UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Arnie J. Suomela, Commissioner

PROGRESS REPORT
1957 FIELD INVESTIGATIONS
DEVIL CANYON DAM SITE AND RESERVOIR AREA
SUSITNA RIVER BASIN.

STATE OF ALASKA

Juneau, Alaska
April 1959
For Administrative Use Only

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INTRODUCTION

1. Interest in the Susitna River Basin, a potential source of hydroelectric power for south-central Alaska, is intense and should become more so as population, industry, and national defense create needs for more power (Fig. 1). The Susitna River, about 275 miles long, originates in the Alaska Range, flows to the southwest, and empties into Cook Inlet near Anchorage. The few human inhabitants in the 19,300 square mile drainage area are concentrated in the Lake Louise area and along the Alaska Railroad which runs north and south bisecting the basin and paralleling the Susitna River from 44 to 122 miles above its mouth. A few roads on the fringes of the area provide opportunities for other means of mechanized ground travel.

2. The eastern one-third of the basin probably furnishes over half the range for the Nelchina caribou herd. Censusing in 1955 indicated a population of about 40,000. These animals, which are reasonably close to population centers and accessible from time to time to hunters with automobiles, swamp buggies, and tractors as means of transportation, furnish more sport hunting than any other caribou herd in the State. Moose, fairly abundant throughout the basin, provide hunting along the railbelt and the few roads and elsewhere to hunters with airplanes and boats. Other big game present and furnishing a limited amount of hunting are Dall sheep, mountain goat, black bear, grizzly bear, and brown bear.

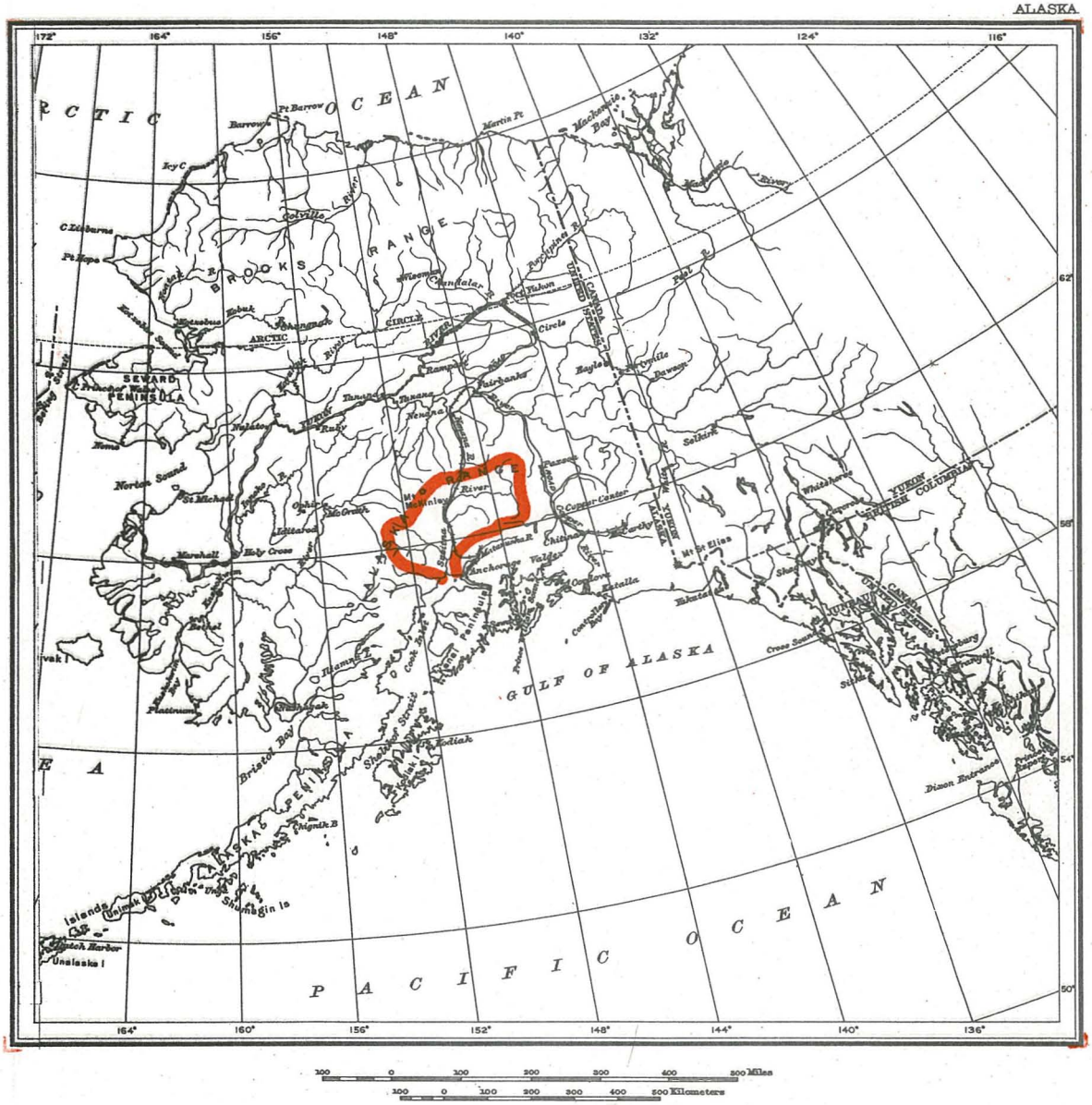


Figure 1. Susitna River Basin, Alaska (Location map)

3. Ptarmigan, spruce grouse, and snowshoe hare, all of whose numbers fluctuate periodically, are found throughout the region. Some waterfowl use the area for nesting as well as for resting during migration. Hunting for these species is limited by inaccessibility.

4. Fur bearers present are beaver, mink, muskrat, red fox, weasel, lynx, otter, wolverine, wolf, and coyote. Harvest of these species varies depending on current fur prices and availability.

5. The Susitna River watershed provides spawning grounds for a substantial portion of the salmon which are taken commercially in Cook Inlet. Estimated percentages of the annual pack contributed by the Susitna River production by species during the 10-year period, 1946 through 1955, are as follows:

Red salmon	39%
King salmon	19%
Pink salmon	20%
Coho salmon	14%
Chum salmon	8%

These figures are computed from estimates furnished by John Skerry, Fishery Management Supervisor for Cook Inlet District, and data in the Fishery Report for Kenai Peninsula (1957).

6. The Bureau of Reclamation (1952) has described 19 potential dam sites for ultimate hydroelectric power development of the Susitna Basin. Results of ensuing preliminary Fish and Wildlife Service investigations were presented in three reports issued during 1952 and 1954.

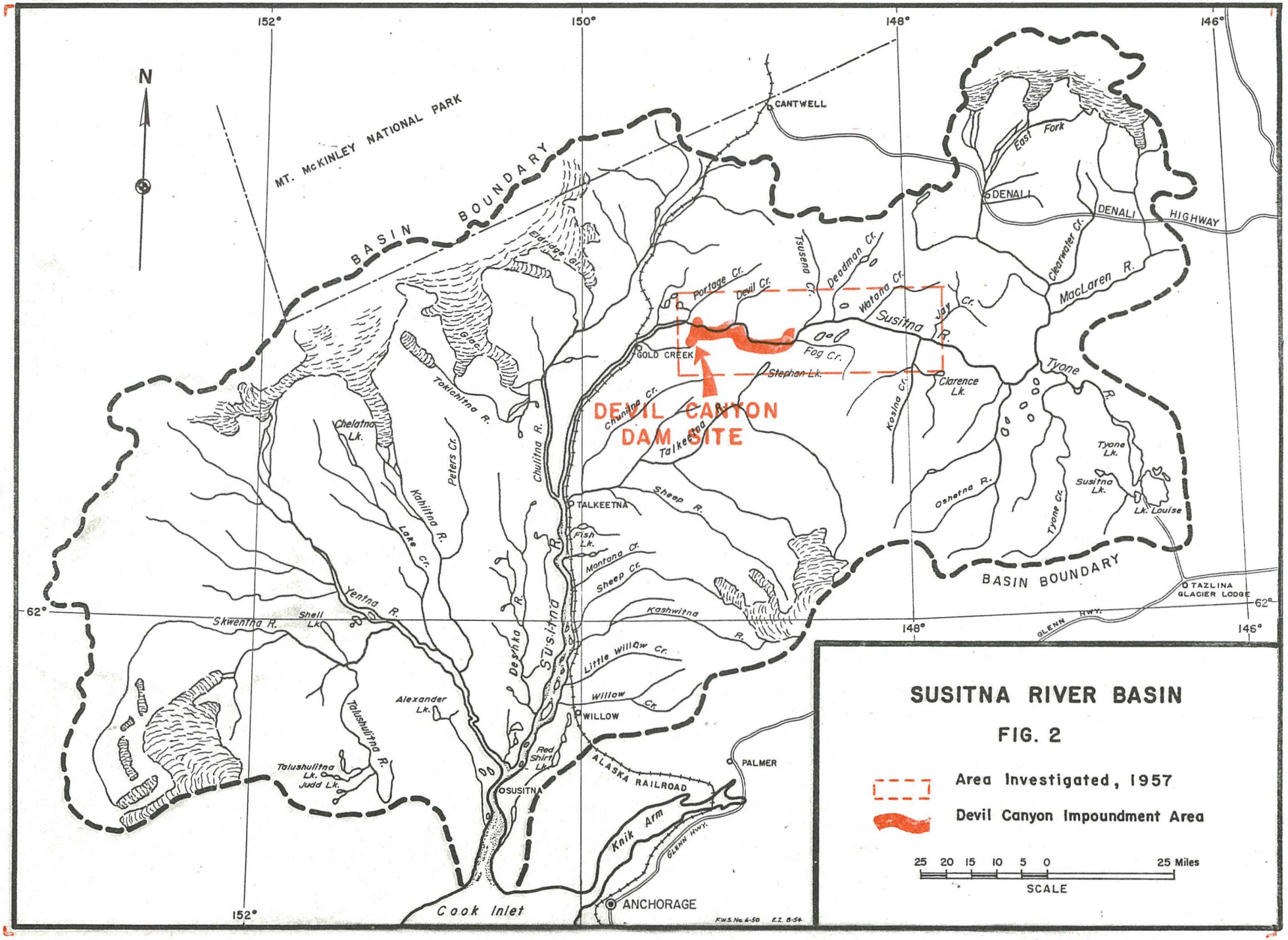
7. The Devil Canyon site has been selected by the Bureau of Reclamation for initial development. Located 134 miles above the river's mouth and 12 miles above Gold Creek railroad station, the site is about midway between the population centers of Anchorage and Fairbanks (Figs. 2 and 4).

8. The dam would be a concrete arch-gravity structure about 500 feet high with a crest length of 1,100 feet. A power plant located at the foot of the dam would have a capacity of 232,000 KW and annual firm output of 1,150,000,000 KW-hours.

9. The reservoir, 25 miles long and between one-half and three-fourths miles wide, would have a total capacity of 2,930,000 acre-feet of which 1,950,000 acre-feet would be available for power storage capacity. These figures are based upon development without upstream storage reservoirs. Complete data for the Devil Canyon project alone and in conjunction with upstream reservoirs are presented in the Bureau of Reclamation Susitna Basin Report (1952).

OBJECTIVES

10. The overall objective of the River Basin Studies investigations was to determine the effects of a dam and impoundment on the fish and wildlife resources of the area with primary emphasis on whether a dam would affect significant runs of anadromous fish. In order to meet these


N
152°
150°
148°
146°
62°
MT. McKINLEY NATIONAL PARK
BASIN BOUNDARY
CANTWELL
East Fork
DENALI
DENALI HIGHWAY
Clearwater Cr.
MacLaren R.
Tsusena Cr.
Deadman Cr.
Portage Cr.
Devil Cr.
Watana Cr.
Jay Cr.
Susitna R.
Fog Cr.
Stephan Lk.
GOLD CREEK
DEVIL CANYON DAM SITE
Clarence Lk.
Kosina Cr.
Tyone R.
Tyone Lk.
Susitna Lk.
Lk. Louise
Oshetna R.
Tyone Cr.
BASIN BOUNDARY
TAZLINA GLACIER LODGE
GLENN HWY.
Eldridge Gl.
Toklatna R.
Chelatna Lk.
Peters Cr.
Kahiltna R.
Lake Cr.
Yentna R.
Skwentna R.
Shell Lk.
Chulitna R.
Churitna Cr.
Talkeetna R.
TALKEETNA
Sheep R.
Fish Lk.
Montana Cr.
Sheep Cr.
Kashwitna R.
Little Willow Cr.
Willow Cr.
WILLOW
Deshka R.
Susitna R.
Alexander Lk.
Talushultna R.
Talushultna Lk.
Judd Lk.
Red Shirt Lk.
SUSITNA
ALASKA RAILROAD
PALMER
Knik Arm
GLENN HWY.
ANCHORAGE
Cook Inlet
F.W.S. No. 6-50 E.I. 8-54
SUSITNA RIVER BASIN
FIG. 2
Area Investigated, 1957
Devil Canyon Impoundment Area
25 20 15 10 5 0 25 Miles
SCALE

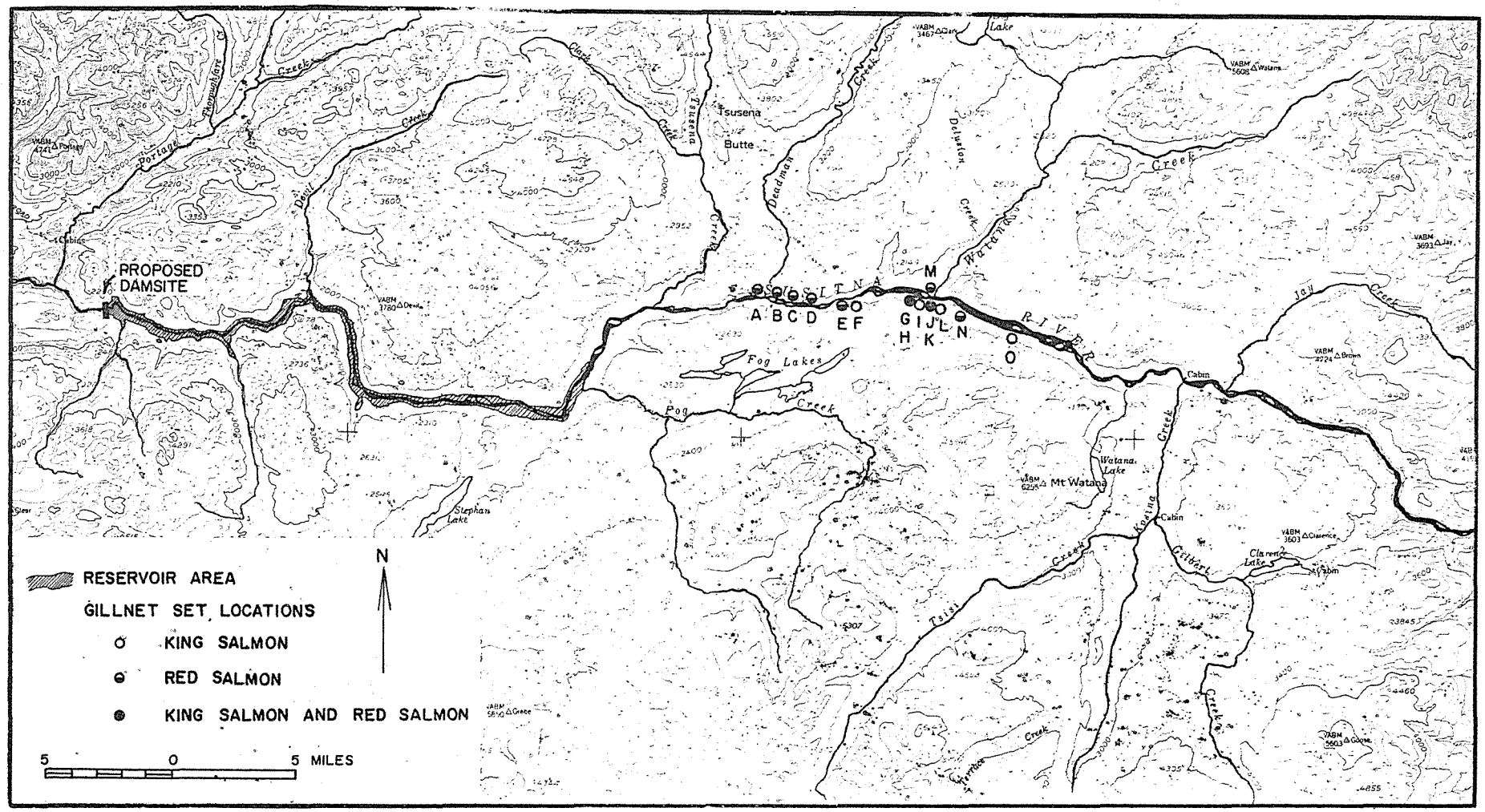
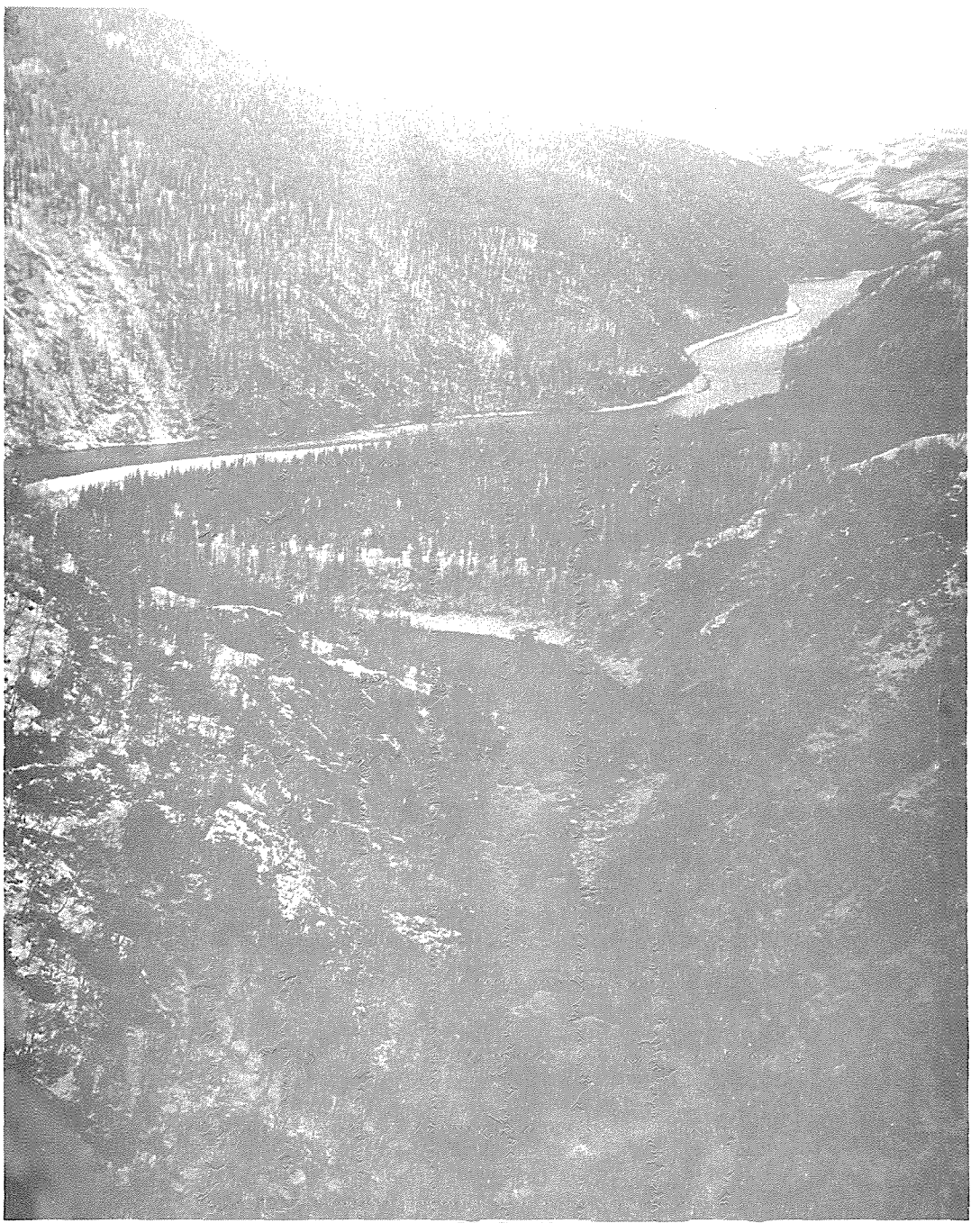


Figure 3. The Susitna River from Portage to Jay Creek. This section contains the proposed Devil Canyon dam site and 1957 area of investigation.



U.S. Bureau of Reclamation photo

Figure 4. Aerial view of Devil Canyon dam site (lower foreground) and reservoir area above.

objectives, a two-year study was initiated. The work during the 1956 field season was devoted to test netting in the Susitna River and its tributaries immediately below the dam site, and at Jay Creek, 55 miles above the dam site. From this work it was determined that there was a possibility of a limited number of salmon passing through Devil Canyon to spawn. Complete findings may be found in the 1956 Field Investigations Progress Report (1957).

11. The primary objective of the 1957 program was to test net above the dam site to further determine if anadromous fish were passing through Devil Canyon. Incidental to this, information was to be gathered on other fish and game species.

DESCRIPTION OF AREA

12. The area investigated during the summer was the Susitna River and tributaries from Deadman Creek to Jay Creek, inclusive. The lower end of this 20-mile section is about $8\frac{1}{2}$ miles above the upper end of the Devil Canyon impoundment area, (Figs. 2 and 3). This area was chosen for study because it contains more potential spawning streams; also, logistics would be less difficult than in the 25-mile long proposed impoundment area. The two areas are believed sufficiently similar that data obtained for resident fish and game populations and game utilization on the study area are applicable to the impoundment area.

13. Stream bottoms and low river bottoms support black spruce-aspen stands. White spruce occurs on the steep side hills in conjunction with paper birch, scrub birch, black spruce, and occasional stands of aspen and cottonwood. Scrub birch is present in the rolling country on each side of the canyon. Willow occurs infrequently throughout the entire study area. Understory includes blueberry, low-bush cranberry, narrow-leafed Labrador tea, crowberry, fireweed, mosses, and lichens.

METHODS

14. Fifteen gill nets, 6 feet in depth and averaging 28 feet in length, were set in the 10-mile section of the Susitna River from the mouth of Deadman Creek to 3 miles above the mouth of Watana Creek (Fig. 3 and Table 1). Six of these sets were of $8\frac{1}{2}$-inch mesh king salmon web; nine sets were of $5\frac{1}{2}$-inch mesh red salmon web. The nets were set with one end anchored and one end free in eddies of the Susitna River and at the mouths of Deadman and Watana Creeks, both potential salmon spawning streams. The first set was made on June 16. Each net was checked on the average of every seven days. A boat accident and the subsequent loss of equipment limited field work to the extent that no nets were checked from July 10 to 22. Nets were removed August 28 and 29 resulting in a total of 7,314 fishing hours [1/] (4,320 with $8\frac{1}{2}$-inch web; 2,994 with $5\frac{1}{2}$-inch web). Although hampered somewhat by fluctuating

1/ 1 fishing hour = 1 gill net fished for 1 hour.

water levels, the gill nets fished with a satisfactory degree of efficiency.

Table 1. Gill Net Sets, Susitna River, 1957

Location No. (Fig. 3)	Dates Fished	Hours Fished $8\frac{1}{2}$" mesh (king web)	Hours Fished $5\frac{1}{2}$" mesh (red web)	Fish Taken
A	July 3- July 4		24	None
	July 7- July 10		72	None
B	July 27- July 30		72	None
C	July 6- July 29		552	None
D	July 28- July 29		24	None
E	June 23- July 11		252	None
F	June 20- June 26	144		None
G	June 20- August 30	1,704		None
H	July 28- August 2		120	None
I	July 24- July 25	24		None
J	July 22- August 1		240	None
K	July 24- July 25	24		None
L	July 24- August 30	888		None
M	July 29- August 29		744	None
N	June 16- July 21		894	None
O	June 27- August 30	1,536		None
	Totals	4,320	2,994	
	Grand Total	7,314 hours		None

15. Ten small fish collections were made (Table 2). Seven of these were from the mouth of Watana Creek, one from Watana Creek two miles upstream from its mouth, one from the Susitna River one mile below Watana Creek, and one from the mouth of Deadman Creek.

16. The lower portions of Deadman, Watana, and Kosina Creeks were surveyed periodically throughout the summer for evidence of

Table 2. Summary of 10 small fish collections, Susitna River Basin, 1957.

PERMANENT FISH AND WILDLIFE SERVICE COLLECTION NUMBER	DATE	LOCATION	METHOD OF CAPTURE	SPECIES					
				Catostomus catostomus (Forster) Northern sucker	Cottus cognatus (Richardson) Sculpin	Coregonus cylindraceus (Pallas) Whitefish	Coregonus lavaretus pidschian (Gmelin) Whitefish	Thymallus arcticus signifer (Richardson) Grayling	Lota lota leptura (Hubbs & Schultze) Burbot
RB57-1	6/25/57	Mouth of Watana Creek	Seine	X	X		X	X	
RB57-2	6/21/57	Mouth of Deadman Creek	Seine, Rod & Reel				X	X	
RB57-3	7/21/57	Watana Creek 2 miles upstream from mouth	Rod & Reel					X	
RB57-4	7/26/57	Mouth of Watana Creek	Seine	X	X	X	X	X	
RB57-5	8/1/57	Mouth of Watana Creek	Seine			X	X	X	
RB57-6	7/6/57	Mouth of Watana Creek	Seine	X		X		X	X
RB57-7	7/8/57	Mouth of Watana Creek	Seine	X		X			X
RB57-8	7/11/57	Mouth of Watana Creek	Seine	X	X	X	X		
RB57-9	7/17/57	Mouth of Watana Creek	Seine	X		X	X		X
RB57-10	not recorded	Susitna River 1 mile below Watana Creek	(not recorded)			X		X	

anadromous and resident fish. Descriptions of physical characteristics of the streams were obtained during these surveys.

17. Wildlife observations were made while traveling and working on the river. The area between Deadman and Watana Creeks was covered intensively on foot, and wildlife species and range conditions were noted.

18. During the winter three aerial surveys were made to determine species and numbers of game animals on and adjacent to the reservoir area. A super-cub was used on January 21, 1958, and a Pacer on February 12 and March 11. Three parallel transects the length of the impoundment area on the first flight and two transects on succeeding flights, resulted in nearly complete coverage of the area each time.

FINDINGS

Fishery Investigations

19. No fish were taken in gill nets during their 7,314 fishing hours. About 4,300 hours of this fishing was with $8\frac{1}{2}$-inch mesh net and about 3,000 hours with $5\frac{1}{2}$-inch mesh net. Fishing efficiency of the nets declined from July 10 to July 22, when a boat accident and loss of equipment prevented their being tended. Unfortunately, this occurred at a time corresponding to the period July 7 to 17 of the previous year when king salmon were netted in the Portage Creek area about 35 miles downstream. However, had appreciable numbers of king salmon come upstream during this

time, it is believed late-running fish would have been taken after July 22, when nets were again fishing effectively. The nets were fished until August 29. During the previous year, all species of salmon, other than king, were taken below the dam site between August 19, when red nets were first set, and August 29.

20. No downstream migrant or temporarily resident young salmon or steelhead were present in ten fish collections obtained in Watana Creek, Deadman Creek, and the Susitna River (Table 2). No evidence of salmon or steelhead was found by walking the lower portions of Deadman, Watana, Kosina, and Jay Creeks during August. Michael Boddner, a homesteader in the Gold Creek area who is familiar with the Susitna River and its major tributaries, has never observed salmon above the proposed dam site.

21. There are two unverified reports of salmon above the dam site. Two sportsmen interviewed during August supposedly identified head bones and other skeletal structures found in the spring of the year near Jay Creek as belonging to salmon. A Bureau of Reclamation employee reported seeing salmon late in July or early August at the mouth of a small tributary which enters the Susitna River from the south about 3/4 mile above the dam site. The fish were not identified as to species, but salmon which might have traveled above the dam site at that time would probably have been chums or kings.

22. Lack of success in netting adult salmon or seining immature salmon, or in finding evidence of salmon in clear tributary streams indicates that during the summer of 1957 few salmon spawned above the dam site.

Stream Surveys

23. Deadman Creek, about 30 miles long, is a clear stream bordered by spruce, cottonwood, willow, and alder. Numerous pools and a bottom with many rocks and large boulders characterize the lower section. Air and water temperatures, respectively, were 65.0°F. and 53.5°F. on June 21; 71.0°F. and 54.0°F. on June 30. Aquatic and terrestrial insects were abundant. Schools of grayling were seen in its frequent pools. Grayling and whitefish (Coregonus lavaratus pidschian) were seined at the creek's mouth.

24. Watana Creek is about 20 miles long and 1 to 5 feet deep. Water flow at the mouth, where it is about 40 feet wide and 1 to 2 feet deep, was 150 to 160 c.f.s. (metered flow) on August 5. Its waters are clear and green-tinged. Bottom material includes gravel suitable for salmon spawning. Occasional deep pools are interspersed with many riffle areas and slide areas are present on the west bank. The stream exhibits marked fluctuations in water level. Mean of water temperatures recorded daily between 8:00 and 10:00 a.m. from June 20 to August 30 was 52.0°F. Mean of corresponding air temperatures was 63.4°F.

Extreme water temperatures were 48.5°F. on July 25 and 47.0°F. on August 11. Corresponding air temperatures were 49.0°F. and 69.0°F.

25. The prominent plant species bordering Watana Creek are birch, willow, and spruce; the main aquatics are moss and algae. Grayling and whitefish were seined 2 miles above the creek mouth. These same species, plus numerous fine-scaled suckers and an occasional burbot and sculpin (Cottus cognatus) were seined at the stream's junction with the Susitna River.

26. Average daily water fluctuations of the Susitna River at Watana Creek was 3.3 inches. The greatest rise in water level recorded in 24 hours was 7 inches; the greatest drop, 14 inches. Water level of the Susitna River dropped 42 inches from June 21 to August 16. Mean temperature of the Susitna River at Watana Creek was 54.0°F. while mean air temperature was 63.0°F. Extreme river temperatures were 50.0°F. on June 23 and 58.0°F. on June 28 with corresponding air temperatures of 69.0°F. and 82.0°F. on these same days.

27. Kosina Creek, about 35 miles in length, has a steep gradient and contains clear, slightly yellow-tinged water. The stream is characterized by a bed of rocks and boulders, steep banks, and numerous riffles. Water fluctuations were slight except for a noted drop in September. Water and air temperatures on August 16 were 53.0°F. and 63.0°F. respectively. Shoreline vegetation is mainly cottonwood, spruce, and a

variety of annuals. Grayling were readily taken with hook and line.

Wildlife Investigations

28. Moose were observed throughout the area during the summer with an indication of movement out of the river bottom during the middle of July. This was possibly a shift to higher elevations to avoid insects. Numbers of moose seen in the proposed impoundment area on winter flights are recorded in Table 2. Similar low densities were noted in areas adjacent to the proposed reservoir. Condition of browse species indicates that the area has supported a high moose population at some time during recent years. Scrub birch, the most abundant browse species, showed moderate to heavy use. The bark of nearly every aspen tree was scarred, indicating moose utilization. The occasional willow showed heavy or severe use. Portions of paper birch which could have furnished browse had grown out of reach.

Table 3. Animals seen in proposed Devil Canyon impoundment area on three aerial surveys.

Date	Moose	Caribou
January 21, 1958	1	12
February 12, 1958	2	10
March 11, 1958	2	24

29. Segments of the Nelchina caribou herd periodically range on both sides of the Susitna River as far west as the impoundment area. Between July 20 and August 20, an estimated 1,500 caribou were observed

crossing the river from north to south in the vicinity of Watana Creek. Although the river here is swift and from 70 to 100 yards wide, the animals, including calves, crossed with ease and at times even swam upstream to find a suitable place to climb on shore. Table 3 shows numbers of caribou seen in the proposed reservoir area on winter flights. No large concentrations or movements of caribou toward the impoundment area were noted in adjacent areas.

30. Black bear were sighted singly or in groups of up to four (female with three cubs) throughout the study area. They were observed more often and droppings were more common late in the summer. Two grizzly bear were seen.

31. Beaver were present in sloughs along the river. The rapid current and ice flow during spring break-up probably restricts them to the sloughs or tributaries most of which provide fair habitat. Sparce otter and mink sign were seen. Fox and coyote sign, although not common, were noted at high elevations. Wolf tracks were common. Other possible fur bearers whose presence was not definitely determined were lynx, martin, wolverine, muskrat.

32. Waterfowl, with the exception of a few merganser which nest in tributaries, were not found in the study area. Few spruce grouse were seen. Bald eagles and a variety of hawks, owls, and song birds were noted.

SUMMARY

33. Field investigations were conducted on the Susitna River and tributaries from Deadman Creek to Jay Creek during 1957 primarily to determine if anadromous fish were present in these waters.

34. No fish were taken by gill net during 7, 314 fishing hours. About 4, 300 hours of this fishing was with $8\frac{1}{2}$-inch mesh net and about 3, 000 hours with $5\frac{1}{2}$-inch mesh net. No downstream migrant or temporarily resident young salmon were taken by seining. No evidence of salmon was observed during ground surveys of clear tributary streams made in August. Grayling, whitefish, sucker, burbot, and sculpin were seined.

35. Moose, caribou, and grizzly and black bear were noted along the Susitna River above the Devil Canyon dam site in varying numbers throughout the year. Fur bearers noted were wolf, coyote, fox, beaver, otter, and mink. Few waterfowl and grouse were observed. Other bird species noticed were bald eagles, hawks, owls and song birds.

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