UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Anchorage, Alaska

SOUTH CENTRAL RAILBELT AREA
UPPER SUSITNA RIVER BASIN
HYDROELECTRIC PROJECT
TWO DAM PLAN

TK
1425
.S8
A23
no.3492

October 1975

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1425
.S8
A23
no.3492

Merged with
A.R.L.I.S.
ANCHORAGE, ALASKA
Est. 1997

OCT 10 1975

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Dear Colonel Debelius:

In response to your letter of March 10, 1975, this is our detailed report on portions of the Susitna River hydroelectric projects associated with the Southcentral Railbelt Area investigation. This report has been prepared in accordance with the Fish and Wildlife Coordination Act, 48 Stat. 401, as amended: 16 U.S.C. 661 et seq., and the National Environmental Policy Act of 1969 (P.L. 90-190; 83 Stat. 652-856). This report is limited to the selected two-dam plan, i.e., Devil Canyon and Watana Damsites on the Susitna River. The Denali damsite was deleted for several reasons, e.g., anticipated severe environmental problems, and the late planning schedule (1995). Further, there is not time within the allotted time frame to conduct a detailed evaluation and prepare a fish and wildlife plan for all three sites. Should the Denali proposal become a viable and imminent alternative the Service, in cooperation with the Alaska Department of Fish and Game, will prepare a detailed report on that project at a later date.

This report has been prepared in cooperation with the Alaska Department of Fish and Game as indicated by the appended letter of October 8, 1975, from Commissioner James W. Brooks, and by the National Marine Fisheries Service as indicated by their letter of October 8, 1975, from Regional Director Harry Rietze.

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DESCRIPTION OF THE AREA

The Susitna River Basin lies in southcentral Alaska north of the farthest inland projection of Cook Inlet between latitudes 61° - 64° north and longitudes 146° - 153° west. Total drainage of the basin comprises about 19,300 square miles of relatively uninhabited lands. The basin is bordered on the south by the waters of Cook Inlet and the Talkeetna Mountains, on the east by the Talkeetna Mountains and the Copper River plateau, and on the west and north by the Alaska Range.

The main stem of the Susitna River from its source in the Alaska Range to its point of discharge into Cook Inlet is about 275 miles long. It flows southward from the Alaska Range for about 60 miles; thence, in a general westerly direction through the Talkeetna Mountains for about 100 miles, and then south for the remaining 115 miles to its mouth at the head of Cook Inlet.

Principal tributaries of the lower basin have as their origin glaciers high in the surrounding mountain ranges. These streams are for the most part turbulent in the upper reaches and slower flowing in the lower regions. Most of the tributaries carry a heavy load of glacial silt.

The Yentna River, one of the largest tributaries, begins in the mountains of the Alaska Range, flows in a general southeasterly direction for approximately 95 miles, and enters the Susitna River 24 miles upstream from tidewater. Alexander Creek, Deshka River, Montana, Goose, Sheep, Caswell, Little Willow, and Willow Creeks are major clear water tributaries on the Susitna River.

The Talkeetna River has its origin in the Talkeetna Mountains. It flows in a westerly direction and discharges into the Susitna River 80 miles upstream from tidewater.

The Chulitna River heads in the Alaska range and flows in a southerly direction, joining the Susitna River opposite the Talkeetna confluence.

Principal tributaries of the upper Susitna drainage are the Oshetna, Tyone, and Maclaren Rivers. The Oshetna and Maclaren Rivers are usually turbid, but have numerous feeder streams that drain many clear-water lakes.

Stream flow in the Susitna Basin is characterized by a high rate of discharge from May through September and by low flows from October through April. High discharges are caused by snow melt, rainfall, and glacial melt. Streams carry a heavy load of glacial silt during the summer. During the winter when low temperatures retard water flows, streams are relatively silt free.

The Alaska Range to the west and north, and the Talkeetna Range to the east make up the high perimeter of the lower Susitna River Basin. The Alaska Range is made up of sedimentary rocks, some of which have been metamorphosed and intruded by granitic masses. The Talkeetna Mountains are primarily granitic. The floor of the lower basin is largely covered with glacial stream deposits.

The upper basin, predominantly mountainous, is bordered on the west by the Talkeetna Mountains, on the north by 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.

Climate of the Susitna Basin is rather diversified. Latitude of the region gives it long winters and short summers with great variation in the length of the daylight between winter and summer.
The lower Susitna Basin owes its relatively moderate climate to the warm waters of the Pacific on the south and the barriers of surrounding mountains. Summers are characterized by moderate temperatures, cloudy days, and gentle rains; winters are cold and the snowfall is fairly heavy. Talkeetna, representative of the lower basin, has an annual mean temperature of 33.2°F., and an average annual precipitation of 28.85 inches.

The upper Susitna Basin, separated from the coast by high mountains, has a somewhat more severe climate than the lower basin. The nearest weather station at Mount McKinley Park has an annual mean temperature of 27.5°F., and annual precipitation of 14.44 inches.

Spruce, birch, aspen, cottonwood, willow, and alder are found throughout the lower basin up to about 2,000 feet. These are interspersed with low muskeg vegetation on the floor of the basin and grassy meadows on higher benches. Understory of timbered areas consists of moss, ferns, high and low bush cranberry, devil's club, wild rose, blueberry, currants, grass, and wildflowers. Above timberline, thickets of alder and willow occur interspersed with grassy meadows. Above this zone vegetation consists of moss, lichens, and wildflowers.

Spruce occurs throughout the upper basin up to the 2,500 to 3,000 foot timberline. Low, scrubby, black spruce grows on the poorly drained bottomland, while the larger white spruce is found on better drained sites. Dwarf birch is distributed throughout the upper basin, and willow occurs along water bodies. White birch and alder occur in limited amounts. The understory includes blueberry, low-bush cranberry, Labrador tea, crowberry, fireweed, mosses, and lichens. Muskeg is interspersed throughout the bottomland and tundra is present throughout better drained areas.

Within the project area of influence is Mount McKinley National Park, which lies some 50 miles to the northwest of Devil Canyon. The Park contains about 3,030 square miles and is the second largest park in the national park system, exceeded in size only by Yellowstone National Park. It was created by an act of Congress in 1917 and has as one of its objectives the protection of the great herds of mountain sheep and caribou in this portion of the Alaska Range. Mount McKinley, the highest mountain in North America, is the principal scenic feature of the park. This lofty peak rises 20,320 feet above sea level, and soars some 17,000 feet above the surrounding forested plateau; it is the only mountain in the world to rise so high from its own base.

Human population of the basin is chiefly concentrated along the railbelt with trappers and miners utilizing the entire basin. The proposed project is located approximately midway between Anchorage and Fairbanks, the two largest cities in the State. It is estimated that these two areas contain about 226,500 people or approximately 75 percent of the entire State's population.

Until 1971, the Alaska Railroad was the only overland means of transportation through the lower Susitna River Basin. The recently constructed Parks Highway now parallels the railroad. The Denali Highway passes through the headwater portion of the upper Susitna Basin. Although other secondary roads are being developed, access to remote areas is still possible only by air and boat travel.

Economic activities are chiefly centered in the lower 100 miles of the basin along the railbelt. The commercial fishery utilizing the Susitna salmon runs is located in Cook Inlet. Placer and lode gold, tungsten, and construction materials are produced in this lower area, but only in limited quantities. Coal and other minerals are present and are receiving more attention as demand increases. Much of the basin is under lease by oil interests. Portions of the lower basin are suited for agriculture and forest industries, which still await full development.

DESCRIPTION OF THE PROJECT

Devil Canyon: The dam, rising 635 feet above its foundation and 565 feet above the normal water surface of the river, will be of a concrete-arch design at river mile 134. It will have a crest length of 2,475 feet. The reservoir created by the dam will have a surface area of 7,550 acres and inundate the Susitna River bed 28 miles upstream to near the Watana damsite.

Watana: The Watana structure would be a rock fill dam rising 810 feet at river mile 165 and would have a crest length of 3,450 feet, at an elevation of 2,200 feet m.s.l. The structure would create a reservoir with a surface area of 43,000 acres and will inundate about 54 miles of the Susitna River. Preliminary reservoir data are shown in Table 1.

Table 1. Pertinent Dam and Reservoir Data[1/]

	Type of Const.	Crest Length	Struct. Height	Norm. Pool elevation m.s.l.	Surface acres	Storage (ac/ft)	Miles of river inundated
Devil Canyon	concrete thin-arch	2,475	635	1,450	7,550	1,050,000	28
Watana	rockfill	3,450	810	2,200	43,000	9,400,000	54 ~~42 miles~~

1/ Both structures are designed to withstand an earthquake of 8.5 on the Richter scale with an epicenter factor of 40 miles.

Distribution of the power would require a transmission line from Watana to Gold Creek where it would be split. The Anchorage route would parallel the Susitna River to the Nancy Lakes area, thence due south to Point MacKenzie. The Fairbanks corridor would run north from Gold Creek to Chulitna at which point it would generally follow the Parks Highway and Alaska Railroad to the existing substation at Ester. The transmission corridor would be about 334 miles in length. Average width would be 125 feet and total required right-of-way would be about 5,100 acres. (Transmission corridor data is set forth in Table 2).

Table 2. Transmission Corridor System

	To Anchorage	To Fairbanks
Double Circuit	136 miles 345 kv	198 miles 230 kv
Route	Southern	Northern
	Powerhouse - Gold Creek - SW along Susitna R., ARR - Talkeetna - E. bank Susitna R. - Nancy Lake area - S. to Pt. MacKenzie.	Gold Creek N. to Chulitna along Parks Highway, ARR thru Broad Pass, Nenana Canyon - Healy, then along existing line - Gold Hill - Ester.
Length	Devil Canyon-MacKenzie 140 mi.	Devil Canyon-Ester 200 mi.
	Devil Canyon-MacKenzie	Devil Canyon-Ester
Cleared right-of-way	140 feet	140 feet
Towers	Steel or aluminum	

Combined electrical production of both dams would be 6.1 billion kilowatt hours of firm energy annually. The two-dam system would also be capable of providing an additional .7 billion kilowatt hours of secondary electrical energy.

FISH AND WILDLIFE RESOURCES

Fishery

Sport: During the warmer months of the year, the Susitna River is silt-laden throughout its entire course due to its glacial origin. Sport fishing is thereby limited to the clear-water tributaries, sloughs, and areas in the main Susitna River near the mouths of these tributaries. Principal freshwater sport fishing species are salmon, rainbow and lake trout, Dolly Varden, and grayling. Other species of lesser importance are burbot and whitefish. The longnose sucker, sculpin, three-spine and nine-spine sticklebacks are present in the river but are generally not considered as important sport fishes.

Sport fishing pressure in the Susitna Basin immediately above the Devil Canyon site is relatively light, with the primary limitation being that of access. Many lakes and rivers afford landing sites for float-equipped aircraft, and fishermen using this method of transportation are frequently rewarded with good catches. The Alaska Railroad and the Parks Highway are the primary means of access to the lower basin. During the summer season, trains sometimes make unscheduled stops at streams along the way to accommodate photographers and fishermen. Completion of the Denali Highway in 1957 opened a small portion of the upper Susitna Basin to fishermen. The Tyone River, originating at Lake Louise and flowing northwest to the Susitna River, has increased in popularity with boat fishermen during the last ten years and is believed to support the largest winter burbot fishery in the state.

That section of the Susitna River downstream from Devil Canyon to its confluence with the Talkeetna and Chulitna Rivers is fed by a few clear tributary streams which furnish habitat for salmon, rainbow trout, grayling, Dolly Varden, and burbot. It is not known how extensively the main stem Susitna below the Devil Canyon damsite is utilized for spawning by these fish, but such usage is probably light due to the silt-laden water and the relatively muddy, sandy nature of the channel. Sport fishing between the damsite and confluence of the Susitna, Talkeetna, and Chulitna Rivers is limited to the mouths of the few clear-water tributaries. Lake trout are present in certain parts of the tributary drainages which contain deep lakes above the Devil Canyon site. The Devil Canyon impoundment area is a rugged, narrow canyon with several rapids and a few clear-water tributaries, the largest being Fog Creek and Devil Creek. Grayling, whitefish, burbot, suckers, and cottids occur in these tributaries and in the main river.

An economic survey conducted by Sport Fish personnel of the Alaska Department of Fish and Game on nine Susitna tributaries from Willow to Talkeetna indicated 21,153 anglers expended $255,092 in the Matanuska-Susitna and Greater Anchorage Boroughs during a brief 35-day salmon fishery. These figures and values are now several years old. Angling intensity has risen sharply since that time and the demand for recreational salmon angling is at an unprecedented level. These figures might easily double if a similar study were conducted at this time.

Commercial: That section of the Susitna River downstream from the Devil Canyon damsite to its confluence with the Talkeetna and Chulitna Rivers is fed by a few clear tributary streams which furnish spawning and rearing grounds for five species of Pacific salmon: sockeye (red); coho (silver); chinook (king); pink (humpback); and chum (dog). Portage Creek, three miles below the Devil Canyon damsite, is the uppermost tributary on the Susitna River where significant numbers of spawning salmon have been noted. Investigations conducted by the Fish and Wildlife Service intermittently from 1952 to 1975 failed to reveal the presence of adult or young salmon above the proposed Devil Canyon damsite. No actual waterfalls or physical barriers have been observed in or above the Devil Canyon area which would preclude salmon from utilizing the drainage area above the damsite. The most logical reason for the absence of salmon from the area, however, is the probability of a hydraulic block resulting from high water velocities for several river miles within Devil Canyon.

Twenty-seven spring fed slough areas adjacent to the main stream Susitna River between the Devil Canyon damsite and the confluence of the Chulitna River have recently been identified as being important for fish rearing. Adult spawning salmon have been recorded in 9 of the 27 sloughs. Rearing salmon fry have been observed in 17 of the sloughs. Additional slough areas are probably present in the same reach or further downstream. Adult spawning salmon have also been observed in nine-clear-water creeks.

Studies concerning both sport and commercial fisheries are currently being conducted under contract between the Alaska Department of Fish and Game and the U. S. Fish and Wildlife Service. Unfortunately, study results are not available for this report because of time restraints imposed on both agencies.

The Commercial Fisheries Division of the Alaska Department of Fish and Game provided the following estimates in Table 3 of maximum sustained yields (MSY) based on historical catch trends for salmon produced in the gill net districts of Cook Inlet, i.e. the area north of the latitude of Anchor Point.

It should be noted the figures shown in Table 3 and those following reflect only minimal estimates of value to commercial fishermen and do not include the equally important additional values related to 1) license revenues, 2) taxation of salmon case pack, 3) contribution to supportive services dependent upon commerical fishing industry, 4) investments in fishing gear, vessels, fishing sites, etc.

Of significant importance in the following information is the total omission of recreational or sport fishing values associated with the Susitna River salmon resource, which is of critical importance in the most densely populated area of the state. The same values for license revenue, taxation on sporting equipment, investment in fishing equipment, etc., apply to the recreational fishing industry, and could be added to the figures presented.

Table 3. Estimated Maximum Annual Sustained Yield (MSY)

Species (salmon)	Estimated Maximum Sustained Yield 1/
Sockeye	1,700,000
Chinook	66,000
Pink	1,800,000
Chum	700,000
Coho	300,000
Total MSY	4,566,000

1/ It should be emphasized that the MSY figures are the best estimates available at this time.

Based on the above "estimates" it is anticipated that the totals presented in Table 4 are produced annually in the Susitna River basin.

Table 4. Salmon Produced for the Commercial Catch in Susitna River Basin

Species (salmon)	Estimated Number of Fish Produced Annually 1/
Sockeye	850,000
Chinook	59,400
Pink	1,530,000
Chum	630,000
Coho	210,000
Total	3,279,400

1/ Again, it should be emphasized that the total is the best estimate available.

Using average prices paid to commercial fishermen in 1975, the values to fishermen for their catch on an annual basis are presented in Table 5. Average prices per pound paid in 1975 for sockeye, chinook, pink, chum, and coho salmon were .63, .62, .36, .43, and .47 respectively.

Table 5. Average Annual Value to Fishermen 1/

Species (salmon)	Production	Average Weight	Average Price/lb.	Value to Fishermen
Sockeye	850,000	6.1	.63	$3,266,550
Chinook	59,400	25.0	.62	920,700
Pink	1,530,000	3.5	.36	1,927,800
Chum	630,000	7.4	.43	2,004,660
Coho	210,000	6.1	.47	602,070
Total Annual Value to Fishermen				$8,721,780

1/ Based on average price per pound to fishermen in 1975.

The above value does not include, of course, the value of salmon it takes to produce the estimated catch produced in the Susitna Basin. Therefore we will address this problem by using estimated return by spawner by species using the 1975 price per pound paid to fishermen as presented in Table 6.

Table 6. Value of Salmon Spawning Stock

Species	Return/Spawner	Spawners 1/
Sockeye	3.0:1	283,333
Chinook	1.0:1	59,400
Pink	3.8:1	402,632
Chum	2.2:1	286,364
Coho	2.2:1	95,455

Value of Spawners

Species	Avg. Wt.	Avg. Price	Spawners	Value
Sockeye	6.1	.63	283,333	$1,088,849
Chinook	25.0	.62	59,400	920,700
Pink	3.5	.36	402,632	507,316
Chum	7.4	.43	286,364	911,210
Coho	6.1	.47	95,455	273,670
Total Average Annual Value of Spawners				$3,701,745

1/ Spawners needed to produce annual catches shown in Table 4.

WILDLIFE

General

The dominant wildlife vegetative cover throughout the Devil Canyon and Watana impoundment area is spruce. Low bottom land along the Susitna River and the tributaries supports black spruce-aspen stands. White spruce occurs on the steep side hills in conjunction with paper birch, black spruce, and occasional stands of aspen and cottonwood. Dwarf birch is present in the rolling country on each side of the sites, while willow occurs infrequently throughout the entire area. The understory includes blueberry, lowbush cranberry, narrow-leaved Labrador tea, cranberry, fireweed, mosses and lichens.

Game populations are limited in number along the steep walls of Devil Canyon which comprise most of the area to be flooded at that site. A few moose, black and grizzly bears are present. Segments of the Nelchina caribou herd periodically range throughout the impoundment areas, particularly the Watana site.

Beaver, present in sloughs along the Susitna River, are probably the most abundant furbearers. Other species of fur animals present include land otter, mink, wolf, lynx, marten, wolverine, and muskrat.

Hunting and trapping in the impoundment areas are virtually nonexistent due to inaccessiblity and rough terrain. This situation may change as the use of snowmobiles and all terrain type vehicles increases. The steep terrain and turbulent flow make crossing the Susitna River difficult for hunters.

Dall sheep frequent the Watana Hills area but none were observed during the period November 1974 to April 1975 when surveys for moose were conducted.

Within the transmission corridor system the area of greatest concern is the area which basically parallels the highway and Tanana River from Fairbanks to Big Delta. There are several historical Peregrine falcon nesting sites along the Tanana and Salcha Rivers. The gyrfalcon is also found in limited numbers in this general area. Several nesting pairs of gyrfalcons have been recorded from the Summit Lake region along the Denali Highway to the Cantwell-Healy area of the Anchorage-Fairbanks Highway.

Two species of big-game, i.e., moose and caribou, need to be addressed in detail. The Alaska Department of Fish and Game, under contract with the Fish and Wildlife Service, conducted monthly game surveys along the Susitna River drainage from November of 1974 until April 1975.

Moose: Monthly moose distribution data indicate that movements occur on a major scale (Fig. 1). During the November survey a majority of moose observed were found at higher elevations near the timber line. By late January they had become concentrated in the lower portions of drainages, including the Susitna River, and relied heavily on browse adjacent to the river (Fig. 2). They remained along these drainages at lower elevations until late April when they began dispersing, some moving back to higher elevations with the receding snow line.

Areas of preferred or critical winter range were delineated at both the Devil Canyon and Watana reservoir sites (Table 7). Classification of each area and boundaries for each area were determined by the relative density of cumulative moose tracks observed from early winter of 1974 until April 23, 1975. The classification categories were: (1) Light use - occasional tracks with little cratering, i.e., areas where snow has been pawed aside to obtain forage, (2) Moderate use - tracks and cratering but not dense, and (3) Heavy use - tracks dense and cratering extensive (Figs. 3 and 4).

Table 7. Preferred or Critical Moose Winter Range

Category of Use	Acres Inundated
Devil Canyon - up to elevation 1,450 m.s.l.	
Light	7,040
Moderate	5,760
Heavy	0
Watana - up to elevation 2,045 m.s.l.	
Light	0
Moderate	15,360
Heavy	18,560

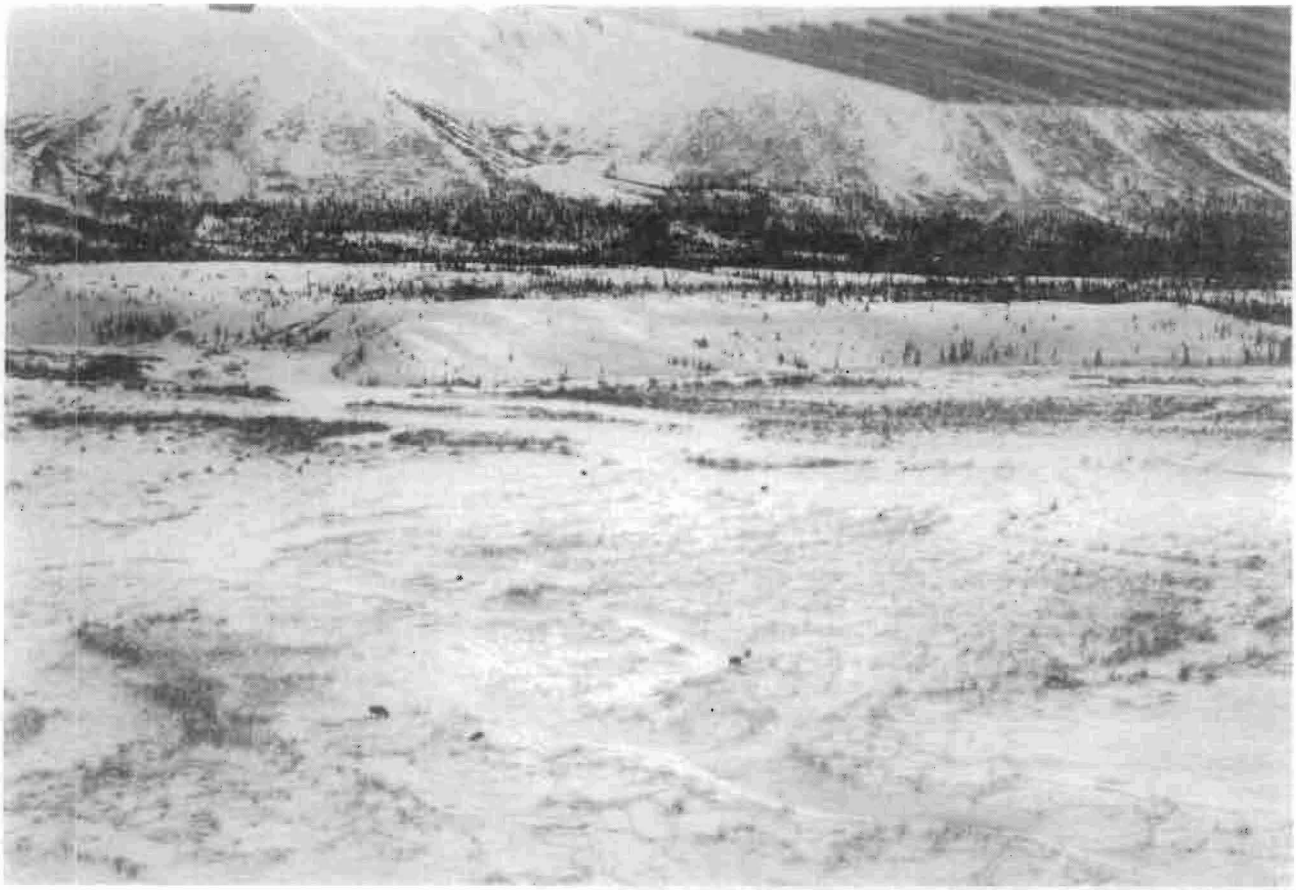


Photo by Ted Spraker, ADF&G
Winter 1974-75

Figure 1. Moose movement on a major scale resulted in the concentration of 43 moose along the Susitna River near Valdez Creek. Similar critical winter habitat exists in the Watana Reservoir site.

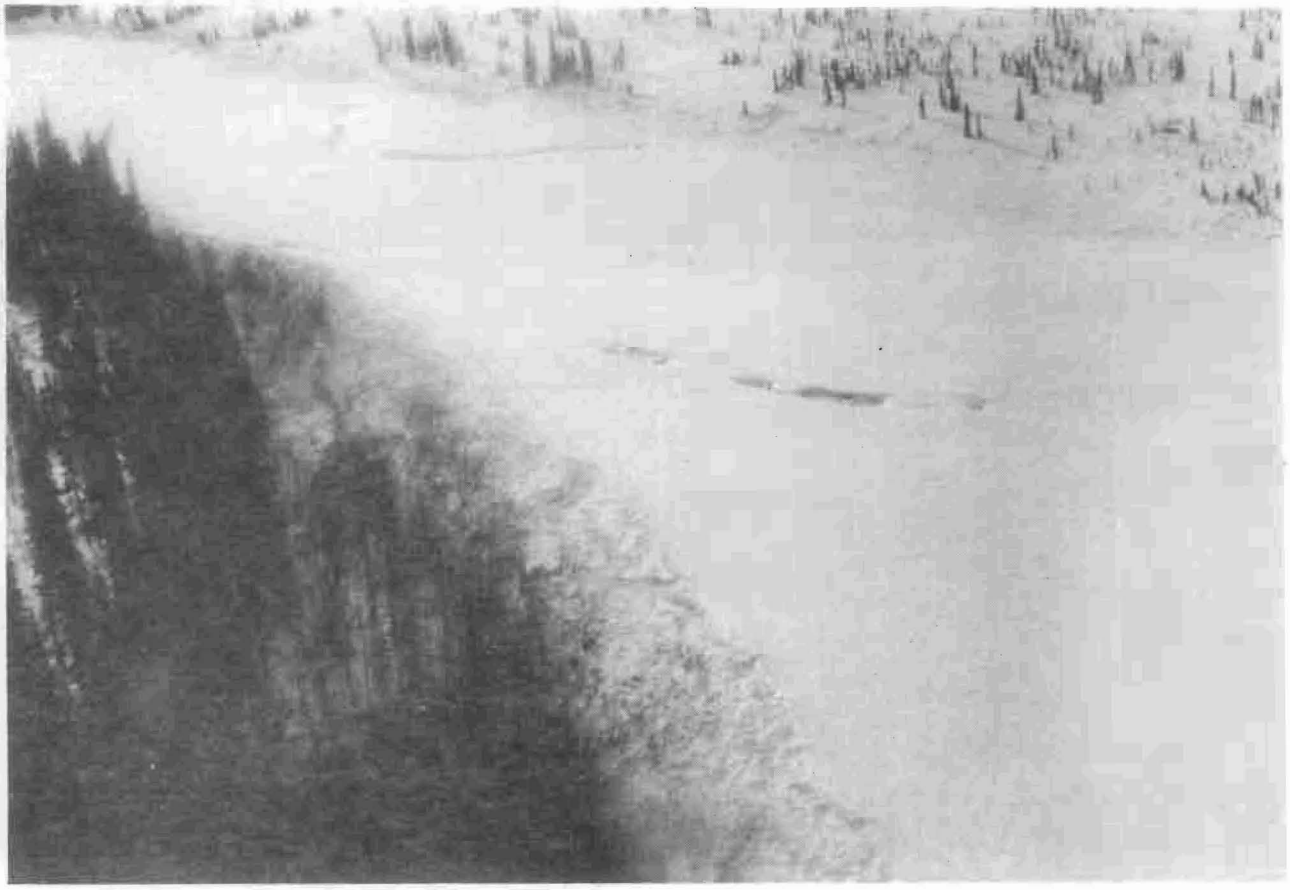


Photo by Ted Spraker, ADF&G
Winter 1974-75

Figure 2. Note heavy use of browse material along the left bank of the Susitna River.

Photo by Ted Spraker, ADF&G
Winter 1974-75

Figure 3. Close up view of moose "cratering", i.e., areas where snow has been pawed aside for forage.

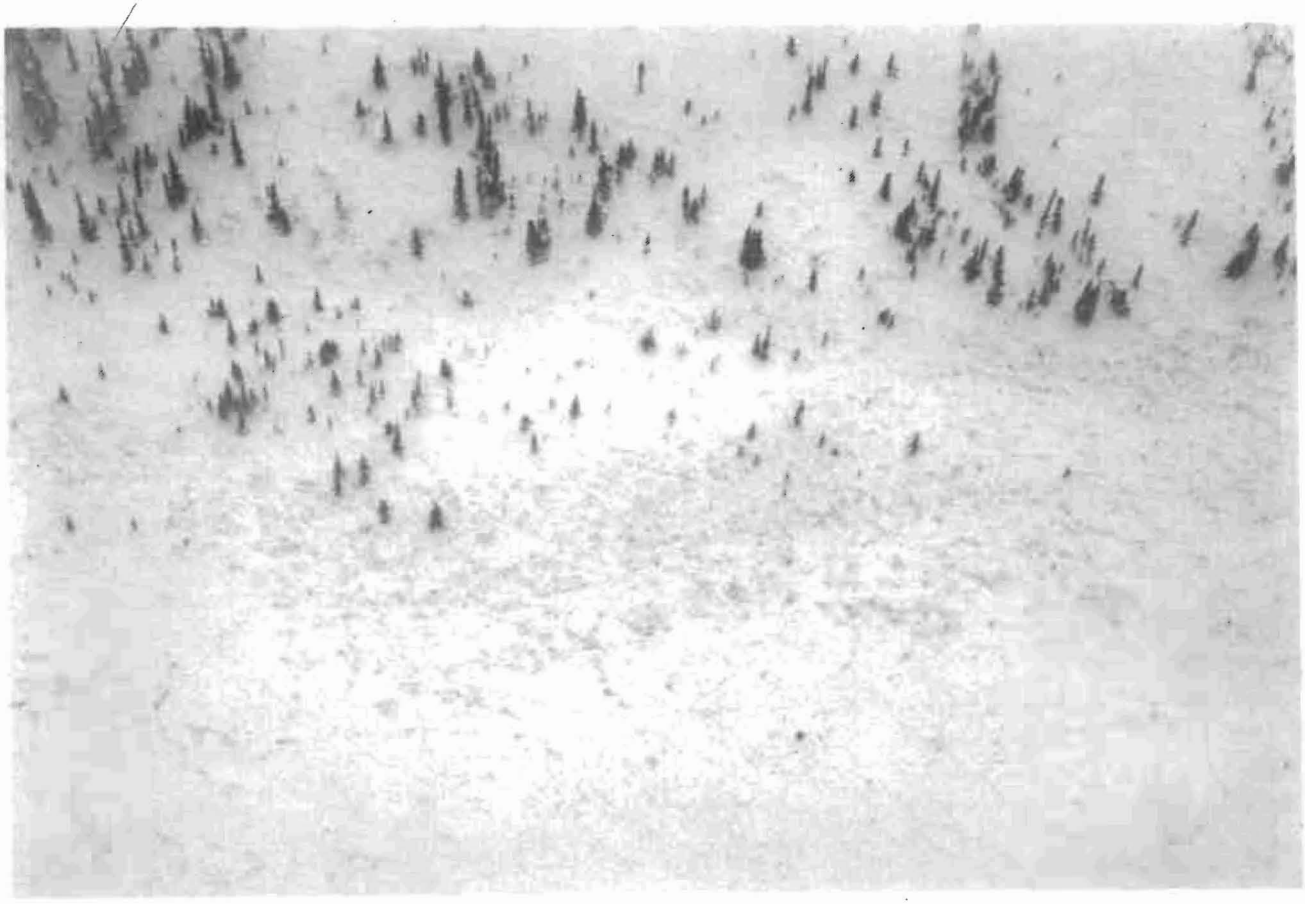


Photo by Ted Spraker, ADF&G
Winter 1974-75

Figure 4. View of typical area receiving heavy use by moose along the Susitna River. Note that tracks are dense and cratering is extensive.

Wildlife: Devil Canyon and Watana Reservoirs will inundate moose habitat consisting of 7,040 acres which receive light use, 21,120 acres of habitat which receive moderate use, and 18,560 acres of habitat which receive heavy use. The moderate and heavy use areas are considered preferred or critical habitat.

Associated with loss of moose riparian browse sites through flooding, is loss of the passage ways between preferred areas if the water or ice level is fluctuated. This problem became apparent by midwinter observation of moose tracks along the Susitna River where animals traveled from one tributary to another (Fig. 5). Locations of moose concentration remained the same throughout the midwinter surveys, but trails indicated that individuals moved from one concentration to another frequently during the winter (Fig. 5). Figure 6 shows moose moving along the Susitna River near the confluence of the Oshetna River.

Photo by Ted Spraker, ADF&G
Winter 1974-75

Figure 5. Moose tracks across Susitna River indicate movement from one area to another. Note heavily browsed area on right bank.

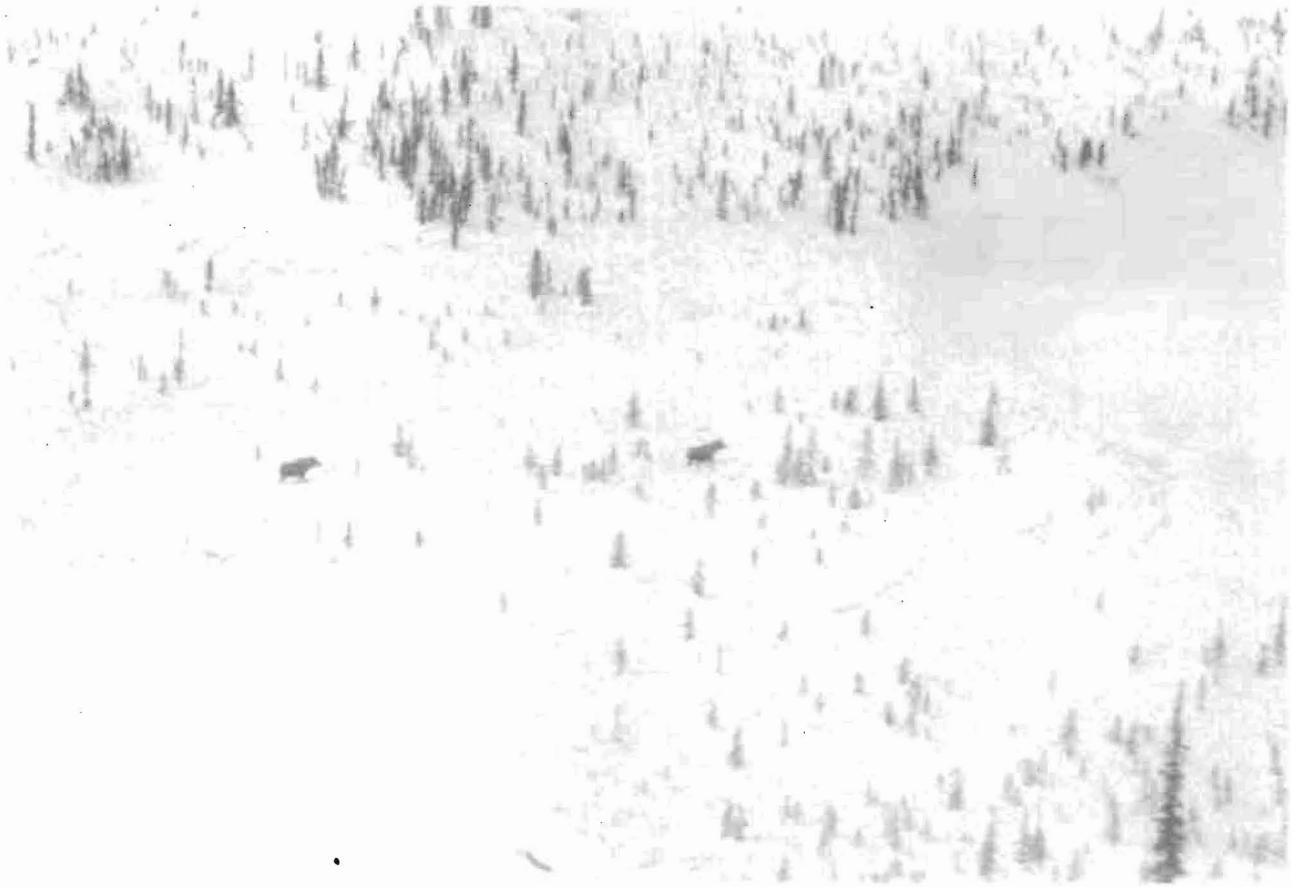


Photo by Ted Spraker, ADF&G
Winter 1974-75

Figure 6. Moose movement along the Susitna River near the confluence of the Oshetna River. This habitat area will be inundated by the Watana Reservoir.

The total acreages of moose winter range below elevations shown in Table 2 at the Devil Canyon and Watana sites by light, moderate, and heavy use categories are 7,040; 21,120; and 18,560 respectively.

Caribou: Use of the Watana Reservoir site by Nelchina caribou for grazing and crossing was minimal during the period November 1974 through April 1975. Deeply rutted caribou trails crossing the Susitna River north of Watana Mountain were observed. Caribou observed wintering north of the Susitna River during the November 1974 survey may have crossed the Susitna River to reach their traditional calving grounds near Kosina Creek. If observations had been made in May, June, July and August, it is likely an entirely different migrational pattern of major caribou crossings may have been indicated.

The use of the Susitna River in the vicinity of Devil Canyon and Watana damsites by Nelchina caribou for grazing and crossing was minimal during the period November 1974 through April 1975. Deeply rutted trails of historic crossing sites along the Susitna River were observed, however. Caribou seen wintering north of the Susitna River during the November 1974, survey may have crossed the Susitna River to reach their traditional calving grounds near Kosina Creek. Fluctuating water or ice levels associated with Watana Dam could disrupt movements across the Susitna River with unpredictable effects.

The Watana Hills Dall sheep herd was not observed close to areas that would be inundated by Watana reservoir. No direct effects on these sheep are expected, although indirect effects due to improved hunter access may well occur.

Increased hunting pressure on big game through creation of access corridors is a major effect foreseen by construction of these dams. Moose in the vicinity of the Devil Canyon and Watana Creek Dams are lightly hunted now because of poor access. Loss of the sanctuary area (the uninhabited, lightly-hunted core) of the Nelchina caribou's range may result in displacement of the herd from some of its essential habitat due to increased human activity on that habitat. Hunting regulations may be modified by the Alaska Department of Fish and Game. The road corridor plus limited river crossing area may prevent movements across the Susitna River. Improved access will result in increased harvest potential and the need for more intensive management.

Loss of winter range for moose, loss of the river corridor for moose movement during the winter, disruption of caribou movements by fluctuation of water/ice levels or transportation corridors, increased hunting pressure on all big game, and increased human activity on key caribou range are some of the problems that may result from construction of dams on the Susitna River. The Watana Dam and any other dams upstream will have substantial effects, while the Devil Canyon Dam will probably be mild in its impact on big game.

EFFECTS OF THE PROJECT ON FISH AND WILDLIFE RESOURCES

Fish: Devil Canyon and Watana Reservoir will inundate about 82 miles of the Susitna River and tributary streams which support existing populations of grayling, Dolly Varden, whitefish, burbot, suckers, and cottids. Grayling and Dolly Varden are found primarily in clear water areas where tributaries join the Susitna River. It is anticipated that both Devil Canyon and Watana Reservoirs will be turbid. Stream fishing potential and production on inundated portions of these tributaries will be eliminated. It is unknown at this time if significant fisheries can be developed in the reservoirs because of the anticipated turbidity and glacial characteristics of the water in the Upper Susitna Basin. Devil Canyon Reservoir affords the best opportunity for the development of a sport fishery as it will be less turbid and more stable than the Watana Reservoir.

A significant portion of the salmon found in Cook Inlet utilize the Susitna River and its tributaries below the Devil Canyon damsite for spawning and rearing. At the present time the Susitna is relatively clear in the winter and turbid in the summer. With the project in operation, the river is expected to be more turbid in the winter and less turbid in the summer. Other changes expected with the project which may have an adverse impact on fish resources including mortality are: (1) altering the natural seasonal flow (reduced summer flows and increased winter flows), (2) changes in natural seasonal water quality (the possibility of supersaturation of certain dissolved gases such as nitrogen as a result of spillage), (3) dewatering of the clearwater sloughs adjacent to the river), (4) thermal changes, and (5) increased winter turbidity with attendant adverse impacts on resident and anadromous fish movement into the mainstem of the Susitna River.

It is anticipated that with the project in operation fishing pressure on the Susitna River below Devil Canyon Dam may increase. Sufficient operational data are not available at this time to determine the magnitude of releases, and the resulting fluctuations in river flows. Conceivably, larger releases could create a hazard for fishermen and have an adverse impact on fish production. If later studies reveal such a possibility, the need for a downstream regulating facility should be considered.

The Susitna River salmon resource has been of economic value to a commercial fishery since the late 1800s. In more recent years, it has played an important additional role in providing extensive recreational fishing opportunity in Southcentral Alaska.

The degree to which these important industries can be affected is totally related to the possible degree of loss which may be incurred as a result of this project.

The possibility exists that some loss to the fishery resource could occur as a result of the project. Loss of Susitna River salmon stocks could contribute to losses of (1) taxes and license revenues, (2) economic hardship or loss of fish processing plants, (3) economic loss to fisherment, (4) loss of revenues by supportive services and businesses, (5) loss of capital investments as fisheries are restricted or closed, etc.

Most of these effects would be felt by both the sport and commercial industries. The potential loss to the economy of Southcentral Alaska through construction of this project could be many times greater than the estimated figures depicted on pages 10 and 11.

Wildlife: Devil Canyon and Watana Reservoirs will inundate moose habitat consisting of 7,040 acres which receive light use, 21,120 acres of habitat which receive moderate use, and 18,560 acres of habitat which receive heavy use. The moderate and heavy use areas are considered preferred or critical winter habitat.

Associated with loss of moose riparian browse sites through flooding, is loss of the passage ways between preferred areas if the water or ice level is fluctuated. This problem became apparent by midwinter observation of moose tracks along the Susitna River where animals traveled from one tributary to another. Locations of moose concentration remained the same throughout the midwinter surveys, but trails indicate that individuals moved from one concentration area to another frequently during the winter. Flow regulation below Devil Canyon Dam may create successional changes in the riparian browse areas with adverse effects to moose.

The use of the Susitna River in the vicinity of Devil Canyon and Watana damsites by Nelchina caribou for grazing and crossing was minimal during the period November 1974 through April 1975. Deeply rutted trails of historic crossing sites along the Susitna River were observed, however. Caribou seen wintering north of the Susitna River during the November 1974, survey may have crossed the Susitna River to reach their traditional calving grounds near Kosina Creek. As we pointed out earlier, if observations had been made in May, June, July and August, it is likely an entirely different migrational pattern may have been observed. Fluctuating water or ice levels associated with Watana Dam could disrupt movements across the Susitna River with unpredictable effects.

The Watana Hills Dall sheep herd was not observed close to areas that would be inundated by Watana Dam. No direct effects on these sheep are expected, although indirect effects due to improved hunter access may well occur.

Increased potential hunting pressure on big game through creation of access corridors is a major effect foreseen by construction of these dams. Moose in the vicinity of the Devil Canyon and Watana Creek Dams are lightly hunted now because of poor access. Loss of the sanctuary area (the uninhabited, lightly-hunted core) of the Nelchina caribou's range may result in stricter hunting regulations in order to properly manage the resource. The road corridor plus limited river crossing area may prevent movements across the Susitna River.

Loss of winter range for moose, loss of the river corridor for moose movement during the winter, disruption of caribou movements by fluctuation of water/ice levels or transportation corridors, increased hunting pressure on all big game, and increased human activity on key caribou range are some of the problems that may result from construction of dams on the Susitna River. The Watana Creek Dam and any other dams upstream will have substantial effects, while the Devil Canyon Dam will probably be mild in its impact on big game.

Birds: Bald eagles, golden eagles, owls, falcons, and various species of hawks are found throughout the entire Susitna River basin. The Fish and Wildlife Service conducted a survey in June of 1974 and found that the population densities of cliff-nesting raptors were low between the Devil Canyon site and the Oshetna River. Several nesting pairs of gyrfalcons and bald eagles were observed in or near the canyons of the upper Susitna River. No endangered species of peregrine falcons, arctic or American, are known to nest along the upper Susitna River, although peregrines have been sighted during migration periods in the Broad Pass and Chulitna River areas.

Unknown numbers of spruce grouse, willow ptarmigan, and rock ptarmigan are found within the project area. Songbirds, shorebirds, and other small birds are found throughout the entire Susitna River basin, but the project is not expected to have a serious impact on these resources.

Waterfowl of various species are found in small numbers along the Susitna River during the nesting season. The Susitna River drainages provide a migratory corridor. Impoundments created by Devil Canyon and Watana dams may provide concentration or resting areas for birds prior to their migration south.

Recommendations:

1. The project be designed, constructed and operated in such a manner as to provide water releases or a flow regime below Watana and Devil Canyon Dams of suitable temperature and water quality, to preserve existing downstream fish resources. Sufficient detailed hydraulic and biological information is not available at this time to determine the above requirements. Should the flow requirements and water quality needed to preserve the existing downstream fish resources not be obtainable or that the fish resources are lost as a result of the project construction or operation, artificial propagation facilities will be required at project cost. In the event that adequate natural reproduction fails to occur in the tributary streams to the reservoir areas, a stocking program will be required at project expense. Costs of appropriate studies, design, construction, operation and maintenance of the facilities should be authorized as a project cost. The design and location of the artificial propagation facilities should be developed cooperatively with the Fish and Wildlife Service, Alaska Department of Fish and Game, National Marine Fisheries Service and the Corps of Engineers. The facility would be operated by the Alaska Department of Fish and Game.

2. If fluctuations of discharge flows below Watana and Devil Canyon Dams create a public hazard or are detrimental to the maintenance of downstream fish resources, a regulating dam and reservoir will be required.

3. Provide safe and convenient access for fishermen to project facilities for recreational purposes.

4. The report of the District Engineer include the preservation, propagation and management of fish and wildlife resources among the purposes for which the project will be authorized.

5. Project lands be acquired in accordance with Joint Army-Interior Land Acquisition Policy for Water Resource Projects.

6. Leases of Federal land in the project areas reserve the right of free public access for hunting and fishing.

7. All project lands and waters at the Devil Canyon and Watana Reservoirs which are not designated for recreation, safety, and efficient operation be dedicated to use for fish and wildlife management in accordance with the provisions of a General Plan prepared pursuant to Section 3 of the Fish and Wildlife Coordination Act. These lands and waters should be made available to the Alaska Department of Fish and Game for management.

8. Detailed biological studies of fish and wildlife resources affected by the project be conducted jointly during pre- and post-authorization periods by the U. S. Fish and Wildlife Service, Alaska Department of Fish and Game, National Marine Fisheries Service, and the Corps of Engineers. These studies shall be allocated as a joint cost among project purposes.

9. The U. S. Fish and Wildlife Service and the Alaska Department of Fish and Game investigate portions of the Upper Susitna River Basin and other areas as replacement habitat for losses caused by the proposed project. The areas delineated should be covered by a General Plan prepared pursuant to Section 3 of the Fish and Wildlife Coordination Act. Operation, maintenance and replacement costs shall be authorized as a project cost.

10. A reservoir clearing plan and a reservoir recreational zoning plan be developed, as necessary, to insure that certain areas, or certain periods, are available for fishing, hunting, and other fish and wildlife purposes without conflicting uses. These plans shall be developed cooperatively by the U. S. Fish and Wildlife Service, Alaska Department of Fish and Game, Corps of Engineers, and Bureau of Outdoor Recreation.

11. To produce the least potential adverse impact on raptors, the transmission lines should be placed along the west side of the Parks Highway.

12. Section of road right-of-ways, borrow areas, and related construction operations be planned in cooperation with the U. S. Fish and Wildlife Service, Alaska Department of Fish and Game, Bureau of Outdoor Recreation, and the Corps of Engineers, so as to minimize damage to fish and wildlife and other recreational resources.

We request that the recommendations in this report be included in your report for authorization.

We appreciate the opportunity to comment on this project and should like to be notified of changes in project plans as they occur.

Sincerely,

Acting Area Director

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

JAY S. HAMMOND, GOVERNOR

333 RASPBERRY ROAD
ANCHORAGE 99502

October 8, 1975

Gordon Watson, Area Director
Fish & Wildlife Service
U. S. Department of the Interior
813 D Street
Anchorage, Alaska 99501

Dear Mr. Watson:

The Southcentral Railbelt, Upper Susitna River Basin Hydroelectric Report prepared by your agency has been reviewed by this department.

The Alaska Department of Fish and Game concurs with the contents of the report, with minor exceptions.

We have compiled a list of suggested changes and/or corrections and submitted them directly to Mr. Ivan Harjehausen of your office through our Anchorage Susitna River project coordinator. Your attention to these comments is requested.

This department would once again like to emphasize the very great need for continuation of existing, and initiation of new studies, to further define the impacts to fish and wildlife.

If we may be of further assistance in finalization of your report, feel free to contact us.

Sincerely,

James Brooks, Commissioner
Department of Fish and Game

Larry J. Heckart

By: Larry J. Heckart
ADF&G Coordinator
Department of Fish and Game

LJH:mk

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

October 8, 1975

Mr. Gordon W. Watson
Director, Alaska Region
Fish and Wildlife Service
813 D Street
Anchorage, AK 99501

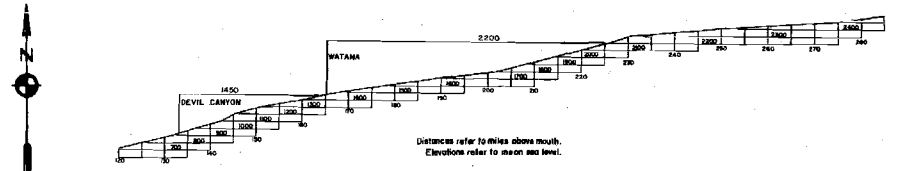
Dear Mr. Watson:

The National Marine Fisheries Service has received your draft final report "South Central Railbelt Area, Upper Susitna River Basin Hydroelectric Project, Two Dam Plan" for review and comment.

We concur with the recommendations as outlined in the "Plan of Development for Fish and Wildlife Resources." We note, however, that results of current studies concerning sport and commercial fisheries are not available for this report. We, therefore, expect to make later comments and offer further recommendations pending conclusion of these studies.

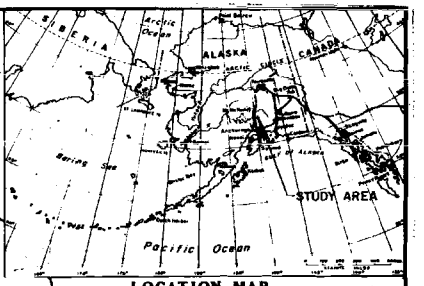
Sincerely,

for Harry L. Rietze
Director, Alaska Region



UPPER SUSITNA RIVER PROFILE

RIVER MILES 120-290



LOCATION MAP

BASIN BOUNDARY

To Cantwell

West Fork

East Fork

Valdez Creek

DENALI

Windy Creek

Butte Creek

Denali Highway

To Paxson

To Fairbanks

Anchorage - Fairbanks Highway

Alaska RR

Devil Canyon Access Road (Proposed)

Portage Creek

Devil Creek

DEVIL CANYON DAMSITE

Tsusena Creek

Deadman Creek

Watana Creek

MACLAREN RIVER

Coal Creek

Jay Creek

GOLD CREEK

Chacachatna Creek

Fog Creek

SUSITNA

WATANA DAMSITE

Watana Access Road (Proposed)

SUSITNA RIVER

Kosina Creek

RIVER

TYONE

RIVER

BASIN BOUNDARY

Tyone Lake

RIVER

Susitna Lake

OSHETNA

Lake Louise

TALKEETNA

SCALE

0 5 10 15 20 Miles

Lake Louise Road

To Glenn Highway

To Anchorage

SOUTHCENTRAL RAILBELT AREA, ALASKA

UPPER SUSITNA RIVER BASIN

TWO DAM PLAN

U. S. DEPARTMENT OF INTERIOR

FISH AND WILDLIFE SERVICE

OCTOBER 1975

CORPS OF ENGINEERS BASE MAP