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HYDROLOGIC INVESTIGATIONS OF SALMON CREEK RESERVOIR AND DRAINAGE BASIN NEAR JUNEAU, ALASKA

By

G. O. Balding

Prepared in cooperation with the
City and Borough of Juneau

ADMINISTRATIVE REPORT
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Anchorage, Alaska
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ILLUSTRATIONS

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FACTORS FOR CONVERTING ENGLISH UNITS TO INTERNATIONAL SYSTEM (SI) UNITS

Multiply English units	By	To obtain SI units
inches (in)	25.4	millimetres (mm)
feet (ft)	0.3048	metres (m)
miles (mi)	1.609	kilometres (km)
square miles (mi^2)	2.590	square kilometres (km^2)
acres	0.004047	square kilometres (km^2)
acre-feet (acre-ft)	1,233	cubic metres (m^3)
acre-feet (acre-ft)	$1{,}233 \times 10^{-6}$	cubic hectometre (hm^3)
cubic feet per second (ft^3/s)	0.02832	cubic metres per second (m^3/s)
gallons per day (gal/d)	0.0438×10^{-6}	cubic metres per second (m^3/s)
gallons	3.785×10^{-3}	cubic metres (m^3)

HYDROLOGIC INVESTIGATIONS OF SALMON CREEK RESERVOIR AND DRAINAGE BASIN NEAR JUNEAU, ALASKA

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ABSTRACT

The City and Borough of Juneau, due to rapid urbanization, is aware of the need for increased service to the public in the form of an expanded, centralized water system. The possibility of using the water now stored for hydroelectric purposes in Salmon Creek Reservoir as a future domestic supply is being considered.

At its present spillway altitude of 1,170 feet or 356.6 metres, the reservoir capacity is 17,585 acre-feet or 21.7 cubic hectometres, virtually unchanged since the dam was completed in 1915. A draft rate of 40 cubic feet per second or 1.13 cubic metres per second would be sufficient to serve 87,000 people at approximately 300 gallons or 1.1 cubic metres per second per person per day. Estimated average annual inflow for 1950-70 is 33,800 acre-feet or 41.7 cubic hectometres. Runoff for that part of the basin below the reservoir is estimated at 35,800 acre-feet or 44.1 cubic hectometres.

Water quality in the reservoir is excellent. Concentration of dissolved solids does not exceed 34 milligrams per litre and dissolved-oxygen content is high. Coliform bacteria were not found in the water samples obtained.

Water quality of Salmon Creek below the reservoir is similar to that of the reservoir. Bacteria counts, however, were somewhat higher.

Water from Salmon Creek Reservoir, with a minimum of treatment, would provide an adequate supply of excellent quality water.

INTRODUCTION

The City and Borough of Juneau, due to rapid urbanization, is aware of the need for increased service to the public in the form of sewage collection and treatment and an expanded centralized water system. It is presently in the process of constructing a sewage-collection system which includes a completed treatment plant and an additional plant planned for the near future. Drinking water in the city and borough is not scarce, but the development of additional good quality water and its distribution

outside of the area served by the wells and springs located in Last Chance Basin (Gold Creek) or to the densely-populated areas of the borough has high priority in the plans of the city and borough. The possibility of using the water now stored for hydroelectric purposes in Salmon Creek Reservoir as a future domestic supply is being considered. This source should be available to the city and borough upon completion of the Snettisham hydroelectric project.

This report was prepared by the U.S. Geological Survey in cooperation with the City and Borough of Juneau. Field work for this study was done during 1972 and 1973.

Purpose and Scope

The purpose of this study was to evaluate Salmon Creek Reservoir and drainage basin for water quality and quantity. The work included: (1) determination of the reservoir area and capacity, (2) the collection and analysis of water-quality samples from the reservoir and selected tributaries, and (3) miscellaneous measurements of discharge and water quality of Salmon Creek below the reservoir.

Acknowledgments

The author is indebted to Preston Burnett, general manager, and William Norton, chief electrician, of A-J Industries, Inc. in Juneau for making data available concerning Salmon Creek Reservoir and the firm's hydroelectric operations in the basin.

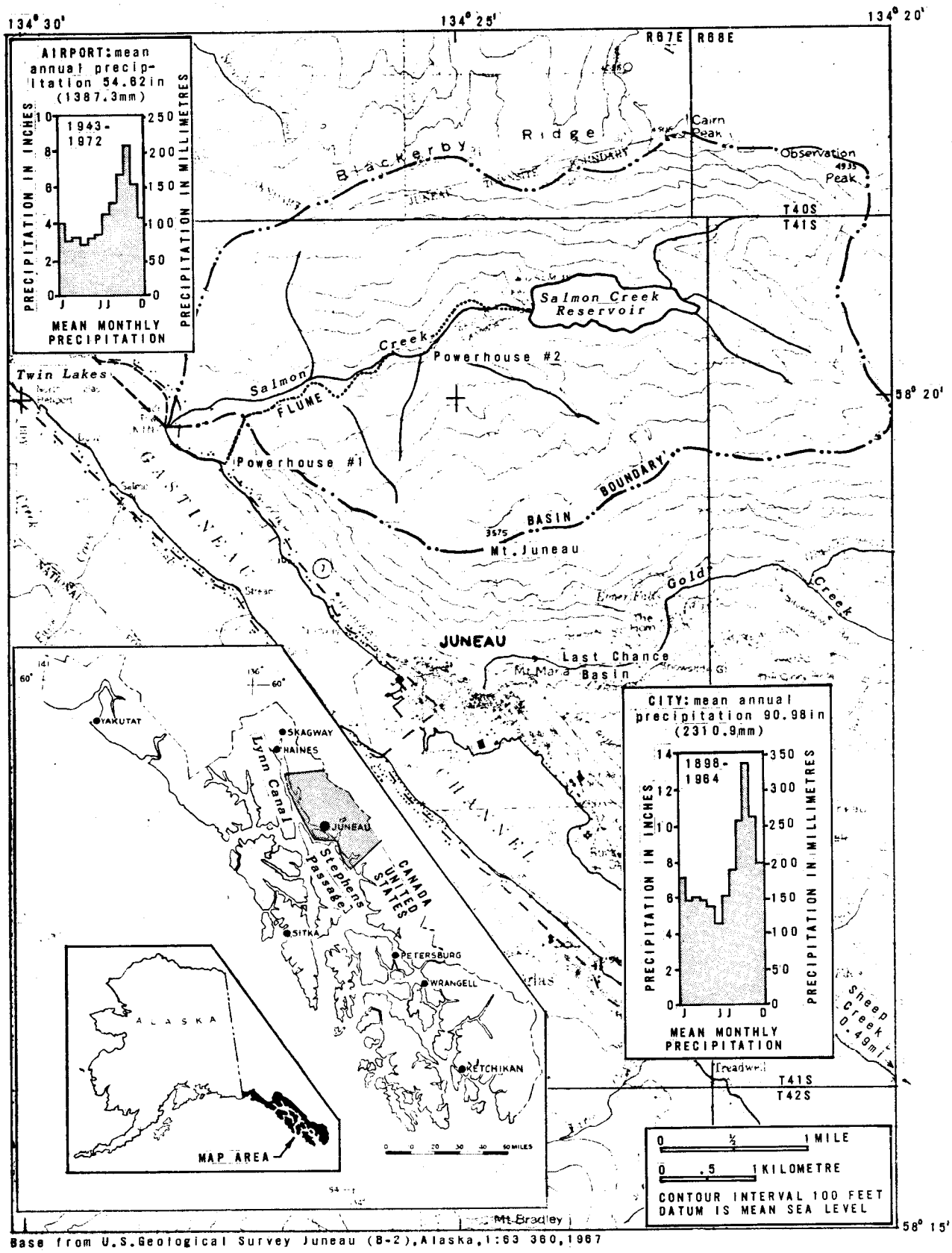
Location

The City and Borough of Juneau is located in southeastern Alaska and encompasses an area of about 3,100 mi^2 (80,290 km^2) (fig. 1). It is bounded on the east by the United States-Canada border and on the west by Stephens Passage and Lynn Canal.

Salmon Creek originates about 3.5 mi (5.6 km) northeast of downtown Juneau and flows westward for about 5 mi (8 km), discharging into the Gastineau Channel. It has a drainage area of 9.97 mi^2 (25.8 km^2) that ranges in altitude from sea level to 4,935 ft (1,504 m) at Observation Peak (fig. 1).

Precipitation

Precipitation records in the area have been collected by the National Weather Service (formerly U.S. Weather Bureau) at the Juneau Municipal Airport since 1943 and in the downtown area since 1898. Precipitation occurs throughout the year but is heaviest during the fall and winter months (fig. 1). The mean annual precipitation at the airport is about



Base from U.S.Geological Survey Juneau (B-2), Alaska, 1:63 360, 1967

Figure 1.-- Location of Salmon Creek Reservoir and drainage basin, and mean monthly precipitation in the City and Borough of Juneau, Alaska.

55 in (1,400 mm) and is about 91 in (2,310 mm) downtown. Precipitation data for the Salmon Creek basin are not available, but, based on data from nearby Gold and Sheep Creeks, precipitation is estimated at 100-150 in (2,540-3,810 mm) per year.

GEOLOGY

The geologic units exposed in the drainage basin consist of unconsolidated sediments and metamorphic rock (fig. 2). The unconsolidated rocks include mass-wasting, glacial, alluvial, deltaic, and marine deposits (Miller, 1972). The metamorphic rocks include primarily quartzite, migmatite, phyllite, slate, schist, and marble (Ford and Brew, 1973).

According to Sainsbury (1953), faulting in the drainage basin is limited to two inferred strike faults with two major oblique faults south of the drainage basin. Steep talus-filled cuts indicate the location of the strike fault planes. Their net displacement and relative movement are not known but probably are small. Approximately 3,500 ft (1,067 m) of horizontal displacement is associated with the Silverbow fault, one of the two major oblique faults south of the basin.

No landslides are noted in the immediate area of the reservoir, but Miller (1972) indicates one on the north side of a tributary to Salmon Creek. This slide does not endanger the reservoir but indicates that slides do occur in the area.

Ford and Brew (1973) have mapped scattered unconsolidated deposits throughout the reservoir basin. Due to the relative steepness of the basin and Juneau's proximity to areas of seismic activity, these deposits may be susceptible to earthquake-induced sliding. Any landslide that terminates in the reservoir would be detrimental to the water quality.

Avalanches could be similarly detrimental. If the avalanche is large enough, debris could be swept onto the frozen reservoir and be deposited in the water when the ice thaws in the spring.

SALMON CREEK RESERVOIR

Salmon Creek Dam and Reservoir are located about 3 mi (4.8 km) upstream from the mouth of Salmon Creek. The dam is a concrete constant-angle arch structure that was completed in 1915 for the Gastineau Mining Company's hydroelectric operations. Salmon Creek Reservoir is about 1.2 mi (1.9 km) long and at the widest point about 0.3 mi (0.5 km) wide. The drainage area behind the dam is 4.31 mi^2 (11.2 km^2).

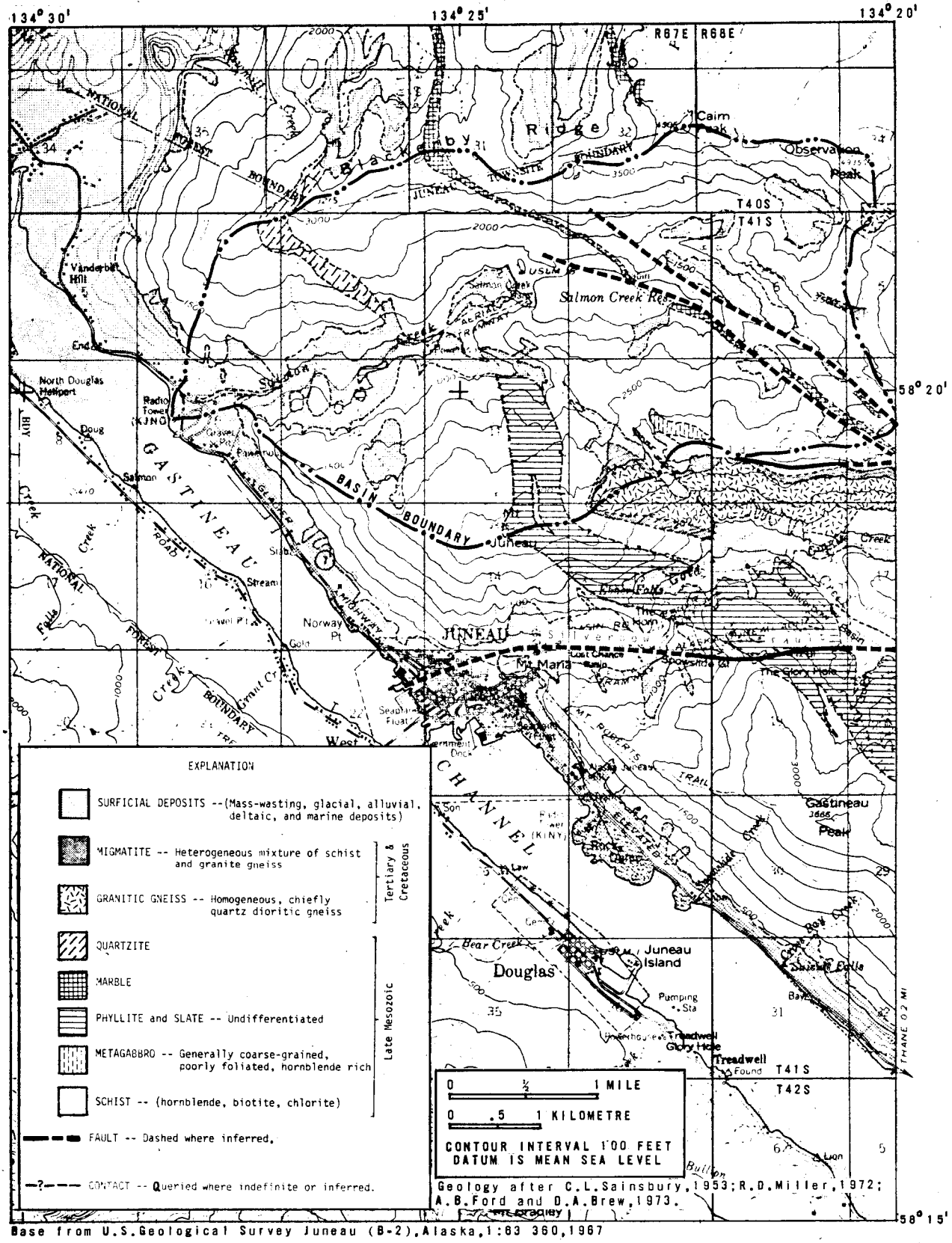


Figure 2.-- Geology of Salmon Creek drainage basin and vicinity.

Inflow

Because runoff data for Salmon Creek are not available, inflow into Salmon Creek Reservoir was estimated by analyzing runoff data for Gold and Sheep Creeks near Juneau (U.S. Geological Survey, 1964; 1967-71b). Runoff characteristics for Salmon Creek are assumed to be similar to those for Gold and Sheep Creeks because all three streams share the same hydrologic setting. Unit annual runoff, computed by dividing annual runoff in acre-feet by drainage area in square miles, is listed in table 1 for Gold and Sheep Creeks. The average unit annual runoff of these two streams is believed to be a good estimate of unit annual runoff into Salmon Creek Reservoir. The estimated annual inflow into Salmon Creek Reservoir is obtained by multiplying these average values by the drainage area of Salmon Creek Reservoir (table 1). The average annual inflow for the 21-year period, 1950-70, is estimated as 33,800 acre-feet (41.7 hm^3).

Capacity

The original survey (1917) at the reservoir indicated a capacity of 18,980 acre-feet (23.4 hm^3) at a water surface altitude of 1,177 ft (358.7 m). However, in 1967, maintenance was performed on the dam under the direction of A-J Industries, Inc., the owners at that time (Alaska Electric Light and Power Company is the present owner). According to William Norton (oral commun., 1973), the 2-foot-high (0.6-m) parapet was removed from the top of the dam and the wooden gates were removed from the spillway which, in effect, decreased the total capacity of the reservoir. The spillway altitude is 1,170 ft (356.6 m), and according to the original survey, the reservoir held 17,630 acre-feet (21.7 hm^3) of water at that alitude.

The present capacity of Salmon Creek Reservoir was determined by placing stakes at strategic locations along its shoreline and running traverses between them with a fathometer (fig. 3). The bottom of the reservoir was then contoured and the area and volume were determined for the spillway altitude of 1,170 ft (356.6 m). The present total capacity is 17,585 acre-feet (21.7 hm^3) with a surface area of 192 acres (0.78 km^2) (fig. 4).

Figure 5 shows draft-storage-frequency curves for the reservoir. These curves indicate the amount of storage required for given draft rates and are based on mass curve analysis (Riggs and Hardison, 1973). For example, once every 10 years, on the average, storage of at least 11,800 acre-feet (14.5 hm^3) would be required to sustain a constant draft rate of 40 ft^3/s (1.13 m^3/s). There also is a 10-percent chance that 11,800 acre-feet (14.5 hm^3) of storage would be insufficient to sustain a constant draft rate exceeding 40 ft^3/s (1.13 m^3/s) throughout any year. A draft rate of 40 ft^3/s (1.13 m^3/s) is equal to 26,100,000 gallons per day (98,800 m^3 per day). At a water-use rate of approximately 300 gallons (1.1 m^3) per person per day, 40 ft^3/s (1.13 m^3/s) would be sufficient for 87,000 persons.

Table 1.--Computed unit annual runoff of Gold and Sheep Creeks and estimated annual inflow into Salmon Creek Reservoir

Calendar year	Computed unit annual Runoff in acre-feet per square mile			Estimated inflow to Reservoir in acre-feet
	Gold Creek	Sheep Creek	Average	
1950	5,420	5,140	5,280	22,800
51	5,840	6,110	5,975	25,800
52	8,830	8,840	8,835	38,100
53	7,620	7,880	7,750	33,400
54	6,810	6,150	6,480	27,900
1955	7,530	6,600	7,065	30,400
56	8,100	7,630	7,865	33,900
57	7,330	6,300	6,815	29,400
58	7,270	6,790	7,030	30,300
59	8,440	7,950	8,195	35,300
1960	9,250	10,210	9,730	41,900
61	10,260	10,670	10,465	45,100
62	8,850	9,140	8,995	38,800
63	7,740	8,660	8,200	35,300
64	8,560	10,230	9,395	40,500
1965	7,120	7,620	7,370	31,800
66	7,320	7,930	7,625	32,900
67	8,710	7,510	8,110	35,000
68	6,220	6,690	6,455	27,800
69	7,560	7,990	7,775	33,500
1970	9,120	8,920	9,020	38,900
Average	7,805	7,855		33,800

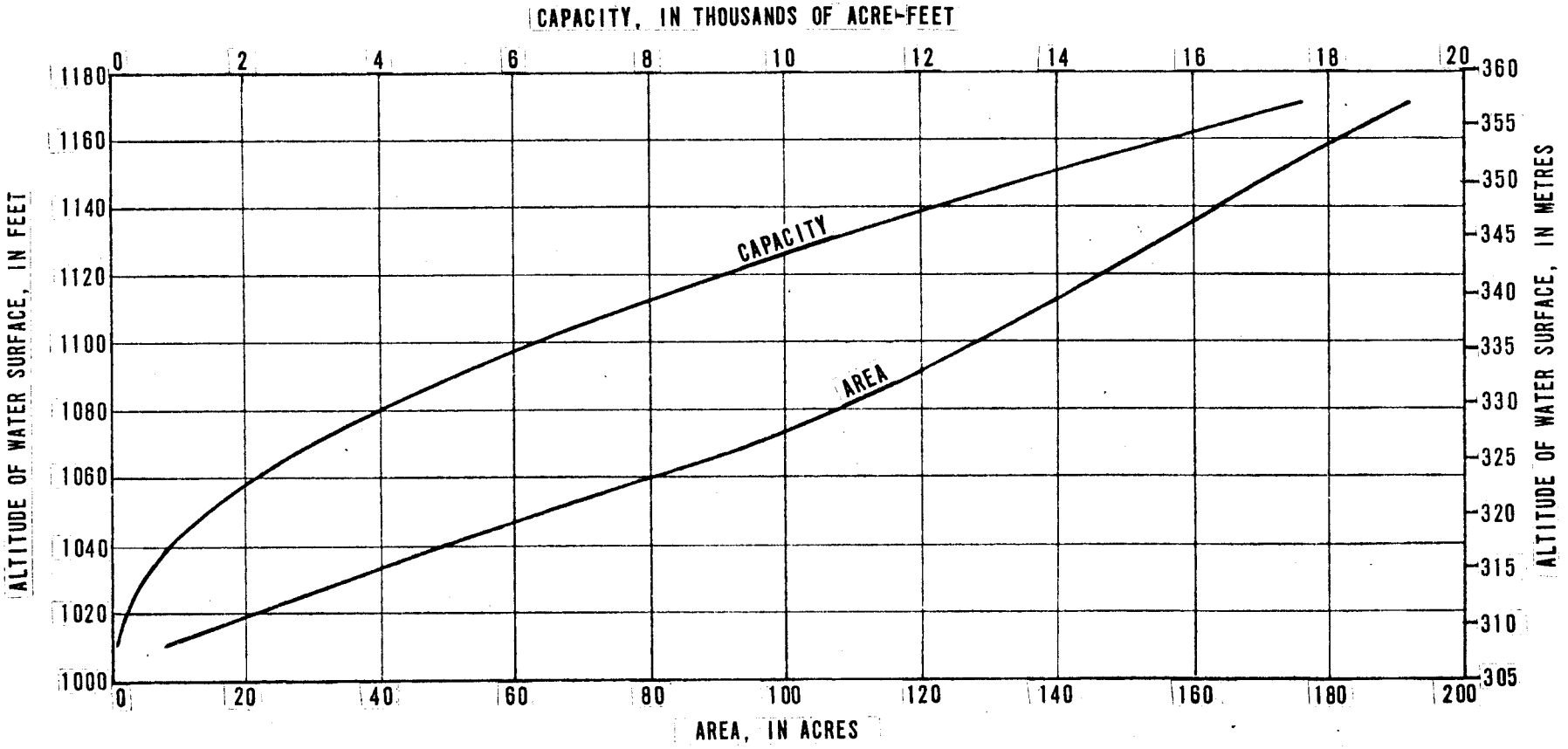


Figure 4.-- Area and capacity of Salmon Creek Reservoir.

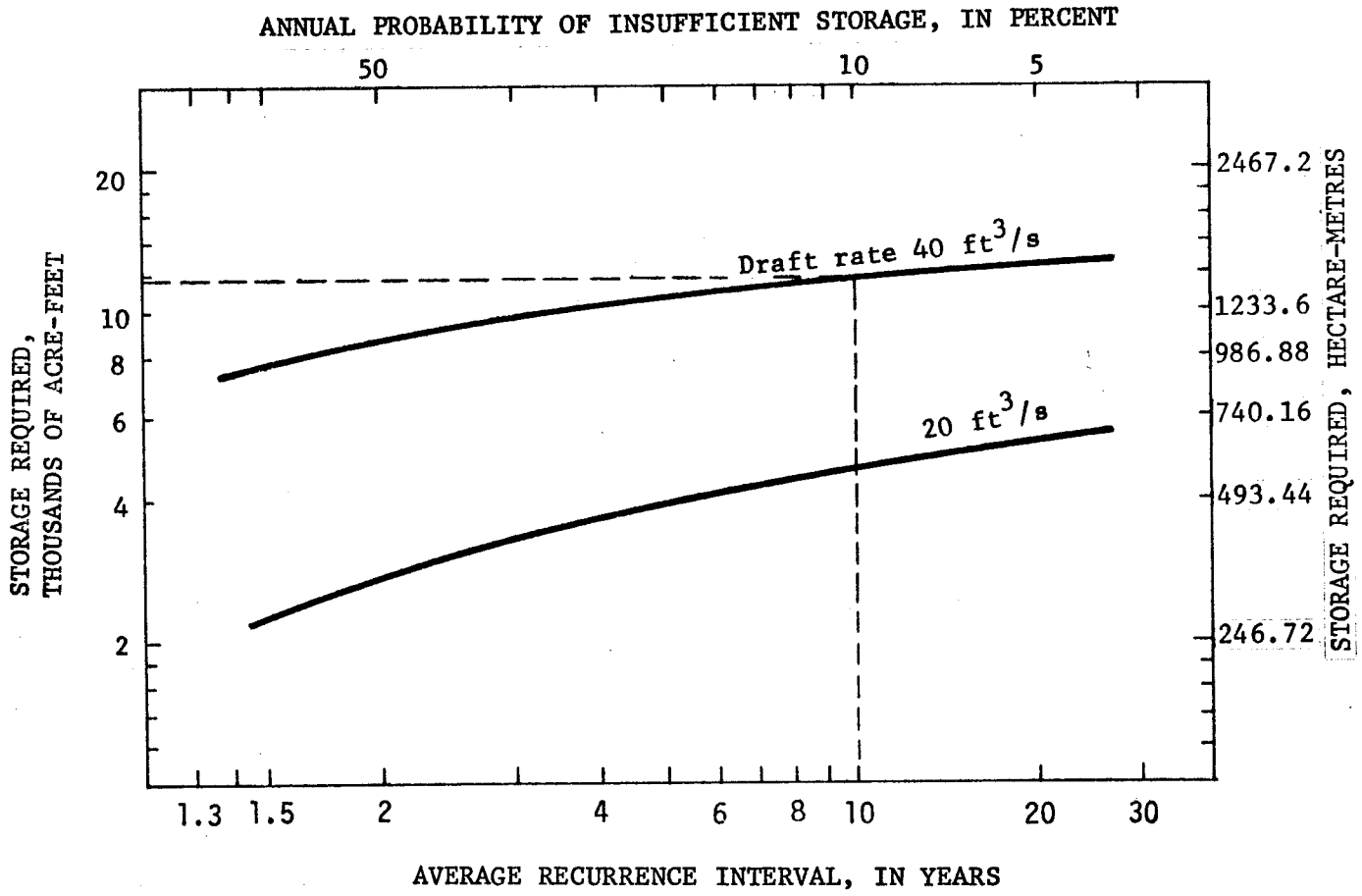


Figure 5.--Draft-storage-frequency curves for Salmon Creek Reservoir.

Streamflow below Reservoir

Discharge of Salmon Creek below the reservoir is of concern to the proposed Twin Lakes recreation area (fig. 1) and the management thereof.

Miscellaneous discharge measurements on Salmon Creek (table 2) give an indication of runoff during certain times of the year. Almost all of the measurements were made near the mouth of the stream and indicate discharges only at that point and may or may not include spillage from the reservoir or from the flume between the upper and lower powerhouses. On February 23, 1973, two discharge measurements were made on Salmon Creek when leakage from the flume was considered negligible due to icing and when there was no spillage from the reservoir. Near the upper powerhouse the discharge was 6.9 ft^3/s (0.20 m^3/s); near the mouth a discharge of 24.1 ft^3/s (0.68 m^3/s) was measured, a gain of 17 ft^3/s (0.48 m^3/s). This can be considered as base-flow conditions.

Based on runoff in upper Salmon Creek and the precipitation at Juneau, the estimated runoff for lower Salmon Creek is about 100 in (2,540 mm) per year, or about 35,800 acre-feet (44.1 hm^3).

WATER QUALITY

Salmon Creek Reservoir

Water-quality sampling sites were established in the reservoir (fig. 6) to monitor seasonal change in water quality. Most of the sampling was done in September 1972 and March 1973. The work involved obtaining temperature profiles at each site and collecting water samples for chemical and bacteriological analyses and determination of dissolved-oxygen content. Samples were collected at three points, one near the reservoir bottom, one just below the water surface, and one at an intermediate zone which was determined from temperature changes in the temperature profile.

Temperature

Lakes and reservoirs generally display three strata or layers of water of differing temperature characteristics. The vertical extent of these layers depends on weather conditions, especially wind, and the amount of heat added to or removed from the lake water. The upper layer is the epilimnion which contains relatively warm water that slowly decreases in temperature with depth. The middle layer, or thermocline, is the zone in which the temperature change with depth exceeds 1°C (Celsius) per metre. The lower level, or hypolimnion, is again a zone in which the temperature slowly changes with depth. The three layers of water are most clearly defined during the late summer or early fall.

Figure 7 shows the late summer and late winter temperature profiles at site B. The late winter profile is shallower (shorter) due to the lower reservoir water level caused by drawdown for hydroelectric operations.

Table 2.--Miscellaneous discharge measurements on Salmon Creek

Date	Location	Discharge (cfs)
9-4-63	50 ft above Highway 7	27.7
9-10-63		77.9
9-12-63	200 ft above Highway 7	197
9-13-63	200 ft above Highway 7	139
3-15-68		22.1
6-26-68		120
8-22-68	150 ft above Highway 7	14.8
1-13-69		1.4
2-23-73	500 ft above Highway 7	24.1
2-23-73	25 ft below bridge below upper powerhouse	6.9

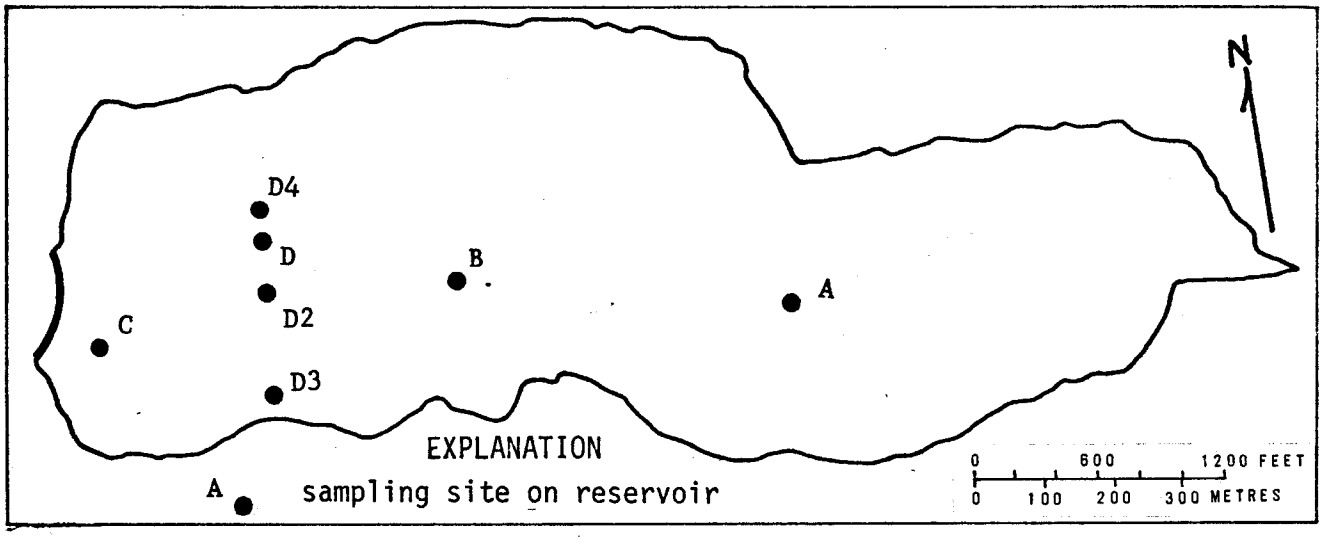


Figure 6.--Water-quality sampling sites on Salmon Creek Reservoir.

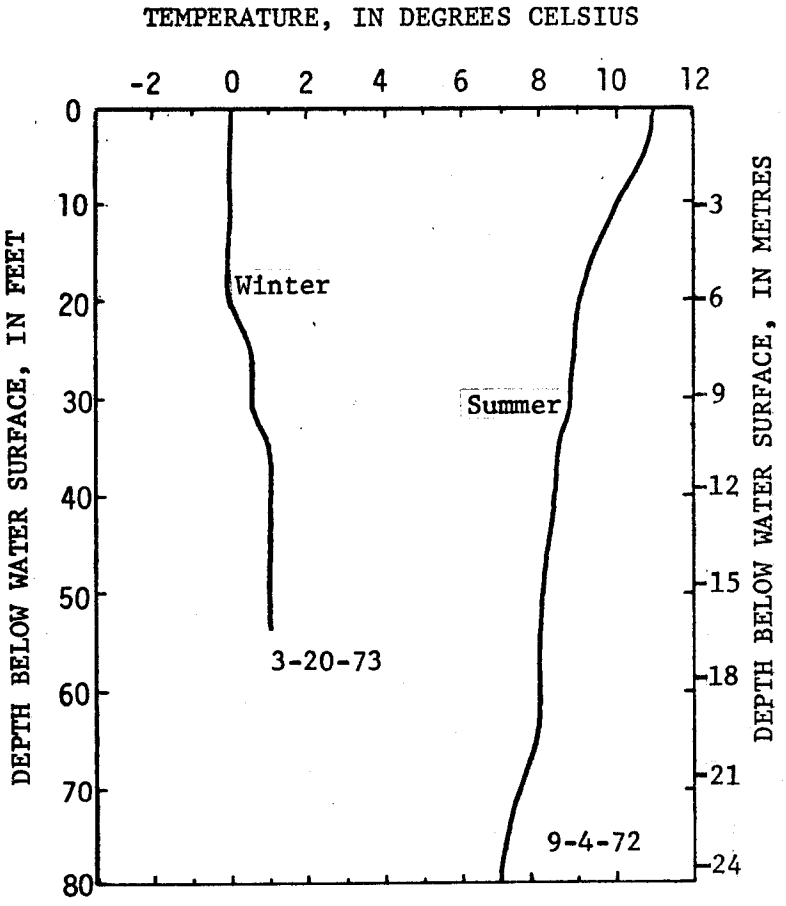


Figure 7.--Seasonal temperature profiles at sampling site B.

The late summer profile shows a surface temperature of 11°C and a near-bottom temperature of 7°C. A thermocline did not exist at that time. If a thermocline does exist at Salmon Creek Reservoir during the summer, it may be only for a very short time and of limited extent due to the wind action on the surface of the lake.

The winter temperature profile is reversed compared to the summer profile; the coldest water temperatures occur in the upper layer and the relatively warmer water temperatures occur in the lower layer. In very deep lakes the water temperature in the lower layer does not go below 4°C. However, in Salmon Creek Reservoir water temperatures are below 4°C at depth because it is relatively shallow and some inflow of water at near-freezing temperature occurs.

Chemical Quality

The extent to which any water can be utilized depends upon its quality in addition to its availability. Because the planned use of water from Salmon Creek Reservoir is for domestic purposes, the limits on amounts of various dissolved constituents as recommended by the U.S. Public Health Service (1962) for drinking water will be used as standards. In addition, domestic water supplies should be soft or not more than moderately hard.

The water in Salmon Creek Reservoir is basically a calcium bicarbonate type of excellent quality (table 3) and meets the requirements for domestic use as recommended by the U.S. Public Health Service (1962). Concentrations of dissolved solids did not exceed 34 mg/l (milligrams per litre), and concentrations of chloride and nitrate were less than 1 mg/l. Sulfates were also low; concentrations did not exceed 8 mg/l. Total hardness concentrations in the reservoir water range from 14 to 21 mg/l (soft, table 4). Iron, manganese, and the trace elements (arsenic, copper, and lead) did not exceed the recommended limits in µg/l (micrograms per litre) as indicated in table 5. Fluoride concentrations in Salmon Creek Reservoir did not exceed 0.1 mg/l.

The Federal Water Pollution Control Administration (now known as Environmental Protection Agency) (1968) recommended that color in water should be less than 10 color units and raw water should have no objectionable odor. The color of water from the reservoir did not exceed 5 color units and no odors were noticeable.

Bacteria Content

Sixteen bacteriological samples were collected from the reservoir and analyzed by the Alaska Department of Health and Welfare, Division of Public Health. The results were acceptable according to the Environmental Protection Agency and State standards showing 0.0 bacterial count on 14 of the samples and a count of 2.2 per 100 ml (millilitres) of water for two of the

Table 3.--Chemical analyses of water from Salmon Creek Reservoir
(concentrations in milligrams per litre)

Sample site	Date of collection	Sample depth (ft.)	Temperature (°C)	Silica (SiO_2)	Iron, dissolved (Fe) (micrograms per litre)	Manganese (Mn) (micrograms per litre)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_2 & NO_3 as N)	Dissolved oxygen	Dissolved solids	Hardness as $CaCO_3$ total	Hardness as $CaCO_3$ noncarbonate	Specific conductance (micromhos @ 25°C)	pH	Color
USPHS standards					300	50							250	250	1.7	10		500					
A	9-04-72	6	10.5	1.3	--	0	5.2	0.7	0.8	0.9	17	0	4.8	0.2	0.1	.02	10.5	22	16	2	40	7.2	0
		18	9.0	1.4	--	0	6.2	.6	.4	.8	15	0	4.5	.2	.1	.05	10.5	21	18	6	38	7.1	0
		78	7.0	1.5	--	10	5.4	.6	.4	1.0	14	0	4.5	.2	.1	.05	11.0	21	16	5	38	7.1	0
		90	6.0	1.6	--	0	6.2	.6	.4	.9	16	0	5.4	.2	0	.09	11.5	24	18	5	40	7.2	0
A	11-07-72	0	-	1.7	50	0	6.2	.6	.6	.8	22	0	6.1	.4	0	.07	--	28	18	0	44	8.0	2
A	3-20-73	1	0.0	2.1	9	0	7.0	.6	.6	.9	18	0	6.2	.8	0	.17	13	28	20	5	49	7.1	0
		10	0.0	2.0	20	0	7.2	.8	.6	.9	21	0	6.8	.7	0	.15	14	30	21	4	51	7.6	5
		24.5	.5	2.2	9	0	7.9	.7	.6	1.0	25	0	7.7	.9	0	.15	7	34	23	2	58	7.0	0
B	3-20-73	1	0.0	2.0	9	0	6.8	.6	.6	.8	19	0	5.7	.6	0	.16	13	27	19	4	48	7.3	0
		30	.5	1.8	20	0	7.0	.7	.5	.8	21	0	6.0	.3	0	.13	12	28	20	3	49	7.5	0
		53.5	1.0	1.7	9	0	6.6	.7	.5	.9	20	0	6.0	.3	0	.13	11	27	19	3	47	7.5	5
		15	0.0	1.9	20	0	7.1	.7	.4	.8	26	0	6.2	.5	0	.13	13	31	21	0	50	7.8	0
C	9-04-72	160	5.0	2.1	--	0	6.0	.7	.5	.9	16	0	5.4	.1	0	.14	10.5	24	18	5	44	7.1	5
C	3-20-73	1	0.0	2.0	40	0	7.1	.8	.6	1.0	21	0	6.2	.2	0	.14	12	29	21	4	50	7.1	5
		10	.6	2.1	9	0	7.4	.7	.5	.9	21	0	6.3	.5	0	.14	13	29	21	4	51	7.2	5
		68.6	1.0	1.8	40	0	6.8	.7	.5	.9	21	0	6.1	.1	0	.12	12	28	20	3	48	7.2	5
D	9-04-72	6	10.0	1.5	--	39	6.2	.6	.5	.9	20	0	4.8	.2	.1	.02	10.3	25	18	2	41	7.3	5
		78	7.0	1.3	--	20	4.6	.6	.4	.8	14	0	4.3	.2	.1	.05	10.9	20	14	3	37	7.2	5
		125	5.0	1.7	--	20	6.0	.7	.5	1.0	16	0	5.2	.2	0	.14	11.0	24	18	5	43	7.0	5
D	11-07-72	0	--	1.7	40	0	6.2	.6	.7	.8	19	0	5.8	.4	0	.06	--	26	18	2	44	7.9	1
D2	3-22-72	10	--	2.1	--	40	6.8	.8	1.0	.8	20	0	6.5	.4	0	.16	--	29	21	5	51	6.8	0
		46	--	--	--	10	6.7	.7	.8	.8	21	-	--	--	-	--	--	--	20	3	50	6.7	-
D3	3-22-72	10	--	--	--	40	6.9	.8	1.2	.8	20	0	--	--	-	--	--	--	21	5	53	6.9	-
		35	--	--	--	20	6.6	.7	1.2	.8	22	0	--	--	-	--	--	--	21	3	51	6.8	-
D4	3-22-72	10	--	--	--	10	6.7	.8	1.9	.7	20	0	--	--	-	--	--	--	20	4	56	6.7	-
		35	--	--	--	30	6.8	.8	2.1	.9	21	0	--	--	-	--	--	--	21	4	57	6.7	-

Table 4.--Hardness classification for domestic water

Hardness range (mg/l)	Classification
Less than 60	Soft
61 - 120	Moderately hard
121 - 180	Hard
Greater than 181	Very hard

Table 5.--Trace elements in water from Salmon Creek Reservoir and from Salmon Creek
(concentrations in micrograms per litre)

Sampling site	Date	Discharge (cfs)	Depth (ft.)	Copper (Cu)	Lead (Pb)	Arsenic (As)
C	3-20-73		68.6	4	17	0
3	2-22-73	6.9		5	2	0
4	2-22-73	25		4	0	3
	3-22-73	8.0		2	3	6
USPHS standards				1000	--	50

samples. The Environmental Protection Agency standards require that drinking water should contain less than 100 bacterial organisms per 100 ml, whereas the Alaska Administrative Code requires that the bacterial count in drinking water should not exceed 50 organisms per 100 ml.

Dissolved-Oxygen Content

The oxygen content of the water is an important factor related to the quality of water in a lake or reservoir. It is significant as an indicator of water pollution by organic wastes. Generally, water in Salmon Creek Reservoir contains from 7 to 14 mg/l dissolved oxygen. This indicates that a condition exists that contributes to the elimination of organic impurities. Lakes and reservoirs having a low dissolved-oxygen content usually have considerable amounts of partly decomposed organic material which results in disagreeable color, odors, and tastes and reduces the transparency of the water.

Current general practice calls for clearing a reservoir site of brush and trees. This was not done at this site. Dead trees and brush are present in Salmon Creek Reservoir and have undergone some decay. However, with the extreme fluctuations of the reservoir storage, which virtually flushes the system annually, no accumulation of debris or any disagreeable color, odor, or taste from year-to-year has occurred. If the reservoir is used for domestic water supplies, annual flushing could help to maintain the present desirable conditions.

Streams

The quality of water samples collected at two streams flowing into the reservoir and on Salmon Creek below the dam (sites 1, 2, 3, and 4, fig. 8) was similar to reservoir water and had concentrations of the various dissolved chemical constituents far below the U.S. Public Health Service recommended limits (table 6). However, bacteriological samples collected at sites 3 and 4 below the reservoir showed higher coliform concentrations than those from the reservoir. This may be attributed to the lack of sewage-disposal facilities at the upper powerhouse. No bacteriological samples were collected at sites 1 and 2. Dissolved-oxygen content in Salmon Creek is high.

SUMMARY AND CONCLUSIONS

Salmon Creek Reservoir has a total capacity of 17,585 acre-feet (21.7 hm^3) at a spillway altitude of 1,170 ft (356.6 m). At a water-use rate of approximately 300 gallons (1.1 m^3) per person per day, a draft rate of 40 ft^3/s (1.13 m^3/s) would be sufficient for 87,000 people. There is a 10-percent chance that 11,800 acre-feet (14.5 hm^3) of storage would be insufficient to sustain a constant rate exceeding 40 ft^3/s (1.13 m^3/s) throughout any year. The quality of water of the selected inflowing

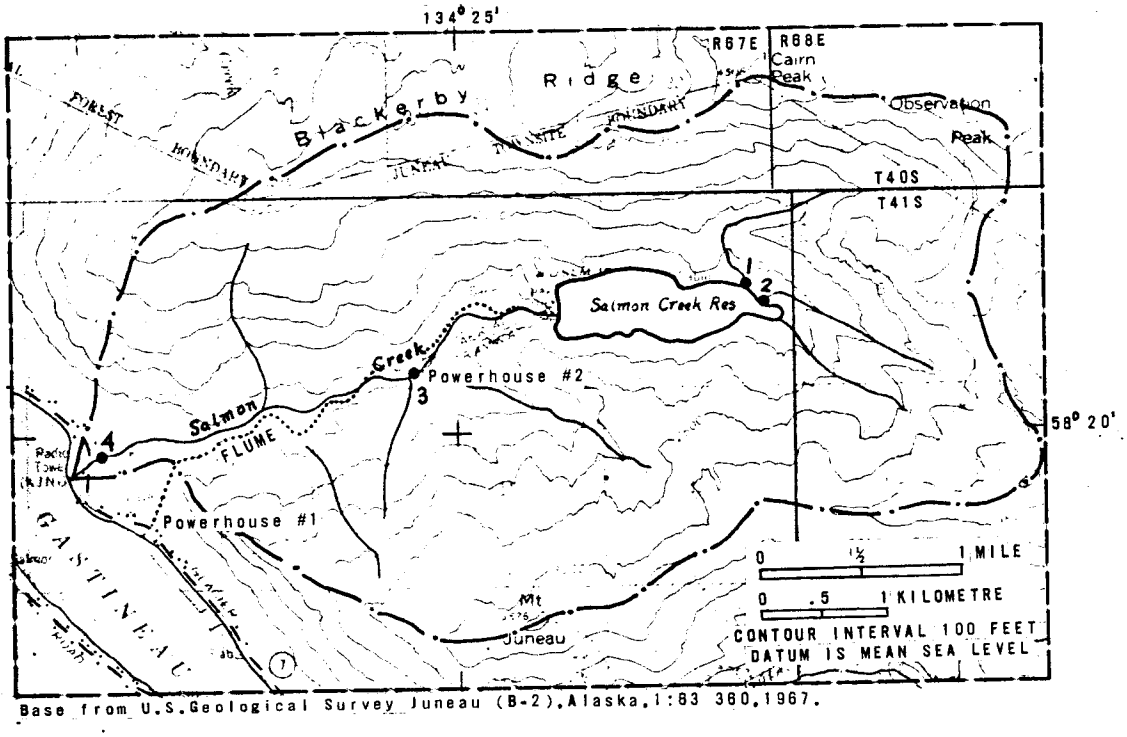


Figure 8.--Miscellaneous sampling sites on selected streams in the Salmon Creek drainage basin.

Table 6.--Chemical analyses of water from selected streams
(concentrations in milligrams per litre)

Sample site	Date of collection	Discharge (cubic feet per second)	Temperature (°C)	Silica (SiO_2)	Iron, dissolved (Fe) (micrograms per litre)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_2 & NO_3 as N)	Dissolved oxygen	Dissolved solids	Hardness as $CaCO_3$		Specific cond. (micromhos at 25° C)	pH	Color
																			total	noncarbonate			
	USPHS standards				300	50							250	250	1.7	10		500					
1	9-4-72	--	--	1.8	-	0	6.0	0.7	0.5	1.0	18	0	4.8	0.2	0.1	--	--	24	18	3	42	7.1	0
	11-7-72	--	--	2.5	70	0	7.3	.9	.6	1.0	26	0	6.5	.4	0	.09	--	32	22	1	49	8.0	0
2	11-7-72	--	--	4.9	20	0	5.2	.4	.7	.8	18	0	2.9	.7	0	.83	--	28	15	0	39	8.2	1
3	2-22-73	6.9	2.0	2.5	20	0	8.8	.9	.6	.8	30	0	5.9	1.5	0	.22	14	37	26	1	60	7.0	1
4	3-15-68	22.1	1.5	2.9	--	-	9.2	.9	.6	.7	28	0	5.0	.7	.1	--	--	35	27	4	60	7.1	5
	6-26-68	120	6.0	2.2	--	-	6.6	.7	.5	.6	24	0	4.6	.2	0	--	--	28	20	0	50	6.8	5
	2-22-73	25	2.0	2.9	40	0	9.0	.7	.8	.7	32	0	4.8	1.8	0	.14	13	37	25	0	61	6.8	2

streams and of the reservoir itself is excellent. Bacterial analysis of the reservoir water showed no coliform contamination and dissolved-oxygen content was high, indicating an overall healthy condition of the reservoir.

Water quality in Salmon Creek below the reservoir was similar to that in the reservoir; however, bacteria counts were somewhat higher.

Water from Salmon Creek Reservoir, with a minimum of treatment, probably would provide an adequate additional supply of excellent quality water for future domestic use in the City and Borough of Juneau.

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