U. S. DEPARTMENT OF THE INTERIOR

Geological Survey

Water-Power Resources

of

Scenery Creek near Petersburg

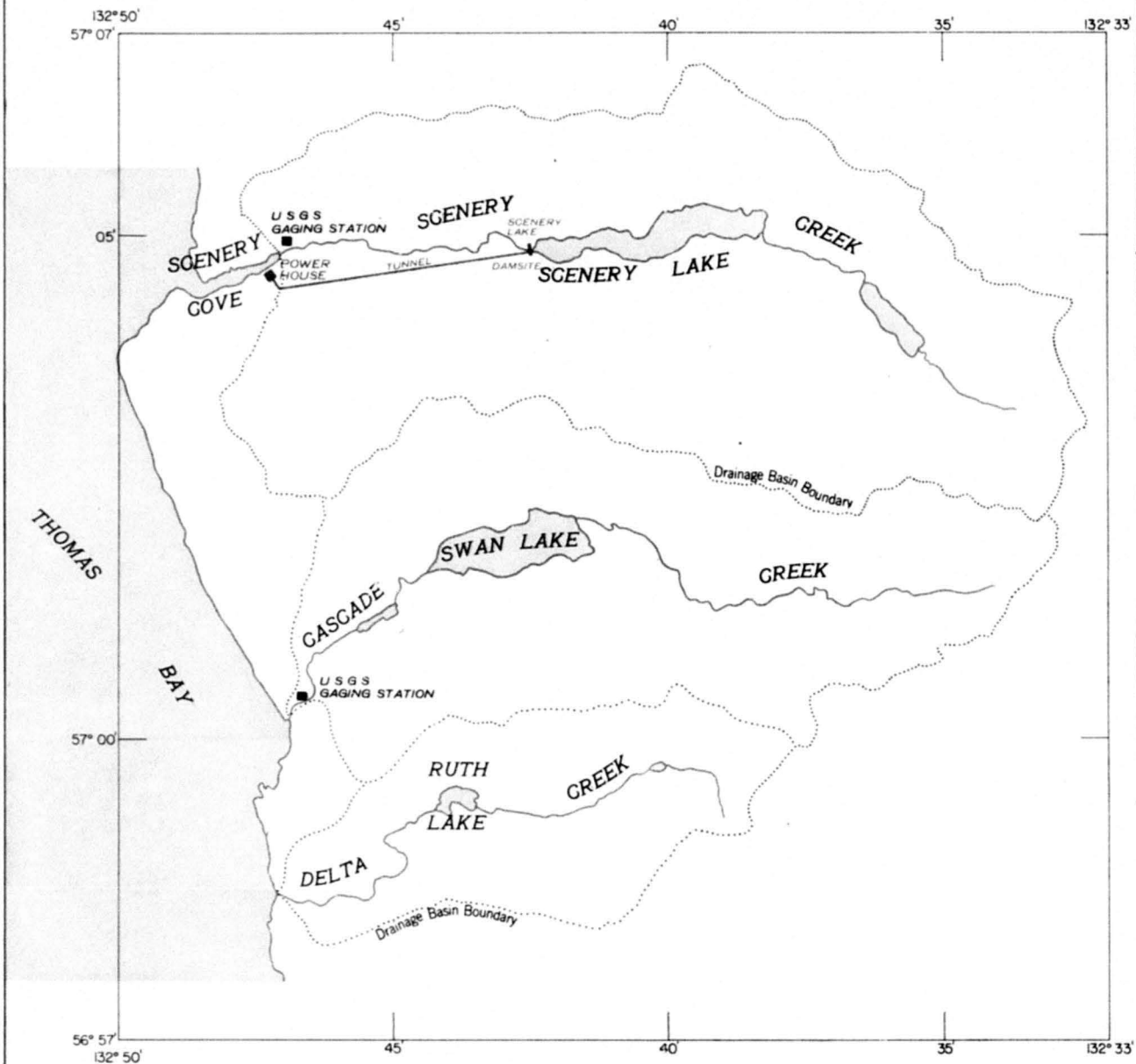
Alaska

Fred F. Lawrence
April, 1950
Tacoma, Washington

CONTENTS

ILLUSTRATIONS

APPENDIX



SCENERY CREEK, ALASKA
LOCATION MAP

Proposed works indicated in red overprint

Scale 1 inch = 2 miles

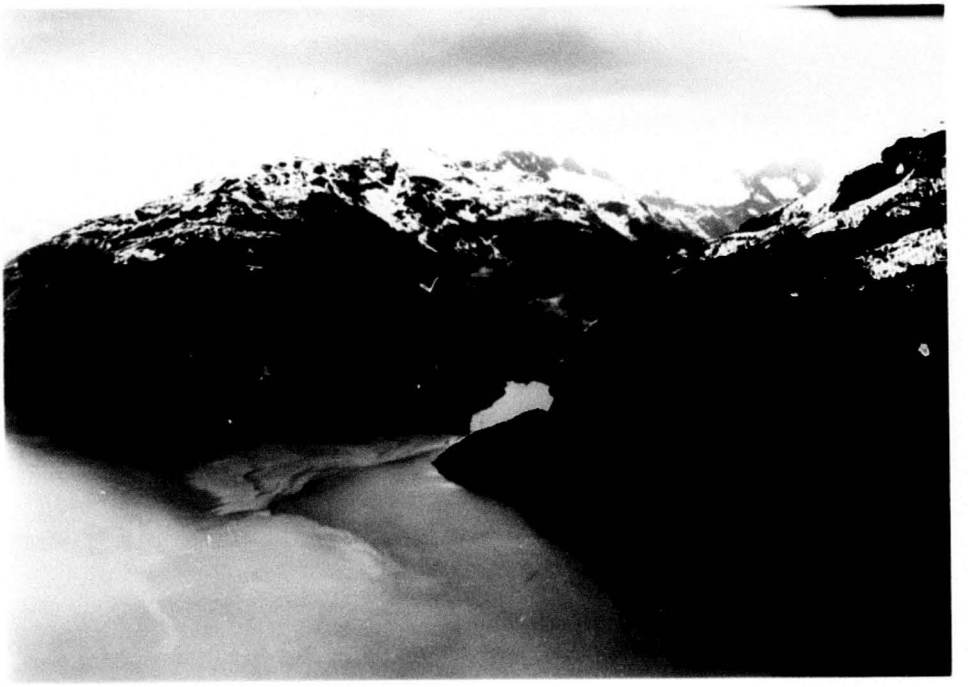
0 1 2 3 4 5 6 Miles

SUMMARY

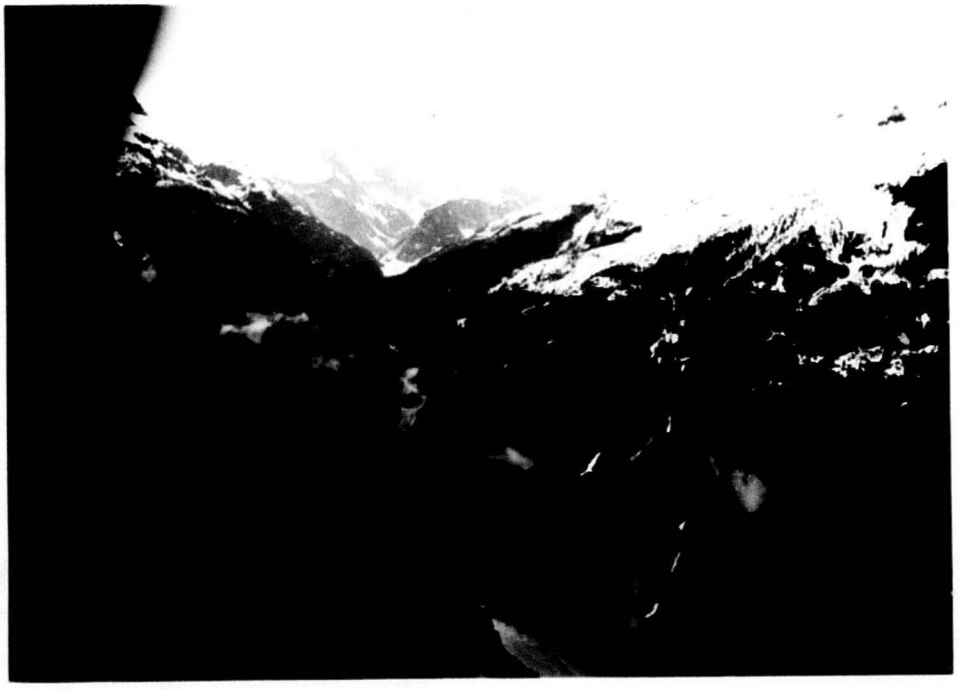
Due to high unit runoff, a good storage site, and a high concentration of fall, Scenery Lake presents a favorable power site. By building a tunnel three miles long from Scenery Cove to tap Scenery Lake at elevation 900 feet and a dam to raise Scenery Lake to elevation 1020 feet, the flow of Scenery Creek can be regulated and 16,000 firm horsepower developed. No stream flow records are available on Scenery Creek but 14 years record of the flow of Cascade Creek, the adjacent drainage on the south, has been used for power estimates. A gaging station was established on Scenery Creek in September 1949, and as records become available the estimates contained in this report will require revision. A geologic examination of the dam site area at the mouth of Scenery Creek and the tunnel location along the south bank from Scenery Cove to Scenery Lake should be made before any further work is done on the project.

INTRODUCTION

Purpose and Scope: This report has been prepared as a basis for the classification of the public land along Scenery Creek, all of which is within the Tongass National Forest. The investigations incidental to its preparation were part of a program the object of which is to classify all of the public land in the United States, including Alaska, as to its value for hydroelectric power production. The investigations were made and the report prepared under the direction of the District Engineer, Water and Power Branch, Conservation Division, U. S. Geological Survey, 410 Federal Building, Tacoma 2, Washington.



Looking east at Scenery Cove and Scenery Creek Valley from a point over Thomas Bay. June 5, 1949. Lawrence photo No. L-4953.



Looking east from a point over Scenery Cove. The mouth of Scenery Creek is in lower center and Scenery Lake is in upper center. Scenery Lake is frozen and covered with snow, June 5, 1949. Lawrence photo No. L-4957.

The field investigations were made by a party composed of F. F. Lawrence, and J. L. Colbert, Hydraulic Engineers and three field assistants hired in Petersburg. Field work was started July 6, 1949, and completed on August 27, 1949. A plane table map was made of Scenery Creek and immediately adjacent topography from Scenery Cove to Scenery Lake; Scenery Lake reservoir site, including underwater contours, from elevation 900 to 1040 feet; Scenery Creek above Scenery Lake 0.9 mile to elevation 1040 feet; all on a scale of 1:24,000 (1 inch = 2000 feet) with 10 foot contours. These maps, a profile of Scenery Creek and Scenery Lake, and a table showing the area and capacity of the Scenery Lake reservoir site have been published on one sheet under the title:

Plan and Profile
Scenery Creek and Scenery Lake, Alaska
Dam Site

and are included with this report as Plate 12. Soundings were made across the lake at 5 sections and are shown on Figure 5 with their locations indicated on Plate 12. Daily records of rainfall, maximum and minimum temperatures, and the elevation of the water surface of Scenery Lake were made and are included in the appendix of this report. Field activities also are discussed more fully in the appendix.

Acknowledgments: The U. S. Forest Service, through its Regional Office in Juneau and Supervisor's office in Petersburg, cooperated in furnishing camp equipment and transportation for the party and supplies from Petersburg to Scenery Cove and in furnishing a boat for use on Scenery Lake. (See Plate 9). The Alaska Communications System, Signal Corps, U. S. Army, through its Petersburg office was very helpful in maintaining communications between Petersburg and the two camp sites. (See Plate 10). The Juneau office of the Geologic Division of the Geological Survey

furnished camp equipment and an outboard motor. The entire force of the Northwest District office at Tacoma assisted in the preparation of the report with helpful suggestions and criticisms. Computations were checked by J. L. Colbert, Hydraulic Engineer, and the report has been edited by Arthur Johnson, District Engineer, Northwest District and L. L. Bryan, Regional Engineer, Western Region. The manuscript was prepared by Leona C. Conlin, District Clerk.

Previous Investigations: A brief review of the power possibilities of Scenery Creek has been published in a joint report by the Federal Power Commission and the U. S. Forest Service.[1] Stream flow records

[1] Federal Power Comm., and U. S. Forest Service; Water Powers of Southeast Alaska, 1947, Scenery Creek Near Thomas Bay, p. 64

for Cascade Creek have been published in this report and in U. S. Geological Survey Bulletin 836-C,[2] for the period 1918-1928. Records for the

[2] Henshaw, Fred F., Surface Water Supply of Southeastern Alaska, U. S. Geological Survey Bull. 836-C, 1932

period since October 1947 have not been published at this time but are available in the U. S. Geological Survey office at Juneau, Alaska.

Maps and Aerial Photographs: The map prepared in the field by the author and J. L. Colbert in 1949 provided most of the basic data for this report. (See Plate 12). A planimetric map, scale 1:40,000, of the Scenery Creek, Cascade Creek, and Delta Creek basins was prepared by the Topographic Division, U. S. Geological Survey, from air photographs taken in 1948. This map was used for drainage area computations and as a base for the Location Map, Plate 1, of this report. Chart Number 8210, "Thomas, Farragut and Portage Bays, Alaska," U. S. Coast and Geodetic Survey, scale 1:40,000, shows the coast line and adjacent land forms.

The map of Tongass National Forest, by the U. S. Forest Service, scale 1 inch = 12 miles, shows the general location of the area under examination. Sheet 6 of a set of maps entitled "International Boundary Between United States and Canada from Cape Muzon to Mt. St. Ellias," shows some generalized topography of the region. World Aeronautical Chart No. 138, "Mt. Fairweather Alaska," scale 1:1,000,000 also covers the area under consideration.

Scenery Creek basin has been covered by the two sets of aerial photographs which have been taken of southeastern Alaska. Mr. Robert O. Davis, Regional Engineer, Rocky Mountain Division, U. S. Geological Survey, Denver, Colorado; in a letter dated April 3, 1950, furnishes the following information about these aerial photographs.

"The 1929 photography was flown by the U. S. Navy with a three lens camera, the wing prints being inclined at an angle of 35° toward the horizon. The flying height was approximately 10,000 feet and the scale of the verticals about 1:20,000. Focal length of the vertical camera was 6.5 inches and for the wing cameras 7.5 inches. Negative films of this project are now stored in this office, but we have no facilities for rectifying the wing prints.

The 1948 photography was also flown by the U. S. Navy and are 9" x 9" single lens photographs, carrying the symbol S.E.A. This photography was flown with a 6 inch focal length camera, flying height 20,000 feet, at an approximate scale of 1:40,000. The film for this project is also, presently, being stored in this office, and prints can be furnished after proper clearance."

Looking east at mouth of Scenery Creek at east end of Scenery Cove. Proposed power plant would be on the right. June 5, 1949. Lawrence photo No. L-4955.

(Left) Looking upstream (east) from a point on north bank of Scenery Creek 1000 feet below the mouth of Canyon Creek. August 10, 1949. Lawrence photo No. L-49100.

Scenery Creek is the northernmost of three small streams draining the coast range and emptying into Thomas Bay about 20 miles northeast of Petersburg, Alaska. The basin lies 100 miles southeast of Juneau and 125 miles north of Ketchikan.

Scenery Creek, Cascade Creek, and Delta Creek all flow west into Thomas Bay. Scenery Creek basin is bounded on the north and east by the basin of Baird Glacier, on the south by Cascade Creek, and on the west by Thomas Bay. Delta Creek basin is bounded on the south and east by the basin of Patterson Glacier, on the north by Cascade Creek, and on the west by Thomas Bay. Cascade Creek basin lies between Scenery Creek and Delta Creek. Patterson Glacier and Baird Glacier head in the ice cap east of Cascade Creek basin (see Plate 1).

The valleys of the three creeks are similar and typical of streams on the mainland of southeastern Alaska. They have been gouged out by glacial action and each has a lake with its lower end two or three miles back from tidewater and 1000 to 1500 feet above sea level. In the case of Scenery Creek, the lake is three miles east of the coast, 957 feet above sea level, and 544 acres in area. Swan Lake on Cascade Creek is about 2 miles from the coast, 1487 feet above sea level, and 614 acres in area.[1] Ruth Lake on Delta Creek is about two miles east of tidewater, 1275 feet above sea level and 70 acres in area.[2]

[1] Federal Power Comm., and U. S. Forest Service; Water Powers Southeast Alaska, 1947, Ps. 63, 64.

[2] ibid

The course of Scenery Creek is interrupted by two lakes, Scenery Lake (See Plate 6) and an unnamed much smaller lake about one mile upstream from the upper end of Scenery Lake. The former is comparatively

deep, a maximum depth of 225 feet having been observed (see profile Plate 12 and Figure 5). The profile shows a concentration of 600 feet of fall in the 1.2 miles immediately below the lake (see Plate 4) with the remaining fall of 357 feet in the 2.4 miles to Scenery Cove and tidewater. The side slopes around the lake are precipitous (see plates 4 and 6) with no beach except at the mouths of the five creeks entering from the sides (see plate 8) and at the head of the lake where the valley is one third of a mile wide and covered with a dense growth of alder brush (see plate 6). The first three quarters of a mile of valley downstream from Scenery Lake is very narrow with extremely steep side walls. Downstream from this section the valley widens out to some extent (see plate 2).

The lower part of Scenery Creek basin is covered with a moderately heavy growth of spruce and hemlock of pulp grade. Near the stream the ground is covered with a very dense growth of alder, devil club, huckleberry, and other vegetation common to southeastern Alaska (see plates 2 and 3). Above 2500 feet rock is exposed except where covered with perpetual ice and snow. There are several small hanging glaciers at the head of the valley.

There has been no development in the basin, and there are no inhabitants, buildings, or trails. It is possible to walk from tidewater to Scenery Lake but the trip should be attempted only by an experienced woodsman or with such a woodsman as a guide. The lake is large enough to land sea planes and access is quite simple via such a plane from Petersburg. The basin has been visited by occasional prospectors and possibly by fishing parties. Game is comparatively scarce in the basin. During the two months the Geological Survey party spent there, several black bear, a few ducks and geese, many mountain goats on the high slopes,

View from the air of outlet of Scenery Lake and proposed dam site. Area circled in red appears in photo below. June 5, 1949. Lawrence photo No. L-4960.

Looking southeast from point on north bank of Scenery Creek at outlet of Scenery Lake. Elevation of lake surface in background is 958 feet. August 2, 1949. Lawrence photo No. L-4988.

(Left) Looking west, downstream, from a point on north bank at outlet of Scenery Lake. Elevation of water surface in foreground, 920 feet, in extreme background 885 feet. August 10, 1949. Lawrence photo No. L-49102.

Looking south at point where Scenery Creek leaves Scenery Lake. Lake surface elevation on date of photography was 958. August 10, 1949. Lawrence photo No. L-49103.

and one porcupine were seen. No deer, elk, moose, brown or grizzly bear were observed. The lake contains many small fish from 8 to 12 inches in length and a few larger ones, the largest caught measuring twenty-six inches. These fish appear to be a landlocked species of Dolly Varden trout. A few mosquitoes, gnats, and flies were encountered but not in such numbers as to be troublesome.

The areas of the three basins and components thereof are summarized in the table below. The lakes indicated are: for Scenery Creek, Scenery Lake; for Cascade Creek, Swan Lake; for Delta Creek, Ruth Lake.

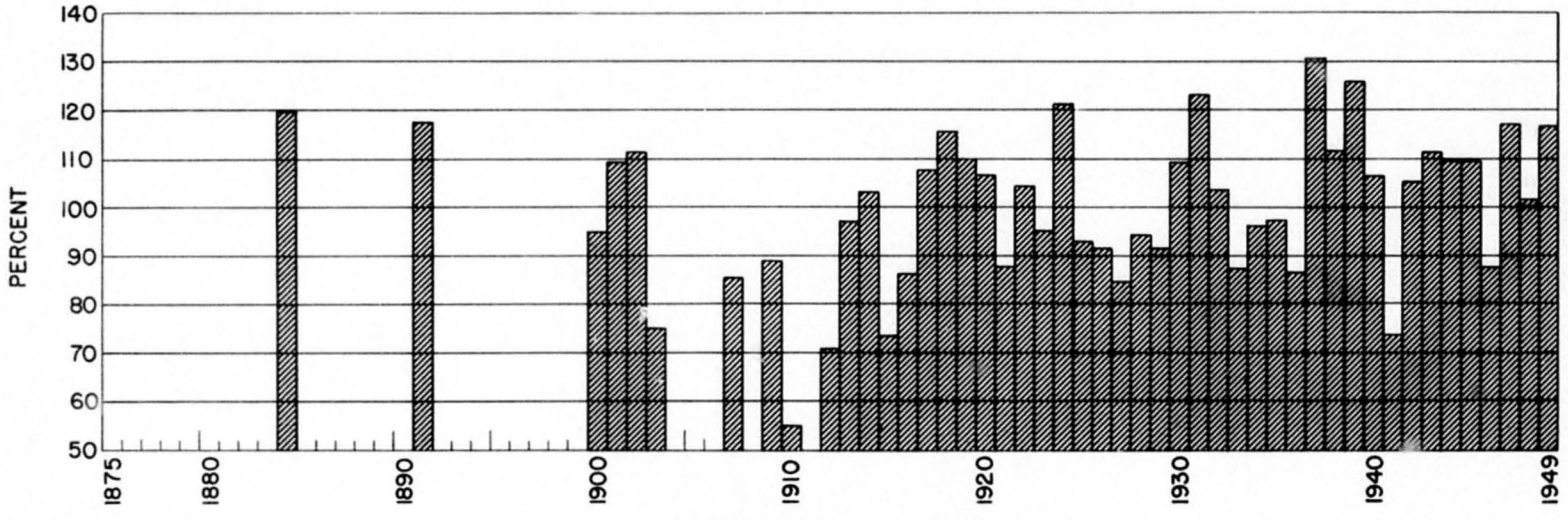
Stream	Drainage Areas in Sq. Miles above mouth	above gaging Sta.	above mouth of lake	Area in acres of lake surface	Altitude of lake surface
Scenery Cr.	33.6	30.0	21.1	544[a]	957[a]
Cascade Cr.	23.0	23.1	18.9	614 [b]	1,487 [b]
Delta Creek	10.3	-	7.9	70 [b]	1,275 [b]

a/ See Plate 12

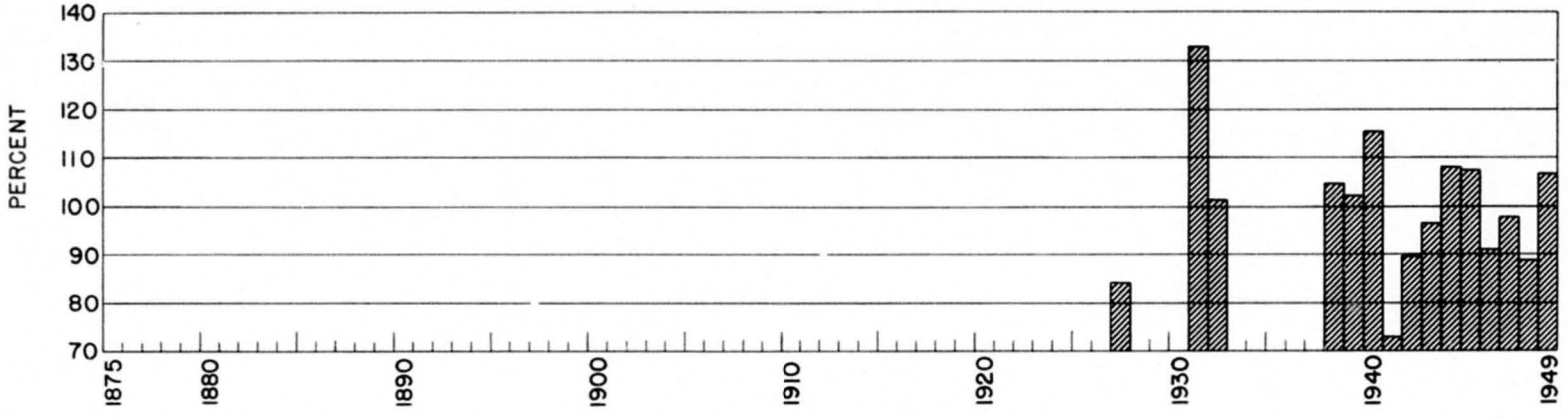
b/ Federal Power Comm., and U. S. Forest Service; Water Powers Southeast Alaska, 1947, Ps. 63, 64.

The weather on Scenery Creek is, like the rest of southeastern Alaska, cold and wet. No records of precipitation or temperature in the basin are available except those obtained during the course of the survey. These are included in the appendix. The mean temperature for the period July 7 to August 27 was 50.1 degrees and during that time 11.1 inches of rain fell. It will be noted from Figure 2 that July and August are comparatively dry months at Petersburg.

The following table shows the tidal data for Thomas Bay as furnished by the U. S. Coast and Geodetic Survey.



JUNEAU, ALASKA
47 Years Record. Mean= 88 inches



PETERSBURG, ALASKA
15 Years Record. Mean= 111 inches

INDEX OF WETNESS
(ANNUAL PRECIPITATION AS PERCENTAGE OF MEAN)

U. S. GEOLOGICAL SURVEY

FIGURE 1

	Feet
Highest tide (estimated).....	20.5
Higher high water.....	16.10
Mean high water.....	15.10
Half tide level (mean sea level).....	8.35
Mean low water.....	1.60
Lower low water.....	0.00
Lowest tide (estimated).....	-4.5
Mean range of tide.....	13.5

WATER SUPPLY

Precipitation: Except for the rainfall records obtained during the course of the survey in July and August, 1949 (see appendix), no precipitation or temperature records are available for the basin or for any point on the mainland nearby. Records are available at Petersburg, on Mitkof island 20 miles southwest of Scenery Cove, for 15 years; 1927, 1931-32, and 1938 through 1949; and at Juneau, on the mainland 100 miles to the north, for 47 years; 1884, 1891, 1900-03, 1907, 1909-10, and 1912 through 1949. Figure 1 shows a graph of the total annual precipitation as a percentage of normal or Index of Wetness for these two stations. The annual distribution of this precipitation along with the distribution of runoff at Cascade Creek is shown on Figure 2. It will be noted on this latter figure that while the period of heaviest precipitation comes in the fall and the winter, the heavy runoff comes in summer, indicating that a large percentage of the precipitation falls as snow. The mean annual precipitation at Juneau for 47 years is 88 inches, at Petersburg for 15 years, 111 inches, while the measured runoff for the 23 square miles tributary to the gaging station on Cascade Creek has averaged 148 inches for the 14 years of record. Since conditions

on Scenery Creek are similar to Cascade Creek, the precipitation there is undoubtedly much greater than at either Juneau or Petersburg, but it seems likely that the annual distribution is similar.

Because of the low temperatures and high relative humidity, the loss through evaporation will be negligible.

Runoff: A gaging station was established on Scenery Creek 300 feet upstream from the mouth of South Fork in September, 1949, by the U. S. Geological Survey. At the time of writing no records are available for this station or for any part of Scenery Creek. A station has been maintained for 14 years on Cascade Creek; 1918 through 1928 by the U. S. Forest Service, and 1947-1949 by the U. S. Geological Survey. A monthly hydrograph of the flow at this station is shown in Figure 3. The drainage area tributary to the gage on Cascade Creek is 23.0 square miles, while that of Scenery Creek, above the mouth of Scenery Lake is 21.1 square miles. Although the area above the mouth of Scenery Lake is somewhat higher than that above the gage on Cascade Creek, the geography of the basins (see Plate 1) indicates that the upper part of Scenery Creek may lie in a rain shadow behind the ridge separating it from Cascade Creek. Since precipitation normally increases with altitude but decreases in a rain shadow, these two factors will compensate. Falls Lake, a small lake on Cascade Creek below Swan Lake, has an area of 20 acres and a water surface elevation of 1150 feet. Because it is formed by a pervious natural dam it is said to be self emptying in low water periods thus increasing low water flows. However, the area of this lake is so small that its storage cannot be large enough to affect the stream flow greatly. Everything considered, the flow in second-feet per square mile at the outlet of Scenery Lake is probably very nearly the same as the flow at the gaging station on Cascade Creek. All computations for storage and power in this report are based on the assumption that the

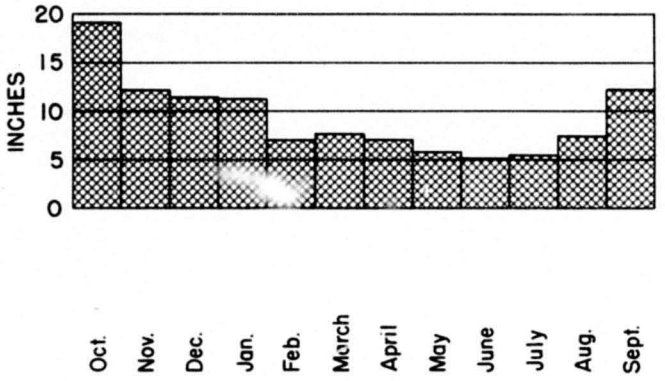
ANNUAL DISTRIBUTION

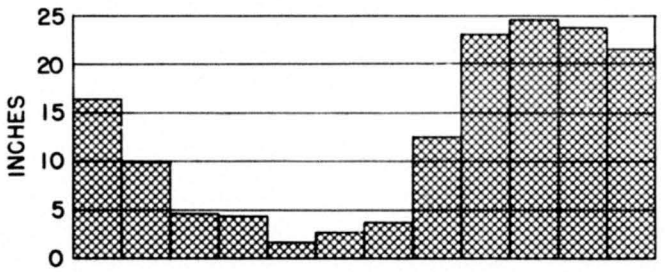
PRECIPITATION AND RUNOFF

PETERSBURG, ALASKA

Mean monthly Precipitation

15 years record, 1927, 1931, 1932, 1[illegible]--1949





CASCADE CREEK AT THOMAS BAY NEAR PETERSBURG, ALASKA

Mean monthly runoff

14 years record 1918--1928, 1947--1949

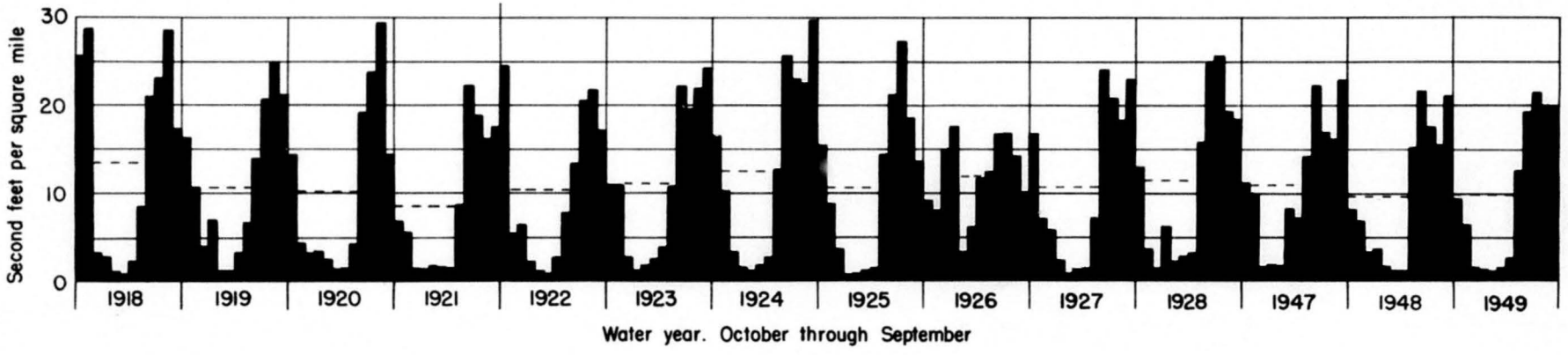
Drainage area 23 square miles

MONTHLY HYDROGRAPH

CASCADE CREEK AT THOMAS BAY NEAR PETERSBURG, ALASKA

Drainage area 23 square miles

Mean monthly discharge shown in solid line
Mean annual discharge shown in dashed line
Mean discharge, 14 years, 10.94 second feet per square mile



U.S. GEOLOGICAL SURVEY

FIGURE 3

unit flows are identical.

Since the years of record of runoff at Cascade Creek and precipitation at Petersburg do not coincide, it will be necessary to use the 47 year record of precipitation at Juneau to compare precipitation with runoff. The tabulation following is a comparison of the two, in inches of precipitation against inches of runoff, for the 14 years of record on Cascade Creek.

	Juneau		Cascade Creek	
Year	Precipitation Inches	Percent Normal 47 Yrs.	Runoff Inches	Percent Normal 14 Yrs.
1918	102.09	115.5	185.3	125
19	97.04	109.8	146.6	99
20	94.14	106.5	138.8	94
1921	77.70	87.9	117.4	79
22	92.03	104.1	141.2	95
23	84.11	95.1	150.7	102
24	107.37	121.5	172.9	116
25	82.04	92.8	146.6	99
1926	81.09	91.7	162.9	110
27	74.86	84.7	146.6	99
28	83.20	94.1	155.2	105
1947	103.59	117.2	149.3	101
48	89.85	101.6	132.6	89
49	103.11	116.6	133.4	90
Mean 14 years	90.87		148.6	
Mean 47 years	88.41			

The parallel records do not agree as much as one might expect, since the rainfall records at Petersburg and Juneau seem to show that the precipitation pattern is similar for the whole area (see Figure 1). One explanation for this may be that on the higher slopes of the basin the snow cover does not melt completely every year, and precipitation which falls one year may appear as runoff several years later. There are also

some small glaciers in the area and the amount of meltwater from them is a function of temperature. The year 1949, although wetter than average, was quite cool and it is not surprising that the runoff was below normal. Therefore any estimate of runoff from precipitation records will be of doubtful value.

WATER UTILIZATION PLAN

At present Scenery Creek is not being used in any way. No salmon run up the stream to the lake although some may run as far as Jacobs Creek and up Level Creek.

In a report on potential power of Southeastern Alaska,[1] the

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[1] Federal Power Comm., and U. S. Forest Service, Water Powers Southeast Alaska, 1947; Scenery Creek Near Thomas Bay, p. 64

Scenery Creek power site is discussed and three possible ways to develop its power are suggested. These are essentially the same as will be outlined later.

Because of its isolated location, any development of power on Scenery Creek presupposes a market such as a pulp mill built within economical transmission line distance. Such a pulp development with a town and mill built south of the entrance to Thomas Bay has been suggested by the Forest Service and would utilize the power available on both Cascade and Scenery Creeks.

The following plan and alternatives are presented as the most feasible ways to develop the power available on Scenery Creek. Since the unregulated winter flow is very low (see Figure 2), a dam will be required at the outlet of Scenery Lake to regulate the flow. A tunnel would be built tapping the lake near the 900 foot elevation (see Plate 12), making storage available in the lake down to that elevation (see Figure 4.) The lower end of this tunnel would emerge about 600 feet downstream from the lake

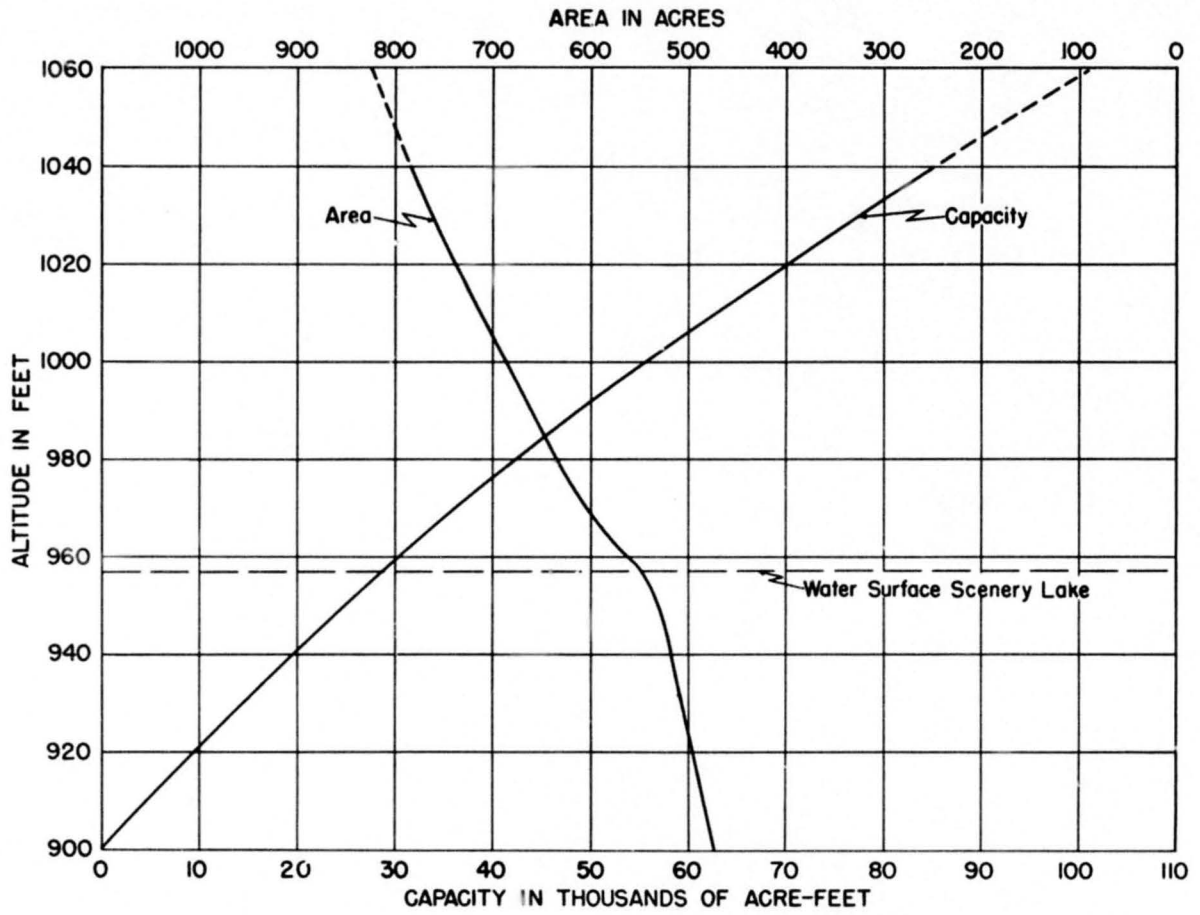
outlet. From this point downstream to Scenery Cove three possible ways to carry the water present themselves. First is an open ditch along the 900 foot contour. Because of the steep contour of the valley sides and the fact that rock is on or very near the surface for the entire distance, construction costs would be high. Because of the frequency of snow slides, maintenance costs would be very high and power interruptions in the winter time frequent, and freezing of the water in the ditch would be a problem. The second method would utilize a pressure conduit on the valley floor. For the first one-half mile this would require a tunnel and possibly two short stretches of tunnel below. Material costs would be high, and snow slides would present the same maintenance problem as for the first method. The third and probably most feasible route would be a tunnel near the 900 foot elevation along the south side of the valley to a point above the mouth of Scenery Creek and a penstock in tunnel to a power house, possibly also built into the rock at the mouth of Scenery Creek on Scenery Cove. The tunnel would be built to operate under pressure to utilize the head above elevation 900 feet. The two small streams and South Fork, all entering from the south, could be intercepted near the 900 foot elevation and would materially increase the power available. Although the first costs would be highest for this method, the lowered maintenance costs and increased reliability of service indicate that this scheme is the best method of developing the stream. No provision for passing water from the lake for fish life will be required, for the three streams entering from the north, Canyon, Jacobs and Level Creeks will provide all the water required for salmon in the lower reaches of the stream.

A study of the profile of Scenery Creek on Plate 12 shows that, of the 957 feet of fall available below Scenery Lake, 600 feet are available

in the 1.2 miles between Jacobs Creek and the lake. There is room for a power house on the south bank near the mouth of Jacobs Creek, and if the power developed (two-thirds of that available) would be sufficient for the market this scheme should be given consideration. A tunnel would be the only feasible method of carrying the water from the lake to the power house. If this were done approximately two-thirds of the available head could be developed with only one-third the length of tunnel required to develop the full head. However, the dam and outlet works at the lake would be the same for both methods; the power house, although smaller would be much less accessible, and transmission line maintenance, difficult at best, would be even harder.

AREA AND CAPACITY

SCENERY LAKE RESERVOIR SITE, ALASKA



U.S. GEOLOGICAL SURVEY

FIGURE 4

Storage: Any power development on Scenery Creek which will provide power during the winter months will require storage. This is shown graphically on the hydrograph in Figure 3 and the distribution of runoff curve in Figure 2.

This storage can be provided by building a dam at the outlet of the lake and a tunnel to tap the lake below its present level. Such a tunnel not only provides additional storage but also minimizes the ice problem in winter operation. Figure 4 shows a curve of area and capacity above the 900 foot level and a table giving this same data is included on Plate 12.

A mass curve, computed on a second-foot days per square mile basis, was plotted for the 14 years of record on Cascade Creek. From this curve regulated flows for Scenery Creek were computed, assuming identical unit runoff and with no allowance for leakage or evaporation. It was found that complete annual regulation could be obtained with 69,000 acre-feet of storage producing discharges which varied from 193 second-feet in 1922 to 264 second-feet in 1924. However, the minimum flow could have been raised to 206 second-feet if the storage had been utilized on a two year basis. The following table summarizes the regulated flow characteristics of the stream for the period of record on Cascade Creek.

Regulated Discharge
Scenery Creek at Outlet of Scenery Lake, Alaska
Computed from records for Cascade Creek at Thomas Bay, near Petersburg, Alaska

	Annual Operation		Two Year Operation	
Water Year	Discharge maintained Second-feet	Storage required Acre-feet	Discharge maintained Second-feet	Storage required Acre-feet
1918	242	63,200		
19	223	54,400		
20	207	61,100		
1921	210	63,600		
22	193	46,900)		
23	246	59,400)	220	67,400
24	264	69,100		
25	230	61,500		
1926	260	19,700		
27	221	59,600)		
28	237	61,100)	229	64,000
1947	236	46,500		
48	205	54,000)		
49	207	56,500)	206	56,900

It will be noted that the maximum storage was required in 1924, when 69,100 acre-feet of storage would have provided a flow of 264 second-feet. However, 67,400 acre-feet were required in 1922-23 to produce a regulated flow of 220 second-feet.

Additional storage up to 100,000 acre-feet would have made possible the regulation of the stream to 225 second-feet for the period November 1, 1919, through January 31, 1926. The last two years, 1948 and 1949, have been below normal. A flow of 225 second-feet for the period October 1, 1947, through September 30, 1949, would have required maximum storage of 79,000 acre-feet on April 30, 1949, and at the end of the period on September 30, 1949 the reservoir would have been drawn down 28,400 acre-feet. Since 70,000 acre-feet of storage can be obtained with a

Looking east from west end of Scenery Lake. Lake surface elevation on day of photo 956. August 21, 1949. Lawrence photo No. L-49119.

Looking east from a point on Scenery Lake about 1 mile west of east end of lake and opposite mouth of Lost Valley Creek. U. S. G. S. camp on lake shore in lower center. August 21, 1949. Lawrence photo No. L-49115.

dam to elevation 1020, while 100,000 acre-feet requires a dam to elevation 1059, it is doubtful if the higher maximum flow warrants the additional expense.

Dam Site: A detailed survey of the dam site area is shown on Plate 12 and photographs are shown on Plates 4 and 5. On the south side of the stream solid rock is exposed in many places. The rock in the stream bed at the lake outlet forms a V notch weir with an estimated depth of 10 to 15 feet of water with the lake at elevation 957. The north side of the stream is covered with a heavy growth of brush, spruce, and hemlock and rock is not exposed in many places but is likely quite near the surface. A natural spillway section with a surface elevation of 1035 lies 250 feet northeast of the stream and 1100 feet northwest of the lake outlet. In the case of a dam to elevation 1020, some excavation would be required, but if the dam were built to elevation 1059 a dike would be necessary.

Potential Power: The following water-power estimates contemplate construction of a dam at the outlet of Scenery Lake to control the lake to elevation 1020 feet, a tunnel to tap the lake at elevation 900 feet and extending from Scenery Lake to the outlet of Scenery Creek through the mountain on the south side of Scenery Creek, and a power house on tidewater at the creek mouth on Scenery Cove. Although it is expected that the tunnel will intercept the flow of the two small creeks entering from the south and South Fork Scenery Creek, no allowance has been made for the added flow. Neither has any allowance been made for evaporation or leakage. It is intended that the tunnel operate under pressure utilizing all the head between Scenery Lake and the water surface at Scenery Cove.

Since the period of record of stream flow probably covers a period of slightly above normal flow, the estimates of the flows available for power have been revised downward slightly. The regulated flow which was available fifty percent of the time during the 14 years of record was 223 second-feet. A value of 215 is probably closer to the long time Q 50 and will be used. The horse power available fifty percent of the time has been computed as follows:

$H.P._{50} = 0.08QH$ where

$H.P._{50}$ = horse power available fifty percent of the time

Q = discharge in second-feet available fifty percent of the time

H = gross head in feet (in this case 1020)

0.08 = product of the quantity $\frac{(62.4)(0.70)}{550}$ (allows for 70 percent efficiency)

$H.P._{50}$ computed in this way equals 17,500. The flow available 100 percent of the time was 206 second-feet which is the same as that available 90

Looking south at mouth of Lost Valley Creek which is the largest tributary to Scenery Lake excepting Scenery Creek. Elevation of notch in upper center is 2040 feet, of the lake 948. August 2, 1949. Lawrence photo No. L-4985.

Looking north at Staircase Falls and Staircase Falls Creek which enters Scenery Lake on the north side near the east end of the lake. July 30, 1949. Lawrence photo No. L-4976.

percent of the time. A value of 200 for the former seems more likely for the reasons given. $H.P._{100} = 16,300$, $H.P._{90} = 16,800$.

The installed capacity of the plant will depend on the type of load, the number of interconnections, and whether the plant is to carry the base load or be used for peaking purposes. One possibility would be three 12,500 H.P. wheels each connected to a 10,000 KVA generator.

The amount of energy available with such a setup, assuming 90 percent efficiency in the generator and 70 percent efficiency in the hydraulic works from the maximum elevation in the reservoir to the average tailwater elevation (sea level), would have been as follows:

Water Year	Flow-Second-feet	Output Millions of Kilowatt hours
1918	242	115
19	223	106
20	207	99
1921	210	100
22	220	105
23	220	105
24	264	126
1925	230	109
26	260	124
27	229	109
28	229	109
1947	236	112
48	206	98
49	206	98

Power Transmission: The probable location of the load for the plant is on the mainland south of the entrance to Thomas Bay. Since development on Cascade Creek will very likely precede or at least be simultaneous with that on Scenery Creek, the best location for a transmission line is probably along the west side of the ridge between South Fork Scenery Creek and Thomas Bay. The line would go south from the power house on

Scenery Creek to the power house on Cascade Creek at its mouth. From Cascade Creek the line would follow along the bluff above Thomas Bay to Delta Creek and the delta of Patterson river. From the west side of this delta to the mill location the country is quite flat with gently rolling hills and with no location difficulty, but the section from Scenery Creek to Delta Creek is across very rugged country where construction will be expensive and maintenance difficult. Crossing the delta of Patterson river will offer the difficulties usual where a shifting river channel is encountered.

If Scenery Creek should be developed by itself, consideration should be given to transmitting power to the load by submarine cable across Thomas Bay, along the west shore of Thomas Bay by conventional line, and across lower Thomas Bay by another submarine cable. According to Chart 8210, Thomas, Farragut, and Portage Bays, U. S. Coast and Geodetic Survey, Scale 1:40,000, depths in the order of 100 fathoms would be encountered at the crossing opposite Scenery Cove but a crossing at the mouth of Thomas Bay could be made with a maximum depth of 7 fathoms.

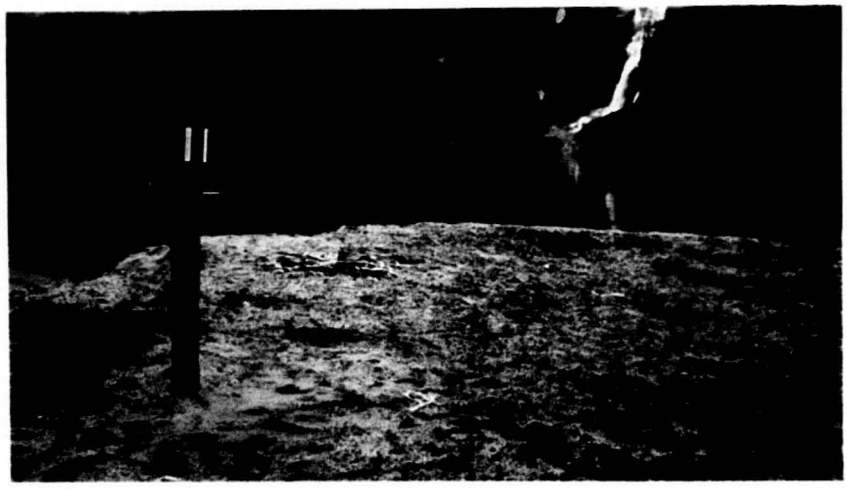
APPENDIX

Summary of Field Activities

History: A reconnaissance of the Scenery Creek area was made by the author early in June, 1949. At that time arrangements were made to borrow equipment from the Geological Survey office in Juneau and from the Forest Service offices in Juneau and Petersburg, and to obtain the use of the Forest Service boat to move the party and equipment from Petersburg to Scenery Cove.

The author and J. L. Colbert, Hydraulic Engineer, left Tacoma on June 30, 1949, arriving in Petersburg the same afternoon. At Petersburg equipment which had arrived from Tacoma and Juneau was assembled at the Forest Service dock and additional equipment including stoves and petroleum products were purchased. Three field assistants were hired at Petersburg and the necessary paper work completed. The party and all the camp and surveying equipment left Petersburg on the morning of July 6 and arrived at Scenery Cove about noon of that day. Camp was established on the north side of Scenery Creek in the forest just above highest tide. The survey of Scenery Creek from Scenery Cove to a point 1/4 mile above Jacobs Creek was completed and three bench marks set from this location. On July 22 camp was moved to a sand bar at the east end of Scenery Lake. For this move two small amphibious aircraft (Widgeons) were chartered from Alaska Island Airlines. The move required three trips for each plane and was completed in three and one-half hours. The survey of Scenery Creek from 1/4 mile above Jacobs Creek to Scenery Lake, the Scenery Lake reservoir site including Scenery Creek to 0.9 mile above Scenery Lake, Scenery Lake

View of equipment used for soundings in Scenery Lake for underwater contours and cross-sections. August 1, 1949. Lawrence photo No. L-4982.



Rain gage on sand bar at east end of Scenery Lake. Large coffee can is perforated and drains into smaller milk can. Large #2½ can is safety device in case rainfall exceeds capacity of milk can. August 6, 1949. Lawrence photo No. L-4993.

dam site, and soundings of Scenery Lake were all completed from this camp. On August 26th the camp was dismantled and equipment packed and on August 27th equipment and personnel were moved to Petersburg by one Widgeon type aircraft making four trips. This move was completed in slightly over four hours. The largest part of the equipment was stored in the Forest Service warehouse in Petersburg. However, stream gaging equipment and the radio-telephone were shipped to Tacoma. The field assistants were discontinued on August 29 and the author and J. L. Colbert returned to Tacoma on August 30.

Personnel: The five man party was very satisfactory. In organizing a party for this type of work consideration should be given to the following points: (1) One man should be kept in camp at all times to keep off bears. This man can logically act as camp tender and cook. (2) Local help who are familiar with the terrain and experienced in the open should be hired wherever possible. (3) Because of the steep hillsides and heavy brush cover it is impossible for the party chief to carry both the alidade and the plane table. Therefore a recorder is necessary and one technically trained who is "learning the ropes" before assignment as party chief is ideal. (4) Since most of the traverse will entail cutting brush for a line, two rodmen are necessary.

Equipment: The equipment used was adequate for the job but in some cases there was room for improvement. The following items may be of interest to anyone undertaking a similar survey.

(a) Surveying equipment: The same outfit used "outside" is

adequate provided that water proof plane table sheets and notebooks are used. Essential items should be carried in duplicate since the cost of a shutdown is very high. For example five days lost on this survey would have paid for a complete plane table outfit.

(b) Sounding: Plate 8-A shows the sounding rig used to locate underwater contours and to obtain the data for the cross sections shown on Figure 5. A stream gaging sounding reel was set on a frame built up of 2"x4"s mounted in the bow of a Forest Service skiff. A 300 foot steel tagline marked at 2 foot intervals to 50 feet, 5 foot intervals to 150 feet, and 10 foot intervals to 300 feet, was wound onto the reel and a 3 pound sash weight wired onto the end of the line. This outfit proved very satisfactory and measurement of depths to the nearest foot could be made very rapidly after a short period of practice.

(c) Weather equipment: Plate 8-B shows the equipment used to measure precipitation. The 2 pound coffee can has been punched to act as a funnel draining into the milk can. The ratio of areas was determined and the amount of rainfall computed from the depth measured in the milk can. The number $2\frac{1}{2}$ fruit can was provided to be used if rainfall exceeded the capacity of the milk can. It was not used. It is suggested that a standard rain gage be used in the future. Maximum and minimum temperatures were obtained with a Taylor max-min thermometer which was read and set every morning. It proved entirely satisfactory.

(d) Small boats: Since transportation from the camp on Scenery Lake to all points on the lake, to the dam site, and to reach Scenery Creek below the lake was by boat this was a very important

item of equipment. A 12 foot folding canvas boat was purchased in the spring of 1949 for use on the survey. It was assembled as soon as camp was made on Scenery Lake and on its trial run proved to be inadequate to carry the party and the surveying equipment when used with a 5 horsepower outboard motor. Such a boat would prove satisfactory for two men and equipment or 3 men without equipment, when used with such a motor. The Forest Service office at Petersburg was notified of the situation by radio and Mr. Knox Marshall, the Supervisor, offered to send in one of their knocked down skiffs. This was done and the boat assembled at the camp (see Plate 9) and proved very satisfactory. This boat was left on Scenery Lake for the use of fishing parties in the future. The 5 horsepower Johnson outboard motor borrowed from the Juneau office of the Geological Survey proved very satisfactory.

(e) Camp equipment: Two 8'x8' and one 10'x12' light weight tents and one 10'x12' standard weight tent all equipped with flies were used. These tents proved too small and the following is recommended: Sleeping tents, one 10'x12' tent for each two men with the cook to live in the cook tent; cook tent, preferably 14'x16'; storage tent 10'x12' or 14'x16'. Light weight tents are satisfactory and much easier to handle. Flies are absolutely essential in this climate. One of the problems of a camp in this country is heating the tents. A small gasoline or kerosene heater for each living tent is recommended. Cooking can best be done on a portable wood stove supplemented by a two burner Coleman gasoline stove. Some provision must be made for drying clothing. This was done on Scenery Lake in a lean-to built around an extra tent fly. It was found that extra canvas and a plentiful supply of rope were very convenient around camp.

(f) Communications: Any camp established on the mainland of southeastern Alaska will be completely isolated unless a fairly large boat is available. This was true on the Scenery Creek survey and to maintain communications a radio-telephone was purchased in Seattle in June, 1949. This equipment (see plate 10-A) consisted of a 25 watt transmitter and receiver, both 4 channel, crystal controlled, and powered by 2 six volt storage batteries. A 12 volt gasoline generator was purchased to keep the batteries charged. The equipment was designed for marine use, for operation on the 3 megacycle band and proved satisfactory in every way. Call letters and frequency were assigned by the Washington office. Prior to leaving Petersburg for Scenery Cove arrangements were made with the office of the Alaska Communications System to call each night at seven to send or receive messages. This schedule was maintained throughout the time spent in camp and only once was communication impossible. In this way telegrams were sent and received, groceries and supplies ordered, planes authorized to bring mail and supplies and contact maintained in case of injury or illness. The latter was not required but was considered as one of the most important reasons for having the set. The setting up and operation of the set was not difficult and can be done by anyone with a normal amount of common sense and two or three hours of instruction, supplemented by a trial setup under supervision of the instructor.

(g) Transportation: Movement of men and equipment in southeastern Alaska almost never involves automobiles. It will usually follow the pattern set by this survey, i.e. by boat to tidewater points, and by air to points in the interior where lakes are available on which to

land. Movement by water is more or less routine and needs no discussion here. Air transport in small amphibious type aircraft proved very satisfactory. It involves two problems, (1) keeping packages small enough to go in the plane hatches and (2) setting up camp close to a point where the planes can be loaded and unloaded.

(h) Life belts: Since a small boat was to furnish the means of transportation for much of the survey and a considerable part of the survey was to involve cliffs overhanging deep water, some type of life belts were obviously required. The type chosen was a light plastic affair one inch wide containing a bladder which could be inflated from a small gas cartridge by simply squeezing with one hand. These belts proved very satisfactory particularly so since they were light enough that one could be worn without any feeling of weight or restraint on the part of the wearer.

(i) Photographs: In addition to the photographs included in this report, an album of photographs of Scenery Creek and Scenery Lake has been prepared and is open to inspection at the Geological Survey offices at Washington, D. C., and 410 Federal Building, Tacoma, Washington.

SCENERY CREEK, ALASKA

Temporary Weather Station Records
July and August, 1949

Station Location - July 7-22 On Scenery Cove. Lat. 57°04.9' N., Long. 132°47.1 W., Elev. 10 feet on grassy flat about 300 feet north of mouth of Scenery Creek.

July 23-Aug. 27 At east end of Scenery Lake, Lat. 57°05.0' N., Long. 132°38.3' W., Elev. 959 feet on sand bar about 100 feet north of point where Scenery Creek empties into Scenery Lake.

Note: Observations on Scenery Cove and Scenery Lake made as of 8:00 a.m. Temperature and precipitation for the 24 hours from 8:00 a.m. July 9 to 8:00 a.m. July 10 are recorded for July 10. Observations at Petersburg are for the 24 hours from midnight to midnight of the day indicated.

	Precipitation		Max. Temp.		Min. Temp.		Mean Temp.		
Date	Scenery Creek	Peters-burg	Scenery Creek	Peters-burg	Scenery Creek	Peters-burg	Scenery Creek	Peters-burg	Lake Elev.
July 7	0	0		59		47			
8	0	0	57	64	46	50	52	57	
9	0	0.03	66	70	43	44	54	57	
10	0.16	0.05	60	64	46	52	53	58	
11	0	0.01	54	68	45	52	50	60	
12	0	0.20	63	65	47	52	55	58	
13	0.08	0.01	56	57	46	51	51	54	
14	0.14	0.08	50	62	44	51	47	54	
15	0	0.00	56	65	43	48	50	58	
16	0	0.17	60	55	45	50	52	54	
17	0.50	0.14	50	60	44	49	47	54	
18	Tr.	0.0	50	62	44	48	47	54	
19	0	Tr.	58	68	43	42	50	59	
20	0.12	0.40	58	56	45	43	52	54	
21	1.31	0.01	48	53	44	48	46	50	
22	Tr.	0.01	46	61	44	48	45	54	
23	0	0	60	66	40	44	50	55	Sta.moved
24	Tr.	0.29	67	57	48	51	58	54	
25	0.27	0.18	54	60	45	50	50	55	
26	0.21	0.0	58	58	46	50	52	54	
27	Tr.	0.20	55	61	45	52	50	56	956.1
28	0.40	0.57	58	57	46	51	52	54	956.2
29	0.59	0.01	54	56	46	46	50	51	956.6
30	0.03	0.12	51	56	40	45	46	50	956.6
31	0.79	0.62	55	58	46	45	50	52	956.5

Date	Precipitation Scenery Creek	Precipitation Peters-burg	Max. Temp. Scenery Creek	Max. Temp. Peters-burg	Min. Temp. Scenery Creek	Min. Temp. Peters-burg	Mean Temp. Scenery Creek	Mean Temp. Peters-burg	Lake Elev
Aug. 1	1.05	.55	50	54	45	50	48	52	957.6
2	0.75	.58	55	59	47	50	51	54	957.9
3	0.05	.63	55	60	46	49	50	54	958.0
4	0.27	.27	58	60	45	48	52	54	957.8
5	0.09	.10	56	60	46	48	51	54	957.3
6	0.72	.22	50	53	44	49	47	51	957.2
7	.28	.28	50	59	45	49	47	54	956.9
8	.48	.12	54	58	46	49	50	54	957.0
9	.48	.93	50	55	44	49	47	52	957.3
10	.92	.02	52	59	41	48	46	54	957.8
11	Tr.	.21	58	57	44	48	51	52	957.2
12	.28	.01	53	58	45	49	49	54	956.8
13	.25	.68	53	55	44	50	49	52	956.4
14	.45	.26	51	57	43	49	47	53	956.7
15	.05	.16	54	61	43	47	48	54	956.6
16	.02	.09	56	61	39	46	48	54	956.3
17	.26	.16	57	57	44	46	50	52	956.0
18	.12	0	53	59	43	46	48	52	955.7
19	0.0	0	58	58	38	41	48	50	955.5
20	0.0	0	60	64	41	41	50	52	955.4
21	0.0	0	63	66	42	43	52	54	955.5*
22	0.0	0	66	66	41	45	54	56	955.6
23	0.0	0	64	60	40	48	52	54	955.7
24	0.0	0	62	68	42	45	52	56	955.7
25	0.0	0	63	63	42	44	52	54	955.6
26	0.0	0	63	65	43	46	53	56	955.6
27	0.0	0	63	61	42	44	52	53	955.7

* Earthquake observed at 8:02 p.m. August 21, 1949

Mean	Precipitation Scenery Creek	Precipitation Petersburg	Temperature Scenery Creek	Temperature Petersburg
July 7-22	2.31	1.11	50.1	55.7
July 23 - August 27	8.81	7.26	50.1	53.4

SCENERY CREEK

Prior to the 1949 survey by the Geological Survey there were no bench marks in the Scenery Creek basin. On July 8, 1949 mean sea level was established at the mouth of Scenery Creek in Scenery Cove by the following procedure. Tidal bench mark BM-2-1923 set by the U. S. Coast and Geodetic Survey was recovered on the west side of Thomas Bay six miles southwest of Scenery Cove. The elevation of this mark as obtained from the U. S. Coast and Geodetic Survey was 8.29 feet above half tide level which for this purpose was assumed equal to mean sea level. Observations were made at this mark at 10 minute intervals for one hour straddling high tide and it was observed that high tide was 3.88 feet lower than the bench mark or 4.41 feet above mean sea level. Simultaneously with the above observations levels were read from the water surface of Scenery Cove to a newly set bench mark at the mouth of Scenery Creek. It was found that the bench mark was 4.35 feet above high tide. Since the water surface at Ruth Island was 4.41 feet above mean sea level at the same time and it was assumed that the water surface elevation was the same at Scenery Cove then the elevation of the bench mark was 8.76 feet mean sea level datum. This datum was the base for the vertical control of the survey.

The vertical control for the survey consisted of a double run line of vertical angle-stadia levels from BM 9 (above) to the outlet of Scenery Lake and a similar line from the upper end of the lake upstream one mile. Because of the extremely rugged character of the topography for the three-quarter mile downstream from the lake outlet it was not possible to keep the vertical angles below 6 degrees as is customary in this work. Every care was used to keep errors to a minimum and to eliminate mistakes and it is probable that the datum at Scenery Lake is within two feet of true mean sea level. A lake staff gage was established on the lake and its zero determined. Daily observations of this gage were made and are included as part of the appendix to this report. Lake level as determined from the gage was used as control for the work around the lake and to determine the elevation of the eight bench marks set on the lake shore. The elevations of the three bench marks set along Scenery Creek between Scenery Cove and Scenery Lake were determined from the main traverse line.

All bench marks are standard U. S. Geological Survey three inch bronze tablets inscribed "Plane table bench mark." They are all grouted in either ledge rock or large boulders as indicated in the description.

PTBM 1 Petersburg, about 20 miles northeast of, at the east end of Scenery Cove, an arm of Thomas Bay. About 20 feet south of north hill side and on north side of small stream at about highest tide level. About 250 feet north of mouth of Scenery Creek. In the top of a large isolated boulder, a standard 3 inch bronze plane table bench mark tablet grouted in rock and stamped "L-1-1949-9". Elevation 8.8

PTBM 2 Petersburg, about 20 miles northeast of. One mile east of (upstream) mouth of Scenery Creek. At mouth of Level Creek which is first large tributary entering Scenery Creek from the north. 70 feet north of confluence and 18 feet above water surface. 40 feet northwest of Level Creek. In the top of a large boulder with a six foot vertical face on the streamward side. A standard 3 inch bronze plane table bench mark tablet grouted in rock and stamped "L-2-1949-142." A six inch aluminum witness marker is nailed to a nearby tree. Elevation 141.6

PTBM 3 Petersburg, about 20 miles northeast of. 2.1 miles east (upstream) of mouth of Scenery Creek in Scenery Cove. At mouth of Jacobs Creek which is second large tributary entering Scenery Creek from the north. 40 feet northwest of Scenery Creek and 15 feet south of Jacobs Creek. In the top of a large boulder with aluminum witness marker nailed to 14 inch hemlock 8 feet south. A standard 3 inch bronze plane table bench mark tablet grouted in rock and stamped "L-3-1949-363." Note: This tablet was stamped 363 erroneously and was not changed because of poor trail conditions. Elevation 352.2

PTBM 4 Petersburg, about 25 miles northeast of. Two and three quarters miles east (upstream) of mouth of Scenery Creek in Scenery Cove. At mouth of Canyon Creek which is third large tributary entering Scenery Creek from the north and first below Scenery Lake. 1800 feet northwest of outlet of Scenery Lake. 100 feet north of Scenery Creek and 60 feet east of Canyon Creek. In the top of a large boulder with 5 inch spruce growing on top. 6 inch aluminum witness marker nailed to nearby tree. A standard 3 inch bronze plane table bench mark tablet grouted in boulder and stamped "L-4-1949-821." Elevation 820.7

PTBM 5 At outlet to Scenery Lake. On gently sloping rock ledge due north of top of falls. About 10 feet north of Scenery Creek and 10 feet west of Scenery Lake. A standard plane table bench mark tablet grouted in ledge rock and stamped L-5-1949-961." Note: This mark is shown on map as "958". Elevation 960.7

PTBM 6 640 feet northeast of outlet of Scenery Lake. About 5 feet northwest of edge of water on top of a rock ledge. An aluminum witness tablet is nailed to root of 24 inch hemlock about 10 feet north of mark. A standard plane table bench mark tablet grouted in ledge rock and stamped "L-6-1949-960." Elevation 960.1

PTBM 7 0.47 mile east of outlet of Scenery Lake on south side. About 100 feet south of first prominent point east of lake outlet. About 5 feet east of and 5 feet above water surface. About 2 feet below the top of a large boulder. An aluminum witness tablet is nailed to 15 inch spruce tree about 15 feet east of mark. A standard plane table bench mark tablet grouted in boulder and stamped "L-7-1949-960." Elevation 960.0

PTBM 8 0.65 mile east of outlet of Scenery Lake on north side. At Rainbow Falls and 55 feet above lake surface. 10 feet west of main stream and 10 feet east of small side stream. On horizontal rock ledge 2 feet north of south edge. A standard plane table bench mark grouted in ledge rock and stamped "L-8-1949-1011." Elevation 1010.6

PTBM 9 1.4 miles east of outlet of Scenery Lake, on south bank. 300 feet east of eastmost mouth of Lost Valley Creek which is third largest stream east of mouth of lake. 75 feet east of large boulder with vertical face on lake side. On top of a boulder about 10 feet square, 8 feet from water's edge on north and east sides and 6 feet above water surface. A standard 6 inch aluminum witness tablet is nailed to a 12 inch spruce tree about 20 feet west of mark. A standard bronze plane table bench mark tablet grouted in boulder and stamped "L-9-1949-962." Elevation 962.2

PTBM 10 1.7 miles east of outlet of Scenery Lake, on north side. 125 feet northeast of mouth of Bear Creek which is first large creek entering lake on north side east of outlet. 80 feet above lake surface on a prominent rock ledge which has a vertical face about 15 feet high on the side facing the lake. Mark is on southwest corner of ledge. A standard plane table bench mark tablet grouted in ledge rock and stamped "L-10-1949-1038" Elevation 1038.0

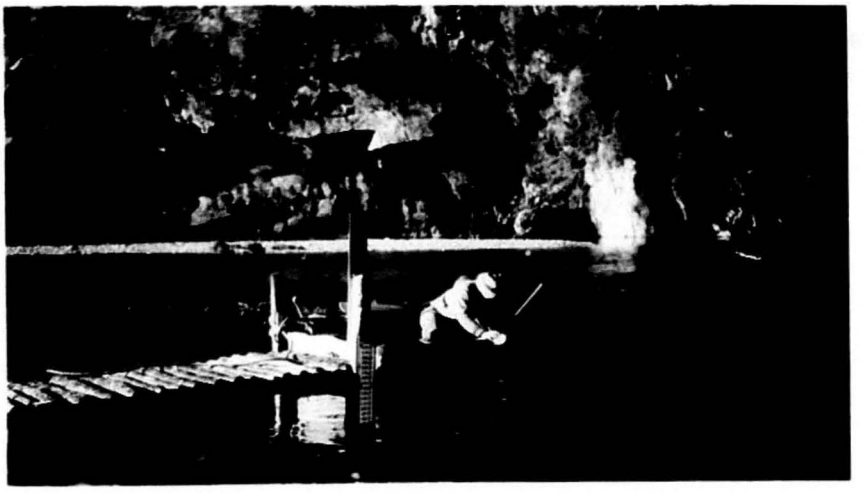
PTBM 11 At northeast corner of Scenery Lake. On the northwest corner of a long narrow boulder about 30 feet long which is in the lake about 25 feet south of north shore and 50 feet west of east shore and about 6 feet above water line. A standard plane table bench mark grouted in boulder and stamped "L-11-1949-962." Elevation 962.2

PTBM 12 At southeast corner of Scenery Lake. 200 feet southeast of mouth of Scenery Creek on the top of a large boulder which is the only such boulder in the immediate area. About 50 feet north of toe of main slope. A standard 3 inch bronze plane table bench mark tablet grouted in boulder and stamped "L-12-1949-970". A six inch standard aluminum witness tablet is nailed to a tree about 8 feet east of mark. Elevation 970.0

Assembling boat furnished by U. S. Forest Service for use on Scenery Lake. Pre-cut lumber is purchased on government contract from firm in Ketchikan. July 30, 1949. Lawrence photo No. L-4972.

Finished boat powered by 5 H.P. Johnson outboard motor. Boat is towing spruce log cut to stove wood lengths for camp fuel. August 6, 1949. Lawrence photo No. L-4994.

Radio Station KWYQ setup in cook tent at Scenery Lake camp. Station was powered from 12 volt storage batteries and had a power output of 25 watts. Daily schedules were maintained with the Alaska Communication Service station at Petersburg. August 9, 1949. Lawrence photo No. L-4996.



View of dock and lake gage at east end of Scenery Lake. Zero of gage is at elevation 954 feet. August 21, 1949. Lawrence photo No. L-49111.

View of U.S.G.S. camp at east end of Scenery Lake. Camp was set up July 22 and dismantled August 27, 1949. All equipment was transported to and from the site by air. July 30, 1949. Lawrence photo No. L-4974.

Looking west from camp site at east end of Scenery Lake. Canvas boat is 12 foot folding type obtained from Kalamazoo Boat Company. It was found to be too small to transport a party of 4 men and their surveying equipment. July 23, 1949. Lawrence photo No. L-4970.

U. S. GEOLOGICAL SURVEY

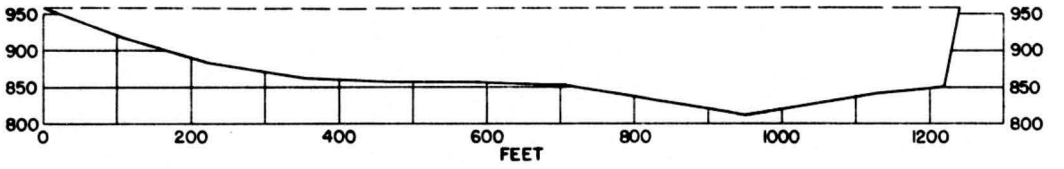
SCENERY LAKE, ALASKA
CROSS-SECTIONS

LOOKING EAST

FROM SOUNDINGS MADE IN AUGUST, 1949

SCALE 1 INCH=200 FEET

LAKE SURFACE ELEVATION 957 FEET



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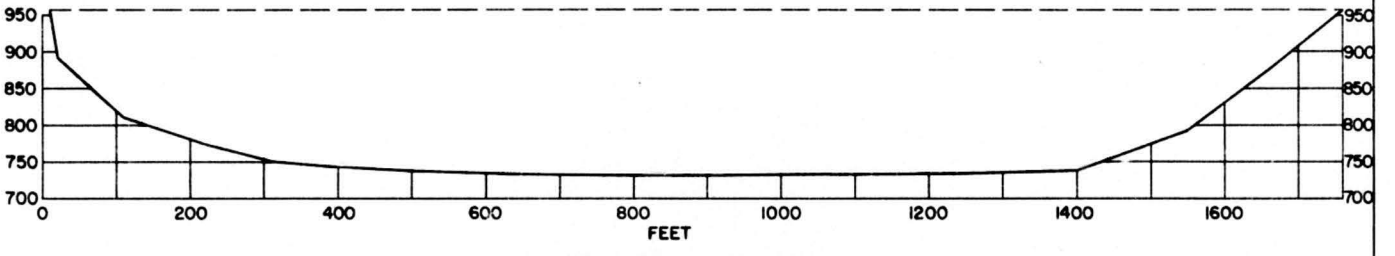
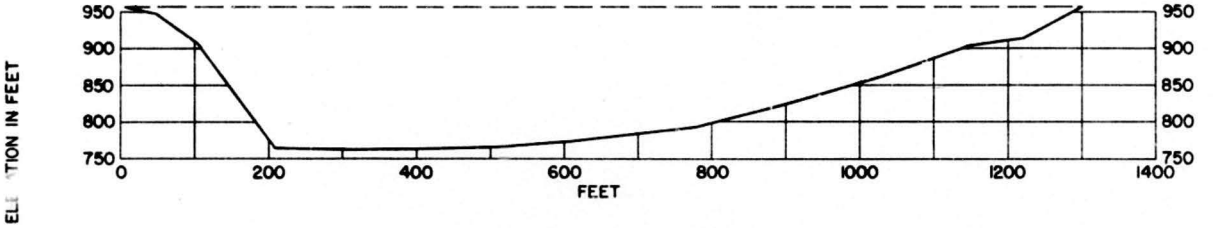
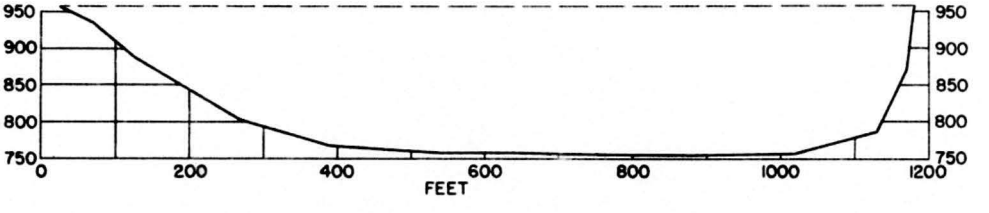


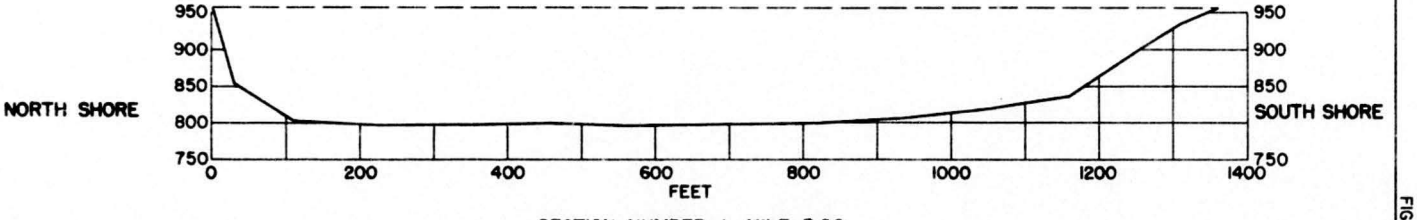
SECTION NUMBER 4. MILE 5.52



SECTION NUMBER 3. MILE 5.04



SECTION NUMBER 2. MILE 4.42



SECTION NUMBER 1. MILE 3.90

FIGURE 5

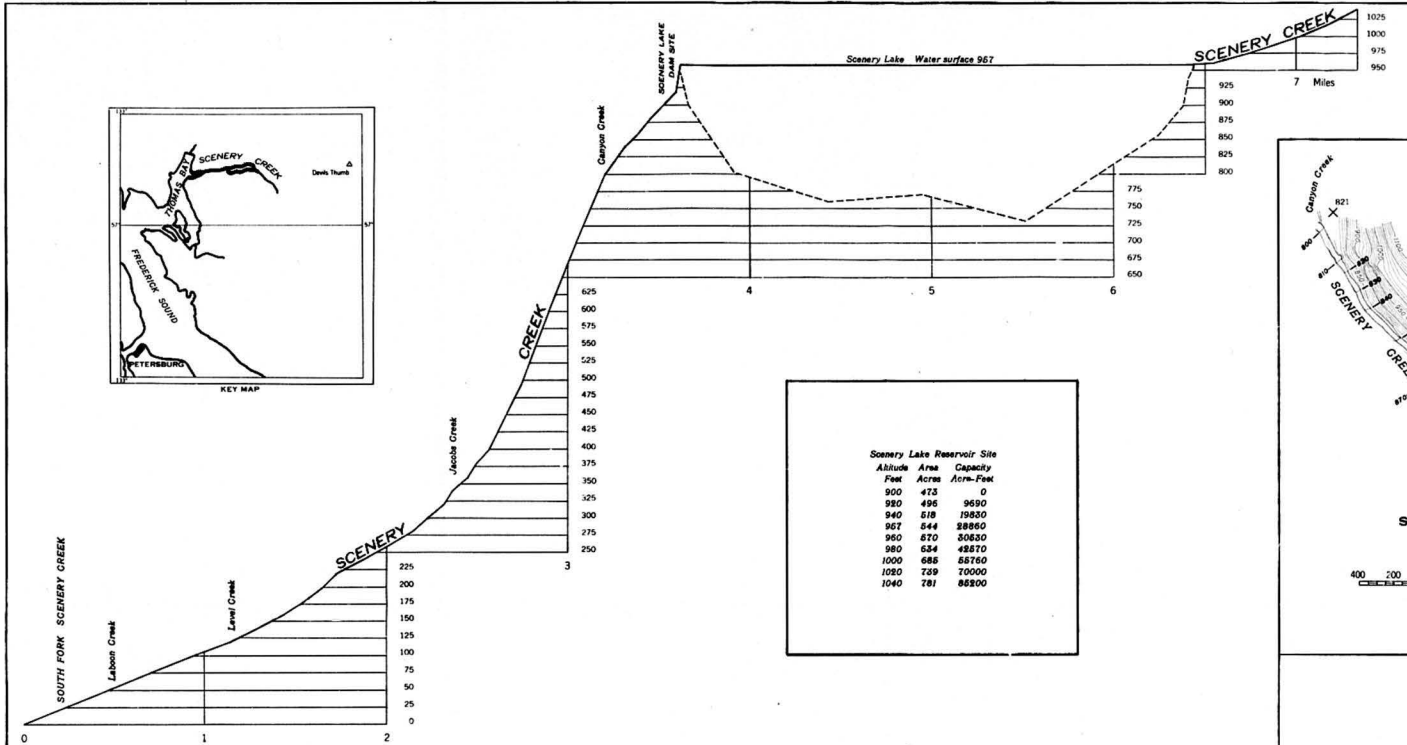
GPO-S-F80

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PLAN AND PROFILE
SCENERY CREEK AND SCENERY LAKE, ALASKA
DAM SITE

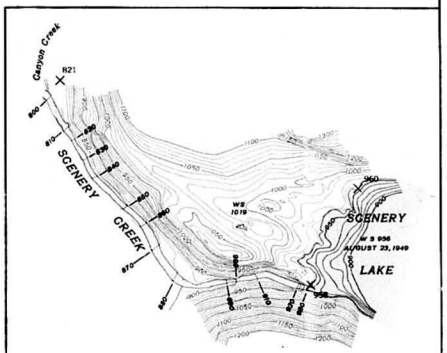
PLATE 12
ONE SHEET

KEY MAP



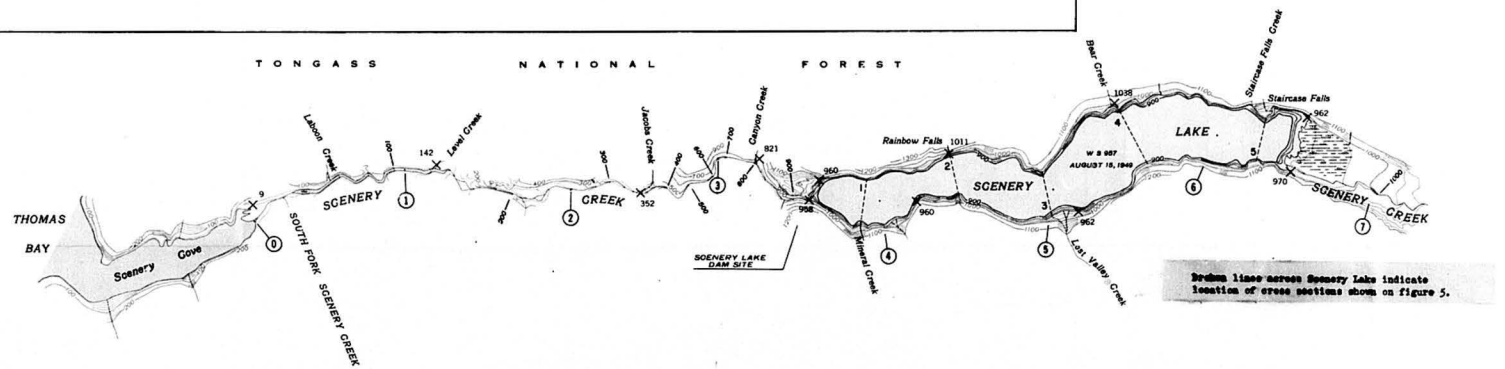
Scenery Lake Reservoir Site

Altitude Feet	Area Acres	Capacity Acre-Feet
900	473	0
920	496	9690
940	518	19830
967	544	28860
960	570	30630
980	634	43870
1000	685	55760
1020	739	70000
1040	781	85200



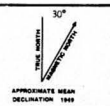
SCENERY LAKE DAM SITE
(MILE 3.6)

Scale 1:4800 or 1 inch = 400 feet
400 200 0 400 800 1200 Feet
Contour interval 10 feet
Datum is mean sea level



Broken lines across Scenery Lake indicate location of cross sections shown on figure 5.

Topography by F. F. Lawrence and J. L. Colbert
Surveyed in 1949



Scale 1:24000 or 1 inch = 2000 feet
1 0 1 2 Miles
5000 0 5000 10000 Feet
Contour interval 20 feet
Vertical scale 1 inch=100 feet
Datum is mean sea level

Subject to adjustment
All crosses (X) are plane table bench marks

One sheet with dam site and profile

SCENERY CREEK, ALASKA
Printed in 1950
ONE SHEET