink salmon run may have been destroyed by a late August-early September flood has not been omitted.

135 There is no attempt anywhere in the referenced five paragraphs to relate Cook Inlet catch to Susitna River stocks. Neither is there any reference to case packs for Cook Inlet as an indicator of Susitna production. We agree that there is no present method of affixing a value to the Susitna River salmon production and have not attempted to do so. We have added a statement that the Alaska Department of Fish and Game accords a significant percentage of the Cook Inlet salmon run to the Susitna River Basin.

136 The inclusion of a life history section for anadromous fish was an optional decision made by the writers of the EIS. There is no requirement by NEPA or CEQ guidelines that such a section be included in an EIS. Salmon were included because of the great significance (recreational as well as economical) accorded this species. Also, project impacts are more subtly associated with the life requirements of salmon than with any of the other major fish species.

137 Concur. The statement has been revised to indicate that the numbers of game birds are unknown.

138 Caribou range map is as shown from maps in the Southcentral Regional Profile and the Alaska Wildlife and Habitat Atlas.

139 The statement has been clarified to indicate that grizzly bear are also found throughout this part of Alaska.

140 Possible improvement of summer fishing conditions might occur with reduced sediment loads downstream of Devil Canyon dam. Other recreation downstream of Devil Canyon does not appear to be significantly affected at this time.

141 Detailed information on hydrology, including sedimentation, can be found in Appendix I of the feasibility report. Multi-level water release structures do not draw water from the bottom of the reservoir storage pool (the so-called dead storage pool), but generally from the upper one-half to one-third of reservoir storage.

Comment on the replacement of sediment load in water releases at Devil Canyon is discussed in Section 4.01 Hydrology and Water Quality of the EIS. We concur that sediment loads below the dam would probably increase as sediment is picked up from the riverbed, but the 15 to 35 ppm refers to the releases at Devil Canyon dam.

142 Comment noted.

143 There will be no reduction of downstream flows druing construction. Close coordination with the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game will be undertaken to pre-determine minimum flows downstream from the dams during filling.

144 The EIS will be updated or supplemented as significant new information is acquired and provided to the Corps of Engineers.

145 This determination will be an objective of fishery investigations as the study progresses.

146 Fish access to the sloughs as a result of decreased summer flows will be improved if it is found to be necessary and required.

147 Comments noted.

148 As previously stated, minimum flows required to maintain the fishery will be determined in cooperation with U.S. Fish and Wildlife Service and Alaska Department of Fish and Game. Impacts on other water quality parameters which might result from withholding a portion of the water during high flows for reservoir filling is not known at this time.

149 Comments noted. The EIS has included additional temperature and turbidity information from the Moran Dam study.

150 If provisions are made to prevent hydraulic blockages to salmon spawning tributaries and sloughs (as the EIS says there will be, if necessary), it is not likely that tributary spawning areas will be reduced. The EIS does not state that mainstem spawning will be enhanced. We agree that little, if any, mainstem spawning occurs under present natural conditions. However, it is not unrealistic to assume that some spawning habitat could develop in the mainstem within the reach subjected to significantly reduced summer sediment loads and flooding.

151 Concur.

152 The second sentence in the referenced paragraph <u>does</u> make a theoretical statement. The evidence supporting the statement is contained in the sentence itself where an example is cited of natural lakes in Alaska which have heavy glacial inflow, yet sustain fish populations.

153 The Alaska Department of Fish and Game is the source of these figures (as indicated by reference in the paragraph). They are included here only as a matter of officially recorded data--observations made during one moose survey. The paragraph contains no allusion as to the significance of the figures--they speak for themselves.

154 Disagree. Transmission line rights-of-way <u>are</u> known to improve habitat for wildlife species which benefit from subclimax vegetation.

155 Concur. The sentence has been modified to indicate that there will be a <u>potential</u> increase in hunting pressure.

156 The paragraph which is the subject of this comment refers to sediment and turbidity changes which would occur upon completion of the project. Any increases in turbidity during construction would be of extremely short duration, while small diversion dams were being placed to direct river flow through bypass tunnels. Dam construction, itself, would be done "in the dry," thus construction of the dams would have no significant impact on water quality.

157 Concur. The sentence has been modified to indicate a <u>potential</u> increase in pressure on existing game populations.

158 Comments noted.

159 Disagree. Until studies are made of this situation, no positive conclusion can be made concerning the downstream impacts of flow regulation upon moose habitat. However, there is a good possibility

that moose browse will be increased as a result of regulation. Bar areas within the braided stream channel are too frequently and extensively flooded under natural conditions to support any significant amount of browse vegetation. When the flow becomes regulated, the stream channel is expected to become more unified and will probably assume a meandering pattern. Large, barren bar areas, no longer subjected to intensive erosion from frequent flooding, will probably establish permanent plant growth. As this growth evolves through the shrubby successional stages, moose browse will be increased. Eventually, much of these lands will establish trees, mostly cottonwood, and thus evolve beyond the browse stage. Moose habitat will, at that time, decrease but will probably continue to exist in greater quantity than is presently available within the braided channel system.

160 There will be no significant effects on fish during the 10-year construction period. As previously stated, there may be some very temporary degradation of water quality through increased siltation during the short period when the stream will be blocked with temporary diversion dams required to divert river flow through the bypass tunnels. This impact should be minor. With regard to terrestrial wildlife, construction activity will result in some outright destruction of habitat and the evacuation, and probable decimation, of species inhabiting the immediate and surrounding construction areas. This impact, overall, will be much less significant, however, than the subsequent impact related to habitat inundation as the reservoirs are filled.

STATE
of ALASKA

MEMORANDUM

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF LANDS

OCT 30

TO: RAYMOND W. ESTESS
State-Federal Coordinator
Office of the Governor
Division of Policy Development and Planning
Pouch AD
Juneau, Alaska 99801

DATE: October 27, 1975

FROM: GARY JOHNSON, Acting Chief
Planning & Classification Section
Alaska Division of Lands
323 E. 4th Avenue
Anchorage, Alaska 99501

SUBJECT: State I.D. No. 75091103
Southcentral Railbelt Hydroelectric Project

The above-noted project has been reviewed by the Division of Lands' staff, with the following comment considered appropriate:

161 "General Comment: This project appears to have favorable energy development benefits while having a relatively low environmental impact." (Planning & Classification - G. Johnson)

Thank you for the opportunity to review this project.

RESPONSE TO COMMENTS BY
STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF LANDS

161 Comment noted.

MEMORANDUM State of Alaska

RECEIVED
OCT 24 1975
[illegible]

TO: Raymond W. Estess
State-Federal Coordinator
Division of Policy Development
and Planning
Office of the Governor

DATE: October 21, 1975

FILE NO:

TELEPHONE NO:

FROM: James E. Moody
Chief Planning Engineer
Division of Aviation
Department of Public Works

SUBJECT: State I.D. No. 75091103
Susitna River Hydroelectric Proposal

Following ~~our~~ are off-the-cuff comments on the subject project as requested in your September 24 memo, and as related to the September 22 transmittals from the Corps of Engineers.

Attached is a copy of the October 9 memo with Mr. Baxter's comments following his review of the material.

162 The data, as Baxter noted, was too broad in scope and brief to allow us to evaluate how the project could effect our present and future operations. Specifically, there is no inventory of the airports or recognized landing areas, either public or privately owned, in the immediate vicinity of the project. The scale of the maps and the quality of the printing supplied with the data are such that it is not possible to identify the boundaries of the project so that we can compare them against our inventory of landing areas, although we doubt that very many fields would be involved.

163 The biggest question from the standpoint of transportation deals mainly with surface transportation rather than aviation. That is, how would the dams, lakes, and related facilities improve, and restrict, accessibility to the Susitna Basin? The creation of an 80 mile long system of lakes would certainly restrict the selection or alignment of road routes traversing the area. On the other hand, the lakes themselves might offer a certain degree of flexibility relative to surface transportation. Perhaps the most important point is the fact that there would likely be a spur highway constructed connecting the railroad and George A. Parks Highway to the dam system, thereby providing convenient public vehicular access to what is now a relatively remote region.

164 It is also likely that some type of airport or landing strip will be constructed in the immediate proximity of each of the dams, to provide quick access during construction if for no other reason. It would be interesting to know where these strips might be, how large they would be, and so on. (Potential for future use after dam construction is complete?)

The dams and their related hydroelectric plants will in themselves create employment opportunities. Since the projects will result in improved surface access plus a major supply of electrical energy, and since the area is relatively close to mineralized zones, mineral and other resources may be developed thus contributing to more employment, increased settlement or population, and an increased need for both air and surface transportation. The increased accessibility will likely attract considerable recreational activity, whether or not any mineral or other industrial resources are developed. 165

Has anyone considered the alternative of private development of this hydroelectric resource? Which would benefit the State more - federal development of the resource, or private development? 166

The tone of the draft EIS and the draft Interim Feasibility Report seem to indicate a relatively detailed review of the impact on the lands actually encompassed by the proposed project. However, a project of this scope which will create an 80 mile system of lakes with road access (such that perhaps 75 percent of the State's population will be within roughly 4 hours driving time) will have a significant impact on the adjacent lands. The subsequent impact on air and other transportation can only be identified after probable uses of this adjacent land have been cataloged. For example, if the National Park Service, or the Division of Parks of the State's Department of Natural Resources, desires to preserve the surrounding area for recreational purposes, one type of aviation activity will predominate. That is, recreational flying or simple transportation for recreational purposes might be the prime transportation mode. Seaplane traffic might comprise the highest percentage of aeronautical activity and might result in heavy impacts at corresponding seaplane bases in Anchorage and elsewhere. On the other hand, should there be extensive settlement of the area, and particularly if this is associated with mineral or industrial development, a higher percentage of aeronautical activity might involve commercial (scheduled airline) operations - possibly with medium to heavy aircraft. 167

A better map showing the lake system, probable surface access routes, and surrounding area; plus more information on the wildlife, mineral, and agricultural resources of the area from respective State offices would help us better gauge the impact of the project. It is apparent that the project itself will have less long range impact on air transportation than the secondary developments which will spring from the proposed hydroelectric complex. 168

Attachment

STATE
of ALASKA

MEMORANDUM

TO: James E. Moody
Chief Planning Engineer

DATE: October 9, 1975

FROM: Kinney R. Baxter
Assistant Planning Engineer

SUBJECT: Alaska State Clearinghouse
State I.D. No. 75091103
Upper Susitna River Basin
Southcentral Railbelt Area

169 After reviewing the Draft Environmental Impact Statements for the Hydroelectric Power Development, I have found that the way in which it is written does not create much detail to analyze constructively or destructively. The approach is of a general nature and prohibits many comments being made towards the EIS. In the past EIS's that have been reviewed, the author will commit himself to particular controversial topics, thus creating a flock of comments from the various agencies.

The only comments that I have to make are concerning the introduction of two large lakes that will greatly influence the activities of float planes and boats. This will open the adjacent land to hunting and fishing camps as well as other recreational functions. Will the adjacent land be open to public sale or will it be established into a Wildlife Reserve, or whatever? I am sure that with the introduction of visitor centers that other people will follow and a community will more likely be established.

RESPONSE TO COMMENTS BY
STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF AVIATION

162 Comment noted. Air transportation is discussed in the EIS to the depth necessary for the feasibility stage of planning. During detailed planning, all Alaska State agencies would be closely coordinated with to insure consideration of resources or developments within their areas of purview. The Corps, upon request, will be happy to provide the Division of Aviation with detailed maps of the project study area.

163 Construction of the dams will not restrict surface accessibility to the Susitna Basin, since no road access is presently available through the canyon area. Construction of an access road leading from the George A. Parks highway will provide public vehicular access to what is now a relatively remote region. We agree, road route selection will be restricted by the reservoirs. Also, the reservoirs, themselves, may provide some benefit as landing sites for amphibious airplanes.

164 No landing strips related to project construction will be developed in the area without prior consultation with the Federal Aviation Administration and the Alaska Division of Aviation.

165 Comment noted.

166 Yes. The Devil Canyon High Dam alternative discussed in the EIS is a proposed development by Henry J. Kaiser Company. Private financing of electrical energy projects is one of the standard tests in computing benefits of Federal projects. In the instance of this study, coal, which was determined to have a lower benefit-to-cost ratio than hydropower, could easily be a privately developed power source. Either Federal or private development would be of benefit to the State. If identical resources were developed to the same degree, presumably the benefits would be approximately equal.

167 Comment noted.

168 The quality of maps has been improved in the revised EIS. However, they are still small in size and scale. As previously noted, the Corps will provide larger, more detailed maps upon request.

169 All public lands acquired for project purposes will be open to the public. The status of wildlife on these lands would be determined by the Alaska Department of Fish and Game. Other comments made by Mr. Baxter are noted.

GROUP COMMENTS AND RESPONSES

	Comments
Alaska Conservation Society - College	170-182
Alaska Conservation Society - Anchorage	183-199
Greater Anchorage Chamber of Commerce	200
Cook Inlet Region, Inc.	201
Knik Kanoers and Kayakers, Inc.	202
Orah Dee Clark Jr. High - 7th Grade, 6th Period	203
Sierra Club	204-257

Alaska Conservation Society
Incorporated in 1960

Box 80192 College, Alaska 99701

ALASKA CONSERVATION SOCIETY COMMENTS ON THE ALASKA DISTRICT, CORPS OF ENGINEER'S ENVIRONMENTAL IMPACT STATEMENT, HYDROELECTRIC POWER DEVELOPMENT, UPPER SUSITNA RIVER BASIN, SOUTHCENTRAL RAILBELT AREA, ALASKA dated: September 1975

GENERAL COMMENTS

Considering the magnitude of the proposed two dam project for the upper Susitna River, the draft environmental impact statement (deis) is wholly inadequate in a great many respects, even as a feasibility study. A thorough analysis of its inadequacies would require considerably more energies than we, as an organization dependent upon volunteer workers, can muster in the short time period available for study since the release of the document on September 22, 1975. Instead, we have chosen to identify types of deficiencies and present examples of these types in the remarks that follow. 170

TYPE ONE: CONFUSING PRESENTATION

Is this or is this not a draft EIS, that is the question? According to the title page, the document published in September 1975 is a draft EIS and according to a cover letter sent with the document that is dated September 22, 1975 signed by Col. Charles A. Debelius, District Engineer, the document received by us is THE draft EIS. "A final Environmental Impact Statement, incorporating all comments received, will be prepared and will be filed with the Council on Environmental Quality" (letter dated Sept. 22, 1975 from Col. Debelius). However, at the public hearing held by the Corps of Engineers on 8 October 1975 in Fairbanks, Alaska, Col. Debelius and his staff stated that the document entitled draft EIS was in fact a preliminary draft EIS and that a draft EIS would be developed later followed by a final draft EIS. To add to the confusion, the summary page, under item 2 "Description of Action" states that "since the current study is in the feasibility stage, impacts are not exhausitvely evaluated. If the project is authorized and funded for detailed studies environmental, social,economic, and engineering aspects of the project will be studied at length prior to a recommendation to Congress for advancement to final project design and construction." Later, on page 1 of the document, under paragraph 1.02, "Scope of the Study" a two stage study is indicated wherein Stage 1 "is an interim report, to be completed by 1 December 1975, on the feasibility of hydroelectric development on the upper Susitna River" and Stage 2 "is a comprehensive report, anticipated to be completed in 1978, to determine the feasibility of developing other hydroelectric sites in the Southcentral Railbelt area." From this statement is one to conclude that the document we received is a draft (or preliminary draft) EIS for Stage 1 of a feasiblity study? Will this then be followed by a final EIS on Stage 1? And this followed by a draft EIS on Stage 2; followed by a final EIS on Stage 2; followed by a draft EIS on the Devil Canyon/Watana authorized project; followed by a final EIS on the authorized project???? 171

What makes these questions relevant is the vast difference in importance between being asked to comment on a draft EIS on Stage 1 of a feasibility study versus a draft EIS on a project that is authorized. Although the latter has not yet been accomplished, the Corps is recommending authorization and Senator Mike Gravel has already introduced a bill to the U.S. Senate "authorizing construction of Devil Canyon and Watana dams in order to hurry the project along so that it can be included in this sessions "omnibus water resources development package". (Gravel, 1 August 1975 News Release.) If authorization is given by Congress, what happens to the normal and proper sequence of environmental evaluation required by NEPA? Will the two stage feasibility study of hydroelectic sites in the railbelt area be continued even though construction of one project (Devil Canyon/Watana) has been authorized?

TYPE TWO: BIASED EVALUATION OF ALTERNATIVES

The resolution adopted by the Committee on Public Works of the U.S. Senate on 18 January 1972 specifically requests that the Board of Engineers for Rivers and Harbors include in its evaluation of materials relating to developing power resources in the Southcentral Railbelt area of Alaska a review of the potential of "the Susitna River hydroelectric power development system, including the Devil Canyon Project and ANY COMPETITIVE ALTERNATIVES THERETO...(p.1: caps are ours). Ten alternative power sources are mentioned in the DEIS but all are dismissed as noncompetitive in the course of ten pages! Two of these sources, natural gas and coal, are really viable alternatives in Alaska at this time, yet the treatment in this EIS is, to say the least, biased and wholly inadequate. For example, in paragraph 2, page 71 the document states: "In view of the quantities of coal involved and present-day mining practice, it is presumed that strip mining would be employed to obtain the coal. Without specific knowledge of the mining site, it is not possible to project how much acreage would be affected; however, it is assumed to be in the hundreds, possibly thousands, of acres..." If this isn't biased, I don't know a biased statement when I see one. If it isn't deliberately biased, then it reflects a non-objective and incompetant review of existing knowledge regarding coal as an energy source in Alaska.

In the first place the distribution of coal suitable for use in generating electricity for the southcentral railbelt area IS KNOWN; the sites are few in number and there are reasonable estimates of the coal reserves available in them. (See paragraph 6.022 USGS Report). Thus, the acreage that would have to be disturbed to extract the coal to supply a given amount of generating capacity can be calculated but apparently wasn't. Second, if we assummed that the acreage that would be affected was "in the hundreds, possibly thousands," how does that compare with the 50,500 acres (=78.91 square miles) which will be inundated by the two dams to say nothing of the roads, construction camps etc.!!! Furthermore, a strip mined area can be recontoured and revegetated so they come back into being productive habitat for at least some (and in the Nenana coal field, perhaps most) of the species that inhabited the area before stripping occurred. In addition, the total acreage disturbed is not affected all at once, whereas, inundation by a resevoir with the consequent siltation, buries the total acreage in a few years, and, for all practical purposes, completely eliminates its biological productivity or at least significantly reduces it forever.

172

Later in this same paragraph the statement is made that "Water in contact with coal and mine wastes generally become acidic and toxic to vegetation and animal life." What does that general statement have to do with the specific alternative of using coal to generate electricity in Alaska? Coal in the Nenana coal field (near Healy, Alaska) is very low in sulfur and thus there is very little potential of a serious acid waste problem. Furthermore, burning this coal produces very low emissions of sulfur dioxide and that which is produced can be captured by appropriate stack design. Thus, the impression given the uninformed reader that all coal produces bad environmental conditions is very misleading especially in the case of the Alaskan situation. The final sentence in this same paragraph appears absolutely ludicrous when compared with another sentence from this same document: "The construction of the proposed hydroelectic project would have a significant impact on the existing natural scenic resource values within the project area." (Draft EIS, page 61, paragraph 2). Which is worse? The final paragraph of the coal alternative concludes: "In view of the extensive adverse environmental impacts associated with the coal alternative, both in magnitude of effects and areas affected, this is determined to a less (sic) desirable source of energy production than hydroelectric development." (p.72) How could the Corps arrive at this conclusion when NO EVIDENCE is presented that using Alaskan coal as an energy resource would produce more "extensive adverse environmental impacts" than hydroelectric power from two dams on the Susitna River?

TYPE THREE: LACK OF QUANTIFICATION OF MATERIAL DESCRIBING EXISTING ENVIRONMENT

173 Throughout the draft EIS, meaningless adjectival descriptors are used rather than numbers. Examples:

a. Page 12, para. 2: "Most of the upper Susitna River Basin is underlain by discontinouous permafrost." How much is most? What is the relationship of discontinous permafrost to the success or failure of the hydro project? What are the environmental consequences of building dams in such terrain?

174 b. Page 14, para. 1:" Few kayakers have attempted the dangerous eleven mile run through Devil Canyon." How many is a few? Were white-water canoer groups contacted and asked about their views?

175 c. Page 25, para. 2.02.3.: "Grizzlies are common throughout the Susitna River drainage and are fairly numerous in the upper Susitna despite the absence of salmon (see Fig.8)" "Common" and "fairly" numerous in relation to what other areas? How many per square mile?

176 Many additional examples could be cited but they are almost too numerous to count! If the data are available, present them and if they are not available, say so.

TYPE FOUR: IMPORTANT ISSUES NOT ADDRESSED ANYWHERE OR VERY LIGHTLY TOUCHED UPON

177 a. On page 17, paragraph 2.01.4.5 the point is made that "much of the drainage basin has never been geologically mapped," and the "the basin constitutes one of the least known areas in the State"... yet NO WHERE in Section 4.0, Environmental Impacts, does the EIS consider the consequences of inundating 50,500 acres of geologically unmapped terrain. The potential loss of mineral resources is dismissed in one sentence: "Inundation would obviate the practicability of future mining or, extraction of such resources." (page 67).

178 b. The EIS makes the following statements:

page 10:"The Susitna River...is the largest stream discharging into Cook Inlet."

page 14:"Freshwater runoff into the Upper Inlet is an important source of nutrients and sediments"

page 45:"Significant reductions of the late spring and early summer flows of the river and substantial increases of winter flows would occur" if the dams are built.

In spite of these facts, no where does the EIS consider the impact on Cook Inlet of modifying the river flow!

TYPE FIVE: INADEQUATE REFERENCING OF SOURCES UTILIZED

Although 31 pages of the draft EIS are devoted to a description of the "environmental setting without the project", very few references are made to the sources of the material presented and the few citations that are given, are incomplete so that someone wishing to check with the original source would have a difficult time locating it. 179

TYPE SIX: UNREADABLE OR INADEQUATE FIGURES

Figure 3 (page 7) is so sketchy as to be useless for assessing relationships between the transmission corridor and even basic terrain features. Figure 4 (page 11) is unreadable. 180

SUMMARY

Following a review of the draft EIS for hydroelectric development in the Upper Susitna River Basin, the Alaska Conservation Society found the document to be a totally inadequate evaluation of the environmental impacts likely to occur if the Devil Canyon and Watana dams were to be constructed on the river. Deficiencies in the document are so numerous that an item by item enumeration of them would probably require a document equal to or greater in length than the draft EIS itself. In order to keep our comments to a reasonable level, we classificed the deficiencies into six types: 1. Confusing Presentation; 2. Biased Evaluation of Alternatives; 3. Lack of Quantification of Material Describing Existing Envrionment; 4. Important Issues Not Addressed; 5. Inadequate Referencing; and 6. Unreadable Figures. Several examples of the deficiencies noted for each category are presented and referenced to their location within the draft EIS. 181

CONCLUSION

In view of the inadequacy of the draft EIS, the Alaska Conservation Society feels that the existing document needs to be completely revised and upgraded BEFORE any further recommendations are made to Congress by the U.S. Army Corps of Engineers. In particular, the Corps should meet its responsibility as mandated by the Committee on Public Works of the U.S. Senate to evaluate "any competitive alternatives" to the Devil Canyon and Watana Dam project in an unbiased manner and present this evaluation to the public. 182

RESPONSE TO COMMENTS
OF ALASKA CONSEVATION SOCIETY
COLLEGE, ALASKA

170 Comment noted.

171 This comment indicates a lack of understanding of the procedural requirements established by the Council on Environmental Quality for federal agency compliance with the National Environmental Policy Act. Guidelines to Federal agencies for preparing detailed Environmental Statements on proposals for legislation appear in the Code of Federal Regulations in Title 40, Chapter V, at Part 1500. In addition, pursuant to Section 2(f) of Executive Order 11514, the Corps has developed agency procedures in consultation with CEQ which even more specifically provide guidance for the preparation of Corps Environmental Impact Statements. Both CEQ guidlines and Corps regulations have been adhered to in the preparation of the Draft Environmental Impact Statement. Following coordination of the DEIS with other agencies, groups and individuals--and incorporation of all comments received, responses thereto, and addition to the EIS of any new or additional information received--the Corps will prepare an updated revised Draft Environmental Impact Statement. The RDEIS will then be subjected to intensive in-house review at higher levels of authority, and the District will make any necessary revisions. After such revisions are made, the RDEIS will be submitted to CEQ and, at the same time, will be sent out to the Board of Engineers for Rivers and Harbors, the final review agency of the Corps, and to Federal and State agencies for review and comment. Groups and individuals commenting on the draft statement will be furnished informational copies. The District will prepare appropriate responses, make necessary revisions to the main text due to comments received and forward a Final Environmental Statement to the Office of the Chief of Engineers which in turn will forward the document to the Office, Secretary of the Army. If the Chief of Engineers determines that new information received is of such significance as to warrant reconsideration of previous recommendations of the Board of Engineers for Rivers and Harbors, he will send the document back to the Board for such reconsideration. When the Office, Secretary of the Army, transmits the Final Feasibility Report and accompanying FEIS to Congress, it will also transmit the Final Environmental Impact Statement to CEQ. At the same time, the Division and District office will be notified of the transmittal for timely distribution of the FEIS to agencies, groups, and individuals that have received and furnished comments at various levels on the statement. The document commented on by the reviewer is a Draft Environmental Impact Statement, as indicated on the cover and in the text. The DEIS addresses Stage I of a two-stage study. Stage I involves a study, as mandated by Congress (by resolution of the Committee

on Public Works of the United States Senate on 18 January 1972), to determine the feasibility of hydroelectric development on the upper Susitna River. Stage II will involve an additional study (not yet undertaken) which will determine the feasibility of other hydroelectric sites in the Southcentral Railbelt area. Thus, the second state study will be conducted to fully respond to Congress' directive. There is a vast difference in importance in being asked to comment on a Draft Environmental Impact Statement of a feasibility study versus a Draft Environmental Impact Statement on a project that is authorized. If this project is authorized, extensive, detailed environmental studies will be undertaken to identify unavoidable adverse impacts which will result from project construction. Procedures will be studied whereby the project can be modified to minimize adverse impacts or to otherwise mitigate unavoidable damages. At this time the EIS will essentially be rewritten and the review process initiated again. As a result of this detailed evaluation of project impacts, Congress will again have an opportunity to consider the merits of the project and make a determination as to whether or not it should be authorized for funding and construction. The latter requires a distinct and separate action by the Congress.

172 In reference to the alternatives to the proposed Susitna River hydroelectric development, the Interim Feasibility Report discusses in greater detail the reasons that coal was determined to be a less desirable source of electrical energy production than hydroelectric development. The alternatives to hydroelectric development are also discussed in Section 6.0 of the EIS. The information was gathered from a wide variety of sources and presented in a condensed form.

173 Many unquantified--and unquantifiable--resource values are described naratively throughout the EIS. The statement makes it clear that permafrost is primarily restricted to areas of the Upper Susitna Basin upstream from the reservoir sites, though the Watana site is known to have some permafrost. The exact extent of this condition will not be known until proposed detailed geologic studies have been completed. Permafrost will have no relationship to the success or failure of the hydro project. It will, however, be a factor (one of many geological considerations) that will have to be taken into account in the design and function of the project. Permafrost is not present in the Devil Canyon damsite but may be present within a portion of the reservoir site. The Watana reservoir site contains areas of intermittant permafrost, particularly on north-facing slopes. In these areas the overburden mantle aasumes a steeper angle of repose than would normally exist. It is expected that as the reservoir fills and permafrost degrades, some slumping of natural slopes will occur. These slumps or slides will be minimal in their effect on the capacity of the reservoir, since very light overburden is found in the lower elevations of the canyon where such slumping would occur. Above these rocky walls the valley flattens abruptly into the high terraces of glacial deposits where the slopes are generally stable. Permafrost

will not be a factor in the success of the dam since the foundation will be established well below the level of permafrost conditions.

174 There have been only two or three people, to our knowledge, who have claimed to have run the 11 miles of "whitewater" at Devil Canyon; there have been others who have kayaked portions of this section of the river and portaged out of the deep canyon around dangerous sections of the river. A copy of a report by Dr. W.L. Blackadar of Salmon, Idaho is included. See response No. 257.

175 The words "common" and "fairly" numerous are descriptions used from various State and Federal agency wildlife statements and reports - it is presumed that these terms were used in relation to the animals in the State of Alaska.

176 The terms and numbers used in the EIS were from available data from Fish and Wildlife Agencies. It is also stated that additional fish and Wildlife data will be obtained during the preconstruction planning process.

177 By selectively quoting portions of two sentences the reviewer conveys the impression that absolutely nothing is known about mineral resources in the drainage basin. In their entirety, the two sentences which are partially quoted read thus: "Though a number of mineral occurrences are known and the area is considered favorable for discovery of additional deposits, much of the drainage basin has never been geologically mapped. Thus geologically, the basin constitutes one of the least known areas in the State except for a few areas in the vicinity of Denali where some geologic mapping has been done." Additionally, the previous paragraphs states: "Most of the Susitna Basin above Devil Canyon is considered highly favorably for deposits of copper or molybdenum and for contact or vein deposits of gold and silver." The paragraph goes on to identify two known mineral deposit sites - one for copper and one for gold. The potential loss of know, suspected, and unknown mineral resources is thus candidly acknowledged in the sentence as quoted wholly from Section 4.0. Geologic mapping of the impoundment areas, required to determine faults and foundation conditions, would be extensive prior to any recommendation that the project be funded for construction.

178 Although Cook Inlet is not specified by name in discussing the downstream effects of modified river flow, the following statement is made in Section 5.0: "Adverse impacts could result from possible reduction in nutrients and primary productivity, cutting, and erosion of existing streambed configuration, increased turbidity during the winter months and changes in the hydraulic and biological regime of salmon rearing and spawning sloughs." These impacts will diminish with downstream distance, but some of them may well be felt to some extent in Cook Inlet itself. A determination of any significant

impact on Cook Inlet can only be determined subsequent to lengthy and costly detailed hydrological, biological, and water quality studies of the entire downstream system. Such studies are planned if the project is authorized and funded for preconstruction planning. The magnitude and cost of these and other studies which will be required prior to final recommendations for construction authorizations are clearly beyond the scope and funding constraints of the current feasibility study.

179 Many specific material sources are referenced within the body of the draft EIS and general information sources are listed in the bibliographic references section of the EIS.

180 A new schematic drawing of the proposed transmission corridor has been furnished by APA. The exact on-the-ground location of the proposed transmission line will be determined in future studies that will incorporate environmental, economic and engineering considerations.

181 The word "if" is significant in the context of the first sentence of this comment. The Corps has clearly stated in the draft EIS that if the project is authorized and funded for preconstruction planning, detailed environmental studies will be undertaken prior to any recommendations for construction authorization and funding. At the present time it is not known _if_ the project will even be funded for further studies, much less construction. In response to the remainder of the "Summary" comment, every deficiency that can be specifically identified has been given an individual response and clarified in the RDEIS.

182 The Corps of Engineers is very aware of its responsibility as mandated by the Committee on Public Works of the U.S. Senate. The public has been kept fully informed throughout the progress of this study. A number of public meetings have been held, workshops with interested environmental groups have been conducted, and the draft EIS has been sent to everyone indicating an interest in it, along with a letter specifically requesting their views and comments. See response No. 171, for a discussion on procedures of updating the EIS prior to formal submittal to Congress.

ALASKA CONSERVATION SOCIETY

UPPER COOK INLET
CHAPTER
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ANCHORAGE, ALASKA
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Oct. 17, 1975

Charles Debelius
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Anchorage, Alaska 99510

Col. Debelius:

The following are the comments of the Upper Cook Inlet Chapter of the Alaska Conservation Society on the Draft Environmental Impact Statement on "Hydroelectric Power Development - Upper Susitna River Basin Southcentral Railbelt Area, Alaska", Alaska District, Corps of Engineers, Sept. 1975.

183 UCIC,ACS protests the short time frame in which this statement has been brought out. The agencies much less the public asked to comment on the statement has scarcely enough lead time to identify what needed to be done, much less to do it. Some of the following questions asked at the hearings were partially answered at the public meeting held by the Corps in Anchorage Oct. 7(which was only 16 days before written comments were due) but we wish to assure they are contained in the final EIS.

184 UCIC,ACS believes this DEIS to be generally inadequate and unacceptable. We agree with the Statement on pg. 8 "...The EIS does not include a detailed and exhaustive evaluation of project impacts..." We object strenuously to the fact that the proposed project has to be authorized to be built before adequate environmental studies can be made.

The following are some general observations and questions on the DEIS:

Fish, Game, Habitat

The most obvious factor is the loss of 50,000 plus acres that will be inundated by the resevoir waters and lost as habitat. Talks with F & G personnel reveal that they need more time to do adequate game counts (moose, caribou, etc.), range work to determine what kind of habitat will be lost, identify specific caribou migration routes through the area, and they need time to identify exactly which streams the mixed stocks of salmon spawn in. As we understand it, they had at the most a year to start doing this work with only 2 full time regular staff people and the

DEDICATED TO THE WISE USE, PROTECTION AND PRESERVATION OF
ALASKA'S RENEWABLE AND NON-RENEWABLE NATURAL RESOURCES.

parttime help of 2 aides. Also, money was not available to do the studies needed. This money, as we understand it, would be provided under enabling legislation should it be passed, but again, we protest that this proposed project should not be authorized until adequate studies are done.

185 F & G as well as other concerned agencies, need time to initiate studies to define impact, regulatory changes and to define mitigation to compensate for loss of habitat. They also need more specific data from the Corps in order to evaluate downstream effects on fish and other aquatic inhabitants of the streams and tritutaries affected by this proposed dam system.

Game counts sited in the DEIS are completely inadequate - i.e. pg. 53 "During the June 1974 survey, one grizzly was sighted...five black bears were sited on the Susitna River. A total of 56 caribou were sighted in the survey area" What was the survey area? Is one years data the only available? How many times during the year were counts made? Information as basic as this does not seem to be available in the DEIS.

186 Specific studies need to be done to determine how increased river water temperature will effect such things as downstream icing conditions, salmon egg emergence, and effects on other inhabitants of this system. The effects will not be limited to just the immediate area of the dams.

What will the specific changes be in going from an unregulated river to a regulated one? What effect will this have on the moose range? What will the Corps do to mitigate these effects? The Corps seemingly will have to mitigate for the loss of moose range - will they give lands to the State somewhere else or provide money to increase management on other lands? This question does not seem to be addressed at all in the DEIS.

Siltation

The problem of siltation raises many questions in our minds that are not addressed in the statement. How will decreased siltation in the summer effect primary productivity? If the nutrients are decreased during the warmer months when life re-emerges in this northern latitude, what will be the result up the food chain? Especially in Cook Imlet into which the Susitna drains? How will this effect the zooplankton? And on up the food chain? Eventually, could this possibly effect the salmon runs? Also, as decreased siltation is predicted after completion of the proposed dams, what about the increased siltation bound to result from the construction phase (est. to be 10 - 15 years)? Other questions - How much silt will be picked up after the water is released from the dam? There may be a low sediment load spilled from the dam, but what are the' figures say, 1 mile below the dam?

Sedimentation

The factors that influence the rate of erosion, transportation of materials to a reservoir and the trapping of sediment within a reservoir are complex and highly variable. The geology of an area, nature of the soils, slopes, rainfall, runoff, hydraulic characteristics, cover and other conditions vary greatly.

However, given the glacial silt and other sediment content of the water of the Susitna River, the stated loss of storage capacity for a 100 year period (6.5% for Devil Canyon dam, 3.6% for the Watana dam) appear low. The reduction of suspended sediment to 15-35 ppm (pg. 46) means that much of the unregulated river sediment load (less than 1000 ppm in summer months) would be retained in the proposed dams.

Records from 20 existing reservoirs in the U.S. having drainage areas greater than 1000 square miles and storage capacities ranging from 0.05 to 2.06% and averaging 0.72% (Gottshalk, 1964). A couple of examples:

187 Elephant Butte reservoir in New Mexico, lost 16% of its original storage capacity (2.6 million acre-feet) in 32 years of operation. Guernsey reservoir in Wyoming lost 39% of its storage capacity of 73,000 acre-feet in just 26 years.

The data sources and methods used to compute those sedimentation rates are not included in the DEIS and are thus not available for evaluation by reviewers of the statement. Also, there is no mention of the construction of a sediment pool to mitigate the estimated loss of storage volumne over the years.

Frazil Ice

188 Has the problem of frazil ice been considered? This phenomen of northern climates is a great hazzard to power plants. It is essentially ice fog that solidifies into a special crystal formation on the intake system as the cold (glacial in this instance) water hits the warmer area nearer the turbines. It solidifies instantly and when this happens, the fast revolving turbines have a decreased water flow and could burn out. There is supposedly technology to overcome this, but the problem is not addressed in the DEIS and we feel it is a very important environmental consideration. (See Williams, J.P. "Frazil Ice - A Review of its Properties with a Selected Bibliography", Engineering , Nov. 1959, pg. 55-60). We are not convinced this problem can be dismissed by saying the water temperature in the reservoir will be "to high for this to occur".

Water Flows

189 What will be the effect of essentially eliminating peak and low flows? Providing flow figures for the Chulitna and other down stream areas we do not feel "are beyond the effect of the project". Also, what will be the effect of warmer water flow in winter and cooler in summer?

Permafrost

190 There seems to be incomplete identification of permafrost areas. How will melting ice on reservoirs effect the permafrost? How much will erosion contribute to the sediment load and will wave action cause increased erosion on permafrost areas? What will be the effect of innundating large areas of discontinuous permafrost? Exactly how much permafrost will be under the impounded area?

Earthquakes

191 Pg. 62 states: "Devil Canyon and Watana Dams will be designed to withstand a Maximum Credible Earthquake of 8.5 magnitude with an epicanter of 40 miles at a focal depth of 20 miles which is the approximate distance of both damsites to the Denali Fault system and is the most likely source of a seismic event of this magnitude. The Susitna Fault, truncated by the Denali Fault, bisects the region in a NE to SW direction approximately 2.5 miles west of the Watana damsite". As the Susitna Fault is part of the Denali fault system, is it not possible that a quake could occur closer than 40 miles? We feel this certainly needs more study and further clarification.

Geology

192 What is the geology of the foundation of the dams? How far to bedrock? What is the formation of the canyon sides that will be innundated with water?

Flood Control

193 Pg. 71 mentions under Alternative Sources of Power - "A coal-thermal facility would forego the recreational and flood control benefits provided by a hydropower project". Where is the data documenting flooding and the need for flood control on the Susitna? Is flooding a problem on the Susitna?

Recreation

As moose and caribou habitat will be destroyed (thus decreasing hunting) and there will be no fish in the reservoirs, what will the great recreational benefit of these proposed dams be to the public? Boating? Water sports? What? As the area below the proposed dams will probably be

194 closed due to safety reasons, kayakers will probably be excluded from using the river. Also, will the access roads be open to the public of will they be closed due to safety reasons?

Access Roads

195 Exactly where will these be built - it is very hard to tell by the maps in the DEIS. Also mileage estimates vary. Will they be open to the public? How wide will the right of way be? How will the dirt and gravel be obtained to build these roads? .

Transmission lines and corridors

The statement is very unclear as to exactly where these will be. How will right of way be obtained? It proposes to cross federal, state, private, and native lands. With increased pressure on land resource and use of land for nonproductive purposes, has burying the transmission lines been considered? Technology is available to do this and could cause much less disruption of the land. Fewer trees would have to be destroyed and the buried limes area could be revegetated. Such a corridor could have varied edges instead of a straight swath cut thru the wilderness. We realize this alternative is very expensive but we feel it should be considered as an alternative to overhead transmission lines in the DEIS.

We also note the effect of earthquakes on overhead transmission lines has not been addressed. We have some questions as to possible health hazzards around transmission lines due to high wattage radiation. 765,000' volts seems to be the critical point at which adverse impacts begin. Some of the problems encountered include:

1. ozone formation 196
2. interferance with radio and T.V. signals
3. noise pollution - humming and crackling sound (up to 70 decibels has been recorded - 90 decibels is the legal noise limit)
4. possibility of electric shock
5. possibly health hazzards - increased b/p, chromosome damage, nervous system damage)

We do not know if any of this would happen with this proposed project, but we feel in the interests of public health, that this should be looked into and addressed in the DEIS.

What studies have been done on strength of the wind in the areas for transmission lines? We understand the project around Juneau has had incredible problems with wind blow-down of lines - not that there are as strong winds in the interior, but then who knows? No data is presented on this. What will be the energy as delivered to Anchorage and Fairbanks? What will be lost in transmission? On pg. 3 it states: "A subsidiary purpose in the construction of the electrical transmission line will be the interconnection of the largest electrical power distribution grids in the State of Alaska..." What are these 2 power grids? Could they be interconnected without the proposed dam? Why is it necessary to interconnect them?

Dam operation

197 Who will be charged with operating the dam if it is built? The Corps? Utilities commission? The State? Also a very important question is what is going to be done with the "secondary power" produced? The proposed project has a built in surplus of power - or in other words, it is building way ahead of the current needs of the railbelt. What is the purpose of this secondary power production? Is the purpose to attract industry? If so, we feel that this is a sell out from the original stated purpose. "Extra power" with no where to go will necessate carrying charges and as usual, the taxpayer will pay. Plus the fact that this overproduction will be wasted and thus the rational to attract big industry to use it.

198 Cost benefit ratio

This ratio is computed as 1.4 so supposedly there is more benefit than cost? But, looking at the interest rate which was computed at 6 3/8%, we do not feel this is an accurate reflection of the realistic market. We need to know the cost of this proposed project in terms of how much energy will be used to build the dam, how many barrels of oil will be irretrevibly committed, and how much energy will it "cost" to maintain the dam? Let's look at the cost - as one of the benefits, the dam is supposed to be "lower cost of power generation" (pg. 3) how are we to evaluate the following figures of estimated cost of the dam and transmission lines:

1. When first proposed in April 1960 -$478,874,000 (Devil Canyon Project Report of Commission of Reclamation, March 1961)
2. Jan 1974 - $682,000,000 (Devil Canyon Status Report, May 1974, Dept. of Interior, Alaska Power Adm.)
3. Jan. 1975 - $1.343 billion (Corps, DEIS)

To our way of thinking, this project is economically unfesible. How can the Corps justify this outrageous expenditure - which almost amounts to their total operating budget for the entire Corps last year? We do not feel all the alternative sources of power have been evaluated with an "open mind". Could currently available power sources developed to their fullest supply the needs of the railbelt? How much energy will really be needed in the railbelt? What will be the net energy benefit analysis? Will other energy resources be developed concurrently and be available by the time the dams are on line?

199 Inconclusion, we have very serious questions about the lack of factual content of the DEIS, the potential attraction of big industry due to overproduction of power, and socio-economic impact that would be inevitable. We see no proven need for this project and certainly cannot see that it is economically fesible.

Susitna River Fact Finding
Committee [illegible]

Jim Lieuen
Virginia del Rio
Chris Bentley

RESPONSE TO COMMENTS BY
ALASKA CONSERVATION SOCIETY
UPPER COOK INLET CHAPTER

183 Formal public meetings to discuss the selected plan for hydropower development on the Upper Susitna River Basin were held in Anchorage on 7 October 1975 and in Fairbanks on 8 October. The public was given 15 days to include written comments they wished to be inserted into the public record for those meetings along with any statements they made at the meetings.

The District Engineer stated that all written comments on the Draft Environmental Impact Statement for the proposed project, which was distributed by the Corps of Engineers on 22 September 1975, should be made to the Corps by 17 November 1975 so that these comments could be included in the Environmental Impact Statement due to be completed in early December 1975. Actually, environmental comments dated through 3 December are included in the Comment and Response Section of the EIS.

184 As stated in Section 1.03 of the Draft Environmental Impact Statement for the proposed Devil Canyon-Watana hydroelectric project on the upper Susitna River, the study is in the feasibility stage, and the EIS does not include a detailed and exhaustive evaluation of project impacts, many of which cannot be fully ascertained prior to congressional authorization and funding of detailed economic, environmental, and engineering studies (including additional fish and game studies). The two-stage authorization process requires congressional approval before advancing from the detailed studies stage to final project design and construction stage when the actual project funding would be authorized and project construction would begin. Many projects have preliminary authorization from Congress, but for one reason or another they are not all funded or constructed.

185 As indicated in Section 4.03 (Wildlife) of the EIS, the numbers of big game and the amount of habitat are minimal within the proposed Devil Canyon impoundment area, and preliminary data indicate that low populations of such animals presently utilize the proposed reservoir area. If the project is authorized, it is expected that construction on the first dam would start in 1980 or 1981. Authorized fish and wildlife studies would be funded to continue during the interim study period and the information would be used to prevent, ameliorate, or mitigate the adverse impacts to important fish and wildlife species.

186 All project data, including river regulatory information, are available to the fish and wildlife agencies at the District Engineers' office in Anchorage, and these agencies are aware of this coordination

of information. Although up-to-date information on fish and wildlife is somewhat limited, past data--including information from the 1950's and 1960's--indicate that these are low game populations in the proposed Devil Canyon-Watana project areas. One survey study made during the winter of 1974-75 does not constitute a reasonable scientific study, as such, but it further indicates that the numbers of various animals in this area are relatively low.

187 Sedimentation studies to determine the significant environmental impacts--both adverse and beneficial--that would be generated by the proposed project, will be continued. Preliminary studies, including A Hydrologic Reconnaissance of the Susitna River Below Devil's Canyon, October 1974, prepared for National Marine Fisheries Service at Juneau, Alaska, and various detailed U.S. Corps of Engineers and Bureau of Reclamation hydrological studies and other studies on sedimentation are available for review at the Alaska District, Corps of Engineers' office in Anchorage, Alaska. During the construction phase, the river's flows would be diverted through tunnels around the dam construction areas and should not significantly affect sediment below the dams. Other activities, such as building roads and bridges and clearing vegetation in the proposed reservoir areas and transmission line corridors, could cause some siltation or sediment problems. These activities would be done in such a manner as to minimize possible adverse impacts (see Section 4.11). Preliminary sedimentation studies and post-Bureau of Reclamation studies indicate the rates of sediment deposition in the reservoirs as stated in the EIS. These computations are available for review at the Corps' office in Anchorage. The sediment load one mile below the Devil Canyon dam should be substantially the same as the releases at the dam due to the rocky nature of the riverbed in this section of the Susitna River and with no significant tributaries in this section of the river that could contribute higher sediment loads. There would be a period of channel stabilization in the 50-mile section below the proposed Devil Canyon dam in which the river would tend to adjust to the stabilized regulated flows with low sediment levels. Some channel degradation in some sections of the river would occur as the river would attempt to replace the missing sediment load with material picked up from the riverbed, but this is not expected to be of significant concern along the coarse gravel bed reaches of the river between Devil Canyon and Talkeetna. Projected studies should further clarify and define degradation of the riverbed in this section of the Susitna.

188 Yes, the problem of frazil ice has been considered. Also see response number 298.

189 The detailed effects of altering the present flow regimen of the river can only be determined by studies which have not yet been made, but which are proposed during the pre-construction stage of planning when detailed studies are normally made. Effects of flow changes will be studied as far downstream as they can be measured, including Cook Inlet. Winter and summer water temperatures will not be significantly affected by the project. Multiple outlet structures will permit withdrawal from the reservoirs (in which water will be thermally stratified) at any level required to maintain near-natural stream temperatures.

190 See response number 173.

191 See response number 240.

192 See response number 36.

193 The quoted sentence is a statement of fact. The Corps has a wealth of data, available for public perusal in the District office, documenting flood damages to the Alaska Railroad and the town of Talkeetna. Benefits attributable to reducing damages to the Alaska Railroad are computed in the project cost-benefit ratio. Benefits to Talkeetna are not. Benefits resulting from increased recreational opportunity are also included in the cost-benefit analysis. Benefits attributable to flood control and recreation comprise about 0.2 of 1 percent of the total project benefits, thus neither is a factor in project justification.

194 The recreational benefits ascribable to the project are summarized in the EIS. The detailed recreational analysis is contained in Section F to Appendix 1 of the Interim Feasibility Report. This document is available for public inspection in the District office. Access roads and all other facilities will be open to public use unless some areas or operational procedures of the project are determined to be dangerous to public safety.

195 Exact locations of the roads are not presently known, nor have mileages and right-of-way widths been exactly determined. It is anticipated that the majority of access roads will be open to the public. This is a basic premise in the estimate of public recreational usage on project waters and lands. Dirt and gravel will be obtained in the vicinity of road construction. Necessary borrow areas, where possible, will be screened from view from the access road. These areas will be rehabilitated as necessary.

196 Transmission line right-of-way will be obtained through standard real estate procedures. Very little of the line will cross private property, and, wherever possible, private lands will be avoided altogether. In the event some private lands are traversed, property will be acquired where possible by negotiation. If this cannot be accomplished, the government will exercise its power of eminent domain. Yes, burying the transmission line has been considered, and a discussion of this alternative has been added to the EIS. It is the conclusion of the Alaska Power Administration that underground cable is much more susceptible to damage from seismic activity than are overhead transmission lines, and that the installation of significant lengths of high voltage underground electrical transmission cable is limited by present technology (see Section 4.13 of the EIS). A number of studies have been made concerning health hazards associated with radiation from high-power transmission lines. It is generally concluded that lines transmitting less than 500 kv pose no threat to human health. One of these studies was made by Battelle Pacific Northwest Laboratories and is entitled Measuring the Social Attitudes and Esthetic and Economic Considerations Which Influence Transmission Line Routing. The report is dated July 1974 and is identified by index number NW-1837UC-11. There are very few climatic data for the area traversed by the transmission line corridor, particularly in regard to wind speeds. The Interior Zone (north of the Alaska Range) is dominated by high pressure air masses resulting in relatively mild winds. The Transitional Zone (south of the Alaska Range) has generally calm winds, although high winds over 50 m.p.h. can be expected. The Mountain Zone (Alaska Range) can be expected to have the highest winds. High winds are reported to have knocked down 138 kv towers in the area lying between Cantwell and Healy. As stated in the EIS, the net firm annual energy delivered to Anchorage and Fairbanks would be 6.1 billion kilowatt-hours. This is net of losses in power transmission, which amounts to 0.7 percent of the energy generated at the power sites. The two referenced power grids are comprised of existing networks of transmission facilities which separately serve the greater Anchorage and Fairbanks areas. Yes, they could be interconnected without the proposed dam; however, it is not necessary to connect them. The advantage to interconnection is largely related to the greater reliability of electric energy supply to the two separate communities. They would automatically be interconnected if the proposed hydropower system is developed.

197 The marketing agent and operator of the system would be the Alaska Power Administration. For a detailed discussion of secondary energy and attraction of industry, see response number 255.

198 Ideally, the interest rate shown reflects the opportunity cost of the funds committed to the project. It should not necessarily reflect current financial market conditions, but rather the approximate return to savings and investment over the 100-year project

life. Current high interest rates are very possibly a short-term aberration. By law, the interest rate is annually set equal to the average interest rate on long-term government securities, limited by a maximum increase of 0.25 percent per year. A sensitivity analysis using a range of interest rates is described in Section C of Appendix 1 to the Interim Feasibility Report which is available for public review in the District office. The costs mentioned are costs of different systems with different capabilities; they are not altered cost estimates of the same project. Currently available power sources (coal and natural gas) could supply the needs of the railbelt but at higher cost than the proposed plan. The energy needs of the Railbelt area are discussed in the revised main report. If constructed, the selected plan is to meet increased energy loads during the period from about 1986 to 1997. During this time, if the load projections are not exceeded, the existence of the hydro project would take the place of any net addition to thermal plant capacity that would otherwise be added in the Railbelt area.

199 Comment noted.

Greater Anchorage
CHAMBER of COMMERCE

Crossroads of the Air World

October 22, 1975

Colonel Charles A. Debelius
District Engineer
Corps of Engineers
P.O. Box 7002
Anchorage, Alaska 99510

Dear Colonel Debelius:

On behalf of the Board of Directors and membership of the Anchorage Chamber of Commerce, I wish to express our total support for the development of hydroelectric power in the Upper Susitna River area.

The Chamber would like to offer its services in helping to promote the construction of the Devil's Canyon and Watana dams as soon as possible. Please call on us for any further help we may provide.

Sincerely yours,

200 Loren H. Lounsbury
Loren H. Lounsbury
President

bww

GREATER ANCHORAGE CHAMBER OF COMMERCE — 612 F STREET, ANCHORAGE, ALASKA 99501 — (907) 272-2401

RESPONSE TO COMMENTS BY
GREATER ANCHORAGE CHAMBER OF COMMERCE

200 Comment noted.

ohn Colberg, Jr.
hairman of the Board

Roy Huhndorf
~~Ralph A. Johnson~~
President

COOK INLET
CIRI
REGION, INC.

October 9, 1975

Alaska District, Corps of Engineers
Attn: Colonel Charles H. Debelius,
District Engineer
P.O. Box 7002
Anchorage, Alaska 99510

Dear Sir:

This is to notify you of a possible error in the impact statement "Hydroelectric Power Development Upper Susitna River Basin Southcentral Railbelt Area, Alaska." On page 39 the second paragraph under Archeological Recources states that, "two archeological sites within the general vicinity of the proposed transmission line corridor are listed in the National Register of 4 February 1975. These are the Knik and Dry Creek Sites." According to Doug Reger, State Archeologist, the Knik site is not an archeological site, but an historic townsite. It is not listed in the National Register as an archeological site (p. 5250). However, Dry Creek is listed as an archeological site.

Employed as a research assistant with the Cook Inlet Historic Sites Project, I have encountered this apparent inconsistency. The Project is involved in compiling an inventory of Native historic and cemetery sites in the Cook Inlet Region.

If you have any comments on this matter, please direct them to:

201

Mary Weirsum
Cook Inlet Historic Sites Project
1211 West 27th Avenue
Anchorage, Alaska 99503

Thank you.

Sincerely,

Mary Wiersum

Mary Weirsum, Research Assistant
Cook INlet Historic Sites Project

MW/mr

1211 W. 27th • ANCHORAGE, ALASKA • 99503 • PHONE 274-8638

RESPONSE TO COMMENTS BY
COOK INLET REGION, INC.

201 The correction has been made in the EIS.

Knik Kanoers & Kayakers, Inc.
3014 Columbia
Anchorage, Alaska 99504
17 November, 1975

Col. Charles A. Debelius, District Engineer
Alaska District, Corps of Engineers
Department of the Army
P.O. Box 7002
Anchorage, Alaska 99510

Dear Col. Debelius:

The Knik Kanoers & Kayakers wish to go on record as opposing the construction of any dams on the Susitna River. Such development would destroy a major wilderness whitewater river, termed "the biggest in North America" by its first paddler, Dr. Walter Blackadar.

In the 'fifties and 'sixties the Corps dammed a number of the nation's finest whitewater rivers in the name of "progress." Yet each new dam served only to spur on further profligate use of energy. In other words, these beautiful rivers were sacrificed to no useful purpose. Nowadays such economic boondoggles would never win approval, yet the Corps is attempting to start the same destructive, wasteful process here with one of the country's most spectacular, wildest, loveliest rivers. The Susitna must be left to run free for future generations.

Sincerely yours,

202

Ed Swanson
President

RESPONSE TO COMMENTS BY
KNIK KANOERS & KAYAKERS, INC.

202 Comments noted.

October 8, 1975

From:

Orah Dee Clark Jr. High
150 South Bragaw
Anchorage, AK

To whom it may concern,

The seventh grade sixth period class took a poll, and has decided, at the rate of seventeen to three, against the series of dams, beginning with the Devils Canyon Dam. We decided against it for various reasons; (1) that it would harm the ecology, (2) That it would harm the natural habitat of moose and other wildlife, and (3) that it would damage the scenery, which we feel has been damaged enough.

We were appointed to this commitee by our teacher Mrs. Stark of Orah Dee Clark Jr. High. She gave us the pro's and con's of the issue, and took the poll.

203

Respectfully yours,
Kris Ashley
Theresa Rusnak

RESPONSE TO COMMENTS BY
SEVENTH GRADE
ORAH DEE CLARK JR. HIGH SCHOOL

203 Comments noted.

Sierra Club
3304 Iowa, #5
Anchorage, Alaska 99503
15 November, 1975

Col. Charles A. Debelius, District Engineer
Alaska District, Corps of Engineers
Department of the Army
P.O. Box 7002
Anchorage, Alaska 99510

Re: NPAEN-PR-EN

Dear Col. Debelius:

The following are the comments of the Sierra Club on the Corps of Engineers' draft environmental statement on Susitna River hydropower development.

204 The draft statement is inadequate. Its basic fault is that it is one long propaganda piece, with a notable lack of hard data presented. Such date must be supplied in the final document so that readers can make a rational choice as to whether the proposed Susitna dams are economically and ecologically justifiable.

205 There has been a serious failure to discuss alternatives to the project. The Federal Power Commission did the scoping analysis to select the least-cost alternative for comparative evaluation with the hydro project. In doing so, the FPC eliminated from consideration several alternatives which could, if allocated the $1.5 billion projected hydro cost or even lesser amounts, compare favorably to the dams. These alternatives include solar, wind, geothermal, and tidal power generation systems and investment in conservation measures.

206 The DEIS recognizes that oil, natural gas, and coal will be Alaska's major power sources for at least the next decade. During this time it makes much more sense to invest in technologies which the scoping analysis ruled out and have them on line by the end of the decade.

207 A major advantage of non-hydro alternatives is their flexibility. Coal plants, for example, can come on and off line in response to demand. Once a hydro project is built it will generate large amounts of electricity regardless of need. The effect of this will be to attract industries that need large blocks of electricity

On page six, it is stated that "The benefit-to-cost ratio compared to the coal alternative at 6 1/8% interest rate and 100-year

project life is 1.4 using Federal financing." Surely the
writers of the DEIS understand that a benefit-cost ratio is
meant to indicate whether a project's costs outweigh its
expected benefits. It is an internal relationship and the coal
alternative should not have entered into the calculation at all,
though it is proper, once the B/C ratio is computed, to compare 208
it to the B/C ratio for other projects. Furthermore, the DEIS
gives no information on how this figure was arrived at. What
are the project's expected benefits? On page 71 recreation and
flood control are mentioned as benefits, but within the body of
the DEIS flood control is otherwise never referred to.

The Corps accepted the FPC scoping study and proceeded to
evaluate coal as the least-cost alternative. Coal was evaluated at a 8.77% discount rate while the hydro project was evaluated at the 6 1/8% interest rate prescribed by the Principles
and Standards Act (which, while a vast improvement over the 209
ridiculous interest rates the Corps used to assume, is still
extremely low in terms of today's money market). The draft
interim feasibility report gives a B/C ratio of 1.4 for hydro
and 1.3 for coal. But the difference in interest rates seems
to account for the reason the B/C for hydro is more than that
for coal. Even with that favorable interest rate, the ratios
are almost the same! Furthermore, the B/C analysis gives no
weight to flexibility and responsiveness of the power generating
systems. The coal alternative is a flexible system which the
private sector would finance, and coal is a resource which can
be developed ton by ton as it is needed. The hydro project
would be an inflexible commitment of resources underwritten by
the federal government; its "front-end" costs are extremely
high and represent bills which fall due before any energy is
produced at all.

Another flaw in the B/C study is the estimate for recreation
benefits. Recreation benefits are estimated at $300,000 annually.
In fact, there are virtually no recreational benefits for the
project and there are very high recreation losses. According
to the draft interim feasibility report (p. F-3), "Few places
in the world offer the variety of outdoor recreation resources
available in Alaska. Both residents and visitors alike have 210
unexcelled opportunities for recreation activities among a profusion of beautiful lakes, rivers, and mountains, largely untouched by modern civilization." Given these fortunate circumstances, why would anyone want to visit a narrow, murky, artificial lake? The Watana reservoir, with its annual drawdown of
from 80 to 125 feet (which would be at its worst in early June,
then rise steadily throughout the summer), would be virtually
unusable for recreation purposes. A boat-ramp which can allow
for a 125-foot variation in water level in a steep, narrow canyon
would be difficult indeed to design.

The Susitna flows "some 130 miles through uninhabited country"
(p. 10). This is another, roundabout way of stating that it
flows 130 miles through wilderness. Were the writers of the DEIS

211 afraid that the word "wilderness" might make the river in its undammed state sound too valuable?

212 The statements at the top of page 14 are misleading. It should be noted that none of these rivers is Class VI in its entirety. Turnback Canyon on the Alsek can be portaged; the rest of the river has been run by inexperienced kayakers. Devil Canyon on the Susitna can also be portaged; here again, the river above the canyon can be and has been run by kayakers of limited experience. Less is known of the Bremner, but the heavy whitewater is confined to its two canyons. The point is that even a very difficult river can be utilized by inexpert kayakers and rafters if the rapids can be portaged. As for Devil Canyon itself, instead of making value judgements and using loaded words like "dangerous," the final EIS should emphasize that it is attractive to kayakers precisely BECAUSE it is difficult. Walt Blackadar, the first person to run it and a heavy-water paddler of extensive experience, termed it "the biggest whitewater in North America."

213 Mention is made here that the Susitna was recommended as a BOR study river "but was not one of the 20 rivers recommended for inclusion in the (Wild & Scenic Rivers) system by the Secretary of the Interior in 1974." True, as far as it goes, but it doesn't go far enough; Interior's d-2 bill is only one of several. The Susitna is indeed proposed as a wild river in the conservationists' d-2 bill, as the authors of the DEIS were surely well aware.

214 Page 23. "Several" nesting pairs of bald eagles and gyrfalcons were observed in the canyon area. How many is "several"? Were there so many that they could not be counted?

215 On the same page, it is noted that "Motorized all-terrain vehicle access to the backcountry has improved hunting success even in the face of a rapidly declining caribou population" (Nelchina herd). A critical factor has been winter maintenance of the Nabesna road, which permits snowmobilers to haul their machines in as far as they wish in comfort, then take off. Caribou--especially pregnant cows--are not able to withstand the resultant noise and harassment. Roads vastly increase the activity of off-road vehicles, and the Susitna dams will require roads (built at state expense?), presumably maintained in winter (also at state expense?). The final EIS should investigate the probable consequences to an already threatened caribou herd.

216 Page 24. The maps through the entire document are poor. Only someone who recognizes the shape of the Susitna would be able to locate it on the maps, since it is not labeled. Yet presumably the relationship of the river to the habitat being mapped is critical--far more so, for instance, than the location of Cordova (which appears on each map). Without knowing which line represents the river, and the location of each dam, the graphics are quite literally meaningless.

Hunting pressure for rams in the Cantwell-Healy area is "fairly heavy due to relatively good access from highways, by air, and by ATV's" (p. 27). The statement is true, and the Susitna hydro project would provide equally easy access for an area that is now wilderness--a road, which can also be used to haul ATV's on, and two or more enormous lakes to land a floatplane or ski-plane on. The effect on moose, caribou, and bear should be noted in the final EIS. 217

The Susitna area "has consistently produced more wolverines than any other area of comparable size in the State....Wolverines have withstood human encroachment and trapping without any noticeable reduction in numbers or range" (p. 28). Yet it has already been admitted that the area is presently wilderness, so any "encroachment" so far has been hunting lodges and trappers' cabins--not 70,000 visitors a year. Would the DEIS have us believe that wolverines won't mind the dams, roads, people, noise, etc.? Absurd. The wolverine is an extremely secretive, wary wilderness species which cannot coexist with highways and industrial development. 218

Page 37: "Float planes are used to fly in hunters...but this form of access is relatively minor....A major recreational use... is big-game hunting....The greatest pressures are exerted from a few fly-in camps." If fly-in access is "minor," then how can it produce the "greatest" pressure in a "major" recreational use? The statements are inconsistent, a frequent problem in the DEIS "It appears that the use of ATV's for hunting, already prohibited in some areas, may have to be further controlled." This statement misleadingly implies that such use can be controlled, when in fact it is very difficult (and expensive) to do. What will be the costs of the extra wildlife protection officers needed to enforce such a closure in an area where easy access has newly been created? Who will pay these costs? 219

Page 38. Again, the superlative, huge whitewater of Devil Canyon is implied to be very unattractive, equivalent to implying that Mt. St. Elias is "no good" for climbing because it is very difficult and successful attempts have been few. 220

We find it exceedingly odd that the DEIS was rushed to publication just before the Corps was due to receive the Jones and Jones study on recreational use and potential of the Susitna. Although as a consequence we have not had the benefit of reading the study itself, we understand that it recommends that the whitewater of Devil Canyon not be inundated, because of its great value as a scenic and recreational resource. 221

Page 40, energy needs. Again, these are mere unsubstantiated statements. "Because of lead time needed for coal and hydroelectric development, immediate needs for the next decade will have to be handled by additional oil and gas-fired units." True, even too generous, as regards hydropower (the Corps fact sheet of Oct. 23, 1975 estimates construction time at 14 years), but Beluga coal has already been leased and is ready to be mined, and Healy coal is already in production and has been for years. 222

223 Page 41. "Heavy emphasis should be given to those technologies which utilize renewable or essentially inexhaustible energy sources." It is preposterous to imply, here as elsewhere in the DEIS, that the Susitna dams represent the use of renewable resources. A wilderness river is not a renewable resource. Once developed, it is destroyed forever. And great wilderness whitewater rivers are not only nonrenewable, they are exceedingly rare, thanks largely to the Corps of Engineers.

224 Page 42. More garbage graphics. What on earth do the figures on the left represent? 50,000 WHAT? On what information is the graph based? Here again, we are to accept it on faith. And it's an old, old trick to set forth one absurdly high figure to make one's preferred alternative look more reasonable by comparison. Whatever those left-hand numbers symbolize, the high range indicates we'll use 19 times as many of them in the year 2000 as we did in 1970. Even hamsters don't multiply that fast.

225 Page 45. There are some interesting implications on sedimentation here, although the DEIS wrongfully fails to make them explicit. The average natural flow in the five high-flow months of May-September is 19,328 cfs. If we assume an average sediment load of about 1000 ppm (the DEIS says it is "less than 1000," leading the cynic to believe that it must be very close indeed to 1000 ppm), then 19.3 cubic feet of silt would be flowing into the Watana reservoir every second during those five months for a total of 255,130,560 cubic feet (9,449,280 cubic yards), just in the May-September period, every year. We will charitably assume that no silt enters the reservoir from October-April. Meanwhile, of course, a small amount of silt is leaving the system: 15-35 ppm year-round in an average flow of 9300 cfs. Again generously assuming that a high 32 ppm leaves the system, that's .3 cubic feet of sediment lost per second or 9,460,800 cubic feet each year (350,400 cubic yards). In short, 9,449,280 cubic yards of silt, sand and gravel entering the system every year, 350,400 cubic yards going out, and a net yearly gain of 9,098,880 million cubic yards. That's a formidable amount of silt. Can the Corps guarantee that reservoir siltation problems will not occur here as they have at other dams?

226 Page 46. If whitewater can "reduce substantially" the supersaturated nitrogen and dissolved oxygen introduced into the water in passing over the spillway, then why not leave more whitewater available for this useful purpose, instead of submerging nine of the 11 miles of Devil Canyon?

227 Page 48. "Future detailed studies" will be necessary to make sure general channel degradation won't occur below the dam as the river attempts to regain its normal sediment load. These studies are to be part of "pre-construction planning," which the Corps would have us believe does not necessarily commit us to building the dams, despite the name.

We are told that the Watana would flood existing fish habitat but might create "other fish habitat at higher elevations on these tributaries." Perhaps. But it's certainly not going to replace spawning habitat, which requires clean, well-oxygenated gravel; not while the Watana reservoir is fluctuating 125 feet every summer! 228

Page 49. The Susitna carries winter silt loads of 4-228 ppm; earlier the DEIS had termed the winter water "clear." Yet the discharge below the dams would be "milky" at 15-35 ppm. Both statements can't be true. The problem may be that the DEIS tends to use figures distorted by extreme circumstances when the mode would be more useful. Trivial here, perhaps, but not so elsewhere--as regards energy demands, for instance. 229

Page 51, the question of fish habitat in lakes with heavy silt inflow. The DEIS admits that it could be a problem, but mentions the many natural lakes where there is fish habitat despite heavy inflows of silt. But these lakes have equally heavy silt flows back out, as anyone knows who has paddled the Tazlina. The lakes don't simply silt up as the Watana reservoir will eventually. 230

Also on this page is the first hint ("the proposed series of high-head dams") that the Corps does indeed intend to build all four dams once it gets its foot in the door, despite the pious assurance on page 89 that "the magnitude of environmental impacts resulting from a four-dam system in the Upper Susitna River Basin clearly makes this a less desirable alternative than the one-, two-, or three-dam plans." The final EIS should make explicit the Corps' intention to build all four dams. 231

Page 52. The problem of ice shelving in the Watana reservoir and the attendant difficulties for caribou and moose attempting to cross it is a serious one and there is no justification for glossing over it, as the DEIS does. Studies indicate that caribou use of the Watana site for grazing and crossing "was minimal during the period November 1974 through April 1975." One five-month study, on a migratory species like caribou, is of very limited utility, yet the reader of the DEIS might well recieve the impression that it proved that caribou do not and will not use the area. No such conclusion is possible on the basis of a single winter's study. 232

Page 53. Counting conditions in June 1974 were "less than ideal." ADF&G saw only 356 moose, whereas they'd seen 1796 the previous fall. Unless the winter was inordinately severe, we can assume that counting conditions were not merely "less than ideal": they were totally inadequate.. Yet the DEIS mentions the figures as though they were meaningful. ADF&G has rightfully resented the unreasonable haste with which it has had to carry out its Susitna dam studies, and on a meager budget. Cooperation from the Corps has been very poor. 233

Page 54, transmission line impacts. The DEIS states there will be "not many per se; most...will be as a result of construction and maintenance." In fact the growth the Susitna dams will foster, and the easy access it will provide, will cause major

234 impacts. And as any hunter can attest, wildfowl tend to avoid transmission line corridors.

235 Page 56. "Initial annual visitation to the project area would be about 77,000 people"! Is this figure part of the source of that inflated 1.4 B/C ratio? How was it derived? If 77,000 people really did use the area (as opposed to merely driving by out of curiosity to glance at the dam, which would hardly provide a significant recreational benefit), the impact would be tremendously heavy. Can Talkeetna (pop. 200) handle such a visitor load?

236 Page 57. "Much of the existing tree and shrub cover in the Upper Susitna River Basin is located in the river and creek bottoms and on the steep canyon slopes above the streams and would be lost during dam construction." This is important moose habitat.

237 Page 61. Land along the Susitna "is a natural and scenic area that would probably qualify for wilderness classification under most definitions of the term." (Emphasis added.) Under what definition could it possibly fail to qualify? The proposed Corps project would definitely destroy a wilderness river and area of high quality. That fact should be admitted forthrightly in the final EIS.

238 "The proposed transmission line corridor would cross no existing or presently proposed scenic, wild, or recreational rivers, nor would it cross any existing or presently proposed wilderness areas or wildlife refuges." True, but what of the dams themselves, and the proposed Susitna National Wild River of conservationists' d-2 legislation now pending before Congress?

239 "Between Gold Creek and Cantwell, a visible (power) line would have substantial impact, particularly if located west of the highway and railroad." It could not be concealed through Broad Pass. This area provides some of the most strikingly scenic views of Mt. McKinley and the impact of such a transmission line would be devastating. It is appalling that the Corps would even consider placing the line on the west side of the highway and railroad.

240 Page 62. How fortunate that the "most likely" source of an 8.5 earthquake would be a safe 40 miles distant. Yet it is also admitted that "the Susitna Fault, truncated by the Denali Fault, bisects the region in a northeast to southwest direction approximately 2.5 miles west of the Watana damsite." What studies of the fault system and "most likely" quakes have been done by independent seismic experts? Why does the DEIS contain no maps or graphic displays showing the location of these faults? Was it feared that it would look a little too graphic only 2.5 miles from an 810-foot-high earthfill dam?

Page 63. There could be ice-fog conditions in the area below Devil Canyon Dam "during periods of extreme cold weather." The implication is that ice fog is a rare occurrence indeed, happening

241 only under "extreme" conditions. Alaskans know better. Why did the DEIS not frankly state that ice fog would be present? It's hardly a critical point. Of course, the defensive attitude carries through elsewhere in the DEIS to more important matters.

242 Page 64. "The proposed projects will not create large blocks of excess electric power for heavy energy-consuming industries." An amazing statement! Without some good demand figures, how are we to believe this? What of the Healy and Beluga coal and the Cook Inlet and Prudhoe gas? Are these other entrepreneurs expected to give up their markets and go elsewhere? More plausibly, there will be a vast surplus and industry will be encouraged to come up to Alaska to use it. And in fact the Corps' own Joe Auberg (Western Planning Division, Washington office) says that the final EIS will recognize that construction of the hydro project would mean commitment to a growth policy for the southcentral region.

243 Can the town of Talkeetna handle the impact of 500 to 1000 construction workers? The construction period should be mentioned here. The reader should not have to look up a separate Corps fact sheet to find that the project will take 14 years.

244 Page 65. Problems with temperature, dissolved oxygen, and supersaturated nitrogen "would be held to minimal, and possibly insignificant levels by spillway design..." If the problem is really that easy to solve, why does it still exist on other major dams (e.g. Columbia)? The final EIS should not imply that the Corps has the answer to all the questions on supersaturated nitrogen, etc. It doesn't.

245 Page 68. "Future power systems" (but not this one?) "will also require approaches that include full consideration of environmental values and alternatives and must anticipate that Alaska and the nation will attach increasing importance to environmental protection, energy conservation, and conservation of nonrenewable resources." Again the DEIS fails to recognize that huge wilderness whitewater rivers are nonrenewable resources, and scarce, too. Nor is a dam, rapidly filling up with silt, truly a "renewable" resource.

Pages 70, 73. It is interesting to note the close proximity of major coal and petroleum resources to the cities of Anchorage and Fairbanks. Since the concept of the "railbelt" as having high energy needs is fallacious (the two widely-separated cities of Anchorage and Fairbanks are heavy energy consumers, and so to a much smaller extent are the towns of the Kenai Peninsula, but the handful of homesteaders, lodge-owners and railroad workers living along the "railbelt" account for a minute share of the total energy demand), why not simply utilize these nearby resources, which are already being developed, and without the need for federal funding? Or is the Corps telling Alaskans that we

246 must endure the environmental costs of strip-mining for coal, and the stress of pipeline booms, but are not to be permitted to gain any benefit from the development of our state's resources? Must all our coal, oil and gas be shipped to the Lower 48 for others to use?

247 Page 75. The forecast of energy needs is absurd. Having used 1.4 million barrels of oil and 16 billion cubic feet of natural gas in 1972, we are expected to use (under "mid-range" estimates!) 26 million barrels of oil (19 times as much) and 134 billion cubic feet of gas (eight times as much) in the year 2000 "if recent trends continue." Without further documentation of these amazing figures, the reader must inevitably think them equivalent to saying, "If recent trends continue, the teenager will be 10'6" by the time he's 33 years old."

248 Page 77. The "extreme costs and environmental effects involved in most tidal flow hydroelectric proposals are major factors opposing" tidal power. True enough; very few places in the world are suitable for the development of tidal power. Cook Inlet happens to be one of the best, however.

249 It is notable that the DEIS finds us "too small" for nuclear power or solid waste burning, but "too big" to be allowed to use our own oil and gas.

250 Page 67. The transmission line "right-of-way would provide cleared land at little or no expense to the farmer." A dangerously irresponsible statement that should be deleted from the final EIS. Radiation from high-voltage power lines is hazardous to living tissues.

251 Page.75. The difficulty of safe disposal of radioactive wastes is noted. Many people question the wisdom of a system that must rely on many future generations to deal responsibly with the by-products of energy used by this generation. But the same argument can be raised in connection with this hydropower project. Even if it becomes obsolete, even if it silts up and can no longer produce power, a huge dam must be maintained and repaired forever, else downstream residents will be at risk of horrendous floods or mud-slides. A dam is a sword of Damocles hanging over the heads of our great-granchildren.

Page 94. We concur with the Alaska Energy Office criticism that the final EIS should include a net energy benefit analysis for the whole system, including the energy used during construction and losses during long-distance transmission.

Page 6, cost. Total first cost (January 1975) prices of $1.343 billion. There was no justification for using January 1975 prices in the DEIS. The Corps' October 23 fact sheet already shows a price jump to $1.5 billion (a $157,000,000 rise--more than enough to build Senator Gravel's federal office building!), but even this figure is ludicrous. The contractors will not be paid in 1975 dollars. The same fact sheet mentions a 14-year construction period. If the project were already in progress today, it could not be finished until late 1989. The whole DEIS is filled with speculative projections on dubious grounds; why was there no projection of costs in October 1989 dollars? If inflation continues at its current 13% rate--note that we are playing the Corps' own game here--the final cost will be $8.33 billion, a staggering sum. 252

But let us assume that inflation will be nonexistent for the next 14 years and that there will be no cost overruns. A modest proposal: instead of building the Susitna dams, that $1.5 billion could be invested. Even at a mere 6%, it would produce $90 million a year. It could be split up among some 400,000 people expected to live in the railbelt area at $225 per capita. Surely most Alaskans would prefer to have the cash--$900 yearly for a family of four would go far toward paying the gas bill!--and the generous U.S. taxpayer would be sure to approve, since the $1.5 billion principal would remain untouched. A beautiful wilderness whitewater river would not have to be destroyed, and Alaskans would not have to suffer through still another wracking construction boom. 253

The hydro project not only makes little sense for Alaska, it makes little sense in terms of a wise national energy policy. The opportunity cost of investing $1.5 billion to produce power for approximately 400,000 people is extremely high. This large an investment in projects other than hydropower could provide more energy for more people at lower environmental cost. 254

The DEIS suggests that Alaska would be dependent on oil and gas during the dams' 14-year construction time. When the dams come on line, the hydropower would theoretically replace oil and natural gas generating facilities, thus freeing up the oil and gas to be shipped to the Lower 48. (This scenario is unlikely to occur, as earlier noted, because the hydropower would probably attract large block industrial users and stimulate demand, rather than meeting existing and projected demand.) But even if oil and natural gas were no longer needed for electrical generation, the yearly savings would be insignificant compared to national oil consumption. The DEIS states that estimated 1972 fuel use for Alaska's power systems included 1.4 million barrels of oil. For purposes of comparison, in 1972 the nation as a whole used 5.99 billion barrels of oil. (Source: Ford Foundation Energy Policy Project, <u>Preliminary Report</u>.) Thus Alaska represented less than one four-thousandth of the total demand. 255

A major goal of the project is to conserve fossil fuels (p. 91).

> "By the same token, the project would contribute to a savings in nonrenewable energy resources with an energy equivalent of about 11.3 million barrels of oil, or approximately 80 billion cubic feet of gas per year. Although this savings is a principal factor in the consideration of a hydroelectric alternative, over the long haul hydroelectric energy must be viewed

256 as an interim measure for conserving the nation's nonrenewable energy sources until some more practical, permanent method of producing electricity is achieved which will not overburden the nation's or world's finite resources."

257 But $1.5 billion invested now in new energy sources and conservation measures would yield much greater benefits than the dams. The Corps is pushing for "pre-construction planning" funding as though an energy emergency situation, rather than a surplus, exists or will exist within the next couple of decades. There is no emergency, however. Alaska is well supplied with energy resources in the process of being developed. The just-released study by the state Division of Geological and Geophysical Survey shows that with the Prudhoe Bay gas owned by the state we will have an embarrassment of energy riches. Since there is time, the $1.5 billion or $3 billion or $8 billion of the federal taxpayers' money which the dams will cost should instead be invested in research for alternative, better means of energy production, research which would be a godsend to the whole nation.

Sincerely yours,

Jack Hession

Jack Hession
Alaska Representative

RESPONSE TO COMMENTS BY
SIERRA CLUB

204 Comment noted.

205 The Federal Power Commission, in carrying out its functions under the Federal Power Act, is concerned with all elements in determining power values. The Corps cooperates with the Federal Power Commission in evaluating power benefits on the basis of unit power values developed by the Commission. Project power benefits include financing factors related to the alternative source of power, public or private, that would most likely be utilized to serve the same market area in the absence of the project. The alternative is usually a new, privately financed, modern, and efficient thermal powerplant. However, all alternatives are carefully examined. In the case of this study, both natural gas and coal were chosen as the most reasonable potential alternatives. Gas was eliminated on the basis of projected availability at the time hydropower would go on line in 1986, and by the direction of Congress to conserve nonrenewable resources and to utilize renewable resources for power generation where possible. There is no longer any reason to anticipate this fuel will continue to provide an abundant, cheap energy source for the long term as has been exercised in the past. In calculating the benefit/cost ratio of coal and hydropower alternatives, the latter was determined to have the greater benefits.

206 Comment noted.

207 It is true that some non-hydro alternatives, such as coal, are more flexible than hydropower in response to fluctuation in demand. However, the hydropower project presently proposed will not meet energy demand projected to exist within a relatively few years following project completion. Thus, existing or future coal or gas plants may well be used to provide the flexibility to cope with fluctuation in demand above the level of baseload requirements fulfilled by the hydropower project. For a thorough discussion of the effect of the project upon industrial development, see response number 255.

208 The coal alternative does enter into the hydro project cost-benefit calculation, because this alternative is the economic standard against which each of the hydropower plans is tested. That is, the power benefits of a given hydro system represent the cost of producing the same amount of power by constructing and generating a conventional, state-of-the-art generation system using coal as fuel. Thus, the coal alternative, by definition, has a benefit-cost ratio equal to one. The interest during construction was added to project costs, and those expenditures accruing after 1986 were discounted to the 1986 power-on-line date at 6-1/8 percent to give the total investment cost. The present worth of the benefits was calculated also by discounting at 6-1/8 percent to 1986. The investment cost and present worth of the benefits were then amortized at 6-1/8 percent over the 100-year project life to give annual costs and benefits which were then compared to give the benefit-cost ratio.

209 The coal alternative was not evaluated at an 8.77 percent discount rate. The 8.77 percent figure is used to calculate annual fixed charges and, as such, is used for different purposes than the discount rate employed in the hydro analysis. Incorporated in this 8.77 percent is the composite of municipal and REA borrowing costs in the Anchorage and Fairbanks areas. It is this cost of borrowing that is properly compared with the 6-1/8-percent discount rate annually established by the Treasury Department. The composite financing used by FPC in analyzing the public, non-Federally financed coal alternative was 6.25 percent interest rate for the Anchorage-Kenai market area, and 5.95 percent interest rate for the Fairbanks market area.

210 Most of the recreation benefits attributed to reservoir development are associated with the Devil Canyon site. Also see response number 81.

211 Comment noted.

212 The paragraph has been reworked to indicate that portions of the listed rivers are Class VI boating rivers, and that Devil Canyon is difficult instead of dangerous. For more information on white water of Susitna, see response number 257.

213 The Corps of Engineers is aware that "The Susitna is indeed proposed as a wild river in the conservationists' D-2 bill--". Furthermore, all land and water within the immediate area of project influence, including the upper Susitna River, are tentatively scheduled for selection as Native deficiency lands, which are classified as D-1. Section 3.0 of the EIS is devoted entirely to a discussion of the relationship of the proposed action to land use plans.

214 The paragraph from which the word "several" is excerpted refers to the 1974 findings of the U.S. Fish and Wildlife Service during a survey of raptor populations in the canyon area of the upper Susitna River. During this survey, three nesting pairs of bald eagles and two gyrofalcon nests were observed near the Devil Canyon area.

215 The Susitna River dams will require access roads which will be built at Federal expense. They will require year-round maintenance. The State may choose to incorporate these roads into the State highway system. If it does, then maintenance will become a State responsibility and cost. On the other hand, if the State does not choose to incorporate the roads into its highway system, maintenance will continue as a Federal responsibility and cost. Hunting pressure will not increase as a result of road access into the damsites since ADF&G has the statutory capabilities to control the actual pressures. Thus, only the potential for hunting pressure will increase.

216 The Susitna River has been drawn with a darkened line to more clearly show its location on the schematic maps.

217 The EIS clearly states (in Section 5.0) that increased pressures on existing game populations through hunting, trapping, and general disturbance and harassment will require intensified game management and law enforcement practices. As previously stated, ADF&G has the statutory capabilities to control these pressures--albeit, at greater cost and effort on the part of State government.

218 The quoted statement is included in the EIS to emphasize the importance of Susitna River Basin to wolverines. Encroachment to date has included more than "hunting lodges and trappers' cabins;" it has also included hunting and significant impact on wolverines in the Upper Susitna River Basin. We have expressed concern, however, (in Section 5.0) that any losses to moose and caribou occasioned by the project will "...impact upon predator species." This, of course, includes the wolverine.

219 Of course, the use of ATV's can be controlled. The Alaska Department of Fish and Game, in commenting on the draft EIS, has stated that it has the statutory capabilities to control the actual pressures of increased hunting potential. In the discussion of adverse environmental effects which cannot be avoided (Section 5.0), with reference to required road construction, it is stated: "This would have the potential to increase pressure on existing game populations through hunting, trapping, and general disturbance and harrassment. This in turn would require intensified game management and law enforcement practices and preventative measures for the control of wildfire." Increased costs related to intensified management and law enforcement would be borne by the State.

220 There is nothing in the referenced paragraph which implies that the "Superlative, huge whitewater of Devil Canyon" is unattractive, much less 'very unattractive'." However, to be constant with an earlier change in adjectives suggested by the reviewers, we have substituted the word "difficult" for "violent."

221 The Jones and Jones report was provided to the Alaska District in March 1975, and has been available in the District office for public review since that time. All relevant, significant information contained in the report was utilized in preparation of the draft EIS. With respect to the report's recommendation concerning the inundation of Devil Canyon, the following is quoted from page 8 of the report: "In particular, it is suggested that relocation of the Devil Canyon Dam to a point above Devil Creek be investigated, perhaps at a higher pool level, coupled with relocation of the Vee damsite somewhat downstream and deletion of the Watana damsite entirely. Possible benefits include preservation of the esthetic resources of Devil Canyon and enhanced reservoir fish habitat and recreational opportunities." In fact, not only was this alternative considered and evaluated, it was but one of a number of dams and combinations of reservoirs which were evaluated in selecting the proposed plan. The authority and responsibility for this final decision rests with the District Engineer--not with a consultant.

222 Comment noted.

223 The EIS candidly discusses the inundation of some 82 miles of the Susitna River, including 9 miles of the existing 11-mile whitewater section in Devil Canyon. The whole section from which the sentence is quoted deals with energy needs. The Susitna River does, in fact, constitute an inexhaustible energy source.

224 The ordinate scale of the load projections on the projected energy demand graph was inadvertently not labeled in the draft EIS. The numbers in this scale represent kilowatt-hours (in millions) and have been so labeled in the revised draft EIS. The origin and meaning of the curves on the graph are fully discussed in the EIS. The mid-range load projection curve selected for the Corps' analysis is considered conservative, with annual rates of increase in power, requirements less than 7 percent after 1980 as compared to an historical annual growth rate of 14 percent during the period 1960 to 1971.

225 On the basis of data from reservoir projects on many types of rivers, the Corps has developed a reliable methodology for calculating sedimentation rates. On the basis of this methodology, which includes consideration of geologic characteristics of the basin, river gradient, precipitation patterns, runoff characteristics, and topography, the Corps has estimated that the project will exceed by a large margin the 100-year life upon which economic justification is based (it is presently believed that the useful life of the project due to sedimentation may exceed 500 years).

226 Nitrogen supersaturation is a phenomenon which would only occur when water is released through the overflow structure. This would occur at an estimated frequency of once every 2 years with a duration of 14 days. The overflow structure will be designed to minimize introduction of nitrogen. The expected impact of this condition is not significant enough to warrant relocation of the dam.

227 Quoted fully, the sentence containing the phrase "future detailed studies" states: "However, this phenomenon would be the subject of future detailed studies to determine the distance at which sediment loads would become reestablished." There is nothing in the EIS indicating that such studies "...will be necessary to make sure general channel degradation won't occur below the dam..." It is true that the referenced future detailed studies are recommended as part of preconstruction planning. Detailed planning of all Corps projects is done following specific Congressional authorization and funding of such studies. Following the completion of detailed preconstruction planning, Congress again determines whether or not the project should be funded for construction.

228 The EIS states only that possibly other fish habitat would be created at higher elevations on the tributaries to the Watana reservoir. The actual effects can only be predicted on the basis of detailed field studies. There is a good possibility that reservoir fluctuation would not significantly affect spawning habitat. Drawdown will occur during the winter months, when river inflow is low. The reservoir will be filled during the spring and summer months of higher runoff. Should spawning occur during the period when the reservoir is full and relatively stable, there may be little adverse impact on any new spawning habitat created at the higher elevation.

229 In describing river characteristics under existing conditions in Section 2.0 of the EIS, it is stated: "During the winter when low temperatures retard water flows, streams run relatively silt-free." We see no conflict between this statement and the one on page 49 of the draft EIS which states that winter investigations by the Alaska Department of Fish and Game indicated that suspended solids ranged from 4 ppm to 228 ppm. Following project construction it is predicted that suspended sediment in releases at Devil Canyon Dam would be relatively low (15 to 35 ppm) year-round as a consequence of heavier sediments being retained in the reservoirs. However, even at this low figure, it is predicted that the water may not be as clear in the winter months as it now is due to the nature of the very fine "glacial scour" which will be introduced into the reservoirs during the summer months and remain in suspension during the winter. Sediment samples taken by ADF&G under existing conditions reflect a transport of heavy sediments which originate from the riverbed itself. Relatively high concentrations of large, granular material may not significantly affect water clarity, whereas much smaller amounts of a finely suspended sediment will cause a turbid or "milky" appearance. The last two sentences of the reviewer's comment are noted.

230 All lakes silt up. The rapidity of filling is related to the amount and characteristics of sediment inflow, outflow, and the size, depth, and length of the lake. This is equally true of natural bodies of water and manmade lakes.

231 The "proposed series of high-head dams" refers to the Devil Canyon and Watana dams. These are the only dams proposed for development in the Upper Susitna River Basin. The proposed high-head Watana Dam inundates the Vee damsite thus making it unavailable for hydroelectric development. There are no other damsites suitable for development of a high-head dam.

232 The following statement is made in the referenced paragraph of the EIS: "...under adverse ice conditions, the reservoirs could result in increased problems for some segments of the herd. Also, there could be some permanent changes in historical herd movement patterns." The five-month study by ADF&G was referenced because it is the only study that has been made of caribou crossing at the Watana reservoir site. A previous paragraph states that caribou do use the area.

233 There is no implication in the referenced paragraph that the moose count figures are "meaningful." They are included simply as a matter of recorded fact. If any conclusion can be drawn from these statistics, it would appear to be that the upper Susitna River and the low drainage areas of the major tributaries provide important moose wintering habitat. The statement "cooperation from the Corps has been very poor" is a misstatement of facts. The Corps has cooperated and worked very closely with ADF&G.

234 Impacts resulting from the transmission lines, including secondary effects resulting from road access, are thoroughly discussed in other paragraphs in this section of the report. We note with interest that some reviewers regard transmission lines as a threat to wildfowl because of the possibility of collision while others believe that wildfowl tend to avoid transmission line corridors.

235 The visitation estimate was provided by a private consultant who closely coordinated his work with the Bureau of Outdoor Recreation and the Alaska Division of Parks. Benefits attributable to recreation constitute approximately 0.2 of 1 percent of the annual project benefits. The Corps has not predicted that the estimated 77,000 people who will visit the project annually will also visit Talkeetna, which would be separated from the Devil Canyon site by over 110 miles of roads. There is no planned direct project road access between Gold Creek and Talkeetna.

236 As required by the 1958 Wildlife Coordination Act, the Corps has requested from the U.S. Fish and Wildlife Service an evaluation of project impacts upon fish and wildlife resources, including moose. Upon the conclusions of their study, a determination will be made through the cooperative efforts of wildlife agencies to determine mitigation measures necessary for the unavoidable destruction of moose habitat.

237 The Corps' description is accurate as written. There are many criteria established for wilderness classification of an area. The description was put in the EIS to inform the reader of the wilderness quality of the area. The fact that a portion of this area will be extensively modified, including complete inundation of some 84 miles of river, is clearly stated and extensively described in the EIS.

238 As stated in response to a previous question, the lands affected by the project are presently classified as native village deficiency lands, and the Corps is aware of conservationists' D-2 legislation now pending before Congress.

239 The Corps is not considering placing the transmission line on the west side of the highway and railroad between Gold Creek and Cantwell. The quoted sentence is factual as written. The schematic figure indicating the location of the transmission line corridor has been clarified.

240 The Susitna Fault, although close to the project, does not have the probability of creating as violent an earthquake at the reservoir sites as does the more distant Denali Fault. For this reason, an 8.5 Richter Maximum Credible Earthquake (MCE) at the Denali Fault (40 miles distant) was selected for design purposes rather than the 6.0 Richter MCE event which could result from the Susitna Fault (2.5 miles distant). The fault system of the entire area would be thoroughly studied prior to final project design and construction.

241 Again the statement concerning the possibility of the occurrence of ice-fog conditions below Devil Canyon Dam during periods of extreme cold weather is factual as written. As noted in the comment, this is hardly a critical point given the remote location of the damsite.

242 The EIS already recognizes growth as an inevitable occurrence in the Southcentral Region, unless an anti-growth policy is established to prevent it. The projected energy demand upon which justification for the project is based is clearly explained in the EIS and illustrated in Figure 9. A medium growth rate, as projected by the Alaska Power Administration, contains no provision for energy needs which would be required of large industrial development. The question of industrial development is more fully addressed in response number 255.

243 The temporary impact of construction workers upon small communities is discussed in the EIS (Section 5.0). The fact that the impact is temporary is one of the primary reasons that it may be particularly adverse. The total period of construction is expected to take 10 years. Approximately 4 years will be required for preconstruction planning. Construction workers will not be present during this period. As stated previously, Talkeetna is over 110 miles by road from Devil Canyon Dam and nearly 150 miles by road from the Watana damsite.

244 Nitrogen supersaturation in the Columbia River is caused by the depth of the plunge pools immediately downstream of the various dam projects. The Corps of Engineers, through extensive research conducted jointly with State and Federal environmental agencies, has developed a "flip lip" that is being incorporated into the Columbia River spillway section of hydropower projects to prevent flows from plunging into deep pools. Although nitrogen supersaturation is still present in the Columbia River, the concerned agencies are optimistic that with the installation of "flip lips" into the spillway of critical projects, the level of nitrogen supersaturation in the Columbia River system will be reduced to noncritical levels. Other factors influencing nitrogen supersaturation include water depth in the river, stream turbulence, distance, etc.

245 The sentence quoted from the EIS states that, along with energy conservation and conservation of nonrenewable resources, environmental protection will be attached increasing importance by the nation. The EIS clearly indicates the trade-offs between these different values which would be required by hydroelectric development. The nation, as represented by the actions of Congress, will in effect determine whether or not the costs of the trade-off are justified by the benefits. The EIS does not state or imply that dams constitute a renewable resource. Only water is indicated as having this characteristic.

246 Alternatives related to gas, oil, and coal are sufficiently discussed in the EIS to explain the justification of their rejection as alternatives to hydropower.

247 Comment noted.

248 The sentence from which the phase is quoted refers to all tidal flow hydroelectric proposals. Tidal power is seldom if ever proposed in areas where it is not "suitable." Cook Inlet may be one of the best areas for such development; nevertheless, the "extreme costs and environmental effects" are the basis for not recommending it for tidal flow hydroelectric development.

249 The basis for the rejection of nuclear power, solid waste burning, and oil and gas alternatives are explained in the EIS. Some of the alternatives were rejected on the basis of providing either excess or insufficient energy to meet a reasonable amount of the needs of moderately projected growth.

250 The statement is factual and has not been deleted from the EIS. Scientific studies of the radiation effects of high voltage power lines indicate that there are no harmful human effects from lines transmitting less than 500 kv. The maximum power transmitted on the proposed system would be 345 kv. Farming practices, furthermore, generally do not expose humans to sustained, close-range contact with transmission lines. For reference to an authoritative study concerning the health hazards of transmission line radiation, see response number 196.

251 Comments noted.

252 Prices at the actual time of construction will undoubtedly be higher than January 1975 prices. Similarly, the price of energy will also be higher, and since the project produces energy long after the great majority of project costs are paid, incorporation of a general price level escalator would have the effect of amplifying benefits to a greater degree than costs. Assuming inflation would, therefore, cause the project to appear more economically favorable. Inflation is not assumed because assumptions about future price levels are deemed too speculative. Future values, cost, and benefits will be equally affected by inflation. Long-range projections are not made based simply on historical rates of growth. They are often included in a discussion for purposes of comparison.

253 Comment noted.

254 The study reveals that the hydro project will produce the required energy at a low economic and environmental cost.

255 Stimulation of significant heavy industrial development is not expected to result from the Susitna Project for the following reasons:

1. The projected energy load growth upon which the marketability assumptions are based, does not incorporate significant heavy industrial development. Rather, the projection assumes a gradual expansion of industry based only on already planned expansions to existing facilities and on readily identifiable new industry closely tied to proven resource capabilities and economic realities; this development is expected with or without the project.

2. The hydro project is designed to provide additional power incrementally through phased construction. From 1986 to about 1995, the Susitna power will meet both increased load and displace otherwise produced by more costly stream-fired plants. The less efficient and obsolete steam-fired plants will be inactivated or retired.

3. There will be some secondary energy associated with the proposed plan. Such energy is not designed into the plan, but is a result of defining the "firm" energy as that which can be produced in the worst water year (drought). Thus, in most years, there is additional water available to produce "secondary" energy which, because it cannot be quaranteed to the user, is usually sold at a discount on a when-available basis.

The secondary capability of the proposed plan is seasonal, occuring during the summer months of June through September, and amounts to about 12 percent of the firm energy output. Of the 25 years of stream flows utilized for the operational studies, secondary energy would be available during the summer months of 16 of the years. It is estimated that secondary energy would be marketed at about 10 mills per KWH or approximately 50 percent of the estimated cost of firm energy. Neither firm nor secondary energy generated from the Susitna Basin projects will be what is commonly termed "cheap" power even though it is attractive when compared to the thermal generated alternatives available for satisfying future Railbelt energy needs. Marketability analysis has determined that the required pay-back usage rate for firm energy from the Susitna Project, is 21.2 mills per KWH. In comparison, present rates for firm energy marketed by Bonneville Power Administration in the Pacific Northwest during the winter months is 4.1 mills and less in the summer. In general, energy by the hydro project will be somewhat less expensive than energy provided from alternative sources. It is for this and environmental reasons, that the hydro project is the selected plan. The resulting energy cost savings will accrue to all Railbelt area electricty users. This lower cost energy will provide a slight locational advantage to the Railbelt area in comparison to conditions without the plan. Significant stimulation of heavy industry is not expected to result, however, because as noted above, the project is designed such that available capacity as closely as possible approximates the projected demand. Further, the cheaper secondary energy will be available on too irregular a basis to serve as an important determinant in industrial locational decision-making.

256 Coment noted.

CITIZEN COMMENTS AND RESPONSES

SALMON MEDICAL CENTER
BOX 1110
SALMON, IDAHO 83467
W. L. BLACKADAR, M.D. 756-3633
BOYD K. SIMMONS M.D. 756-3633

October 16, 1975

Alaska District Corps of Engineers

Anchorage, Alaska

Re: Draft environmental impact statement on the Upper Susitna Basin - Hydroelectric power development

Dear Sir:

I have reviewed carefully your 95 page statement and am alarmed that you dismiss the adverse changes in Devil's Canyon in a two line insert on page 93. The loss of Devil's Canyon for white water kayaking deserves much more impact than you have given it. This section of canyon has only been paddled a few times but it is paddleable and it is destined to become extremely well used and extremely popular.

Ten years ago, almost no one had run the Grand Canyon in kayaks. Now, thousands are traversing this famous gorge. As these thousands look for new horizons, Devil's Canyon looms as the only challenge which is technically feasible to do without undue risk. I paddled Devil's Canyon in 1972, plan to return with a large group this next summer and I know of another group that will go independently. To lose the Devil's Canyon section of white water would be a tragic loss to America and it's future generations because there is no other place like it in North America, or for that matter the world as far as I know.

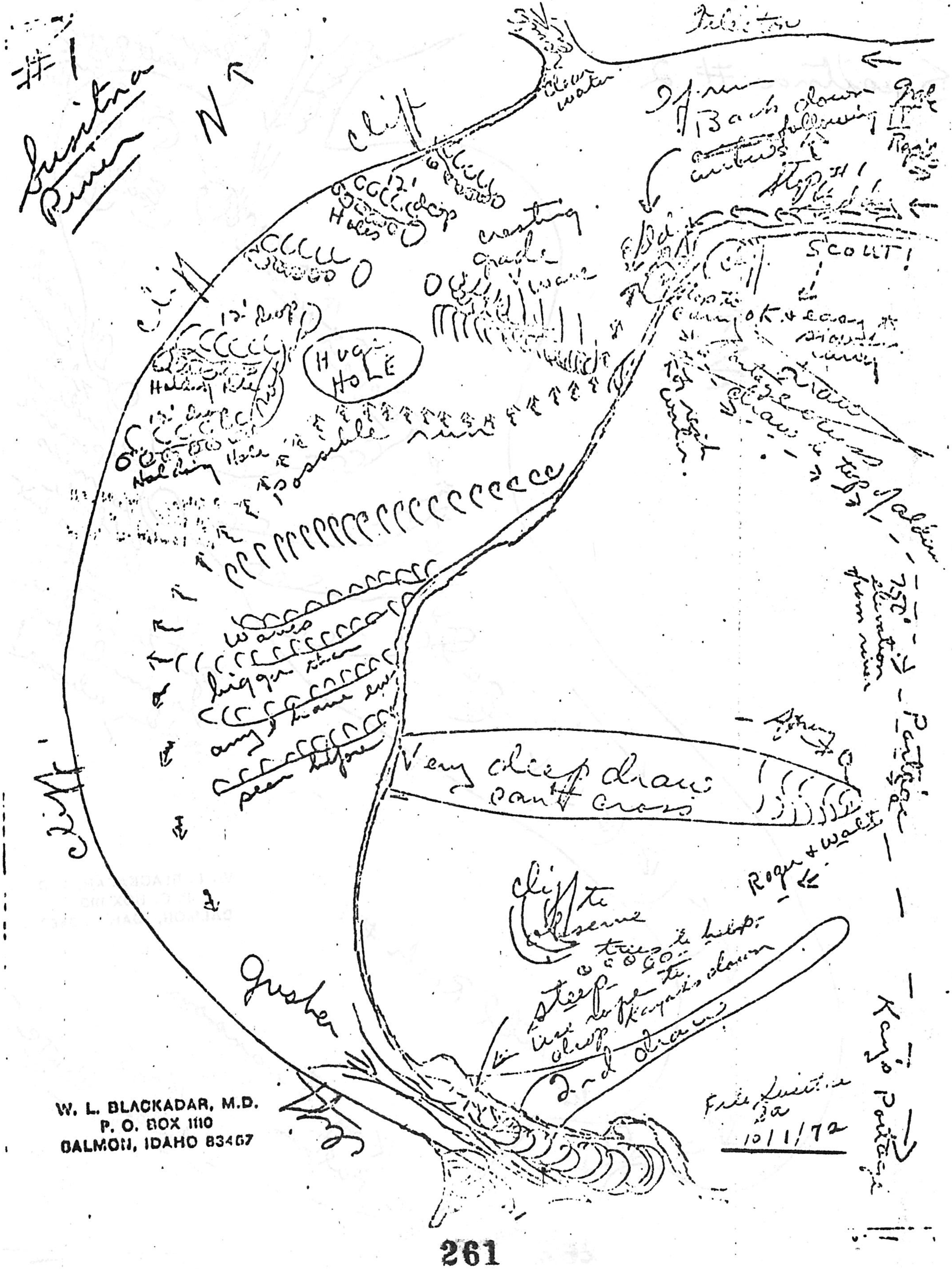
You dismiss the anadromous fish capacity of the Susitna by stating that fish do not now traverse Devil's Canyon. This to my knowledge is true and yet it would be a very simple project to pass fish successfully through Devil's Canyon since the bottleneck, I believe, is only in two drops. These could easily be altered with short tunnels to permit this passage or some sort ofladder operation so actually the loss to fisheries of Devil's Canyon is thoroughly as great as that loss would be at Rampart over a five hundred year period.

While you have listed many proposals for the Susitna all of them include a dam in Devils Canyon. Certainly some alternative thought should be given towards having only the upstream dams built allowing future generations to make the decision in Devils Canyon.

Please enter this statement in the hearing record and have it show that there is strong opposition to the Devil's Canyon dam and that this loss will be irretrievable.

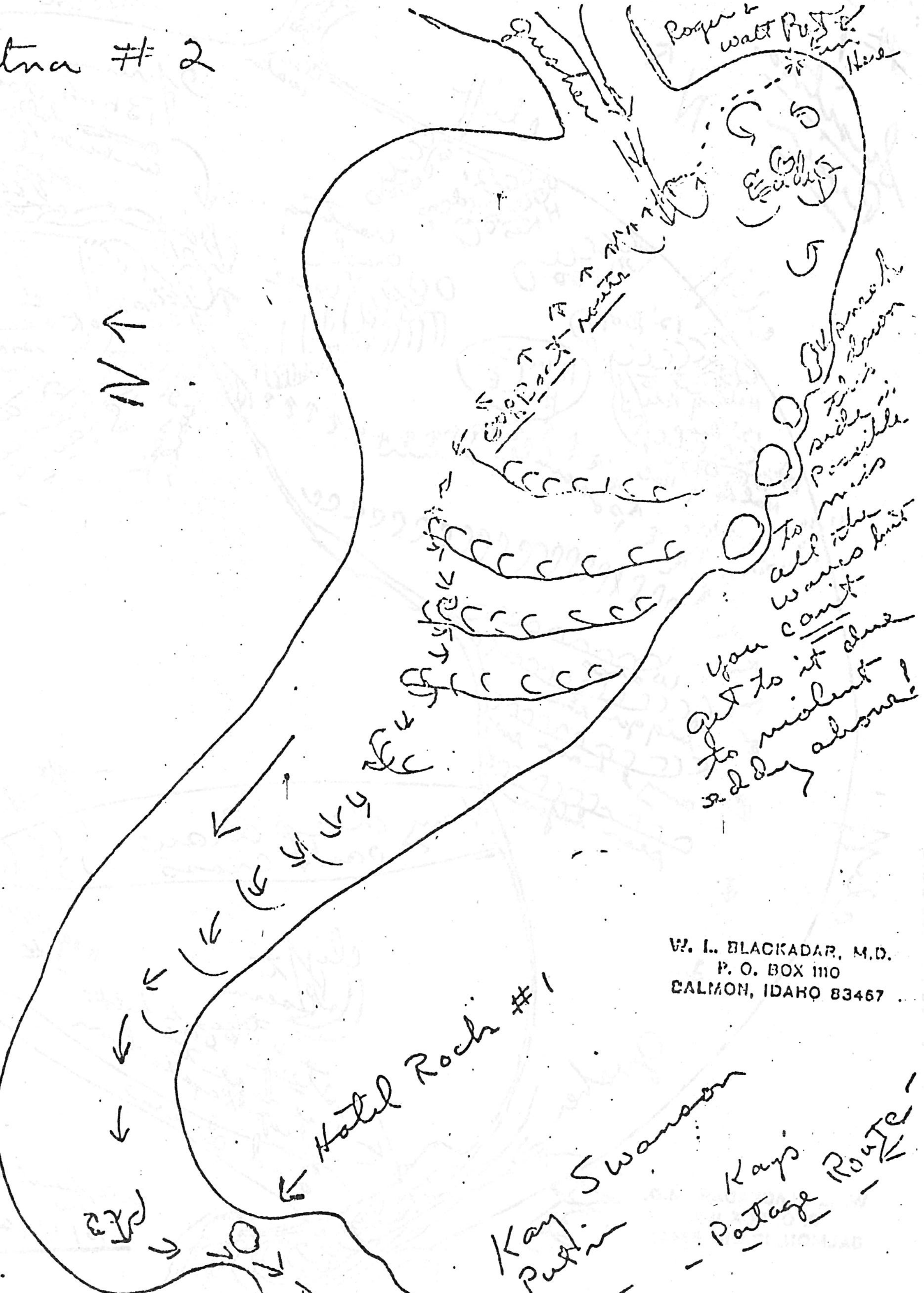
Sincerely submitted,
Walt Blackadar
W. L. Blackadar, M.D.

WLB:kc



W. L. BLACKADAR, M.D.
P. O. BOX 1110
SALMON, IDAHO 83467

Susitna # 2



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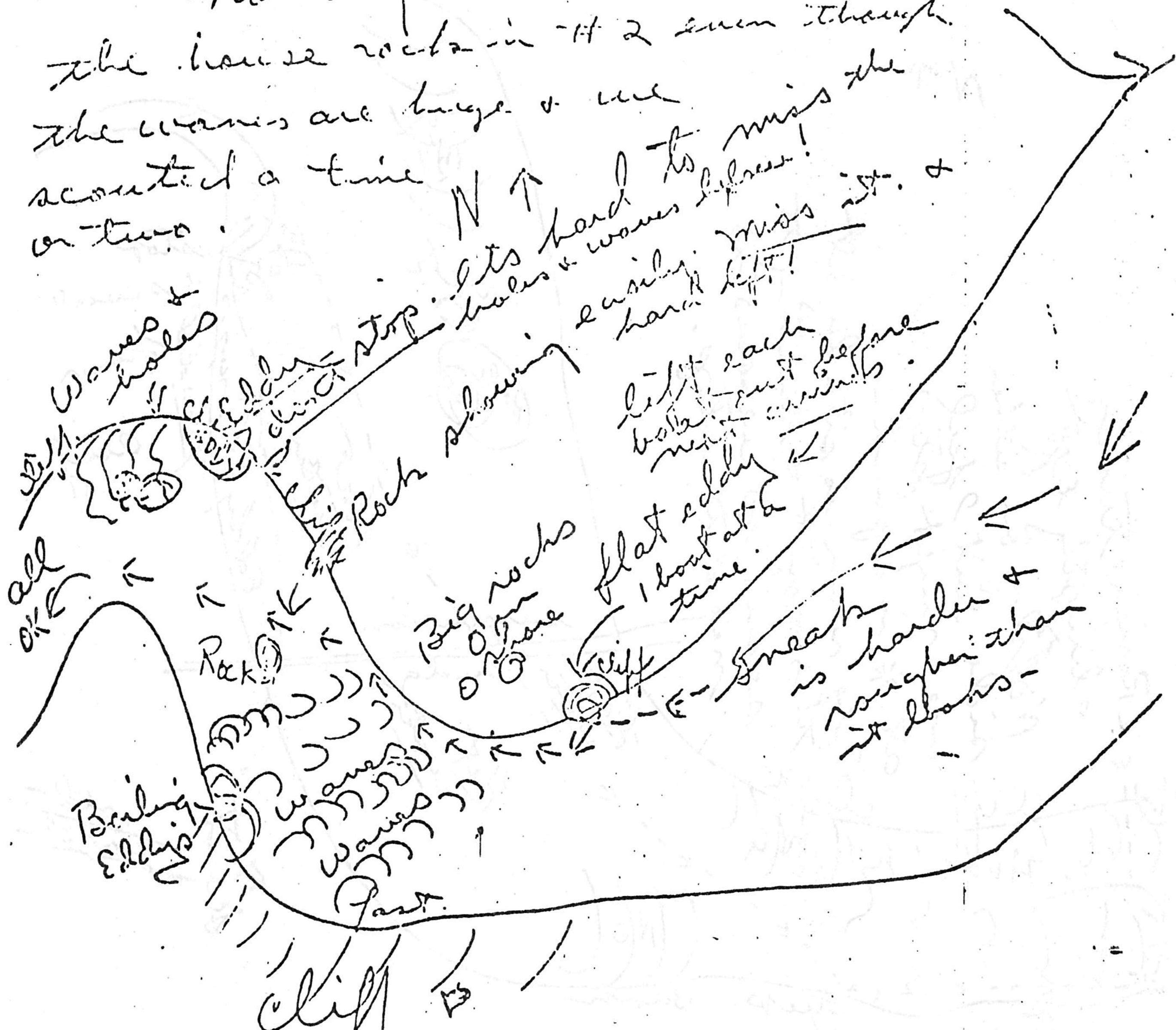
Susitna #3

nothing else needs scouting from the house rocks in #2 even though the waves are huge & we scouted a time or two.



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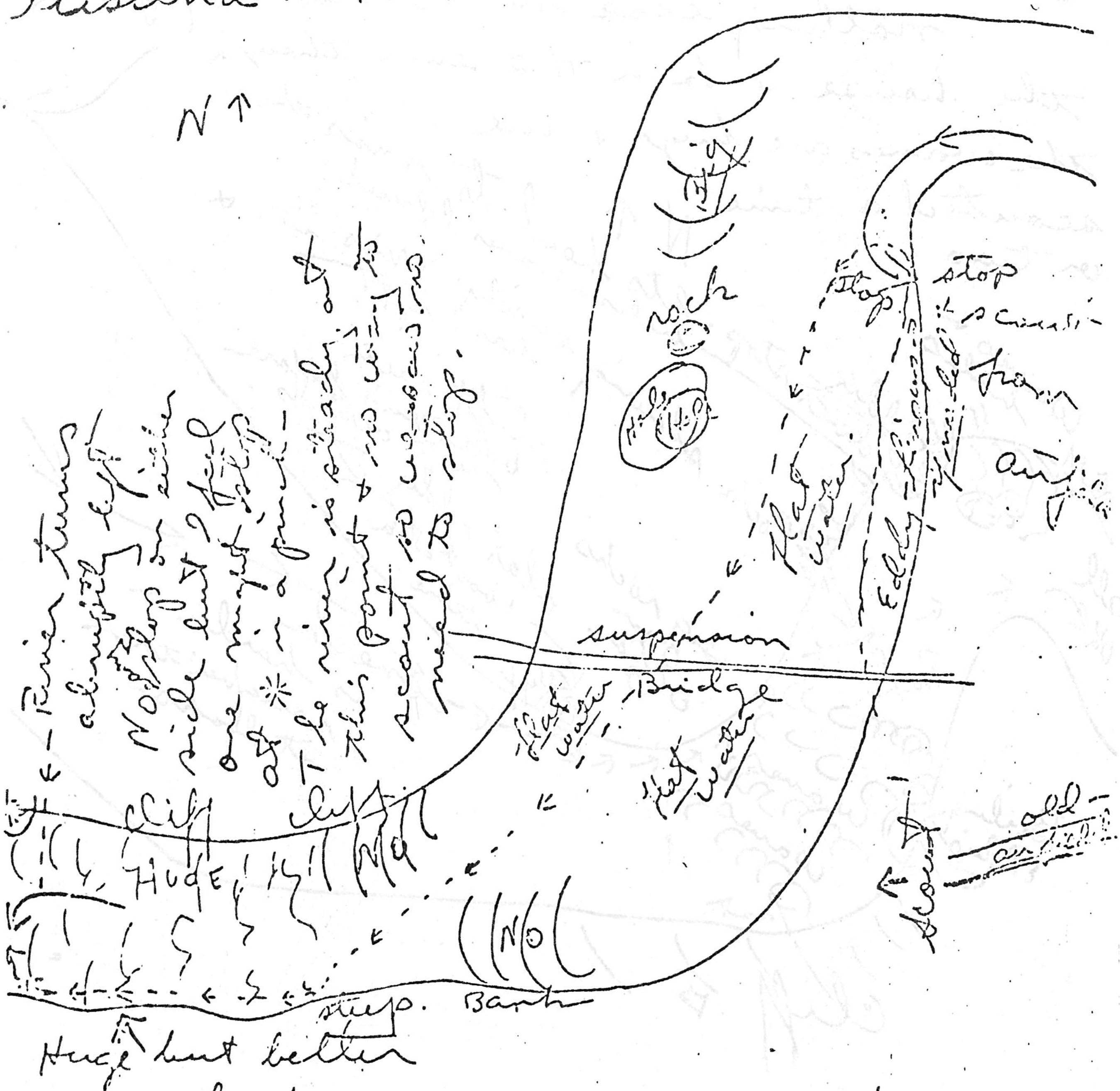
Susitna # 4



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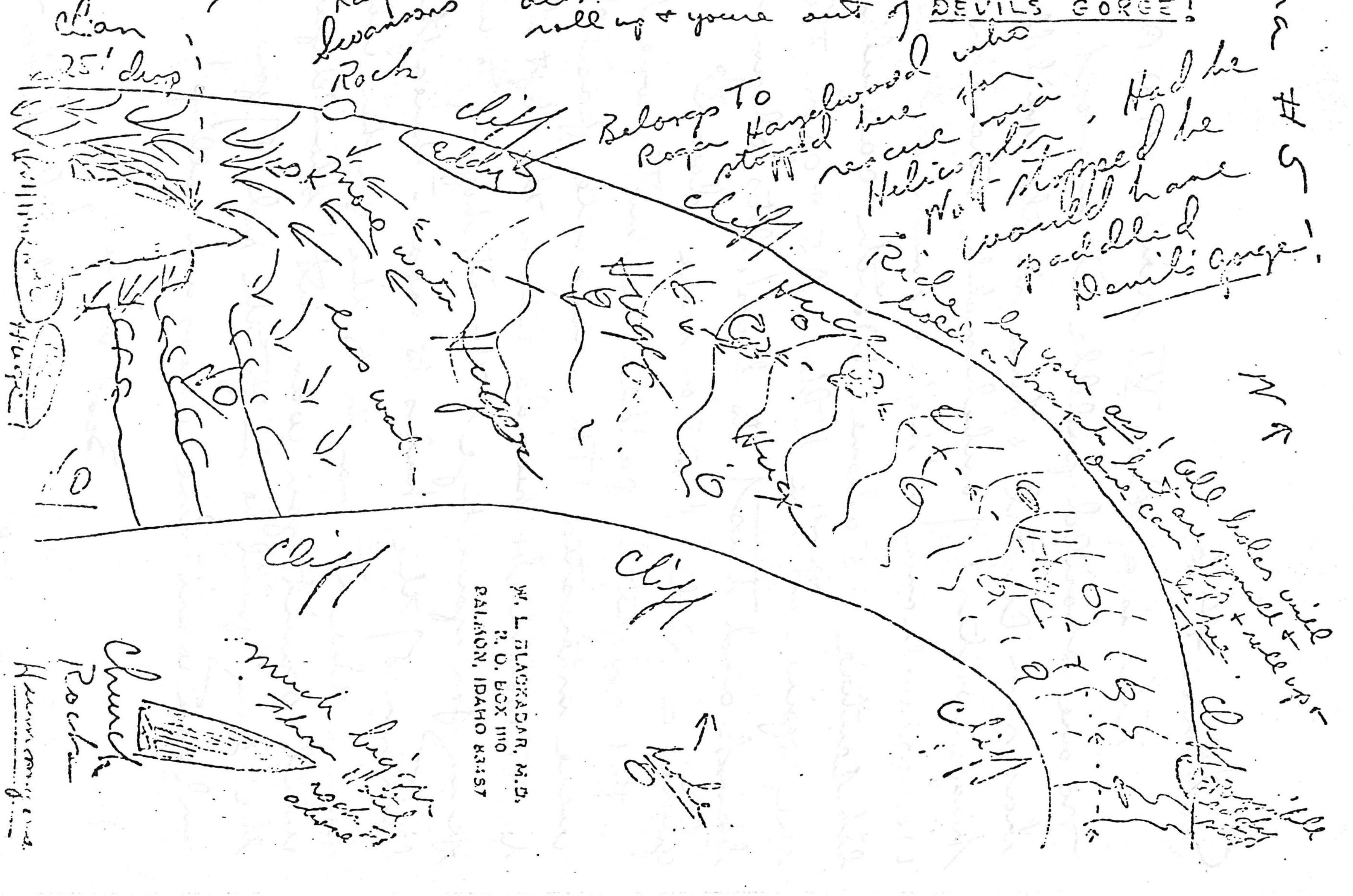
Susitna #5

Dont stop in this eddy or It will scare Hell out of you - The slot on the rt past the church spire will take you thru all holes + not hold holes - you'll flip so roll up + youre out of DEVILS GORGE!

Belongs To Roger Hazelwood who stopped here for rescue via Helicopter. Had he Not stopped he would have paddled Devil's Gorge!

Ride by your ass! All holes will small + roll up

[illegible] as far to the left as one can



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SALMON, IDAHO 83467

Susitna #6

This is a class VI river A.W.A.
no one should paddle it unless he or she has run Crystal & Lava in the middle - It's huge water of unbelievable strength & power. Waves well over 20' high & much not scoutable like [illegible] #5 above! Watch carefully for the spine at the bottom of 5 & go on the rt. bank and trust to luck. It's clean but quite a ride! 25' or more down

#1 might be paddleable but none of us were interested! The only route feasible would be to work backwards down the left chute & ferry for your life to the rt. hoping to use the bottom of the holes to cross - thereafter running down the rt. bank to the gusher which will squirt you way out! Should you miss the ferry you'll be in for the ride of your life - and you won't live unless you roll up!

Best wishes,

Walt Blackadar, M.D.

W. L. BLACKADAR, M.D.
P. O. BOX 180
SALMON, IDAHO 83467

RESPONSE TO COMMENTS BY
W. L. BLACKADAR, M.D.

257 Comments contained in Dr. Blackadar's letter of 16 October 1975 are noted. Drawings and notations made by Dr. Blackadar on 1 October 1972 (not an inclosure with Dr. Blackadar's letter of 16 October 1975) are also inclosed, since they contain additional information related to the navigability of the whitewater section of Devil Canyon. Comparing the possible loss to theoretical salmon introduction into the upper Susitna basin to the huge area covered by the Yukon River drainage above Rampart appears to be somewhat exaggerated.

October 7, 1975

My name is Eric Boemer and I live ~~At~~ on Dearmoun Road. As of now, my occupation is a school bus driver. I am interested in what is taking place here in this wild and beautiful state of Alaska

Originally I am from California and am familar with this word we know as "progress." Also I am familar with the Army Corp of Engineers and their occupation. The issue here tonight is as I feel, is a dam or several dams on the Susitna River in the best intrests of all Alaskans. Searching my soul, it says that the dam is not needed.

258 Anchorage and Fairbanks are growing in leaps and bounds. The sprawling metropolis thrives on our natural resources. It is evident to see what could happen if these dams are erected, and power is distributed from Anchorage to Fairbanks. Do Alaskans really want this so called progress?? I think not.

The rivers on the earth are throbbing arteries which support life on this planet. What happens when man made dams are constructed on these rivers? First of all, the fertile nutrients normally carried downstream are backed up in a artifical lake. Whatever happens upstream on the river is going to have a significant effect on the downstream portions. How will this effect the waters in the ocean or bay when they are deprived of these nutrients. In Egypt, the Aswan dam had a drastic effect on the fisheries in the ocean; will this happen to the Cook Inlet??

In 1973, the Susitna river was recommended for detailed study under the National and Wild Rivers Act. So far, it has not been seeing much attention this river could possibly be of National significance; for the entire United States. The white water stretch in Devils canyon is a wild and raging torrent of water, symbolizing the qualities that make Alaska what it is. If the dam is constructed, the river will be tamed (~~to a slow moving remnant of~~) beyond repair.

259 What are our alternatives to damming the Susitna river, or for that matter any river? First, in this age of computer technology, it seems that anything that man can put his unlimited mind to, he can do. Using this as a basic philosophy, other sources of energy can and should be utilized. The corps of engineers feel that solar, wind, ~~an~~ geothermal, and nuclear fusion are not feasible in the next 15 years. I disagree!!! These comparatively non-polluting forms of energy, are within our grasp. It is time to set new directions!!

Other considerations which need mentioning deal with the possibility of Earthquakes in this region. Will the proposed dam really hold up to A earthquake of the magnitude of the last 1964 quake?? What would happen if it did not?? The communities that had developed because of this power supply would be wiped owt.

What of the wildlife of the region? What will happen 260
to the migrating caribou, ~~the~~ of the Nelchina herd. The Alaska fis
and game considers them to be ~~a~~ one of the most important carib
population in the State. Is it worth pushing these animals farther 261
and farther back into the wilds, in the name of development and progres
How will this effect the Natives who are subsisting off of these wander
creatures?? More research is needed to determine the effects that dam build
will have on the wildlife in the area and also the socio-economic aspects
effecting the people of Alaska.

Thank you for your time and patience in hearing my story.

Eric Boemer

RESPONSE TO COMMENTS BY
ERIC BOEMER

258 The growing populations of the Anchorage and Fairbanks areas will generate an increased demand for energy. Hydroelectric power is considered to be the most desirable method of supplying projected energy needs at this time.

259 The alternatives are listed and discussed in Section 6.0 of the EIS.

260 See response number 240.

261 The possible impacts of the impoundments on the Nelchina herd have been discussed in the EIS. Additional studies concerning the wildlife within the region will be conducted during the preconstruction planning phase of the project.

October 19, 1975
426 Skarland Hall
U. of A., College, Ak.
99701

Southcentral Railbelt Task Team
Alaska District, Corps of Engineers
Box 7002,
Anchorage, Ak., 99510

Dear Sirs,

We've been discouraged by past proposals made by the Corps, particularly the Rampart Dam proposal. We're more encouraged by the Susitna Dam project, which demonstrates more thorough research and more attention to environmental impacts than the preceding studies. However, we do find some weaknesses in the study, and we find we can't accept the proposal for a number of reasons.

This testimony considers only the Devil Canyon/Watana dams proposal. These two dams will have some significant impacts, which we found were inadequately considered, or not considered at all, in your study.

Most important are the possible impacts on the Nelchina caribou herd. This is the most important herd in Alaska in terms of annual sport-hunter harvest: it deserves much consideration. Colonel Debelius mentioned during his presentation at the Fairbanks hearing on the Draft EIS that the herd consistently crosses the river in July, and that the major impact of the dams on the herd would be an occasional mortality due to ice shelving in the reservoirs.

We've done some further research, and feel that a far greater impact on the herd is likely. In middle May, the herd calves along the south banks of the Susitna River, beside the proposed Watana reservoir. The herd normally crosses to the summer grounds north of the river in late May and early June. Migration times fluctuate more widely than your report indicates. (Most of this information comes from an Alaska Department of Fish and Game report entitled, "Nelchina Caribou Report", by Gregory N. Bos, published in April 1973 by the Department)

It is likely that the herd would frequently cross the reservoir before the ice is out. Caribou are excellent swimmers and low mortality would be expected even when large numbers of very young calves cross an ice-free, turbulent river. However, hoofed animals can't cope with falls through ice: they are not able to climb out again. At Lake Louise, biologists have observed caribou breaking through thin ice, and all the animals subsequently drowned.

We wonder about the stability of the ice on Watana Reservoir with expected water level fluctuations of 125 feet. Ice developing on fluctuating water surfaces could be expected to be particularly unstable. We would expect unstable ice on the reservoirs to have serious effects on calf numbers.

The proposed access road is likely to draw a number of hunters, snowmachiners and assorted members of the public to the area, further increasing mortality. The area presently acts as a recharge area for wildlife: a number of different game populations enjoy stability of numbers and security in the dam area, due mostly to difficult access. If the dams are built, we strongly recommend keeping the access road closed to the public, and we recommend not planning campsites and recreation areas around the reservoirs.

We looked at the Alaska Power Commission report on which your energy demand curve is based. We question its accuracy, since it predicts future energy need partly on increased energy use stemming from the oil pipeline impact: an impact we don't expect to continue. Energy needs may well be much less than the energy needs you have projected.

The Corps' Public Brochure stated," A particularly important consideration of certain hydropower projects is the potential to provide far more power than demanded at the time operation begins. Plentiful power at relatively low costs can stimulate growth and development."(pg. 11).

We don't want to see increased industrialization in the state--we feel that this is a very real danger from this hydroelectric project. Primarily for this reason, we would rather see, for the immediate future, utilization of natural gas from the proposed natural gas pipeline, replaced in the more distant future by geothermal power.

We don't want energy production above that necessary for the immediate future, since excess energy could stimulate, not only industrialization, but wasteful energy use--a bad habit for the public to develop. We feel that it is poor planning to decide to build a dam before knowing where the gas pipeline will go.

We question Colonel Debelius' statement, made at the Fairbanks hearing, that the life expectancy of the dam would be 500 years. This seems improbable, since we know of no dam with a projected lifetime of over 100 years. Hoover dam was also predicted to have a low siltation rate, and it began silting up before construction was completed. What would the benefit/cost analysis look like if the projected lifetime was 100 years or less, rather than 500 years? We feel this would be a more realistic estimate.

The Susitna is one of the most important rivers in the state in terms of its beauty and in terms of the abundance of wildlife in its drainage area. We place a very high value on an undammed Susitna River, not only for the above reasons, but for its value as a wilderness. If energy is really necessary, we approve of hydropower projects on smaller scales. We feel that the Susitna River is the wrong river to dam.

Sincerely,

Mary Evans

Mary Evans
wildlife management major, U. of A.

Dan Huttanen

Dan Huttanen
wildlife management major, U. of A.

Bob Fox

Bob Fox
TVCC instructor

RESPONSE TO COMMENTS BY
MARY EVANS, DAN HUTTUNEN, AND BOB FOX

262 Comments are noted.

In reference to comments on the Nelchina caribou herd: The information on caribou (Sections 2.01.3.1 and 4.03 of the EIS) was taken from several sources including the Alaska Regional Profiles--Southcentral Region, July 1974 and the State of Alaska, Department of Fish and Game's Alaska's Wildlife and Habitat, January 1973. As stated in the EIS: "Warmer weather and a rapidly filling reservoir should eliminate any adverse ice conditions during the month of May." The major calving area for the Nelchina herd is on the upper reaches of Kasina Creek, Oshetna River, and Little Nelchina River drainages with calving generally taking place between mid-May and mid-June. Migration to the surrounding summer ranges usually begins in the latter part of June with the major movement taking place in July.

As stated in Section 4.15 of the EIS: Even though the project-life is computed on a 100-year period for economic reasons, with adequate maintenance, the useful life of the proposed projects due to sedimentation is estimated to be excess of 500 years. The benefit-cost ratio is based on a project-life of 100 years and is a fixed standard for all Federal hydropower project evaluation.

SEA AIRMOTIVE, INC.

Mr. Chairman, Ladies & Gentlemen:

My name is Ward I. Gay. We operate Sea Airmotive, Inc. at Lake Hood, an air taxi operation. I have lived in Anchorage for the past 40 years and have seen a lot of changes here.

We have needed the Devil Canyon Dam on the Upper Susitna River for 20 years and, in fact, I flew personnel on survey trips of this dam site more than 25 years ago, before any gas or oil was discovered in Alaska. I also remember when the Eklutna hydroelectric plan was first proposed (before World War II). The original estimate was slightly over six million dollars. When we finally got around to doing it, the cost was in excess of 32 million dollars. The big delay was because we did not need that much power. Then gas was discovered at Kasilof. The people in Anchorage wanted gas, so we voted a 20 year franchise to a company and built a pipeline from Kasilof to Anchorage that we are still paying for, even though we have natural gas right across the inlet from us that there is no use for. Chugach Electric has built a power plant at Beluga, that should have been in Anchorage, but the gas was cheaper at Beluga even with building 2 power lines to transmit it to Anchorage. It seems they can bring the power in but not the gas. Maybe because of the franchise. Anyway, the people have to pay for it no matter how it is done so instead of making more mistakes, lets build the Devil Canyon Dam on the Susitna and furnish power to the whole railbelt. This will be utilizing a natural resource that is not expendable. Then the natural resources that are expendable, such as natural gas, oil and coal can be sold to other states and countries that are not as fortunate as we are in having an abundance of water.

It has been said that this dam would destroy wild game habitat and calving grounds for caribou. I took my first hunting party to the Fog Lakes in the fall of 1947 and have hunted there every year since. I have seen thousands of caribou go down the bank and swim the 100 yards of river and go up the other side, seldom stopping in the small spruce timber because they know they are vulnerable to wolves and bear in the timber, and there is very little for them to eat there. I have never seen a cow have her calf down in the canyon. They like the hills above timber where they can see and run. This also applies to moose. With the dam built, the caribou would only have to swim across a 1/4 mile lake. That is nothing for them or moose either, or a grizzly bear for that matter. There has never been any fish in the Susitna drainage above the dam site. Even the salmon cannot buck the white water in the canyon. The lake could be stocked with fish and made a wonderful, accessable recreation area that the people of the railbelt are already in need of. The game animals are nearly gone in this area now, mainly because we have protected the wolves for the last 7 years. This can be changed in a few years. I think the proper people have now learned that man cannot allow the other predators to increase, unlimited, and still have the wonderful game paradise that he desires to view.

Sincerely,

Ward I. Gay

263

Ward I. Gay

RESPONSE TO COMMENTS BY
WARD I. GAY
SEA AIRMOTIVE, INC.

263 Comments noted.

5001 Roger Drive
Anchorage, Alaska 99507
October 20, 1975

Alaska District, Corps of Engineers
Box 7002
Anchorage, Alaska 99510

Dear Sir:

I present the following letter and attachments to you for entry in the official list of comments on the DEIS, Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska. The subject DEIS is inadequate in its assessment of the project's total environmental effects and further, I am opposed to the project regardless of the adequacy of the DEIS. The proposed project is not in the best interest of all the people of this state and country. The basis for my conclusion can best be summarized by referring you to excerpts from the publication by the U.S. Fish and Wildlife Service circular 39, which are contained in attachment II. It will be necessary for you to draw the correlation between "wetlands" and the virgin land remaining in Alaska.

Itemized comments relative to the subject DEIS are contained in Attachment I. 264

Perhaps a solution to the problems of today is to concentrate our efforts on improving what we have and to forego further development and exploitation of rapidly diminishing resources. 265

Sincerely,

Stephen Keith

Attachment I

These comments are based on the information presented in the draft EIS for the Devils Canyon/Watana hydro power project. They are not all inclusive but rather touch only the high points.

266 Ref. Page 6, para 1.03, description of Action
The cost/benefit ratio is questionable when one considers the low interest rate used

267 Ref. Page 45, para 4.01
By reducing flooding of the lower Susitna River valley, moose browse will be effectively reduced because new channels and islands will form less frequently thus reducing the areas favorable for new growth willow etc.

Ref. Page 63, para 4.18, Social Impact
This paragraph speaks of the project as being "designed to fullfill presently projected needs..." and "not to stimulate ...growth". The paragraph also states that the "hydro projects will not create large blocks of excess electrical power for heavy energy consuming industries." My question is, how does the Corps intend to keep industry from using the power? This project will increase the

power generation capacity of the railbelt
area 3.44 times. It is not proposed to
be a replacement for the fossil fuel 268
plants we have now.

By providing low cost energy before the
so called "needs" arise, the government
is in fact stimulating growth. the
concept of providing power to accomodate
projected growth is based on the
government's predetermination that growth 269
and development will occur at rates
projected from the past. Governments have
traditionally encouraged, fostered and
stimulated growth and development

examples: North Slope Oil & gas
Gulf of Alaska oil
Pet 4 oil
Eklutna Power

in order to expand tax bases etc; therefore,
past figures reflect trends as induced
by the governments.

Ref. Page 69, para 6.02.1, No action alternative

As presented, the no action alternative
does not discuss the effects of no action. It

only discusses other alternatives. All the alternatives presented were apparently based on the predetermination that additional power sources are required, according to projected future growth curves. A no action alternative relative to no additional power supplies, hydro or otherwise, is not discussed. 270

Ref. Page 75, Para 6.02.4, Nuclear Power

Nuclear power is spoken to as being the prime source of electrical power (50+%) by the year 2000, a mere 25 years from today. If this is true, why is the government so persistant in developing a hydro project with an expected useful life in excess of 500 years; a project that will destroy the integrity of over 50,000 acres of unspoiled land forever? This does not include the thousands of acres that will be used as spinoff development due to the induced growth factor 271

Ref. Page 95, para 9.02 Formal Public Meetings

"There has been no significant opposition to the proposed project as of September 1975".

272 I have talked to many people that are opposed to the project and have corresponded with the corps and state on the subject. Obviously, those of us that oppose the project are considered to be insignificant by the corps. What does the opposition have to do to be considered significant?

Ref. Page 78 & 80, Para's 6.03.3 & 6.03.4

273 The Chakachamna and Bradley Lake projects combined would almost double present electrical power production. The environmental affects of these projects would be small except that the induced growth factor, the major affect, would still be present and of major consequence.

General comments

The alternative of no power development in Alaska suggestes that it would be necessary to introduce special legislation to curtail growth. The fact is, special

legislation by the federal and state
governments is required to promote
and develope power supplies. West
Coast states, as late as it may be, have
learned by their mistakes and are
274 indeed introducing legislation that
discourages growth. Why can Alaska
not be far sighted enough to curtail
growth and development before the state
is in ruins? dollars are cheap. the
federal government turns out dollars by
the thousands but, unspoiled land, once
committed, is gone for many, many lifetimes

The project, by its physical self, is only a small part of the total effect. the devastating effects will come from the increase in power production of 3.44 times Available power will alway be used and it takes people and industry to use it. Great numbers of people are what spoils virgin country with trash, clearing, noise, hunting, fishing and overuse of the land in general. It is not unreasonable to assume that an increase in power production of 3.44 times will induce a corresponding

increase of 3.44 times the population
because of supporting industry; services,
police protection, fire protection, grocery 275
store expansions, more government
controls and expanding bureaucracies,
more gas stations and on and on.

development projects such as this are
prime inducers of growth. They are
like the match that kindles the 276
forest fire. the match in itself is
rather insignificant.

Attachment II

WETLANDS of the UNITED STATES

THEIR EXTENT AND THEIR VALUE TO WATERFOWL AND OTHER WILDLIFE

By Samuel P. Shaw and C. Gordon Fredine
Office of River Basin Studies

CIRCULAR 39
FISH AND WILDLIFE SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

THE PROBLEM OF SAVING WETLANDS

The great natural wealth that originally made possible the growth and development of the United States included a generous endowment of shallow-water and waterlogged lands. The original inhabitants of the New World had utilized the animals living among these wet places for food and clothing, but they permitted the land to remain essentially unchanged.

The advent of European settlers brought great changes in the land, and aquatic habitats were particularly vulnerable to the settlers' activities. Kenney and McAtee wrote in 1938:

> Among the assets of mankind, wildlife receives its true appraisal only in advanced stages of civilization, when, owing to the heedless destruction of earlier times, it has been seriously if not irreparably reduced. Under pioneer conditions the rules for the treatment of wildlife are immediate exploitation of the useful and drastic destruction of the useless, and these rules tend to remain in effect long after the original motives are gone. In the earlier stages of settlement no one thinks of allotting any land for the use of wildlife; the effort is to wrest every possible acre from nature and make it yield an income. There is no vision to see, there is no time to learn, that land units with their natural occupants, as exemplified by a beaver meadow, a muskrat marsh, a duck lake, a deer forest, or an antelope mesa, are productive entities that under certain circumstances may be worth far more than anything man can put in their place and that once destroyed may never be reestablished. [7][1]

THE NATURE OF WETLANDS

The term "wetlands," as used in this report and in the wildlife field generally, refers to lowlands covered with shallow and sometimes temporary or intermittent waters. They are referred to by such names as marshes, swamps, bogs, wet meadows, potholes, sloughs, and river-overflow lands. Shallow lakes and ponds, usually with emergent vegetation as a conspicuous feature, are included in the definition, but the permanent waters of streams, reservoirs, and deep lakes are not included. Neither are water areas that are so temporary as to have little or no effect on the development of moist-soil vegetation. Usually these very temporary areas are of no appreciable value to the species of wildlife considered in this report.

Most wetlands can be drained or filled to create suitable land for agricultural, industrial, or residential expansion. Others lie in potential impoundment sites where permanent deep-water environments can be developed. If either type of project is carried out, however, the food and cover plants required by waterfowl and other wetland wildlife no longer grow in abundance. These aquatic plants need waterlogged or shallow-water soils in order to thrive.

Apparently, a great many people still think that until one of these two courses is followed, any wetland area is just so much wasteland—an unfortunate occurrence in the land-economist's classification of productive land uses. So long as this belief prevails, wetlands will continue to be drained, filled, diked, impounded, or otherwise altered, and thus will lose their identity as wetlands and their value as wildlife habitat.

COOPERATIVE PLANNING

State and Federal agencies engaged in conflicting programs of wetland destruction and wetland preservation must work together to develop unified wetland-use programs that are both acceptable to the landowner and beneficial to the Nation.

It is one-sided planning, for example, if a flood-control agency neglects wildlife values as it plans for the elimination of river-overflow areas, when these areas are used by millions of ducks during the winter season.

In land-use planning, an agency dealing with drainage projects would be subject to criticism if its plans to remove water from extensive marshlands or scattered potholes were developed without regard for the fact that, individually or collectively, they provide essential habitat for thousands

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[1] Italic numbers in brackets refer to items in the List of References on page 47.

SUMMARY OF CHAPTERS

The problem of saving wetlands is to prevent marshes, swamps, open shallow waters, and seasonally flooded lands from being drained, flooded, or filled, hence losing their value as wildlife habitat. These types of aquatic environments, collectively identified in this report as *wetlands*, furnish essential habitat for all waterfowl, most species of fur animals, and many species of farm game, forest game, and warm-water fish. Coordinated advance planning by all resource interests is the keynote to solving the problem. As an aid in such planning, the Fish and Wildlife Service, with the cooperation of State game agencies, conducted a wetlands inventory with emphasis on present usefulness of the lands as waterfowl habitat.

A century of wetland exploitation has taught many lessons in the use and misuse of wetlands. The Swamp Land Acts of 1849, 1850, and 1860 paved the way for transferring nearly 65 million acres of wetlands in 15 States from Federal to State administration for the purpose of expediting their drainage. Nearly all these lands are now in private ownership, and their use by wildlife is usually only a minor consideration. Although evidences of wetland losses as revealed by previous inventories are not completely reliable because they represent different types of coverage, it appears that at least 45 million of the original 127 million acres of natural wetlands have been drained or otherwise destroyed. Agricultural drainage (102 million acres now in organized enterprises) and flood control are the forces primarily responsible, but other activities such as canal construction, drainage for mosquito control, industrial expansion, and highway building have greatly reduced the wildlife values of some wetlands, particularly along the coasts.

Wetland soils have physical and chemical properties that are derived from the environment in which the soils originate. Climate, landform, and native vegetation largely govern the nature of this environment, hence also the nature of the soils and their potential uses. Most wetlands are underlain by organic soils known as peat and muck, or by recently deposited, water-carried alluvial soils. In general, alluvial soils have higher agricultural potentials than peat and muck. Many peat and muck soils have proved unproductive for agriculture after drainage; others are inherently fertile. In many areas, there appears to be a direct relation between potentially good agricultural wetlands and presently good waterfowl wetlands, suggesting that competition between agricultural and wildlife interests will become more intense in the years ahead.

The wetlands inventory reveals the location, classification, and evaluation of 74,439,300 acres of wetlands as waterfowl habitat. At least 90 percent of all wetlands of importance to waterfowl are included. From the standpoint of waterfowl value, the total acreage covered by the inventory is distributed as follows (in millions of acres): 8.9, high; 13.6, moderate; 24.0, low; and 27.9, negligible. Values are based on relative waterfowl use in the State where the wetlands are located. By wetland categories, the eight inland fresh types comprise 63,491,000 acres, the three inland saline types comprise 1,618,000 acres, the three coastal fresh types comprise 4,041,000 acres, and the six coastal saline types comprise 5,290,000 acres.

The 20 wetland types are ecological classifications designed to help recognize the relative importance to waterfowl of the many different kinds

RESPONSE TO COMMENTS BY
STEPHEN KURTH

264 Comment noted. Practically no "wetlands" for waterfowl are located within the proposed Devil Canyon and Watana reservoir areas.

265 Comment noted.

266 The 6-1/8 percent interest rate is provided by Water Resource Council, and is based on the current cost to the Federal Government of borrowing money.

267 Reduction of flooding and erosion could result in subclimax growth of vegetation in the braided channel system and would provide browse for moose.

268 Project power will be marketable by existing power marketing agencies, at rates to be established by normal rate-setting procedures and after public hearings have been held. Use of power by industries can be regulated by means of power rates. Also see response number 255.

269 Growth projections in Alaska are not based primarily on past growth statistics, but rather on demographic, economic, and other factors which will control future growth.

270 The no action alternative is covered in Section 6.02.1 of the EIS.

271 Statement regarding nuclear power providing 50 percent of the electrical power by the year 2000 refers to the nation as a whole. Nuclear power does not represent the most feasible alternative power source for Alaska, as stated in Section 6.02.4 of the EIS.

272 Comments noted.

273 Comments noted.

274 Comments noted.

275 Comments noted.

276 Comments noted.

10-21-75

Gentlemen,

I am writting this litter out of
the frustration of knowing that it will
have a small (if any) effect on the
proposed and eventual building of the
dam at ~~Deth~~ Devils Canyon.

By the Army Corps own admission
construction of access roads, transmission
277 lines and dams, will affect caribou
migration and the small moose
habitat left in the area not to
278 mention the asthetic quality of the
present wilderness area. I am of the
opinion that for these reasons alone
the project should be damned instead
of the area.

I/We, who live in these mountains
are of course more personally involved
279 with its eco-system and balance than
would be someone in Anchorage and
therefore for the above reasons, are
opposed to this project.

It would be appreciated if a comment from your Office were sent to me, but no news, is good news!

The only way I receive news of decisions directly affecting my environment is through the media and this fact greatly annoys me. After all, who will be directly affected when this project becomes a reality? In none of the correspondence on this subject is there any mention of contact, 280
and or consideration of people who live in the bush. Oh well, no one ever stands in the way of progress. Move over moose, here comes the future!

Dan Mawhinney
Box 22
Talkeetna, Alaska
99676

RESPONSE TO COMMENTS BY
DAN MAWHINNEY

277 The proposed Susitna project would change the areas where project facilities such as dams, reservoirs, roads, transmission lines, and recreation areas would be built, but we would design and construct these facilities using the highest standards to lessen the adverse impacts and to maximize the beneficial impacts.

278 Alaska is and will continue to be a great state where people can live, work, play and enjoy the wonderful natural resources that are found here, but those of us who moved here from other places or were born here will have to consider that others will come here in the future for much the same reasons that motivated the present residents to live here. To some this might not necessarily mean progress, but it is the "real world."

With good planning we hope to help provide a good place to live and work and still retain much of Alaska's great wealth in the natural environment. True, some people will be more directly affected by our proposals for hydroelectric power than others, but we believe that what we do propose will adversely affect fewer people than any other viable alternative which would provide equivalent electrical energy. Also, we believe that the proposed project is economically and engineeringly feasible and less environmentally damaging than any other alternative which could meet electrical energy needs of the future.

279 In the Alaska Native Claims Settlement Act more than 80 million acres of Alaska's 356 million acres are proposed to be retained in the 4 Federal systems including parks, wildlife refuges, wild and scenic rivers and natural forests. The State has also proposed millions of acres for park and recreation lands. It is also reasonable to assume that much of the over 40 millions of acres of native lands, 106 millions of acres of State lands and the balance of lands left in other private and Federal control will be left in its natural state or developed to encourage recreation but it is obvious that some development will also take place.

280 As noted in Section 9.0 of the Environmental Impact Statement, we have had three sets of Public Meetings in both Anchorage and Fairbanks where all the public has been invited to attend and to express their feelings and concerns on this proposed project. People from the Talkeetna area and from the areas that would be directly affected by project facilities attended the meetings; the people listened to the proceedings and some made comment, both for and against the proposed project.

THOMAS E. MEACHAM
ATTORNEY AT LAW
SUITE 403
310 "K" STREET
ANCHORAGE, ALASKA 99501

(907) 278-1322
(907) 278-1443

October 9, 1975

Colonel Charles Debelius
District Engineer
Alaska District
U.S. Army Corps of Engineers
Box 7002
Anchorage, AK 99510

Re: Written Testimony Concerning Draft Environmental Impact Statement

Dear Colonel Debelius:

I am enclosing with this letter a copy of my comments concerning your Draft Environmental Impact Statement on hydroelectric power development on the Upper Susitna River Basin, Alaska. I delivered this testimony orally at your public hearing on October 7, 1975, and would request that my written testimony be included in your hearing record.

I would also request that this letter of transmittal be included in your hearing record, since additional facts concerning the production of your Draft Environmental Impact Statement became evident during the course of the hearing Tuesday night. From the testimony given by the Alaska Department of Fish and Game, it is apparent that your Draft Environmental Statement was issued prior to completion of studies by the Alaska Department of Fish and Game, which had been on contract with the U.S. Fish and Wildlife Service to conduct wildlife studies in the affected area, and for the specific purpose of your environmental analysis of the proposed project. By accelerating the completion and issuance of the Draft Impact Statement, your office has totally excluded a body of knowledge which, if available to the general public, would have permitted a much more thorough analysis of the effects of your proposed project. In addition, I would assume that availability of the results of this study would have aided your own planners in evaluating the proposed project.

Not only is this deliberate omission very detrimental from the standpoint of an adequate environmental statement, but

Colonel Charles Debelius
Alaska District
Corps of Engineers
October 9, 1975
Page two.

I learned at the hearing that the Corps of Engineers had also excluded an additional contracted study which was intended to explore in depth some aspects of the project, for purposes of your Environmental Impact Statement. I believe that the firm of Jones & Jones, Consultants, was engaged to study certain aspects of the project. I have seen their report, entitled *Upper Susitna River: Inventory and Evaluation of the Environmental, Aesthetic and Recreational Resources*. This firm was also contracted to analyze specific aspects of the proposal, but the last-minute acceleration of the deadline date for the Impact Statement precluded any analysis of the voluminous results of their study in your Draft Environmental Statement.

I believe that the deliberate exclusion of these two relevant source materials, and the lack of public knowledge of their conclusions, has dealt a very strong blow against your Draft Environmental Statement. I would expect that, at the least, full consideration of these documents will be given in your Final Environmental Impact Statement, and that these documents will be available for evaluation by the interested public.

Thank you very much for your even-handed treatment of the hearing itself, and for the efficient manner in which it was organized and conducted.

Yours sincerely,

281 Thomas E. Meacham

Thomas E. Meacham

TEM/bja
Enclosure

RESPONSE TO COMMENTS BY
THOMAS E. MEACHAM
LETTER DATED 9 OCTOBER 1975

281 A concerted, continuing effort has been made throughout the study process to acquire all data possible from all concerned sources with special emphasis on fishery and wildlife data so vital for a valid assessment of project effects on major ecosystems and the total environment. We have worked through the U.S. Fish and Wildlife Service (FWS), as the lead agency, to coordinate our study with Alaska Department of Fish and Game (ADF&G). We had, prior to the Public Meeting, a preliminary report of FWS (containing the ADF&G contribution). This report, prepared in accordance with the Fish and Wildlife Coordination Act, was formally published on 10 October 1975. In addition, we had informal contacts on a nearly daily basis with FWS personnel to be as sure as possible that no new or important information relative to their area of responsibility was being omitted from consideration. The fact that the Jones and Jones inventory and evaluation (prepared under contract to the Corps of Engineers) is not contained *in toto* in either the DEIS or feasibility report does not mean that it has been excluded, omitted, or ignored in our evaluations. Quite the contrary, it has been of much value to us, and has been in our hands for over six months prior to completion of the DEIS.

COMMENTS REGARDING DRAFT ENVIRONMENTAL IMPACT STATEMENT: HYDROELECTRIC POWER DEVELOPMENT ON THE UPPER SUSITNA RIVER BASIN, ALASKA

October 7, 1975

Gentlemen:

My name is Tom Meacham. I am a resident of Anchorage, Alaska and am conservation chairman of the Mountaineering Club of Alaska. I am testifying as an individual.

I believe that your Draft Environmental Impact Statement regarding hydroelectric power development on the Upper Susitna River is subject to criticism both in concept and in detail. I will deal with the criticisms I have regarding the concept first.

282 Your Draft Impact Statement was issued on September 22, 1975. This hearing comes exactly two weeks after that date, offering no realistic opportunity for public input based on the assertions of fact and assumptions made in your Impact Statement. Instead, this hurried consideration of the Impact Statement seems designed to nullify or eliminate any meaningful criticism from persons or organizations which may have some doubts about your project. This certainly is not the "atmosphere of public understanding, trust, mutual cooperative, and in a manner responsive to the public interest", as your regulations require.

The Draft Impact Statement itself is much too narrow, given the scope of the problem. The Draft Statement purports to analyze the feasibility of hydroelectric power in the Upper Susitna Basin, in relation to other alternative power sources which may be available. We are told that more extensive studies will be made of the various factors required under the National Environmental Policy Act, if the project is approved. However, I have found nothing in the Draft Statement which could be termed a feasibility report, in relation to other alternative power sources and the projected needs of the rail belt area in future years. Because the question of feasibility and of future need will receive only the present environmental analysis, that analysis must be as complete as any required under NEPA for any specific aspect of actual hydroelectric plant construction. The writers of this Impact Statement have, with no statutory authority and very little actual authority, determined that hydroelectric power is the "most feasible" means to meet the area's presumed future needs, and have, without further analysis, proceeded to present the details of the proposed dam construction. Questions which they have left unanswered are the following: 283

1. What is the source of any assumptions regarding population growth and growth in electrical demand in the rail belt area? Are there variations among sources in these projections; and if so, which projections did the Corps examine and adopt? 284

2. Has any comprehensive economic, social or environmental analysis been done of other alternatives to the hydroelectric project, including purchase of power from Canada, coal gasification, coal burning, use of natural gas, geothermal resources, or any other available or projected source in Alaska? If studies have been examined regarding these factors, what is the source of these studies? 285

3. Will hydroelectric development in the rail belt area discourage use and development of alternative sources? Will other sources develop despite construction of hydroelectric projects? 286

These questions, and others which I am sure other persons will raise, go to the very premise upon which your Environmental Impact Statement was based: the "feasibility" of hydroelectric power development in the rail belt region. Until these issues are addressed, there is no point in discussing specific construction proposals for various dams. However, the tone of your Impact Statement indicates quite clearly that "feasibility" to your agency is merely a question of receiving the requisite amount of dollars from Congress, and that once that grant is assured, the Corps of Engineers will very quickly demonstrate that hydroelectric power in the rail belt region is physically feasible. The real question of the propriety of hydroelectric power, in the context of this region's needs and in contrast with other available sources, will never be answered.

Because the majority of your Draft Impact Statement deals with the reality of a two-dam construction proposal, I have some

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questions to raise concerning that proposal. I feel that there are several very serious inconsistencies or unwarranted assumptions made in that Impact Statement, and I feel confident that satisfactory answers will be provided at the time the final impact statement is written. Among my questions are the following:

288 1. Is the capacity of the Devil Canyon-Watana project excessive? The projected electrical output is approximately six times the present need for the entire state, yet it is only one-fourth of your projection of the rail belt area's needs in 1985.

289 2. What entity will manage the proposed project? Will it be a TVA-type authority, which has demonstrated little responsiveness to the public interest? Will the authority operating the project be subject to jurisdiction of the Alaska Public Utilities Commission?

290 3. What will be the policy on sale of "secondary energy"? What is the purpose for providing a capacity to produce secondary energy? Will sale of secondary energy be subject to regulation by the Alaska Public Utilities Commission?

291 4. Will rate structures favor sale of large blocks of power, at low unit cost, to major industrial users? If so, will the availability of cheap power induce basic industries to locate in the rail belt region? Would this location for basic industries be desirable, from the social, economic and environmental standpoint of the existing rail belt community?

292 5. You have stated that the project area contains some discontinuous permafrost. Is any permafrost located beneath the impoundment areas of the two dams? If so, will the extreme yearly drawdown behind Watana Dam lead to continuous melting of permafrost and erosion of resevoir banks?

6. What will be the effects upon fish, wildlife and human activities downstream from the dam sites

during the twelve years of construction? Will the Susitna River be entirely impounded by Watana Dam while Devil Canyon Dam is being constructed? 293

7. What effect will the loss of low, clear flows of the Susitna River in wintertime have upon the fish which migrate from the tributaries to the main stem during wintertime to avoid freezing? 294

8. What effect will the increased wintertime volume, more than eight times the existing uncontrolled winter flow, have upon fish and wildlife in the Lower Susitna? What effect will this increased winter flow have upon erosion potential? 295

9. Will multi-level releases of water from behind the dams lead to increased siltation during releases, when water and silt from the bottom portions of the resevoir are released? 296

10. What will be the peak monthly flows anticipated on the river after construction? The Impact Statement lists only average monthly flows, not peak flows. 297

11. What measures will be taken to control the problem of "frazzle ice" under cold winter conditions? 298

12. What is the present consumption of the rail belt area, in terms of barrels of oil? 299

13. Has the total energy cost of twelve years of dam construction been debited against the eventual production of the project, in terms of barrels of oil? 300

14. How much oil would the total first costs of the project buy at today's prices? 301

15. What will be the actual amount of delivered power to Fairbanks, Anchorage, and other rail belt points? The Impact Statement lists only the projected power production at the dam site, and does not calculate 302

power losses.

303 16. What factors were used to calculate a benefit-cost ratio of 1.4? Why was an artificially low interest rate of six and one-eighth per cent used? Does the nature of this project, on a glacial river with no presently known technique for dredging resevoirs filled by sediment, justify a 100-year life projection?

304 17. Upon what factors was the 100-year project life calculated? Does the Corps of Engineers have any available data from other hydroelectric projects constructed on glacial rivers with stream flows comparable to the Susitna River?

305 18. What will be the effect of increased energy, velocity and abrasion of the released water below Devil Canyon Dam upon the Lower Susitna River, and upon the turbidity of the river?

306 19. Is "flood control" a planned benefit of the resevoirs, as mentioned on page 71 of your draft? What is the historical incidence of Susitna River floods?

307 20. Why has the proposed project been stressed for a "maximum credible earthquake" with an epicenter forty miles distant, since the Susitna fault is only 2.5 miles from the site of the dams? 21. Upon what assumptions is the turbidity rate during winter flows of 15 to 35 parts per million calculated? This assumption seems excessively low, when measured against the river's increased abrasion potential, the multi-level releases, and the significantly increased winter volumes.

Your Draft Impact Statement has seriously neglected to place Devil Canyon in the context of present and future recreation potential in Alaska and in North America. You state that it is one of three major white water rivers in Alaska. However, you neglected to point out that, among white water experts, it is considered the premier stretch of white water in North America, if not in the world. Of the three Alaskan rivers mentioned, the Alsek and the Bremner are inaccessible by boaters at either their origin or their terminus. By contrast, Devil Canyon can be reached on the Denali Highway for departure, and its terminus lies on the Parks Highway. Recreational white water boating is one of the fastest-growing sports in the nation, and particularly in Alaska, yet we have no analysis of this increase in popularity in your Impact Statement. On the contrary, your only statements concerning outdoor recreationists, or to white water boaters in particular, are repeated references to "a few hardy souls" with veiled implications that anyone who tries to kyak any portion of Devil Canyon has a death wish. Your impact statement fails to analyze the tremendous growth of self-propelled sports, such as mountaineering, hiking, backpacking, and white water boating. Instead, it assumes without basis in fact that the Devil Canyon area has no present or future potential for these sports, and can only be made available for recreation users by creating some sort of artificial access, such as resevoirs and roads. The Draft Impact Statement does not discuss the proposed Talkeetna Mountains State Park and the effect such a resevoir might have on that proposal. Nor does it discuss the federal lands surrounding the resevoir proposal which may be selected by Cook Inlet Native Regional Corporation, or may be traded to the State of Alaska as an addition to the Talkeetna Mountains State Park proposal. With increased mechanized access being one of the prime features of the project, it will almost certainly have some type of impact upon a State Park proposal. What value was added to your benefit-cost ratio for the recreation opportunities which you foresee as a result of construction of the project, and upon what factors were these values based? 308

Simply stated, I feel that the value of Devil Canyon of the Susitna River, as the freest, wildest, most violent and most impressive free-flowing river on the continent, has been entirely overlooked. The river, to my knowledge, is still eligible for wild river status under federal law, and any decision by the Interior Department not to recommend the river in 1973 was based on the fact that a hydroelectric project was proposed, and not on any inherent characteristic of the river itself. Based upon the content of your Draft Environmental Statement, I have found no compelling reason why Devil Canyon should not remain free and uncontrolled, a monument to nature and not to man, or particularly to the Corps of Engineers or our Congressional delegation. 309

Please include my statement in your record of oral testimony

310 concerning this proposed project. I am also submitting a written statement which I would like included in your hearing record. I will expect to receive copies of any further public correspondence which you may issue as consideration of the feasibility of this proposed project continues. In addition, I would expect to receive your Final Environmental Impact Statement concerning hydroelectric project feasibility in Southcentral Alaska.

Thank you very much.

Thomas E. Meacham

Thomas E. Meacham
1410 "H" Street
Anchorage, Alaska 99501

RESPONSE TO COMMENTS
OF
THOMAS E. MEACHAM
DATED 7 OCTOBER 1975

282 The timing of the issuance of the DEIS (22 September) and the scheduling of the Public Meeting(s) (7 and 8 October in Anchorage and Fairbanks) were responsive to CEQ guidelines. Guidelines for agency compliance with NEPA are promulgated by the President's Council on Environmental Quality. These guidelines stipulate a 45-day review period for the DEIS following the announcement of its availability in the Federal Register. Such announcement was made in the Federal Register printed on 3 October 1975. Thus, the period for public review and comment on the document does not expire until 17 November 1975. With regard to public hearings, CEQ guidelines stipulate that a DEIS be made available at least 15 days prior to the time of such hearings. This requirement was met in scheduling the Public Meeting in Anchorage on 7 October 1975. Opportunity for public input into the DEIS in this instance is 57 days--from 22 September to 17 November 1975. Actually, comments received by 3 December 1975 are included in the EIS.

Public Meetings (hearings) are designed to involve public participation in a continuous two-way communication process which involves keeping the public fully informed on the status and progress of studies and findings of plan formulation and evaluation activities. It is a means of actively soliciting from agencies, groups, and individuals their opinions and perceptions of objectives and needs. And, finally, it is one tool for determining public preferences regarding resource use and alternatives thereto. Two previous sets of meetings had been conducted prior to the October meetings. The first informed the public that the study was underway and solicited their views as to the direction it should take and as to what specific concerns, wishes, or inputs they had relative to the study subject matter, the study area, and any other allied fields they cared to address. The second set of meetings reported to them the study progress, especially a number of possible alternative means of accomplishing (and even the option of foregoing accomplishing) the basic study purpose of providing electrical energy to supply projected area needs. Once again the comments, desires, and inputs (both factual and intangible) of the public were solicited. The latest meetings continued the previous progress from general to specific by presenting the end results of the preceeding studies, expressed public opinions and wishes, and weighing of the many technical, environmental, and economic aspects of the alternatives.

283 Related to the above misunderstanding of the public review period of the DEIS, there appears to be some confusion as to the purpose and scope of this document. Simply stated, under NEPA (Public Law 91-190), a summary document (EIS) must be prepared outlining for public scrutiny (and review by Federal, State, and local agencies) the significant impacts (both adverse and favorable) which can be reasonably foreseen to result from a specific course of action proposed by a Federal agency. The content of the document is outlined to include five major areas of discussion. They are: the environmental impact of the proposed action; and adverse environmental effects which cannot be avoided should the proposal be implemented; alternatives to the proposed action; the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. A great body of interpretations, regulations, legal decisions, and policies have subsequently evolved to more specifically define the procedures, formats, detailed contents, and processing of the various and sundry versions of EIS's. The feasibility report is a separate and distinct document which examines in detail many of the questions you raise. This document, as well as the DEIS, contains data which were summarized at the Public Meeting. Because the report could not be finalized until the public views on its general content, especially on the conclusion and recommendations to be contained therein, it could not, of course, be published prior to the meetings set to obtain those views. It is now being given final revisions as a result of the meetings and of review by higher authority.

284 The growth rate projections for energy demand are by the Alaska Power Administration (APA). They reflect a 1975 revision of the figures from the 1974 Alaska Power Survey. The major competitive projections are those published by OBERS (Office of Business Economics--now renamed Bureau of Economic Analysis--and Economic Research Service). These projections are based almost solely on population trends and have to date consistently badly underestimated all varieties of growth in Alaska.

285 The alternatives mentioned have been considered as a part of the feasibility study. Data from all available sources have been utilized. Coal is found to be the major alternative to hydropower.

286 Hydrodevelopment may or may not supplant development of alternative power sources. The proposed project will supply the area power deficit only to about the mid-1990's when either additional hydropower or other alternative sources will have to be developed.

287 Comment noted.

288 The capacity of the two-dam project is not excessive. The electrical output is less than three times the present Railbelt need (not six times the present State need, as you state). As such, in conjunction with present systems (and any others developed to meet the demand growth prior to hydropower availability), the proposed system will satisfy the mid-range demand curve until the 1990's when additional power will be needed.

289 Alaska Power Administration (APA), a Department of Interior agency, will manage the project much in the way Bonneville Power Administration manages the Federal hydro system in the Pacific Northwest. They are not subject to APUC regulation, but work closely with them.

290 Yes. However, there is very little secondary energy associated with the proposed plan. Such energy is not designed into a plan, but is a result of defining the "firm" energy as that which can be produced in the worst water year (drought). Thus, in most years, there is additional water available to produce "secondary" energy which, because it cannot be guaranteed to the user, is usually sold at a discount on a when-available basis. The secondary capability of the proposed plan is only about 12 percent of the firm energy output. Again, APA is not subject to APUC regulation, per se, but cooperates closely with them.

291 The proposed project is not intended to be developmental, but to meet a projected, conservative growth projection. If the projection is correct, there should be little in the way of large blocks of power available to induce extraordinary industrialization. For further response to this comment, see response number 255.

292 Yes, some permafrost is located beneath the Watana reservoir and may be also within a portion of the Devil Canyon reservoir. We foresee both melting of this permafrost and some erosion as a result. However, the overburden subject to erosion is shallow over a majority of the steep, rocky canyons, and the net effects on either storage capacity or the shoreline should be minor.

293 The downstream effects during construction should be minimal inasmuch as the entire natural river flows will be passed by diversion tunnels until completion of the Watana Dam about 1986. At that time, a regulated flow consistent with the needs of downstream fishery management will be passed until completion of Devil Canyon about 1990. Again the river flows will be diverted through a tunnel around the Devil Canyon damsite during the construction period at that site. After that, full regulated flow, as

described at the Meeting, will be released. It is now standard procedure to minimize construction inputs of turbidity-pollutants to the river during construction to the extent that all construction waters will be cycled through settling basins, etc., if such need is found.

294 The low level (less than 35 ppm) of glacial "flour" which we expect to be passed downstream year-round (in lieu of highly turbid summer flows and very clear winter flows) is similar to the natural conditions at Kasilof River-Tustumena Lake where fish thrive very well. We foresee no noticeable adverse impact from this source. However, a final determination of these effects will not be made until detailed studies, some of which are currently underway, are completed.

295 The wintertime flow volume, even though substantially greater than that of minimum natural flows, is still quite moderate and should have little adverse impact on downstream fish and/or wildlife. The equalization of the summer and winter flows and the elimination of most of the sediment load will tend to change the dimensions at the river and will increase its erosive potential, but not necessarily actual erosion. The rocky nature of much of the canyon below the damsite will resist any regime change for centuries. Only in areas of alluvial deposits would the tendencies for concentrated flow in a narrower, deeper, possibly meandering channel manifest themselves. Furthermore, they would only be noticeable in that portion of the Susitna River upstream of the Chulitna River confluence. In the past, estimates of erosion downstream of damsites have been too great. In these estimates, the phenomenon of channel armoring (i.e., the small size material is swept away and not replaced, leaving a uniformly large stone bottom highly resistant to further erosion) was not considered. With the present state of the art, most of the above-mentioned morphological processes are calculable, and any potentially adverse effects can be minimized.

296 The purpose of the multilevel intake structures is to allow selection of the water released to preclude just such downstream quality problems. No releases will be made from the reservoir bottom, but only from the active power pool--say about the upper one-third to one-half the reservoir depth.

297 The peak monthly flow would occur during a major flood and would be much less than the natural peak flow since the reservoirs offer storage to allow a spreading of the total flood volume over a period of days rather than a few hours under unregulated conditions. During non-flood periods the combined Devil Canyon and Watana system would be operated so that Devil Canyon would reregulate the Watana reservoir discharge to provide

nearly constant hourly streamflow below Devil Canyon. Devil Canyon, in effect, will be serving a component of the baseload of the system and Watana would be utilized to serve peaking requirements. The composite effect of this operation would provide a nearly constant hourly hydrograph for the river reach below Devil Canyon.

298 Frazil ice is a short-term early winter phenomenon involving a specific set of meteorological conditions in association with shallow, clear rapidly flowing water, and the absence of ice cover. The very deep, milky, relatively placid waters of the reservoirs are totally opposite to the conditions favorable to frazil ice formation. Be that as it may, if such ice did form, the capability of selective withdrawal of deeper-lying, warmer waters provided by the multilevel intake system would offer a simple, immediate, built-in solution to the problem.

299 The estimated Railbelt energy demand for 1975 is 2.4 billion kilowatt-hours, the equivalent to consumption of 5.2 million barrels of oil.

300 In terms of construction costs, yes; in terms of energy consumed, no.

301 The answer depends on what value is assigned to today's oil. At a price of $13 per barrel for oil from OPEC nations, the project's first cost is equivalent to approximately 115 million barrels of crude oil. It should be noted that the energy provided by the project over its 100-year economic life will result in non-use of over 1.5 billion barrels of oil or its energy equivalent of over 11 trillion cubic feet of natural gas. It is also likely that future oil prices could increase substantially.

302 The quoted 6.1 billion kilowatt-hours reflect the net annual power delivered to the two distribution centers, Pt. Mackenzie for Anchorage and Ester-Gold Hill for Fairbanks, after deduction of transmission losses estimated at 0.7 percent of prime energy. The approximate split of delivered energy is 25 percent to Fairbanks and 75 percent to Anchorage.

303 The basic benefits are shown on page 106 of the EIS. The interest rate is that set by regulation of the Water Resource Council for use in economic evaluation of Federal projects, and reflects the government's cost in borrowing money. Sedimentation is calculated to reduce the system storage capacity by 4.2 percent in 100 years. Most of the lost storage is in the "dead storage" zone, not available for power production in any case. The system power output reflects the storage lost to sedimentation over the 100-year project life. Also see response number 121.

304 The 100-year life is a Corps of Engineers standard for this type of project, used in computation of project economics. This policy is accepted by the Water Resources Council and by Congress. The actual useful life of the structures should exceed the 100 years by a large margin. The Corps has data from projects located on many types of rivers. It is from this data that a standard methodology of calculating sedimentation rates has been developed. To attempt correlation of sedimentation of the upper Susitna River with other rivers only on the basis of flow or storage of water is meaningless. Many factors, including but not limited to geology of the basins, river gradients, precipitation patterns, runoff characteristics, and topography, influence sedimentation and must be considered to determine any valid correlation.

305 Increased kinetic energy in the form of high water velocities due to the large head of water behind the dam is dissipated at the dam. Most of the energy is absorbed by the power station turbines. Spillway and outlet works releases spend their energy in the discharge pool below the dam. Thus, the discharge velocity ratios in the canyon downstream of the dam are the same after project completion as under natural conditions.

306 Flood control is a project benefit. The present adverse effect of floods on humanity is limited to damages to the Alaska Railroad. Prevention of these damages is the sole claimed flood control benefit. As the downstream area develops, there will be a growth in population and property which could be adversely affected by unregulated flows; however, no estimate of this future benefit is claimed. Flood control benefits are about 0.03 of 1 percent of average annual project benefits.

307 The Susitna Fault, although close to the project, does not have the probability of creating as violet (high magnitude) an earthquake as the more distant Denali Fault. It is for this reason that an 8.5 Richter Maximum Credible Earthquake (MCE) at the Denali Fault (40 miles distant) was selected for design purposes over the 6.0 Richter MCE event at Susitna Fault (2.5 miles distant).

The turbidity level is predicted on the basis of all settleable solids being trapped by the two reservoirs with only the suspended solids (glacial flour), 15-35 ppm being released at Devil Canyon Dam. The present summer sediment load of the river is attributable to easily erodable soils in the upper basin and is not an indication that significant material is being picked up downstream of the canyons. In fact, the lower riverbed is relatively stable under all but extremely high flows because of the gravel-cobble nature of the bed materials.

[illegible] The DEIS and feasibility study do not slight the recreational potential of the whitewater river. Factually, the area is isolated, has little access, no supply-subsistence facilities, and the Devil Canyon portion of the river is so violent as to discourage all but the most skillful kayakers. As best as we have been able to determine, less than a dozen attempts have been made to run portions of the rapids in the last 50 years. Its classification as a Class 6 river, a threat to the life of even the most skillful boatsman, and the awe of its violence exhibited in written accounts of some who have challenged the rapids guarantee that its recreational use would be limited to a very few people. The reservoirs could and would, however, provide recreational opportunity to broader sections of the public, while about three miles of the rapids would remain to challenge the whitewater enthusiasts. As to ignoring the area potential for "self-propelled sports," our view is that these are the most likely recreational uses for the lands surrounding the reservoirs. As such, we have estimated only a limited recreational development based on camping-hiking-boating, rather than a heavy day-use type of development.

The DEIS does not discuss the conceptual Talkeetna Mountains State Park inasmuch as the State Division of Parks has not indicated any plan that the project area should be a part thereof when or if the park becomes a reality. Rather, they have discouraged association of the project too closely with the existing Denali State Park, preferring that the area be considered a separate State Recreation Area if the State becomes the project recreational sponsor. The fact that the lands for many miles to the south of reservoir sites are presently set aside for native selection under the Alaska Native Claims Settlement Act would appear to argue heavily against the probability that the proposed park and project would be in any way closely associated, at least for the foreseeable future.

[illegible] Comment noted.

[illegible] Comment noted.

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17 October 1975

Col. Charles A. Debelius, District Engineer
Department of the Army
Alaska District, Corps of Engineers
P.O. Box 7002
Anchorage, Alaska 99510

SUBJECT: Draft Environmental Impact Statement: Hydroelectric Power Development, Upper Susitna River Basin, Southcentral Railbelt Area, Alaska

Gentlemen:

The following material is submitted for inclusion in the records of the public meeting of 7 October 1975, RE: Southcentral Railbelt Area, Hydroelectric Power Study, and as specific comment in reply to the Draft Environmental Impact Statement recently issued by the Corps in relation to this study. Within my capacity as a geologic consultant I have had previous imput to this study; specifically, in preparing a reconnaissance geologic study of the Upper Susitna River watershed for the report to the Corps by Jones and Jones; Upper Susitna River, Alaska: An Inventory and Evaluation of the Environmental, Aesthetic, and Recreational Resources. My comments are restricted to the geologic aspects of the proposed project and within this discipline to the inherent seismic dangers of the site and the geomorphological adjustments which may ensue construction of the project. I have thoroughly reviewed the Draft EIS and have personally communicated with Mr. Yould and Mr. Chandler.

Respectfully submitted,

Philip N. Osborn

Philip N. Osborn
Geologic Consultant

Enc.

pacific northwest and alaska
geology • ground water resources

The Draft Environmental impact Statement for hydroelectric power development in the Upper Susitna River basin contains insufficient data within the geologic discipline. This data is essential to a complete and adaquate evaluation of the proposed project - - its merits, benefits, and costs. Specifically:

1) The geologic map on page 16 is incomplete; faults which transect the Susitna Basin are not shown. Major faults intersect the Susitna River downstream from Tsusena Creek (Susitna Fault), at Vee Canyon, upstream from the confluence of the Susitna and Maclaren Rivers, and near Denali. Several smaller faults are located in the Valdez Creek area and at other areas within the site. Undoubtably, other faults exist within the study region; they may be presently inferred or unmapped due to the immense area and the lack of detailed geologic surveillance.

2) The geologic map shows no indication of structural features, particularly in Devil Canyon. A larger scale map should be included showing faults, joints, shear zones, and lithology of the Upper Susitna Basin at the proposed dam sites. Specifically, at Devil Canyon, a master joint set striking N. 25° W. and dipping 80° east, a minor joint set striking east - west and dipping north, a shear zone with strike and dip similar to the master joint set, and the massive phyllite lithology striking east - west and dipping approximately 50 - 60° south are not shown (Kachadoorian, 1974; Osborn, 1974; Jones and Jones, 1975).

3) There is no mention of actual movement along the major faults within the study area and those outside but which could have significant effect on a dam and reservoir system; in particular, but not limited to, these faults and offsets should be mentioned: Denali Fault - - post-Pleistocene displacement of 120m measured and 200m from aerial photograph interpretation; Totchunda Fault - - post-Wisconsan displacement of 270m (Page, 1972); Susitna Fault - - 11 km of displacement inferred from morphological expression (Osborn, 1974)

4) The possibility of an increase in seismic activity as a result of reservoir impoundment and fluctuation is not mentioned. Noting the immediate proximity of the Watana reservoir to the Susitna Fault, this possibility should be considered. This phenomenon has been widely recognized and is well documented, e.g., increase in earthquake activity following the impoundment of Lake Mead behind Hoover Dam (Richter, 1958).

5) There is no mention of the recurrence periodicity of great earthquakes (greater than 8.0) within Southcentral Alaska. A great earthquake may be expected approximately once every 30 years (Sykes, 1971) or 16.7 times during the reasonable lifespan of the dam structure.

6) Large portions of the Upper Copper River basin subsided during the March, 1964 earthquake (Plafker, 1965). The implications of further subsidence during future earthquakes and the possibility, however remote, of a change in drainage patterns whereby the Watana reservoir might invade the Upper Copper River basin should be analyzed. It should be noted there is only 162 feet of elevation gain from the Watana full pool level to Lake Louise. There is a high probability that the Copper River system has been the outlet for the Upper Susitna drainage at least once and possibly several times during the geologic history of the Upper Susitna River (Osborn, 1974).

7) It is absolutely imparative that the possibility of a seiche generated by seismic activity or landslide within either reservoir be considered. These standing waves can have devastating effects, as evidenced at Lituya Bay (Miller, 1960), and have been responsible for several overtoppings and dam failures in historic times.

In addition, the following geomorphological problems and questions should be addressed.

8) How will the accumulation of sediment at the bedload "dumping ground" at the upper end of the Watana reservoir effect the river morphology?

9) What changes will occur in delta building at the mouth of the Susitna River and what are the effects on sedimentation in Turnagain Arm as a result of lower sediment loads in the Susitna? (The principal source area of sediment in Turnagain Arm is the Susitna drainage.)

10) All existing sediment load study samples are instantaneous; there are no continuous samples. Due to the tremendous sediment load in the 30 day period following breakup (perhaps 60 - 80% of total) when discharges may exceed 90,000 cfs, the existing data is inadaquate to allow volumetric extrapolation for a 100 year period.

11) What effects will fluctuations of the Watana reservoir have on solifluction mass wasting and will there be a substantial increase in shoreline erosion?

12) What effects will the transmission corridor have on permafrost in the area of traverse? How will the transmission towers be anchored to prevent dislocation by heaving of the disturbed surface?

These and many other questions, problems, and inadaquacies suggest that the document should be returned to the Southcentral Railbelt Task Team for additional studies and voluminous additions to the Draft Environmental Impact Statement.

Philip N. Osborn | 311

Philip N. Osborn,
Geologic Consultant

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RESPONSE TO COMMENTS BY
PHILIP N. OSBORN

311 The EIS recognizes the most important and major geologic aspects of the project area. The Corps of Engineers will study all of the areas of geologic concern expressed in Mr. Osborn's letter and many more geologic conditions as the Southcentral Railbelt study continues. To this end, the Corps has already retained two consultants specialized in the field of tectonics and seismicity of the area. The United States Geological Survey has been asked to do the geological mapping of the river and reservoirs. This would include tectonics of the area, land slides into the reservoir, seiches in the reservoir, as well as the required geologic data as outlined in Corps of Engineers' regulations and manuals.

Christopher Pearson
Geophysical Inst
College Ak

Dear Sir.

I don't think that the state has any need for the more than 5 billion kw hrs that the two proposed dams on the upper Susitna river would produce. I think that the projections of energy demand do not take into account a probable downturn in the rate of energy groth in the Fairbanks area after the pipeline is finished. I think that options 1 & 2 (ie the Devils canyon & the D.C. High dams) are more reasonable & they have the added advantage of flooding less land & thus would have a smaller environmental impact. I do think though that if a dam is to be built in Alaska the Susitna river is the place for it.

312 Sincerely

Chris Pearson

RESPONSE TO COMMENTS BY CHRISTOPHER PEARSON

312 Comments noted.

P.O. Box 171
Anchorage, AK 99510
October 11, 1975

Col. Charles A. Debelius
District Engineer
Alaska District, Corps of Engineers
P.O. Box 7002
Anchorage, AK 99510

Dear Col. Debelius:

I am writing in general reference to the Upper Susitna River Project. Although I am against the project for environmental and social impact reasons, I would like to focus my comments on a specific part of the study. The following comments, therefore, have to do with the transmission corridor, called alternative "Susitna-1" in the September 1975 draft of the Environmental Assessment of the Susitna Transmission System, which parallels the Alaska Railroad between Talkeetna and Gold Creek.

As a part-year resident of Lane Creek, located near mile 241.7 of the Alaska Railroad, I am deeply concerned about this part of the project. I am not alone; there are hundreds of people who own or lease land and who have recreation or residence cabins in the area affected by "Susitna-1" between Talkeetna and Gold Creek. Access roads will ruin this area, bringing in large numbers of people and all the attendant problems, which is precisely what most people who built in this area wanted to get away from. In addition to the roads, the transmission towers, lines, and cleared areas will be unsightly and an impairment of the wilderness environment.

In reading the above mentioned draft, I was surprised and distressed at the incomplete and misleading information which it contained. I am refering here to the matrices and supporting text for the Environmental Assessment and Environmental Impact sections. Although the draft seems to have been intended as a superficial study, the errors I will note are so glaring that they require comment and correction before the draft is used as a basis for any decisions.

The matrix for this segment of "Susitna-1" under Existing Developments indicate several railroad stops, of which Lane is one. Lane is not even a flag stop, and hasn't been for many years. The current flag stops are mile 232, 233.5, 236, 238.4, 239.5, 241.7, 244.6, and others north to Gold Creek. Each of these stops represent small communities of a scattered three to ten cabins which people use for recreation or residence, mostly the latter. The locations of the cabins range up to three miles, and occaisionally further, from the railroad tracks. The matrix for Impacts under Existing Developements indicates no impact in this area, although lower down on the page the Stephan Lake cabins are mentioned. The text is equally incomplete. Infact, the "Impacts of Preferred Corridor Susitna-1" (pg. 38) scarcely mentions the Talkeetna-Gold Creek segment at all.

The rather significant oversignt of ignoring this large block of people and the impact the "Susitna-1" corridor will have on them, indicates a very superficial and almost irresponsible analysis. I note that the matices can be easily updated. In light of the information contained herein, I hope that the draft, matrices and text, will be corrected before being submitted to decision makers.

A wilderness life for myself and a large number of people will be destroyed if the transmission lines are built in this corridor. I would therefore like to see the "Susitna-1" alternative between Talkeetna and Gold Creek abandoned. If this cannot be done, then at least study it carefully to minimize the impact. Therefore, I certainly hope you will consider helicopter construction in this area and choose a route which will avoid privately leased or owned land.

313

Sincerely,

R. John Strasenburgh

cc. Senators Gravel and Stevens
Representative Young
Bob Cross, Alaska Power Administration

RESPONSE TO COMMENTS BY
R. John Strasenburgh

313 The study is currently in the feasibility stage, thus detailed design and routing of the transmission line has not yet been accomplished. For this reason, the present routing of the line is designated as a relatively broad strip of land constituting a "corridor." As stated in the Environmental Assessment for Transmission Systems (APA): "To avoid presumption of private lands, the final route will be flexible enough to circumvent small blocks of private land." The assessment goes on at some length describing the actions which will be taken to lessen the obtrusiveness of the transmission line with care given to proper design and locations. The section of the assessment dealing with impacts on scenic quality and recreation ends with the following statement: "Whenever possible, existing rights-of-way should be shared or paralleled to avoid the problems associated with pioneering a corridor in inaccessible areas. Trails in these "inaccessible" areas should, however, be avoided; preserving wilderness quality entails sharing or paralleling all rights-of-way except trails, and from these, lines should be shielded as much as possible." Thus, preservation of the wilderness setting will be a major consideration in transmission line location and construction.

STILLWATER CLINIC
BOX 8
COLUMBUS, MONTANA

October 21, 1975

Alaska District Corp of Engineers
Anchorage, Alaska
99500

Re: Upper Susitna Basin Hydro-Electric Power Development.

Dear Sirs:

It comes to my attention that a power development including a dam or several dams in the upper Susitna and Devil's Canyon is still being proposed. It is my feeling that very little thought has been given to the environmental impact that such a project would have, and the permanent loss of some tremendous river floating and boating in the future years. This particular stretch of river is as magnificent, as far as rivers go, as McKinley is when one considers its relationship to other mountains. I feel that any measure to change or deface this river should be as carefully considered as would a proposal to change or deface Mount Mc Kinley.

I wish you would enter this statement in the hearing record as evidence that there is strong opposition to the Devil's Canyon Dam that will permanently destroy the marvels of this canyon.

314 Sincerely yours

C.H. Swanson Jr.,M.D.

CHS/ch

RESPONSE TO COMMENTS BY
C. H. SWANSON, JR. M.D.

314 Comments noted.

JOHN R. SWANSON
P. O. Box 972
Berkeley, California 94701

October 13, 1975.

District Engineer
U.S. Army Corps of Engineers
P.O. Box 7002
Anchorage, alaska 99501

Dear Sir;

Please accept my Comments concerning the Draft Environmental Impact Statement pertaining to the proposed Devil Canyon and Watana Dams on the Susitna River, alaska.

I wish to advise you of my Opposition to such Dams as they will be destructive to Fish and Wild Life resources as well as destructive to Scenic and Wilderness Resources within this general area of alaska.

The Susitna River should remain free-flowing as it is a unique river in its natural state and added, or at least portions of it, to our National System of Wild and Scenic Rivers.

Free flowing natural rivers are now nearly extinct in the United States, all the more reason, then, to keep the Susitna free from any Dams and related developments and, is the power generated from such Dams actually necessary as alaska is now within a substantial oil and natural gas boom?

As I am familiar with portions of the Susitna River, I again urge that it be not destroyed by Dams.

315 Sincerely,
John R. Swanson.

RESPONSE TO COMMENTS BY
JOHN R. SWANSON

315 Comments noted.

410 Skarland Hall
University of Alaska
Fairbanks, Alaska 99701
Oct 7, 1975

Alaska District
Corps of Engineers
P.O. Box 7002
Anchorage, Alaska 99510

Dear Sir:

I attended your hearings held here in Fairbanks in October, with great interest and concern for the future development of the proposed dams on the Big Susitna River.

I was somewhat surprised when Colonel Debelius mentioned that there might still be a possibility of additional dam construction such as the Rampart. When the Corps tries to resurrect such skeletons of this magnitude of biological blunder, it makes one wonder about some of the reasoning behind present studies.

Although I would be the first to admit that the Devil's Canyon area would be ~~the~~ probably the best location for a dam site in the State, I feel that it is necessary to evaluate all of Alaska's resources, and wise land use planning, with the best and wisest use of resources instead of developing in a piece meal style.

I feel that the question should be raised as to the necessity of a dam for hydro-electric power at this time. There are presently many energy resources being wasted in Alaska. Flaring of natural gas has been carried out for over a decade in Cook Inlet. As a student on campus at the University of Alaska at College, I witness entire floors unneccessarily burning electricity 24 hours a day, and consumption is at a maximum.

The fact that the Corps of Engineers is planning this project at this time, prior to knowledge of the route the gas pipeline will take, indicates an attitude of "development for development's sake" to perhaps quote a well known Alaskan inversely.

If infact the North Slope gas pipeline does go through Alaska, it would appear to me to be extremely short sighted at this time to go ahead with construction plans, as well as encouraging more waste of Alaska's renewable and non renewable resources.

316

Yours sincerely,
Barbara Winkley
Barbara Winkley

cc: Governor Hammond

RESPONSE TO COMMENTS BY
BARBARA WINKLEY

316 Comments noted.