SUSITNA
HYDROELECTRIC PROJECT

DRAFT REPORT

SUSITNA RIVER AT WATANA AND DEVIL CANYON

STREAMFLOW TIME SERIES

HARZA-EBASCO
SUSITNA JOINT VENTURE

DRAFT REPORT
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SUSITNA RIVER AT WATANA AND DEVIL CANYON STREAMFLOW TIME SERIES

Report by
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REPORT

STREAMFLOW TIME SERIES

SUSITNA RIVER AT WATANA AND DEVIL CANYON

1.0 SUMMARY

This report presents the results of a study made to update the monthly and 7-day streamflow sequences at the Watana and Devil Canyon dam sites. The updated steamflow series are given in Tables 1 through 4.

2.0 BACKGROUND

Acres American Incorporated (ACRES) generated 32 years (1950-1981) of monthly and 7-day streamflow series at the Watana and Devil Canyon sites (Acres, 1982). The monthly streamflow series were derived using the streamflow data of the Susitna River at Gold Creek and at Cantwell. The resulting series averages 7955 and 9056 cubic feet per second (cfs) at Watana and Devil Canyon respectively. The 7-day series were based on data at Gold Creek Station. The resulting series averages 8201 and 9198 cfs at Watana and Devil Canyon respectively.

R&M Consultants, Incorporated (R&M) and Dr. W.D. Harrison of the University of Alaska, have investigated probable monthly contributions of glaciers to the recorded streamflow at Gold Creek for the months of June through September. They constructed five scenarios of monthly streamflows for Watana based on different assumptions of glacier contributions.

3.0 SCOPE OF THE STUDY

The major work items of the present study include:

1. Review ACRES' procedures used for generation of streamflow series at the two dam sites and modify these procedures, if necessary;

2. Review the study made by R&M and Dr. Harrison on the contribution to streamflow by glaciers, and adopt the most appropriate estimates for possible use in analyzing sensitivity of glacier waste on energy production;

3. Add flow data for the water years 1982 through 1984; and

4. Estimate net reservoir evaporation for use in the reservoir operation study.

4.0 REVIEW OF ACRES STUDY

Streamflow series generated by ACRES at the two dam sites are discussed below. Comments and necessary improvements to these time series also are discussed.

4.1 STREAMFLOW EXTENSION

ACRES selected a common base period of 30 years (1950 to 1979) for the monthly streamflow series and used the available streamflow data at eight stream gaging stations (Exhibit 1) to estimate missing monthly flows at each station. An in-house computer program, based on the program FILL-IN developed by the Texas Water Development Board (1970) was used in estimating the data. The periods for which observed data were available and the periods for which the data were estimated are shown on Exhibit 1.

The FILL-IN computer program is based on a multi-site regression technique which analyzes monthly streamflow series and estimates missing data. The program evaluates statistical parmeters (means, standard deviations, lag one auto-correlation coefficients and multi-site spatial correlation coefficients) and estimates missing data in which the statistical parameters are preserved.

The primary objective of ACRES' analysis was to generate 30 years of monthly streamflow sequences at Cantwell stream gaging station. These data were used with those at Gold Creek stream gaging station to estimate flows at the two dam sites. A comparison of the statistical parameters of recorded and filled-in data series at Cantwell, provided by ACRES (1982), indicates nearly the same statistical parameters in both cases. Therefore, the 30-year streamflow series at Cantwell is considered acceptable. The monthly streamflows at Cantwell and at Gold Creek are given in Tables 5 and 6.

4.2 STREAMFLOW TRANSPOSITION

ACRES derived the monthly streamflow series at the two dam sites using the following relationships:

$$Q_{DC} = 0.827\ (Q_G - Q_C) + Q_C \qquad \text{I}$$

$$Q_W = 0.515\ (Q_G - Q_C) + Q_C \qquad \text{II}$$

in which

Q_{DC} = Monthly flow at Devil Canyon
Q_W = Monthly flow at Watana
Q_G = Monthly flow at Gold Creek;
Q_C = Monthly flow at Cantwell

The coefficient of 0.827 is the ratio of the drainage areas between Cantwell and Devil Canyon to that between Cantwell and Gold Creek. Similarly, the coefficient of 0.515 is the ratio of the drainage areas between Cantwell and Watana to that between Cantwell and Gold Creek.

Transposition of flows by drainage area ratios is acceptable if there is no significant variation in seasonal or annual precipitation amounts over the two areas. This was examined by using a mean annual precipitation map (Exhibit 2) developed by the Soil Conservation Service (SCS 1981). The mean-annual precipitation amounts (MAP) upstream of Watana and Devil Cayon are about 37.4 and 36.8 inches, respectively. The MAP upstream of Gold Creek is about 36.6 inches. The differences in the MAPs upstream of the three locations are insignificant. Therefore, no adjustments to the estimated streamflows for differences in precipitation are required.

The relationships given in equations I and II were not used to generate 7-day flow sequences. Instead, ACRES computed the 7-day streamflow series at each site by multiplying the observed 7-day flows at Gold Creek with the ratio between the drainage areas upstream of the site and that upstream of Gold Creek. The flows at Cantwell were not used because the 7-day flows were not generated at Cantwell for the missing period of record at the station.

Since ACRES used different methods to generate the monthly and 7-day streamflow series, a check was made to evaluate the differences in the streamflow data if the monthly flows also were generated by using the method adopted for the 7-day flows.

For a few selected years, the flows transposed by this method are about 3 to 10 percent higher than those generated by using equations I and II. The accuracy of streamflow records at the two gaging stations is fair to good with a probable error of ± 5 to ± 10 percent (USGS). Since the difference in the monthly and 7-day flow series are within this accuracy, both series would normally be considered acceptable for reservoir operation studies.

However, refined reservoir operating guidelines are now being formulated to optimize project economic feasibility and to establish environmental flow constraints at Gold Creek under various power demand scenarios. Total

energy production is being estimated for both monthly and weekly reservoir operation studies. The previous streamflow sequences give inconsistent results in energy production because of the discrepancies in the intervening[1/] flows derived from monthly and 7-day flow sequences. Therefore, computations were made to revise the 7-day flow sequences at the two damsites to provide consistent energy production between the weekly and monthly operation studies. The monthly flow sequences were assumed to be correct.

4.3 PROCEDURE FOR REVISING 7-DAY FLOW SEQUENCES

The 7-day flow sequences at Cantwell, Gold Creek and the other six stations used by ACRES (Acres, 1982) to estimate missing monthly flows at Cantwell, were reviewed. The purpose was to ascertain whether the computer program FILL-IN could be used to generate the missing weekly data at Cantwell and whether the generated data would produce consistent intervening flows with 7-day flows generated using equations I and II. It was concluded that, because of poor correlation among various stream gaging stations based on 7-day flow sequences, the estimated flows at Cantwell and consequently at the two damsites, were unlikely to provide the same intervening flows as derived from monthly flow sequences. Therefore, the following procedure was used to revise 7-day streamflow sequences.

1. Assume monthly streamflow sequences derived for the Watana and Devil Canyon damsites using equations I and II are correct;

2. Compute intervening flows for each month;

3. Compute 7-day intervening flow sequences from the monthly intervening flow sequences using the pattern of observed 7-day flow sequences at Gold Creek;

1/ The term intervening flows means the flow coming solely from the drainage basin between the dams and Gold Creek.

4. Compute 7-day flow sequences at the damsites by subtracting the intervening flows computed in step 3 above, from the observed 7-day flow sequence at Gold Creek;

5. Compute monthly flow sequences at the damsites using 7-day flow sequences derived in step 4 above;

6. Compare the monthly flow sequences derived in step 5 above with those derived by using equations I and II. Some discrepancies were noticed;

7. Adjust 7-day flow sequences derived in step 4 above until the monthly flow sequences based on 7-day flow sequences match with the monthly flow sequences based on equations I and II.

The above procedure provided the same intervening flows from the monthly and 7-day flow sequences when compared on a monthly basis. In each water year, the 7-day flow sequence starts from the first of October. The flow for the last 7-day period of September is the sum of 8-day flows divided by 7. In leap years, the flow on the 29th of February was neglected since it is generally insignificant. To compute monthly flows from 7-day flows, the flow for a part of a week falling in a given month was prorated according to the number of days falling in that month.

4.4 ADJUSTMENT TO 1969 STREAMFLOW

For the period from 1950 to 1979, the lowest mean annual flow occurred in 1969. ACRES made a frequency analysis of mean annual flows at Gold Creek and estimated a return period of more than 1,000 years for the 1969 (water year) flows. Since ACRES accepted a return period of 30 years for the selection of allowable reservoir drawdown and firm energy, the observed 1969 mean annual flow of 5,561 cubic feet per second (cfs) was replaced by a 30-year low flow estimated to be about 7,200 cfs. The monthly flows were then derived using this value and the ratios of long term mean monthly and annual flows. The recorded monthly streamflows at Cantwell also were

replaced by a 30-year low flow. The resulting 1969 streamflows at Gold Creek and Cantwell were used to compute the corresponding flows at the two dam sites.

The 1969 streamflows included in Tables 1 through 4 of this report are those based on observed records to preserve the sample distribution of historical data.

5.0 GLACIER CONTRIBUTION

Dr W.D. Harrison and R&M have made a preliminary study of glacier contributions to streamflows at Gold Creek. The study resulted in five scenarios of streamflows at Gold Creek each corresponding to one of the following assumptions.

1. Glaciers were assumed to have net zero loss during the 1949-80 period, but there were annual variations in the waste. Annual contributions during the period were estimated using the Tangborn runoff-precipitation model (Tangborn, 1980, 1983) and used to adjust the recorded flows. The resulting flow series represents the conditions of zero contributions from the glaciers in each year.

2. Glaciers were assumed to have wasted 25 meters (82 feet) during the 1949-80 period. Annual contributions were estimated using the Tangborn model, and used to adjust the recorded flows.

3. Glaciers were assumed to have wasted 45 meters (148 feet) during the 1949-80 period. Annual contributions were estimated using the Tangborn model, and used to adjust the recorded flows.

4. Glaciers were assumed to have wasted 25 meters (82 feet) during the 1949-80 period. Annual contributions were estimated using the Tangborn model, and used to adjust the flow series resulting from Case 1.

5. Glaciers were assumed to have wasted 45 meters (148 feet) during the 1949-1980 period. Annual contributions were estimated using the Tangborn model, and used to adjust the flow series resulting from Case 1.

The Tangborn model computes annual glacier balances by relating measured precipitation amounts and annual mass balance of glacier with differences in runoff between a glacierized basin and a nearby non-glacierized basin. R&M computed the model parameters using data for one glacierized basin, Phelan Creek draining Gulkana Glacier, and two non-glacierized basins listed below:

Non-glacierized Basin	Index Precipitation Station
Ship Creek	Talkeetna
Ship Creek	Gulkana
Caribou Creek	Talkeetna
Caribou Creek	Gulkana

The resulting estimate of annual contribution by the glaciers was distributed in the months of June through September based on average monthly temperatures at Talkeetna and a base temperature of 43°F for thawing degree days, allowing for a lapse rate of about 3°F per 1000 feet between Talkeetna and the glaciers. The differences in monthly contributions between Cases 1 and 2 (scenario 4) and Cases 1 and 3 (scenario 5) for the period 1950-79 are given in Table 8. The values in this table can be subtracted from those in

Table 1 to obtain adjusted streamflows for Watana reflecting, respectively, 25 and 45 meters (82 and 148 feet) of net glacial waste during the 1949-80 period.

The estimate of 45 meters (148 feet) of glacial waste during the 1949-80 period was based on two sets of photos taken in 1949 and 1980. Since the photos were taken without vertical and horizontal controls and the analysis was made only for East Fork Glacier which constitutes only five percent of glaciers in the basin, the estimate of 45-meters (148 feet) waste is highly speculative and questionable. In view of the uncertainty in the estimate, R&M made another assumption of 25-meter (82 feet) waste in the computation. A brief water balance analysis based on available mean annual isohyetal maps of the basin and streamflows records at the Susitna River near Denali and the MacLaren River near Paxson indicated that the glacial waste during the 1949-80 period is more likely to be in the order of 22 meters (72 feet).

Currently, pertinent data are not available to verify the estimated historic waste or mass balance of the Susitna glaciers. Regardless of how much effort is made to reconstitute historical wastes of the glaciers, the resulting estimates would be of high uncertainty. However, in the absence of any better information, the glacier contributions as estimated by R&M and Dr. Harrison (Table 8) could be used through a sensitivity analysis to evaluate their effects on power production. The streamflow series at Watana adjusted for these contributions are given in Table 9. However, the adjusted series shown in this table represent no contribution or at least great reduction in contribution from the glaciers, and there is no established evidence that such a situation will occur when the Susitna project is placed in operation.

6.0 RESERVOIR EVAPORATION

Net evaporation from the Watana and Devil Canyon reservoirs is estimated to be negligible. The procedures used in the estimation are discussed below.

Pan evaporation data near the Susitna River basin are available at McKinley Park, elevation 2,070 feet above mean sea level (ft, msl) and the Matanuska Agricultural Experiment Station, elevation 150 ft, msl. These data are given in Tables 10 and 11, respectively.

Based on normal pool elevation of the Watana reservoir (about 2,185 ft, msl) and a comparison of monthly temperatures at Watana and McKinley Park (Table 12), the pan evaporation data at McKinley Park is considered applicable for Watana. The mean monthly evaporations for June and July at this station are about 82 percent of those at Matanuska. Using this as an adjustment factor, the long term mean monthly pan evaporation, for Watana were computed as shown in Table 13.

R&M measured pan evaporation at Watana from May 8 through August 31, 1981. The June through August evaporation was about 9.42 inches (R&M, 1982a). The long term evaporation for the corresponding period is 9.5 inches (Table 13). Table 14 indicates sub-freezing temperatures at Watana for the months of October through April. Because of ice cover over the reservoir, evaporation during these months would be negligible. The mean annual pan evaporation is, therefore, about 14.7 inches (Table 13).

Lake evaporation for the months of May through September was computed using a pan coefficient of 0.7 (see Table 13). This gives May through September lake evaporation of about 10.4 inches. This value is close to the R&M's estimate of 10 inches of reservoir evaporation at Watana (R&M, 1982a).

Precipitation data at Watana are available since May 1980 (Table 14). This period is too short to compute long-term mean precipitation and mean net reservoir evaporation. The mean annual precipitation at Watana was estimated to be about 30 inches from Exhibit 2.

Monthly distribution of precipitation at Matanuska and McKinley Park are given in Table 15. The May through September precipitation is 63 and 67 percent of the annual precipitation. Other precipitation stations near the Susitna basin, also show percentages close to these values.

Using McKinley percentages and 30 inches of annual precipitation at Watana, the monthly precipitation at Watana were estimated as given in Table 13. Except for the month of May, the monthly precipitation amounts are significantly higher than the estimated lake evaporation.

Net evaporation from a reservoir can be estimated by the difference between evaporation from the reservoir surface and evapotranspiration from the same area prior to construction of the dam. A comparison of the estimated annual reservoir evaporation with annual evapotranspiration as represented by the difference between precipitation and runoff (in depth of water) indicated that net reservoir evaporation loss for Watana would be in the order of one to two inches which represents a reduction of 4 to 8 cfs from the mean annual flow. This is quite negligible compared to the mean annual flow of about 8,000 cfs.

Devil Canyon reservoir is located under the same general climatic conditions as Watana, except at lower elevations. Therefore, net reservoir evaporation at this site also can be assumed to be negligible.

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TABLES

TABLE 1
MONTHLY STREAMFLOW AT WATANA
(CFS)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1950	4719.9	2083.6	1168.9	815.1	641.7	569.1	680.1	8655.9	16432.1	19193.4	16913.6	7320.4
1951	3299.1	1107.3	906.2	808.0	673.0	619.8	1302.2	11649.8	18517.9	19786.6	16478.0	17205.5
1952	4592.9	2170.1	1501.0	1274.5	841.0	735.0	803.9	4216.5	25773.4	22110.9	17356.3	11571.0
1953	6285.7	2756.8	1281.2	818.9	611.7	670.7	1382.0	15037.2	21469.8	17355.3	16681.6	11513.5
1954	4218.9	1599.6	1183.8	1087.8	803.1	638.2	942.6	11696.8	19476.7	16983.6	20420.6	9165.5
1955	3859.2	2051.1	1549.5	1388.3	1050.5	886.1	940.8	6718.1	24881.4	23787.9	23537.0	13447.8
1956	4120.3	1588.1	1038.6	816.9	754.8	694.4	718.3	12953.3	27171.8	25831.3	19153.4	13194.4
1957	4208.0	2276.6	1707.0	1373.0	1189.0	935.0	945.1	10176.2	25275.0	19948.9	17317.7	14841.1
1958	6034.9	2935.9	2258.5	1480.6	1041.7	973.5	1265.4	9957.8	22097.8	19752.7	18843.4	5978.7
1959	3668.0	1729.5	1115.1	1081.0	949.0	694.0	885.7	10140.6	18329.6	20493.1	23940.4	12466.9
1960	5165.5	2213.5	1672.3	1400.4	1138.9	961.1	1069.9	13044.2	13233.4	19506.1	19323.1	16085.6
1961	6049.3	2327.8	1973.2	1779.9	1304.8	1331.0	1965.0	13637.9	22784.1	19839.8	19480.2	10146.2
1962	4637.6	2263.4	1760.4	1608.9	1257.4	1176.8	1457.4	11333.5	36017.1	23443.7	19887.1	12746.2
1963	5560.1	2508.9	1708.9	1308.9	1184.7	883.6	776.6	15299.2	20663.4	28767.4	21011.4	10800.0
1964	5187.1	1789.1	1194.7	852.0	781.6	575.2	609.2	3578.8	42841.9	20082.8	14048.2	7524.2
1965	4759.4	2368.2	1070.3	863.0	772.7	807.3	1232.4	10966.0	21213.0	23235.9	17394.1	16225.6
1966	5221.2	1565.3	1203.6	1060.4	984.7	984.7	1338.4	7094.1	25939.6	16153.5	17390.9	9214.1
1967	3269.8	1202.2	1121.6	1102.2	1031.3	889.5	849.7	12555.5	24711.9	21987.3	26104.5	13672.9
1968	4019.0	1934.3	1704.2	1617.6	1560.4	1560.4	1576.7	12826.7	25704.0	22082.8	14147.5	7163.6
1969	3135.0	1354.9	753.9	619.2	607.5	686.0	1261.6	9313.7	13962.1	14843.5	7771.9	4260.0
1970	2403.1	1020.9	709.3	636.2	602.1	624.1	986.4	9536.4	14399.0	18410.1	16263.8	7224.1
1971	3768.0	2496.4	1687.4	1097.1	777.4	717.1	813.7	2857.2	27612.8	21126.4	27446.6	12188.9
1972	4979.1	2587.0	1957.4	1670.9	1491.4	1366.0	1305.4	15973.1	27429.3	19820.3	17509.5	10955.7
1973	4301.2	1977.9	1246.5	1031.5	1000.2	873.9	914.1	7287.0	23859.3	16351.1	18016.7	8099.7
1974	3056.5	1354.7	931.6	786.4	689.9	627.3	871.9	12889.0	14780.6	15971.9	13523.7	9786.2
1975	3088.8	1474.4	1276.7	1215.8	1110.3	1041.4	1211.2	11672.2	26689.2	23430.4	15126.6	13075.3
1976	5679.1	1601.1	876.2	757.8	743.2	690.7	1059.8	8938.8	19994.0	17015.3	18393.5	5711.5
1977	2973.5	1926.7	1687.5	1348.7	1202.9	1110.8	1203.4	8569.4	32352.8	19707.3	16807.3	10613.1
1978	5793.9	2645.3	1979.7	1577.9	1267.7	1256.7	1408.4	11231.5	17277.2	18385.2	13412.1	7132.6
1979	3773.9	1944.9	1312.6	1136.8	1055.4	1101.2	1317.9	12369.3	22904.8	24911.7	16670.7	9096.7
1980	6150.0	3525.0	2032.0	1470.0	1233.0	1177.0	1404.0	10140.0	23400.0	26740.0	18000.0	11000.0
1981	6632.0	3044.0	1790.0	1858.0	1592.0	1262.0	1641.0	14416.0	16739.0	27601.0	30542.0	11669.0
1982	5700.0	2650.0	1863.0	1700.0	1234.0	898.0	1190.0	10879.0	21444.0	20445.0	13206.0	13890.0
1983	5154.0	2132.0	1893.0	1797.0	1610.0	1427.0	1565.0	11672.0	20401.0	18761.0	20863.0	11192.0
1984	6821.0	2657.0	1939.0	1782.0	1742.0	1697.0	1654.0	10937.0	22958.0			

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TABLE 2
MONTHLY STREAMFLOW AT DEVIL CANYON
(CFS)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1950	5758.2	2404.7	1342.5	951.3	735.7	670.0	802.2	10490.7	18468.6	21383.4	18820.6	7950.8
1951	3652.0	1231.2	1030.8	905.7	767.5	697.1	1504.6	13218.5	19978.5	21575.9	18530.0	19799.1
1952	5221.7	2539.0	1757.5	1483.7	943.2	828.2	878.5	4989.5	30014.2	24861.7	19647.2	13441.1
1953	7517.6	3232.6	1550.4	999.6	745.6	766.7	1531.8	17758.3	25230.7	19184.0	19207.0	13928.4
1954	5109.3	1921.3	1387.1	1224.2	929.7	729.4	1130.6	15286.0	23188.1	19154.1	24071.6	11579.1
1955	4830.4	2506.8	1868.0	1649.1	1275.2	1023.6	1107.4	8390.1	28081.9	26212.8	24959.6	13989.2
1956	4647.9	1788.6	1206.6	921.7	893.1	852.3	867.3	15979.0	31137.1	29212.0	22609.8	16495.8
1957	5235.3	2773.8	1986.6	1583.2	1388.9	1105.4	1109.0	12473.6	28415.4	22109.6	19389.2	18029.0
1958	7434.5	3590.4	2904.9	1792.0	1212.2	1085.7	1437.4	11849.2	24413.5	21763.1	21219.8	6988.8
1959	4402.8	1999.8	1370.9	1316.9	1179.1	877.9	1119.9	13900.9	21537.7	23390.4	28594.4	15329.6
1960	6060.7	2622.7	2011.5	1686.2	1340.2	1112.8	1217.8	14802.9	14709.8	21739.3	22066.1	18929.9
1961	7170.9	2759.9	2436.6	2212.0	1593.6	1638.9	2405.4	16030.7	27069.3	22880.6	21164.4	12218.6
1962	5459.4	2544.1	1978.7	1796.0	1413.4	1320.3	1613.4	12141.2	40679.7	24990.6	22241.8	14767.2
1963	6307.7	2696.0	1896.0	1496.0	1387.4	958.4	810.9	17697.7	24094.1	32388.4	22720.5	11777.2
1964	5998.3	2085.4	1387.1	978.0	900.2	663.8	696.5	4046.9	47816.4	21926.0	15585.8	8840.0
1965	5744.0	2645.1	1160.8	925.3	828.8	866.9	1314.4	12267.1	24110.3	26195.7	19789.3	18234.2
1966	6496.5	1907.8	1478.4	1278.7	1187.4	1187.4	1619.1	8734.0	30446.4	18536.2	20244.6	10844.3
1967	3844.0	1457.9	1364.9	1357.9	1268.3	1089.1	1053.7	14435.5	27796.4	25081.2	30293.0	15728.2
1968	4585.3	2203.5	1929.7	1851.2	1778.7	1778.7	1791.0	14982.4	29462.1	24871.0	16090.5	8225.9
1969	3576.7	1531.8	836.3	686.6	681.8	769.6	1421.3	10429.9	14950.7	15651.2	8483.6	4795.5
1970	2866.5	1145.7	810.0	756.9	708.7	721.8	1046.6	10721.6	17118.9	21142.2	18652.8	8443.5
1971	4745.2	3081.8	2074.8	1318.8	943.6	866.8	986.2	3427.9	31031.0	22941.6	30315.9	13636.0
1972	5537.0	2912.3	2312.6	2036.1	1836.4	1659.8	1565.5	19776.8	31929.8	21716.5	18654.1	11884.2
1973	4638.6	2154.8	1387.0	1139.8	1128.6	955.0	986.7	7896.4	26392.6	17571.8	19478.1	8726.0
1974	3491.4	1462.9	997.4	842.7	745.9	689.5	949.1	15004.6	16766.7	17790.0	15257.0	11370.1
1975	3506.8	1619.4	1486.5	1408.8	1342.2	1271.9	1456.7	14036.5	30302.6	26188.0	17031.6	15154.7
1976	7003.3	1853.0	1007.9	896.8	876.2	825.2	1262.2	11305.3	22813.6	18252.6	19297.7	6463.3
1977	3552.4	2391.7	2147.5	1657.4	1469.7	1361.0	1509.8	11211.9	35606.7	21740.5	18371.2	11916.1
1978	6936.3	3210.8	2371.4	1867.9	1525.0	1480.6	1597.1	11693.4	18416.8	20079.0	15326.5	8080.4
1979	4502.3	2324.3	1549.4	1304.1	1203.6	1164.7	1402.8	13334.0	24052.4	27462.8	19106.7	10172.4
1980	6900.0	3955.0	2279.0	1640.0	1383.0	1321.00	1575.0	11377.0	26255.0	30002.0	20196.0	12342.0
1981	7335.0	3382.0	1841.0	1958.0	1839.0	1470.0	1898.0	15789.0	18387.0	31679.0	35256.0	13033.0
1982	6384.0	3270.0	2207.0	2086.0	1570.0	1094.0	1574.0	12490.0	24439.0	22877.0	14535.0	16427.0
1983	6272.0	2454.0	2192.0	2098.0	1858.0	1596.0	1781.0	13777.0	22789.0	20295.0	23203.0	12731.0
1984	7696.0	2976.0	2144.0	1953.0	1888.0	1828.0	1772.0	12425.0	25410.0			

421493/TBL
850116

TABLE 3

7-DAY STREAMFLOW AT WATANA

(CFS)

YEAR													
1950	10810.	4827.	3532.	3195.	2811.	2511.	2114.	2078.	1430.	1430.	1333.	1105.	949.
	853.	823.	829.	925.	925.	817.	527.	529.	597.	598.	560.	605.	678.
	651.	658.	714.	848.	1946.	6733.	11496.	11941.	15064.	14379.	13935.	22008.	16265.
	16762.	17851.	19521.	21227.	21107.	19849.	17791.	18668.	11076.	7789.	8830.	5970.	6063.
1951	4421.	3940.	3441.	1963.	1237.	1165.	1093.	1033.	985.	925.	925.	925.	925.
	828.	807.	807.	807.	757.	690.	690.	690.	661.	622.	622.	622.	622.
	651.	839.	1205.	2234.	5178.	14572.	16205.	8045.	14019.	24843.	17911.	11388.	16037.
	17831.	20870.	19561.	18007.	18019.	18812.	15737.	15901.	21527.	25275.	15701.	16217.	15649.
1952	7760.	5190.	3772.	2931.	2943.	2645.	1992.	1970.	1838.	1598.	1598.	1598.	1598.
	1382.	1345.	1345.	1345.	1129.	881.	881.	881.	798.	780.	780.	780.	780.
	774.	774.	774.	774.	1002.	1273.	1742.	3772.	[illegible]	20866.	29552.	32050.	28362.
	21233.	16506.	21095.	22861.	31318.	21063.	16558.	12566.	18572.	15881.	10740.	9278.	12666.
1953	4370.	6737.	6062.	4433.	4205.	3580.	2295.	2811.	2042.	1430.	1430.	1430.	1430.
	997.	925.	925.	925.	828.	690.	690.	690.	690.	690.	690.	690.	690.
	762.	762.	1205.	2102.	11881.	14139.	12866.	22108.	17443.	29528.	22800.	16560.	21719.
	17010.	15368.	16710.	17371.	21563.	16360.	14728.	15160.	18079.	15797.	18391.	12001.	10889.
1954	6827.	5662.	4154.	3311.	2019.	1910.	1766.	1646.	1502.	1261.	1261.	1261.	1261.
	1117.	1093.	1043.	1043.	945.	881.	881.	881.	762.	656.	656.	656.	656.
	732.	732.	1258.	1345.	5670.	10331.	16734.	19165.	16139.	21407.	20566.	19725.	23978.
	20590.	16822.	15927.	15977.	26168.	20162.	20162.	20182.	19381.	13695.	11773.	10980.	6057.
1955	5466.	5137.	3868.	3868.	3099.	2523.	2379.	2102.	2030.	1850.	1814.	1598.	1598.
	1670.	1662.	1662.	1345.	1273.	1177.	1177.	1177.	1069.	925.	925.	925.	925.
	1009.	1009.	1009.	1009.	2991.	3788.	4421.	13238.	14654.	17094.	27870.	30236.	28314.
	26767.	26018.	16536.	22108.	19016.	17575.	18031.	21923.	31318.	16542.	12638.	10271.	9288.
1956	6085.	4460.	3648.	3143.	2090.	1766.	1622.	1430.	1333.	1093.	1093.	1093.	1093.
	863.	828.	828.	828.	821.	816.	816.	816.	805.	790.	790.	790.	790.
	799.	799.	799.	799.	2114.	9586.	13683.	27221.	18236.	28134.	36615.	26805.	23701.
	24834.	26685.	26909.	26260.	26628.	28198.	21863.	17831.	14896.	13858.	10860.	16380.	11858.
1957	6055.	6055.	4108.	3764.	3159.	2691.	2563.	2439.	2318.	2018.	1958.	1598.	1598.
	1858.	1830.	1830.	1830.	1358.	1261.	1261.	1261.	1153.	1009.	1009.	1009.	1009.
	1009.	1009.	1009.	1009.	2871.	4841.	7905.	17707.	25996.	31466.	27822.	24686.	16902.
	19521.	17935.	20110.	21815.	17627.	17611.	17515.	16061.	17779.	15905.	17359.	16878.	16528.
1958	8669.	7454.	6060.	6206.	[illegible]	3802.	3254.	2675.	3015.	3628.	3095.	2308.	1874.
	2062.	1790.	1562.	1478.	1725.	1213.	1093.	1009.	1009.	1009.	985.	925.	925.
	1009.	1129.	1225.	1405.	3355.	6629.	9262.	17635.	16548.	23545.	23545.	20302.	16500.
	16500.	16500.	16500.	16138.	12531.	23149.	17190.	13935.	9718.	7168.	7168.	5550.	6363.
1959	5038.	4433.	4241.	2943.	2511.	2106.	1862.	1430.	1285.	925.	1021.	1598.	1598.
	1309.	1261.	1261.	1177.	1177.	1177.	1129.	1009.	930.	828.	828.	828.	828.
	841.	841.	1201.	1261.	2403.	3820.	16314.	23113.	16776.	21867.	16350.	19465.	21803.
	22200.	21311.	23069.	18236.	20866.	15665.	20110.	37168.	36303.	24138.	12869.	9365.	10097.
1960	9010.	6223.	3424.	4277.	2931.	2523.	2415.	2270.	2150.	1850.	1850.	1850.	1850.
	1706.	1662.	1502.	1430.	1358.	1261.	1237.	1177.	1101.	1093.	1045.	925.	925.
	925.	925.	1213.	1261.	4925.	6391.	12349.	19221.	20422.	12073.	12517.	12962.	14247.
	19281.	14295.	16846.	22548.	26945.	21363.	18896.	18260.	17539.	15601.	24338.	17251.	14764.
1961	10535.	7652.	3442.	3964.	3015.	2775.	2559.	2270.	2318.	2439.	2391.	2102.	2102.
	2030.	2018.	2078.	2102.	1850.	1518.	1490.	1430.	1358.	1261.	1406.	1766.	1766.
	2102.	2102.	2314.	2355.	6079.	10692.	16500.	17623.	16662.	15953.	26056.	32555.	27353.
	19381.	24302.	21023.	21779.	21563.	21863.	16668.	12719.	13166.	10851.	11857.	11292.	12998.
1962	6769.	3868.	3864.	3868.	2955.	2270.	2270.	2270.	2126	1766.	1766.	1766.	1766.
	1622.	1598.	1598.	1598.	1458.	1261.	1261.	1261.	1225.	1177.	1177.	1177.	1177.
	1430.	1430.	1430.	1430.	3111.	3764.	10271.	15136.	23942.	25467.	44347.	42237.	29900.
	22861.	22320.	14849.	22961.	21911.	19381.	19381.	19381.	19701.	19821.	12517.	10139.	11665.

TABLE 3 (CONTINUED)

7-DAY STREAMFLOW AT WATANA

(CFS)

1963	7694.	5859.	5105.	4613.	3111.	2355.	2355.	2355.	2162.	1682.	1682.	1682.	1682.
	1394.	1345.	1345.	1345.	1309.	1261.	1261.	1261.	1061.	841.	841.	841.	841.
	698.	698.	698.	698.	2242.	2859.	16121.	26068.	30008.	21863.	21863.	21863.	21863.
	26188.	33852.	32074.	27389.	23377.	21143.	18344.	19401.	16434.	12734.	11388.	9106.	9232.
1964	7462.	6300.	5154.	3904.	2427.	2186.	1934.	1598.	1550.	1430.	1382.	1093.	1093.
	949.	925.	865.	841.	841.	841.	824.	782.	728.	648.	621.	555.	555.
	597.	597.	648.	656.	728.	877.	1177.	2606.	24378.	43392.	43330.	36159.	26152.
	21335.	21904.	20746.	14235.	16614.	15749.	12698.	13539.	11436.	9548.	7781.	7824.	7657.
1965	6456.	7225.	4728.	3761.	2590.	2385.	2361.	2631.	1710.	1152.	1027.	933.	933.
	825.	807.	807.	807.	771.	723.	723.	723.	738.	757.	757.	757.	757.
	992.	992.	1252.	1295.	1691.	4529.	7880.	14199.	28290.	18476.	19737.	16860.	27762.
	25527.	25744.	23978.	20794.	16692.	16542.	25551.	17130.	9538.	14168.	17407.	15929.	21059.
1966	12686.	7053.	3304.	2733.	2325.	1904.	1682.	1604.	1538.	1442.	1394.	1337.	1207.
	1193.	1177.	1177.	1177.	1141.	1093.	1093.	1093.	1093.	1093.	1093.	1093.	1093.
	1261.	1261.	1658.	1724.	2535.	3268.	6055.	11604.	18212.	40049.	28699.	24242.	20458.
	15677.	14932.	15629.	17683.	23557.	19269.	15885.	19197.	15349.	10836.	10523.	10403.	8673.
1967	5878.	3941.	2900.	2018.	1454.	1345.	1345.	1345.	1321.	1261.	1261.	1261.	1261.
	1261.	1261.	1261.	1261.	1225.	1177.	1177.	1177.	1105.	1009.	1009.	1009.	1009.
	925.	925.	969.	1093.	1466.	4145.	14416.	20170.	24242.	22344.	29275.	24348.	23870.
	16127.	18055.	25107.	24263.	22788.	21059.	40141.	25732.	17335.	24496.	14427.	10487.	9108.
1968	5761.	4746.	3750.	2859.	2403.	2042.	1934.	1862.	1826.	1766.	1766.	1694.	1682.
	1682.	1682.	1682.	1658.	1598.	1598.	1598.	1598.	1598.	1598.	1598.	1598.	1598.
	1574.	1514.	1586.	1694.	1886.	2475.	11004.	28459.	23161.	22248.	30969.	31402.	22861.
	24747.	22528.	21743.	21011.	16660.	16938.	14091.	12738.	11292.	9478.	9495.	6063.	5305.
1969	4256.	3671.	2830.	2512.	2138.	1658.	1261.	1105.	913.	799.	757.	715.	679.
	649.	651.	589.	589.	589.	589.	601.	631.	631.	655.	673.	709.	733.
	805.	949.	1237.	1754.	2859.	5056.	9615.	16866.	10149.	10764.	13719.	15028.	13647.
	11713.	14824.	15232.	12734.	11256.	12013.	6222.	5047.	4703.	5300.	4635.	3974.	3814.
1970	3313.	3119.	2732.	1844.	1442.	1201.	949.	841.	787.	757.	721.	715.	715.
	715.	715.	685.	673.	673.	673.	631.	631.	631.	631.	643.	673.	673.
	715.	787.	901.	1043.	1634.	3880.	13743.	12409.	15244.	14271.	13767.	13034.	21948.
	21047.	17659.	16920.	16091.	26224.	19233.	16880.	16798.	11592.	10004.	7960.	6109.	5166.
1971	5901.	4425.	4012.	3412.	3364.	3195.	2907.	2571.	2307.	2162.	2018.	1850.	1658.
	1866.	1309.	1169.	1045.	973.	925.	841.	841.	823.	799.	799.	799.	799.
	811.	841.	913.	1021.	1225.	1598.	2355.	4157.	7328.	19221.	34679.	24098.	33208.
	20578.	20938.	24138.	15701.	20882.	37628.	33636.	20626.	16378.	19221.	12265.	9278.	4198.
1972	6512.	5835.	4429.	3652.	3027.	2739.	2595.	2451.	2331.	2186.	2186.	2018.	2018.
	2018.	1850.	1850.	1650.	1850.	1758.	1682.	1682.	1610.	1586.	1514.	1514.	1490.
	1430.	1430.	1370.	1430.	2847.	16458.	16217.	22608.	37204.	20578.	30543.	32002.	21635.
	21335.	21323.	14004.	15897.	17022.	16272.	16758.	17323.	11592.	11088.	15160.	11172.	5700.
1973	4024.	3724.	5166.	3832.	2619.	2138.	1826.	1682.	1466.	1345.	1201.	1177.	1177.
	1033.	1009.	1009.	1009.	1009.	1009.	1009.	1009.	937.	841.	841.	841.	841.
	841.	841.	841.	809.	1177.	2258.	7736.	10655.	13214.	16998.	20338.	30645.	20134.
	17707.	16926.	12804.	13815.	14888.	17683.	14091.	18332.	19985.	10776.	7519.	6350.	5895.
1974	4739.	3817.	2632.	1998.	1610.	1302.	1273.	1165.	1069.	961.	865.	823.	749.
	763.	757.	727.	715.	697.	673.	661.	631.	631.	631.	619.	589.	589.
	589.	613.	739.	1177.	2162.	5538.	10331.	23065.	26308.	16446.	14043.	13130.	14019.
	14287.	17707.	16241.	15617.	14896.	15713.	13442.	10639.	14405.	13971.	7832.	7915.	11992.
1975	4627.	4549.	2451.	1634.	1430.	1430.	1430.	1430.	1418.	1345.	1345.	1345.	1345.
	1333.	1261.	1261.	1261.	1261.	1261.	1261.	1213.	1177.	1177.	1177.	1177.	1177.
	1177.	1169.	1247.	1538.	2391.	5766.	12674.	19365.	25647.	30609.	22993.	20891.	25828.
	23125.	25161.	21858.	21803.	20350.	16366.	15653.	13815.	11985.	9875.	10722.	15665.	15009.

TABLE 3 (CONTINUED)

7-DAY STREAMFLOW AT WATANA

(CFS)

1976	8649.	7628.	7028.	4145.	2863.	2066.	1574.	1249.	1069.	961.	925.	889.	841.
	841.	841.	811.	799.	799.	799.	799.	799.	781.	757.	757.	757.	757.
	757.	793.	905.	1646.	4168.	11725.	11268.	11785.	13563.	23293.	25095.	17671.	17070.
	16253.	16217.	15861.	15857.	18260.	21305.	17299.	13286.	9808.	6899.	5323.	5358.	6517.
1977	4063.	3316.	3162.	2806.	2475.	2283.	2138.	2018.	2427.	2283.	2066.	1898.	1754.
	1666.	1598.	1514.	1478.	1438.	1378.	1345.	1345.	1309.	1261.	1261.	1261.	1261.
	1345.	1345.	1418.	1490.	1658.	2907.	10523.	16145.	24554.	29395.	38934.	31966.	28470.
	16260.	20362.	21455.	17851.	18760.	17935.	16810.	16590.	10523.	8718.	12337.	11833.	11381.
1978	7424.	7532.	6619.	4937.	3772.	3220.	2901.	2691.	2493.	2318.	2216.	2150.	1988.
	1860.	1712.	1662.	1616.	1528.	1430.	1368.	1368.	1345.	1345.	1345.	1345.	1363.
	1368.	1368.	1368.	1466.	3063.	10559.	14416.	9754.	10403.	12938.	17971.	15376.	19161.
	16768.	17861.	17623.	17286.	16998.	16073.	14988.	12869.	6986.	9830.	8500.	6390.	5850.
1979	4554.	5163.	4122.	3093.	3008.	2628.	1970.	1730.	1658.	1598.	1454.	1309.	1261.
	1225.	1177.	1177.	1177.	1093.	1093.	1093.	1093.	1009.	1009.	1009.	1009.	1009.
	1009.	1057.	1165.	1466.	2307.	4325.	10091.	16097.	20633.	23113.	19401.	17515.	21671.
	22176.	21016.	20705.	27203.	22296.	20858.	16842.	14343.	12758.	7868.	7718.	11388.	10305.
1980	6635.	6421.	5915.	4370.	4096.	3720.	4145.	2967.	2823.	2307.	2078.	1898.	1718.
	1610.	1538.	1454.	1362.	1345.	1285.	1225.	1177.	1177.	1177.	1177.	1177.	1177.
	1177.	1177.	1237.	1662.	3484.	6169.	11701.	10463.	16686.	27029.	21299.	27582.	24062.
	26356.	20741.	24218.	25347.	27762.	19549.	16880.	16722.	12157.	8888.	9506.	15977.	11929.
1981	8282.	7362.	6141.	5061.	3916.	3541.	2643.	2691.	2691.	1946.	1502.	1412.	1358.
	1321.	1518.	1700.	1916.	1958.	2040.	1688.	1345.	1261.	1261.	1345.	1370.	1368.
	1430.	1490.	1566.	2054.	4728.	17154.	17226.	11352.	16452.	15665.	14223.	15304.	17875.
	14982.	35300.	36547.	30861.	37858.	30605.	39298.	31137.	20999.	15128.	12193.	10175.	9865.
1982	6425.	6054.	6222.	7216.	3878.	3316.	3243.	2727.	2378.	2127.	2006.	1934.	1934.
	1934.	1934.	1934.	1934.	1945.	1982.	1447.	1051.	925.	925.	925.	979.	1255.
	1261.	1261.	1393.	1850.	2842.	6811.	12614.	16938.	19100.	21989.	18380.	24266.	23545.
	16398.	20277.	20614.	23125.	19893.	13983.	12169.	10620.	11784.	11340.	14199.	22332.	14069.

TABLE 4

7-DAY STREAMFLOW AT DEVIL CANYON

(CFS)

YEAR													
1950	12126.	5414.	3961.	3564.	3153.	2816.	2372.	2331.	1603.	1603.	1496.	1240.	1065.
	957.	923.	930.	1038.	1038.	916.	647.	593.	670.	671.	628.	679.	756.
	730.	738.	800.	951.	2163.	7552.	12895.	13393.	16897.	16129.	15630.	24605.	16244.
	16824.	20023.	21896.	23809.	23674.	21815.	19955.	16452.	12423.	6737.	9904.	6697.	6778.
1951	4959.	4420.	3859.	2202.	1388.	1307.	1226.	1159.	1105.	1038.	1038.	1038.	1038.
	926.	906.	906.	906.	849.	773.	773.	773.	741.	698.	698.	698.	698.
	730.	941.	1442.	2506.	5807.	16344.	18177.	9024.	15725.	27865.	20090.	12774.	17988.
	19551.	22960.	21963.	20198.	20212.	16614.	17651.	17274.	24146.	28350.	17611.	18190.	17597.
1952	6704.	5821.	4231.	3268.	3301.	3022.	2234.	2210.	2062.	1792.	1792.	1792.	1792.
	1550.	1509.	1509.	1509.	1267.	983.	983.	983.	895.	830.	830.	830.	830.
	868.	868.	868.	868.	1124.	1428.	1954.	4231.	20683.	23405.	33147.	35949.	31813.
	26059.	16514.	23661.	25642.	35128.	23647.	16568.	14094.	16344.	17813.	12046.	10402.	14229.
1953	10510.	9800.	6422.	4972.	4716.	4015.	2574.	3153.	2291.	1603.	1603.	1603.	1603.
	1118.	1038.	1038.	1038.	928.	773.	773.	773.	773.	773.	773.	773.	773.
	877.	877.	1419.	2354.	13326.	15859.	14431.	24887.	19565.	33120.	25574.	20814.	24362.
	19068.	17234.	16743.	19864.	24186.	20616.	16520.	17305.	20279.	17719.	16142.	13861.	11720.
1954	7658.	6350.	4659.	3714.	2265.	2142.	1981.	1846.	1684.	1415.	1415.	1415.	1415.
	1253.	1226.	1226.	1225.	1105.	983.	983.	983.	854.	736.	736.	736.	736.
	821.	821.	1411.	1509.	6360.	11568.	16770.	21518.	20346.	24011.	23068.	22125.	26845.
	23695.	16819.	17921.	17921.	29374.	22637.	22637.	22637.	21694.	15361.	13205.	12316.	9037.
1955	6131.	5762.	4339.	4339.	3476.	2830.	2668.	2358.	2277.	2075.	2035.	1792.	1792.
	1873.	1866.	1617.	1509.	1428.	1321.	1321.	1321.	1199.	1038.	1038.	1038.	1038.
	1132.	1132.	1132.	1132.	3355.	4244.	4959.	14849.	16439.	19174.	31268.	33915.	31759.
	32248.	26935.	20741.	24660.	21330.	19713.	20225.	24591.	35128.	18554.	14175.	11521.	10369.
1956	6825.	5025.	4042.	3525.	2345.	1981.	1819.	1603.	1496.	1226.	1226.	1226.	1226.
	967.	924.	924.	924.	920.	915.	915.	915.	903.	887.	887.	887.	887.
	896.	896.	896.	896.	2372.	10753.	15347.	30533.	20454.	31557.	41070.	30155.	26565.
	27407.	24866.	30162.	29455.	24644.	27137.	24523.	19551.	16708.	15091.	21155.	20616.	15091.
1957	6791.	6791.	4808.	4244.	3544.	3018.	2897.	2735.	2601.	2264.	2196.	1792.	1792.
	1630.	1603.	1603.	1603.	1523.	1415.	1415.	1415.	1294.	1132.	1132.	1132.	1132.
	1132.	1132.	1132.	1132.	3220.	5430.	6866.	19861.	29158.	35316.	31206.	27640.	16958.
	21896.	20117.	22556.	28869.	19767.	19753.	19646.	16015.	19982.	17880.	19470.	16931.	20777.
1958	9746.	6361.	6819.	7031.	5120.	4265.	3650.	3001.	3362.	4069.	3471.	2568.	2102.
	2241.	2008.	1752.	1657.	1378.	1361.	1226.	1132.	1132.	1132.	1105.	1038.	1038.
	1132.	1267.	1374.	1665.	3763.	7435.	10389.	19760.	20804.	26410.	26410.	22772.	20750.
	20750.	20750.	20750.	20346.	36468.	25965.	19282.	15630.	10901.	8017.	8017.	6225.	7115.
1959	5651.	4972.	4757.	3301.	2816.	2452.	2069.	1603.	1442.	1038.	1145.	1792.	1742.
	1469.	1415.	1348.	1321.	1321.	1321.	1267.	1132.	1043.	928.	928.	928.	928.
	943.	943.	1348.	1415.	2695.	4265.	16298.	25925.	21060.	24550.	18339.	21855.	24456.
	28901.	23903.	25848.	20858.	22529.	17571.	22556.	81663.	80719.	27070.	13986.	10505.	11325.
1960	10106.	6960.	5840.	4797.	3268.	2830.	2708.	2547.	2412.	2075.	2075.	2075.	2075.
	1913.	1866.	1669.	1603.	1523.	1415.	1388.	1321.	1240.	1226.	1172.	1038.	1038.
	1038.	1038.	1361.	1415.	5524.	7168.	13852.	21559.	22906.	13542.	14040.	14539.	15961.
	21626.	16039.	16986.	25291.	30223.	23964.	21195.	20881.	19672.	17274.	27299.	19349.	16560.
1961	11817.	6563.	6104.	4447.	3382.	3113.	2870.	2547.	2601.	2735.	2601.	2358.	2358.
	2277.	2268.	2331.	2358.	2075.	1698.	1671.	1603.	1523.	1415.	1577.	1981.	1981.
	2358.	2358.	2601.	2641.	6818.	11992.	20750.	19767.	18669.	17894.	29226.	36515.	30661.
	21698.	22772.	21560.	[illegible]	28186.	24523.	20919.	19875.	14768.	11723.	13299.	12666.	14579.
1962	9836.	4339.	4339.	4339.	3315.	2547.	2547.	2547.	2365.	1981.	1981.	1981.	1981.
	1819.	1742.	1742.	1742.	1630.	1815.	1815.	1815.	1374.	1321.	1321.	1321.	1321.
	1603.	1603.	1603.	1603.	3490.	4244.	11521.	16978.	26854.	20566.	55406.	47376.	33538.
	25642.	25035.	21815.	25642.	24577.	21698.	21698.	21698.	22098.	22233.	14080.	11372.	13064.

TABLE 4 (CONTINUED)

7-DAY STREAMFLOW AT DEVIL CANYON

(CFS)

1963	6630.	6571.	5727.	5174.	3490.	2641.	2641.	2641.	2425.	1886.	1886.	1886.	1886.
	1563.	1509.	1509.	1509.	1469.	1415.	1415.	1415.	1213.	943.	943.	943.	943.
	763.	763.	763.	763.	2514.	3207.	10083.	29239.	33659.	24523.	24523.	24523.	24523.
	24378.	33971.	35076.	34721.	26221.	23715.	20575.	21761.	18833.	14283.	12774.	10218.	10355.
1964	6342.	7066.	5761.	4379.	2722.	2452.	2169.	1792.	1738.	1603.	1550.	1226.	1226.
	1065.	1038.	970.	943.	943.	943.	928.	827.	813.	726.	697.	623.	623.
	670.	670.	726.	736.	817.	984.	1321.	2923.	27343.	70767.	40602.	40558.	29334.
	23930.	28658.	23270.	15967.	18635.	17665.	10282.	15186.	12828.	10709.	8727.	8776.	8589.
1965	7241.	6103.	5304.	4219.	2905.	2675.	2648.	2951.	1917.	1292.	1152.	1047.	1047.
	926.	906.	906.	906.	865.	811.	811.	811.	827.	849.	849.	849.	849.
	1113.	1113.	1404.	1453.	1897.	5080.	6839.	15927.	31732.	20723.	22138.	21155.	31139.
	26633.	26875.	26895.	23324.	20966.	16554.	26660.	19218.	10699.	15892.	19528.	17867.	23621.
1966	14229.	7911.	3706.	3065.	2607.	2136.	1886.	1799.	1725.	1617.	1563.	1500.	1443.
	1338.	1321.	1321.	1321.	1280.	1226.	1226.	1226.	1226.	1226.	1226.	1226.	1226.
	1415.	1415.	1859.	1934.	2843.	3605.	6791.	13016.	20427.	44977.	32190.	27191.	22947.
	17588.	16749.	17530.	19838.	26823.	21613.	17723.	21532.	17261.	12158.	11808.	11669.	9728.
1967	6593.	4421.	3343.	2284.	1630.	1509.	1509.	1509.	1482.	1415.	1415.	1415.	1415.
	1415.	1415.	1415.	1415.	1374.	1321.	1321.	1321.	1280.	1132.	1132.	1132.	1132.
	1038.	1038.	1065.	1226.	1644.	4649.	10169.	22623.	27191.	25062.	32837.	27366.	26773.
	24333.	24252.	26161.	32823.	25561.	23621.	51755.	28862.	19883.	27420.	16163.	11763.	10216.
1968	5402.	5379.	4207.	3207.	2695.	2291.	2169.	2089.	2048.	1961.	1961.	1900.	1866.
	1866.	1866.	1866.	1859.	1792.	1792.	1792.	1792.	1792.	1792.	1792.	1792.	1792.
	1765.	1698.	1779.	1900.	2116.	2776.	12342.	31921.	25979.	24954.	34737.	35222.	25642.
	27757.	25268.	24348.	23567.	20953.	16999.	15805.	18283.	12666.	10631.	10650.	6801.	5950.
1969	4774.	4122.	3175.	2817.	2399.	1859.	1415.	1240.	1024.	896.	849.	802.	761.
	728.	707.	660.	660.	660.	660.	674.	707.	707.	734.	755.	795.	822.
	903.	1065.	1388.	1967.	3207.	5671.	10785.	18918.	11383.	12073.	15388.	16856.	15307.
	13138.	16627.	17085.	14283.	12625.	13474.	6978.	5661.	5275.	5945.	5198.	4457.	4278.
1970	3716.	3498.	3004.	2068.	1617.	1348.	1065.	943.	863.	849.	808.	802.	802.
	802.	802.	768.	755.	755.	755.	707.	707.	707.	707.	721.	755.	755.
	862.	863.	1011.	1226.	1833.	4352.	15415.	13919.	17049.	16007.	15442.	14620.	24618.
	23667.	19867.	21222.	20242.	28928.	21572.	16668.	16817.	13003.	11221.	6928.	9095.	5798.
1971	6619.	5524.	4500.	3827.	3773.	3584.	3261.	2884.	2567.	2425.	2264.	2075.	1859.
	1668.	1669.	1338.	1172.	1091.	1038.	943.	943.	923.	896.	896.	896.	896.
	910.	943.	1024.	1145.	1374.	1792.	2641.	4662.	8219.	21559.	44506.	27029.	37337.
	23061.	23866.	27070.	17611.	22978.	42262.	37728.	23135.	14365.	21559.	13757.	14402.	10317.
1972	7304.	6545.	4968.	4096.	3346.	3072.	2910.	2749.	2614.	2452.	2452.	2264.	2264.
	2264.	2075.	2075.	2075.	2075.	1967.	1886.	1886.	1808.	1779.	1698.	1698.	1671.
	1603.	1603.	1536.	1603.	3193.	18460.	16190.	25359.	41730.	23081.	40989.	35896.	24207.
	23930.	23817.	21316.	17362.	14043.	20498.	14797.	19830.	13003.	12837.	17005.	12531.	6868.
1973	4514.	4177.	5794.	4298.	2937.	2399.	2048.	1866.	1644.	1509.	1348.	1321.	1321.
	1158.	1132.	1132.	1132.	1132.	1132.	1132.	1132.	1051.	943.	943.	943.	943.
	943.	943.	943.	947.	1321.	2533.	6677.	11952.	14822.	19066.	31766.	34373.	22983.
	19861.	16905.	14364.	15496.	16658.	19838.	15805.	20562.	21855.	12066.	8838.	7123.	6612.
1974	5316.	4281.	2952.	2237.	1906.	1550.	1428.	1307.	1199.	1078.	970.	923.	896.
	856.	849.	815.	802.	762.	755.	741.	707.	707.	707.	698.	660.	660.
	660.	667.	829.	1321.	2425.	6212.	11568.	25871.	24576.	18446.	15751.	14727.	15725.
	15961.	19861.	16217.	17517.	16708.	17628.	15078.	11933.	16157.	15671.	6785.	6878.	13350.
1975	5190.	5158.	2749.	1933.	1603.	1603.	1603.	1603.	1590.	1509.	1509.	1509.	1509.
	1498.	1415.	1415.	1415.	1415.	1415.	1415.	1361.	1321.	1321.	1321.	1321.	1321.
	1321.	1334.	1455.	1725.	2661.	6468.	14215.	21721.	26768.	34333.	25740.	32406.	26970.
	25938.	26202.	26733.	24916.	22825.	14379.	17557.	15896.	13353.	11076.	16756.	17571.	16928.

TABLE 4 (CONTINUED)

7-DAY STREAMFLOW AT DEVIL CANYON

(CFS)

1976	9702.	6536.	7802.	4649.	3234.	2318.	1765.	1401.	1199.	1078.	1038.	997.	943.
	943.	943.	910.	896.	896.	896.	896.	896.	876.	849.	849.	849.	849.
	849.	889.	1105.	1646.	4676.	13151.	12639.	13218.	15213.	26127.	28148.	19821.	19147.
	14231.	18190.	17341.	17766.	20461.	26140.	19403.	14903.	10548.	7290.	5971.	6005.	7310.
1977	4557.	3719.	3546.	3148.	2776.	2560.	2399.	2264.	2722.	2560.	2318.	2129.	1967.
	1846.	1742.	1698.	1657.	1603.	1536.	1509.	1509.	1469.	1415.	1415.	1415.	1415.
	1509.	1509.	1590.	1671.	1859.	3261.	11804.	18109.	27541.	32972.	43670.	35788.	31934.
	20481.	22772.	24065.	20023.	21020.	20117.	18406.	18698.	11804.	9774.	13838.	13272.	12766.
1978	8327.	6448.	7424.	5538.	4231.	3613.	3254.	3018.	2796.	2601.	2486.	2412.	2230.
	2109.	1987.	1866.	1812.	1705.	1603.	1556.	1556.	1509.	1509.	1509.	1509.	1529.
	1556.	1556.	1556.	1644.	3436.	11844.	16169.	10941.	11669.	14512.	20158.	17247.	21492.
	21047.	14551.	14767.	14390.	14066.	16029.	16762.	13986.	10079.	10577.	9534.	7167.	6113.
1979	5108.	5724.	4623.	3470.	3374.	2948.	2210.	1940.	1859.	1792.	1630.	1469.	1415.
	1374.	1321.	1321.	1321.	1226.	1226.	1226.	1226.	1132.	1132.	1132.	1132.	1132.
	1132.	1166.	1307.	1644.	2567.	4851.	11318.	16056.	29873.	25925.	21761.	14646.	24308.
	24878.	28604.	24953.	30618.	25008.	23391.	16891.	16088.	14318.	8911.	8668.	12778.	11558.
1980	7442.	9446.	6635.	4902.	4595.	4173.	4649.	3328.	3166.	2587.	2331.	2129.	1927.
	1806.	1725.	1630.	1550.	1509.	1442.	1374.	1321.	1321.	1321.	1321.	1321.	1321.
	1321.	1321.	1368.	1866.	3908.	9163.	13124.	11736.	16716.	30317.	23890.	30937.	26989.
	29563.	24994.	31651.	28431.	31139.	21862.	20663.	16756.	13636.	9970.	10662.	17921.	13368.
1981	9269.	6260.	6868.	5677.	4393.	3972.	2964.	3018.	3018.	2163.	1664.	1563.	1523.
	1482.	1725.	2068.	2169.	2196.	2277.	1908.	1509.	1415.	1415.	1509.	1536.	1556.
	1603.	1671.	1779.	2304.	5304.	19741.	19322.	12733.	20697.	17571.	15954.	17166.	20058.
	16816.	34645.	30806.	34615.	30608.	34103.	44074.	34925.	23553.	16964.	13676.	11413.	10616.
1982	7207.	6791.	6979.	8094.	4350.	3719.	3638.	3059.	2667.	2384.	2250.	2170.	2170.
	2170.	2170.	2170.	2170.	2183.	2223.	1623.	1179.	1038.	1038.	1038.	1098.	1409.
	1415.	1415.	1563.	2075.	3194.	7640.	14148.	18999.	21424.	24658.	20616.	27218.	26410.
	18392.	22744.	23122.	25938.	22313.	15684.	13649.	11912.	13218.	12720.	15927.	25048.	15779.

TABLE 5
MONTHLY STREAMFLOW AT CANTWELL*
(CFS)

YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	SUMYR	CALYR
1	4218.3	1824.1	974.6	838.3	662.6	562.7	618.3	7827.5	15670.4	16690.4	13901.9	5631.6	69360.7	1950
2	2710.0	889.0	710.7	556.2	494.8	409.5	999.4	6194.6	12003.0	14652.4	11642.8	11693.5	62955.8	1951
3	3255.8	1575.1	956.5	740.4	492.3	560.5	639.3	2642.7	16465.7	17394.7	13705.1	8185.0	66613.1	1952
4	3431.2	1668.6	932.4	731.2	511.6	476.7	833.7	5960.2	13671.0	13140.8	11158.3	5876.8	58392.4	1953
5	2334.1	916.8	794.1	708.4	482.6	443.3	638.4	7852.1	16795.4	16371.9	19033.7	9832.6	76203.3	1954
6	3293.4	1784.7	1105.3	930.6	797.6	491.0	563.2	3014.7	14675.8	16621.7	12900.7	6064.7	62243.4	1955
7	2465.1	1075.3	855.2	684.3	727.2	614.7	569.2	8231.9	20082.3	18916.4	14164.8	8487.2	76873.6	1956
8	2547.4	1279.1	902.1	888.4	843.4	851.3	802.6	8230.5	19438.8	16361.0	13422.6	8899.4	74466.8	1957
9	3410.4	2051.9	1096.8	876.9	592.2	454.1	689.9	3004.9	13973.2	15743.3	12723.2	4464.4	59081.3	1958
10	2690.1	969.6	733.6	661.7	644.9	501.2	671.2	7894.5	16362.3	15620.2	16790.6	8063.5	71603.4	1959
11	3711.0	1718.7	1187.7	1042.0	826.4	695.6	785.6	13750.5	11108.1	16291.3	17056.1	12704.7	80877.7	1960
12	4625.6	2012.7	1534.8	1207.4	984.7	1056.1	1701.7	9688.0	15710.0	14820.0	16700.0	6725.0	76766.0	1961
13	3281.0	1800.0	1400.0	1300.0	1000.0	940.0	1200.0	10000.0	28320.1	20890.0	16000.0	9410.0	95541.1	1962
14	4326.0	2200.0	1400.0	1000.0	850.0	760.0	720.0	11340.0	15000.0	22790.0	18190.0	9187.0	87763.1	1963
15	3848.0	1300.0	877.0	644.0	586.0	429.0	465.0	2806.0	34630.0	17040.0	11510.0	5352.0	79487.0	1964
16	3134.0	1911.0	921.0	760.0	680.0	709.0	1097.0	8818.0	16430.0	18350.0	13440.0	12910.0	79160.1	1965
17	3116.0	1000.0	750.0	700.0	650.0	650.0	875.0	4387.0	18500.0	12220.0	12680.0	6523.0	62051.0	1966
18	2322.0	780.0	720.0	680.0	640.0	560.0	513.0	9452.0	19620.0	16883.0	19190.0	10280.0	81637.1	1967
19	3084.0	1490.0	1332.0	1232.0	1200.0	1200.0	1223.0	9268.0	19500.0	17480.0	10940.0	5410.0	73359.1	1968
20	2406.0	1063.0	618.0	508.0	485.0	548.0	998.0	7471.0	12330.0	13510.0	6597.0	3376.0	49910.0	1969
21	1638.0	815.0	543.0	437.0	426.0	463.0	887.0	7580.0	9909.0	13900.0	12320.0	5211.0	54129.0	1970
22	2155.0	1530.0	1048.0	731.0	503.0	470.0	529.0	1915.0	21970.0	18150.0	22710.0	9800.0	81491.1	1971
23	4058.0	2050.0	1371.0	1068.0	922.0	881.0	876.0	9694.0	20000.0	16690.0	15620.0	9243.0	82653.0	1972
24	3619.2	1962.0	1138.5	895.6	778.9	638.9	723.2	4763.6	16762.6	12619.[illegible]	12379.8	5037.5	61318.9	1973
25	2037.4	929.4	651.2	583.7	467.7	407.8	553.0	9163.1	12544.9	13434.2	11833.3	7888.1	60493.8	1974
26	2108.9	1191.4	929.8	812.5	779.6	669.5	807.2	5583.5	19277.4	20812.1	14871.9	10648.4	78492.2	1975
27	3879.3	1052.1	564.4	549.6	529.7	496.4	628.4	4788.3	16571.4	14057.3	14468.0	4585.6	62170.6	1976
28	2198.5	1195.9	1150.1	848.6	689.9	777.8	996.2	9619.2	30705.6	16566.4	12242.6	7420.0	84510.7	1977
29	3968.8	1833.7	1263.7	1192.1	1034.4	1272.7	1368.8	7819.4	15655.3	16812.8	10181.5	5488.6	67891.8	1978
30	2345.0	1288.6	1032.3	878.5	808.3	746.7	870.6	6209.9	15598.4	18493.7	12750.7	7320.9	68343.7	1979
31									17370.0	20460.0	14870.0	8570.0		1980
32	5472.0	2487.0	1658.0	1694.0	1186.0	919.0	1218.0	12150.0	14020.0	20870.0	22760.0	9417.0	93851.0	1981
33	3829.0	1627.0	1297.0	1061.0	698.0	573.0	573.0	8219.0	16500.0	16540.0	11010.0	9942.0	71869.0	1982
34	3309.0	1600.0	1400.0	1300.0	1200.0	1148.0	1210.0	8196.0	16460.0	16230.0	17000.0	8650.0	77703.0	1983**
35	5377.0	2130.0	1600.0	1500.0	1500.0	1481.0	1460.0	8481.0	18910.0					1984**

* The Cantwell gage became operational in June, 1980. Flows for the period Oct. 1949 to Sept. 1979 were generated by Acres American, Inc. using a multi-site regression model. Flows have not been generated for the period Oct. 1979 to May 1980.

** Preliminary data obtained from USGS

421493/TBL
850116

TABLE 6
MONTHLY STREAMFLOW AT GOLD CREEK
(CFS)

YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	SUMYR	CALYR
1	6335.0	2583.0	1439.0	1027.0	788.0	726.0	870.0	11510.0	19600.0	22600.0	19880.0	8301.0	95659.1	1950
2	3848.0	1300.0	1100.0	960.0	820.0	740.0	1617.0	14090.0	20790.0	22570.0	19670.0	21240.0	108745.1	1951
3	5571.0	2744.0	1900.0	1600.0	1000.0	880.0	920.0	5419.0	32370.1	26390.0	20920.0	14480.0	114194.1	1952
4	8202.0	3497.0	1700.0	1100.0	820.0	820.0	1615.0	19270.0	27320.1	20200.0	20610.0	15270.0	120424.1	1953
5	5604.0	2100.0	1500.0	1300.0	1000.0	780.0	1235.0	17280.0	25250.0	20360.0	26100.0	12920.0	115429.1	1954
6	5370.0	2760.0	2045.0	1794.0	1400.0	1100.0	1200.0	9319.0	29860.0	27560.0	27550.0	14290.0	122448.1	1955
7	4951.0	1900.0	1300.0	980.0	970.0	940.0	950.0	17660.0	33340.0	31090.1	24530.0	18330.0	136941.2	1956
8	5806.0	3050.0	2142.0	1700.0	1500.0	1200.0	1200.0	13750.0	30160.0	23310.0	20540.0	19800.0	124158.1	1957
9	8212.0	3954.0	3264.0	1965.0	1307.0	1148.0	1533.0	12900.0	25700.0	22880.0	22540.0	7550.0	112953.1	1958
10	4811.0	2150.0	1513.0	1448.0	1307.0	980.0	1250.0	15990.0	23320.0	25000.0	31180.0	16920.0	125869.1	1959
11	6558.0	2850.0	2200.0	1845.0	1452.0	1197.0	1300.0	15780.0	15530.0	22980.0	23590.0	20510.0	115792.1	1960
12	7794.0	3000.0	2694.0	2452.0	1754.0	1810.0	2650.0	17360.0	29450.0	24570.0	22100.0	13370.0	129004.1	1961
13	5916.0	2700.0	2100.0	1900.0	1500.0	1400.0	1700.0	12590.0	43270.0	25850.0	23550.0	15890.0	138366.0	1962
14	6723.0	2800.0	2000.0	1600.0	1500.0	1000.0	830.0	19030.0	26000.0	34400.0	23670.0	12320.0	131873.0	1963
15	6449.0	2250.0	1494.0	1048.0	966.0	713.0	745.0	4307.0	50580.0	22950.0	16440.0	9571.0	117571.1	1964
16	6291.0	2759.0	1211.0	960.0	860.0	900.0	1360.0	12990.0	25720.0	27840.0	21120.0	19350.0	121401.1	1965
17	7205.0	2098.0	1631.0	1400.0	1300.0	1300.0	1775.0	9645.0	32950.0	19860.0	21830.0	11750.0	112744.1	1966
18	4163.0	1600.0	1500.0	1500.0	1400.0	1200.0	1167.0	15480.0	29510.0	26800.0	32620.0	16870.0	133810.1	1967
19	4900.0	2353.0	2055.0	1981.0	1900.0	1900.0	1910.0	16180.0	31550.0	26420.0	17170.0	8816.0	117513.1	1968
20	3822.0	1630.0	882.0	724.0	723.0	816.0	1510.0	11050.0	15500.0	16100.0	8879.0	5093.0	66729.0	1969
21	3124.0	1215.0	866.0	824.0	768.0	776.0	1080.0	11380.0	18630.0	22660.0	19980.0	9121.9	90424.1	1970
22	5288.0	3407.0	2290.0	1442.0	1036.0	950.0	1082.0	3745.0	32930.0	23950.0	31910.0	14440.0	122470.1	1971
23	5847.0	3093.0	2510.0	2239.0	2028.0	1823.0	1710.0	21890.0	34430.0	22770.0	19290.0	12400.0	130030.1	1972
24	4826.0	2253.0	1465.0	1200.0	1200.0	1000.0	1027.0	8235.0	27800.0	18250.0	20290.0	9074.0	96620.1	1973
25	3733.0	1523.0	1034.0	874.0	777.0	724.0	992.0	16180.0	17870.0	18600.0	16220.0	12250.0	90977.1	1974
26	3739.0	1700.0	1603.0	1516.0	1471.0	1400.0	1593.0	15350.0	32310.0	27720.0	18090.0	16310.0	122802.1	1975
27	7739.0	1993.0	1081.0	974.0	950.0	900.0	1373.0	12620.0	24380.0	18940.0	19800.0	6881.0	97631.1	1976
28	3874.0	2650.0	2403.0	1629.0	1618.0	1500.0	1680.0	12680.0	37970.0	22870.0	19240.0	17640.0	120954.1	1977
29	7571.0	3525.0	2589.0	2029.0	1668.0	1605.0	1702.0	11950.0	19050.0	21020.0	16390.0	8607.0	97706.1	1978
30	4907.0	2535.0	1681.0	1397.0	1286.0	1200.0	1450.0	13870.0	24690.0	28880.1	20460.0	10770.0	113126.1	1979
31	7311.0	4192.0	2416.0	1748.0	1466.0	1400.0	1670.0	12060.0	29080.0	32660.0	20960.0	13280.0	128243.0	1980
32	7725.0	3569.0	1915.0	2013.0	1975.0	1585.0	2040.0	16550.0	19300.0	33940.0	37870.0	13790.0	142272.0	1981
33	7463.0	3613.0	2397.0	2300.0	1739.0	1203.0	1783.0	13384.0	26100.0	24123.0	15274.0	17783.0	117162.0	1982
34	6892.0	2633.0	2358.0	2265.0	1996.0	1690.0	1900.0	14945.0	24113.0	21145.0	24500.0	13585.0	118022.0	1983*
35	8181.0	3153.0	2258.0	2048.0	1969.0	1900.0	1837.0	13250.0	26770.0					1984*

* Preliminary data obtained from USGS.

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850116

TABLE 7

7-DAY STREAMFLOWS AT GOLD CREEK

(CFS)

1950	12856.	5740.	4200.	3800.	3343.	2986.	2514.	2471.	1700.	1700.	1586.	1314.	1129.
	1014.	929.	986.	1100.	1100.	971.	686.	629.	710.	711.	686.	720.	801.
	774.	763.	849.	1009.	2314.	6007.	13671.	14200.	17914.	17100.	16571.	26171.	19343.
	19957.	21329.	23214.	25243.	25114.	23129.	21157.	17843.	13171.	9243.	10500.	7100.	7186.
1951	5257.	4686.	4391.	2334.	1471.	1386.	1300.	1229.	1171.	1100.	1100.	1100.	1100.
	940.	940.	940.	940.	904.	820.	820.	820.	786.	740.	740.	740.	740.
	774.	947.	1529.	2657.	6157.	17329.	19271.	9567.	16671.	29543.	21300.	13543.	19071.
	20729.	20343.	23286.	21814.	21829.	17614.	18714.	18314.	25600.	30057.	18671.	19286.	18657.
1952	9229.	6171.	4486.	3486.	3500.	3204.	2369.	2343.	2186.	1900.	1900.	1900.	1900.
	1643.	1600.	1600.	1600.	1343.	1000.	1000.	1000.	949.	880.	880.	880.	880.
	920.	920.	920.	920.	1191.	1514.	2071.	4486.	21929.	24814.	35143.	36114.	33729.
	27629.	19629.	25086.	22186.	37243.	25071.	19686.	18943.	17329.	16886.	12771.	11029.	15086.
1953	11143.	10340.	7233.	5271.	5000.	4257.	2729.	3343.	2429.	1700.	1700.	1700.	1700.
	1186.	1100.	1100.	1100.	940.	820.	820.	820.	820.	820.	820.	820.	820.
	930.	930.	1504.	2500.	11129.	16814.	15300.	26386.	20743.	35114.	27114.	22071.	25829.
	20229.	16271.	19871.	20657.	25643.	21857.	17514.	18029.	21500.	16786.	17114.	19271.	12826.
1954	8119.	6733.	4940.	3937.	2401.	2271.	2100.	1957.	1786.	1500.	1500.	1500.	1500.
	1329.	1300.	1300.	1300.	1171.	1040.	1000.	1000.	906.	780.	780.	780.	760.
	870.	870.	1496.	1600.	6743.	12286.	19900.	22814.	21571.	25457.	24457.	23457.	28514.
	24886.	19529.	19000.	19000.	31143.	24000.	24000.	24000.	23000.	16286.	16040.	13057.	9561.
1955	6500.	6109.	4600.	4600.	3686.	3000.	2829.	2500.	2414.	2200.	2157.	1900.	1900.
	1986.	2000.	1714.	1640.	1514.	1400.	1400.	1400.	1271.	1100.	1100.	1100.	1100.
	1200.	1200.	1200.	1200.	3557.	4500.	5257.	15743.	17429.	20329.	33143.	35957.	33671.
	34186.	20557.	22043.	20357.	22614.	20900.	21843.	20071.	37243.	19671.	15029.	12214.	10993.
1956	7236.	5327.	4339.	3737.	2486.	2100.	1929.	1700.	1586.	1300.	1300.	1300.	1300.
	1026.	980.	980.	980.	976.	970.	970.	970.	957.	940.	940.	940.	940.
	950.	950.	950.	950.	2514.	11400.	16271.	32371.	21606.	33457.	43543.	31971.	28106.
	29057.	31686.	32000.	31229.	31829.	20771.	26000.	20729.	17714.	16040.	22429.	21857.	16000.
1957	7200.	7200.	4886.	4500.	3757.	3200.	3071.	2900.	2757.	2400.	2329.	1900.	1900.
	1729.	1700.	1700.	1700.	1614.	1500.	1500.	1500.	1371.	1200.	1200.	1200.	1200.
	1200.	1200.	1200.	1200.	3414.	5757.	9400.	21057.	30914.	37443.	33006.	24357.	20190.
	23214.	21329.	23914.	25943.	20957.	20943.	20829.	19100.	21143.	16914.	20643.	20071.	22029.
1958	10333.	6864.	7230.	7434.	5429.	4521.	3870.	3181.	3586.	4314.	3600.	2744.	2229.
	2429.	2129.	1857.	1757.	1857.	1843.	1340.	1200.	1200.	1200.	1171.	1100.	1100.
	1200.	1343.	1457.	1766.	3990.	7883.	11014.	20971.	22057.	28000.	28000.	24143.	22000.
	22000.	22000.	22000.	21571.	38686.	27529.	20843.	16571.	11557.	6500.	6500.	6600.	7543.
1959	5991.	5271.	5043.	3500.	2966.	2600.	2214.	1700.	1529.	1100.	1214.	1900.	1900.
	1557.	1500.	1429.	1400.	1400.	1400.	1343.	1200.	1106.	960.	960.	960.	960.
	1000.	1000.	1429.	1500.	2857.	4543.	19400.	27486.	22329.	26029.	19443.	23171.	25929.
	26400.	25343.	27457.	21086.	23886.	14629.	23914.	8a121.	a3121.	28700.	16829.	11137.	12007.
1960	10714.	7400.	4071.	5066.	3466.	3000.	2871.	2700.	2557.	2200.	2200.	2200.	2200.
	4029.	2600.	1786.	1700.	1614.	1500.	1471.	1400.	1357.	1300.	1243.	1100.	1100.
	1100.	1100.	1443.	1500.	5857.	7600.	14606.	22857.	24206.	14357.	14886.	15414.	16943.
	22929.	11000.	14557.	20614.	32043.	25829.	22871.	21714.	20857.	18314.	20943.	20514.	17557.
1961	12529.	9100.	6471.	4714.	3586.	3300.	3043.	2700.	2757.	2900.	2843.	2500.	2500.
	2814.	2800.	2871.	2500.	2200.	1800.	1771.	1700.	1614.	1500.	1671.	2100.	2100.
	2500.	2500.	2757.	2800.	7229.	12714.	22000.	20957.	19814.	16971.	30986.	30714.	32529.
	23000.	24143.	25000.	25900.	25643.	26000.	22200.	21071.	15657.	12829.	14100.	13829.	15457.
1962	10429.	4660.	4600.	4600.	3514.	2700.	2700.	2700.	2529.	2100.	2100.	2100.	2100.
	1929.	1900.	1900.	1900.	1729.	1500.	1500.	1500.	1457.	1400.	1400.	1400.	1400.
	1700.	1700.	1700.	1700.	3700.	4500.	12214.	16000.	28471.	30286.	50743.	50229.	35557.
	27186.	20543.	23129.	27186.	26057.	23000.	23000.	23000.	23829.	23571.	14886.	12057.	13971.

TABLE 7 (continued)

7-DAY STREAMFLOWS AT GOLD CREEK

(CFS)

1963	9150.	8967.	8071.	5866.	3700.	2840.	2840.	2800.	2571.	2000.	2000.	2000.	2040.
	1657.	1640.	1640.	1640.	1557.	1540.	1500.	1540.	1286.	1040.	1040.	1040.	1040.
	830.	930.	830.	830.	2466.	3840.	19171.	31000.	35686.	26000.	26000.	26040.	26040.
	31143.	44257.	30143.	32571.	27840.	25143.	21814.	23071.	19543.	15143.	13543.	10829.	14979.
1964	8897.	7491.	6129.	4643.	2866.	2640.	2300.	1900.	1843.	1700.	1643.	1340.	1340.
	1129.	1140.	1029.	1040.	1000.	1040.	980.	930.	861.	770.	739.	660.	660.
	719.	710.	770.	760.	986.	1043.	1800.	3099.	26990.	75029.	51529.	43040.	31140.
	25371.	26143.	24671.	16929.	19757.	16729.	15100.	16140.	13600.	11354.	9253.	4340.	9106.
1965	7677.	6591.	3623.	4473.	3060.	2836.	2807.	3129.	2033.	1370.	1221.	1110.	1110.
	981.	960.	960.	960.	917.	860.	860.	860.	877.	940.	900.	940.	940.
	1160.	1160.	1429.	1540.	2011.	5386.	4371.	16886.	33643.	21971.	23471.	22429.	33014.
	34357.	34614.	26514.	24729.	22229.	19471.	30386.	20371.	11343.	16849.	20740.	18943.	25043.
1966	15086.	6387.	3929.	3250.	2764.	2269.	2000.	1947.	1829.	1714.	1657.	1590.	1530.
	1419.	1440.	1440.	1440.	1357.	1340.	1340.	1300.	1300.	1340.	1300.	1340.	1340.
	1540.	1500.	1971.	2050.	3014.	3886.	7240.	13840.	21657.	47686.	34129.	26829.	24329.
	16843.	17757.	16586.	21029.	26014.	22914.	16843.	22829.	16300.	12866.	12514.	12371.	14314.
1967	6940.	4667.	3544.	2440.	1729.	1640.	1600.	1600.	1571.	1540.	1500.	1500.	1540.
	1540.	1540.	1540.	1540.	1457.	1400.	1400.	1400.	1314.	1240.	1240.	1240.	1240.
	1100.	1140.	1129.	1340.	1743.	4929.	17143.	23986.	26829.	26571.	34814.	24014.	26366.
	21557.	21471.	24857.	34840.	27140.	25043.	54871.	30640.	20614.	24071.	17157.	12471.	10831.
1968	6851.	5743.	4860.	3440.	2857.	2829.	2340.	2214.	2171.	2140.	2100.	2014.	2040.
	2040.	2040.	2040.	1971.	1900.	1940.	1900.	1900.	1900.	1940.	1900.	1940.	1940.
	1871.	1840.	1866.	2014.	2243.	2943.	13086.	33843.	27543.	26457.	38829.	37343.	27186.
	24429.	26786.	25857.	24986.	22214.	24143.	[illegible]	15143.	13429.	11271.	11291.	7210.	6349.
1969	5061	4370	3366	2987	2543	1971	1500	1314	1086	950	900	850	807
	771	750	700	700	700	700	714	750	750	779	800	843	871
	957	1129	1471	2086	3400	6013	11434	20057	12069	12800	16314	17871	16229
	13929	17629	18114	15143	13386	14286	7399	6001	5593	6303	5511	4726	4536
1970	3980.	3749.	3249.	2193.	1714.	1829.	1124.	1000.	936.	900.	857.	850.	850.
	850.	850.	814.	840.	840.	800.	750.	750.	750.	750.	764.	840.	840.
	850.	936.	1071.	1340.	1943.	4614.	16343.	14757.	18129.	16971.	[illegible]	15540.	26140.
	25029.	21040.	22540.	21514.	20429.	22871.	17671.	19971.	13786.	11897.	9486.	9643.	6143.
1971	7017.	5857.	4771.	4057.	4040.	3840.	3457.	3057.	2743.	2571.	2440.	2200.	1971.
	1743.	1557.	1414.	1243.	1157.	1140.	1000.	1040.	979.	950.	950.	950.	950.
	984.	1040.	1086.	1214.	1457.	1940.	2840.	8943.	8714.	22857.	47186.	26657.	39586.
	24471.	24940.	26740.	18671.	24357.	44743.	40040.	24529.	19471.	22857.	14586.	11029.	14939.
1972	7748.	6939.	5267.	4343.	3600.	3257.	3086.	2918.	2771.	2840.	2600.	2440.	2440.
	2400.	2240.	2240.	2240.	2240.	2086.	2840.	2040.	1914.	1886.	1840.	1800.	1771.
	1740.	1700.	1529.	1740.	5386.	14571.	19286.	26886.	88243.	24871.	43857.	36057.	25729.
	25371.	25357.	22640.	18429.	20243.	21729.	19929.	24600.	13786.	13186.	18029.	13286.	6857.
1973	4786.	4429.	4143.	4557.	3114.	2543.	2171.	2040.	1743.	1640.	1829.	1440.	1440.
	1229.	1240.	1240.	1240.	1240.	1240.	1200.	1240.	1114.	1040.	1040.	1000.	1040.
	1040.	1040.	1000.	1057.	1840.	2886.	9240.	12671.	15714.	24214.	33740.	36443.	23943.
	21057.	24129.	15229.	16429.	17657.	21029.	16757.	21840.	23171.	12814.	8942.	7551.	7010.
1974	5636.	4559.	3130.	2371.	1914.	1643.	1514.	1306.	1271.	1143.	1029.	979.	950.
	907.	940.	864.	850.	829.	840.	786.	750.	750.	750.	736.	700.	740.
	700.	729.	879.	1420.	2571.	6586.	12286.	27429.	31357.	19557.	18700.	15619.	16671.
	16943.	21057.	14314.	18571.	17714.	18686.	15986.	12651.	17130.	16614.	9314.	9413.	14154.
1975	5543.	5469.	2918.	1943.	1700.	1740.	1700.	1700.	1686.	1640.	1640.	1600.	1640.
	1586.	1540.	1540.	1540.	1500.	1540.	1540.	1443.	1400.	1440.	1400.	1440.	1440.
	1940.	1814.	1543.	1829.	2843.	6857.	15071.	23029.	34500.	36840.	27343.	36357.	34714.
	27500.	24940.	26343.	25929.	24240.	14886.	16614.	16429.	14157.	11743.	14886.	10629.	17943.

TABLE 7 (continued)

7-DAY STREAMFLOWS AT GOLD CREEK

(CFS)

1976	10206.	8071.	6357.	4929.	3829.	2457.	1871.	1686.	1271.	1143.	1100.	1057.	1000.
	1000.	1000.	964.	950.	950.	950.	950.	950.	929.	900.	900.	900.	900.
	900.	943.	1171.	1957.	4957.	13943.	14800.	18014.	16129.	27700.	29843.	21014.	20300.
	19329.	19206.	16306.	18857.	21714.	27714.	20571.	15800.	11163.	7729.	6330.	6367.	7750.
1977	4831.	3943.	3700.	3357.	2943.	2714.	2543.	2800.	2886.	2714.	2457.	2257.	2086.
	1957.	1900.	1800.	1757.	1700.	1629.	1600.	1600.	1557.	1500.	1500.	1500.	1500.
	1600.	1600.	1686.	1771.	1971.	3857.	12514.	19200.	29200.	38957.	46300.	37943.	33857.
	21714.	24143.	25514.	21229.	22286.	21329.	19514.	19729.	12514.	10363.	14671.	14071.	13534.
1978	6829.	6957.	7871.	5871.	4886.	3829.	3450.	3200.	2986.	2757.	2636.	2557.	2386.
	2236.	2107.	2000.	1921.	1807.	1700.	1650.	1650.	1600.	1600.	1600.	1600.	1621.
	1650.	1650.	1650.	1743.	3643.	12557.	17143.	11600.	12371.	15386.	21371.	16286.	22786.
	22314.	20729.	20957.	20557.	20214.	19114.	17771.	14829.	10686.	11214.	10109.	7599.	6461.
1979	5414.	6069.	4901.	3629.	3527.	3126.	2343.	2051.	1971.	1900.	1729.	1557.	1500.
	1457.	1400.	1400.	1400.	1300.	1300.	1300.	1300.	1200.	1200.	1200.	1200.	1200.
	1200.	1257.	1366.	1743.	2743.	5163.	12000.	19143.	31171.	27886.	23071.	20829.	25771.
	26371.	26086.	31757.	32457.	26514.	24800.	20029.	17057.	15171.	9847.	9203.	13543.	12254.
1980	7890.	10014.	7034.	5197.	4871.	4028.	4929.	3529.	3357.	2743.	2871.	2257.	2043.
	1914.	1829.	1729.	1643.	1600.	1529.	1457.	1400.	1400.	1400.	1400.	1400.	1400.
	1800.	1800.	1871.	2000.	4143.	9714.	13914.	12843.	19843.	32143.	25329.	32843.	28614.
	31343.	31800.	33557.	30143.	33014.	23200.	21929.	19886.	14457.	10570.	11304.	14000.	14186.
1981	9849.	8719.	7343.	6019.	4457.	4211.	4143.	3200.	3200.	2314.	1786.	1629.	1614.
	1571.	1829.	2129.	2300.	2329.	2414.	2014.	1600.	1500.	1500.	1600.	1629.	1650.
	1700.	1771.	1886.	2843.	5623.	20800.	20886.	13500.	21943.	16629.	16914.	16200.	21257.
	17829.	42086.	41143.	30700.	30600.	30157.	40729.	37029.	24971.	17986.	14500.	12100.	11256.
1982	7641	7200	7399	8581	4612	3943	3857	3243	2828	2529	2385	2300	2300
	2300	2300	2300	2300	2314	2357	1721	1250	1100	1100	1100	1164	1497
	1500	1500	1657	2200	3386	8100	15000	20143	22714	26143	21857	28857	28000
	19500	24114	24514	27500	23657	16629	14471	12629	14014	13486	16886	26557	16729
1983	10429	8201	6677	3914	2971	2786	2643	2471	2400	2300	2300	2300	2443
	2771	2400	2129	2000	1957	1900	2043	2086	1957	1814	1700	1643	1514
	1500	1529	1786	2414	4586	11086	19143	17000	24143	27343	19586	23886	23671
	25371	21857	18243	19686	21014	26586	24629	21757	26529	18957	11729	10334	13574
1984	11283	9373	7946	5457	4843	3386	2943	2700	2514	2386	2286	2200	2129
	2100	2100	2029	2000	2000	2000	2000	1943	1900	1900	1900	1900	1900
	1800	1800	1800	1857	2800	6400	15643	23543	14543	18457	27700	25871	29100

NOTE: Streamflows for the water years 1983 and 1984 are the preliminary data obtained from USGS.

Table 8

ADJUSTMENTS FOR GLACIERS WASTE

	Scenario 4				Scenario 5			
Year	June	July	Aug	Sept	June	July	Aug	Sept
1950	1,632	2,244	2,376	612	2,952	4,068	4,308	1,104
1951	2,388	4,260	2,808	1,044	4,320	7,704	5,076	1,884
1952	2,208	3,072	2,280	312	3,996	5,568	4,140	576
1953	912	984	636	216	4,860	5,304	3,384	1,176
1954	2,263	2,496	2,184	780	4,116	4,548	3,972	1,416
1955	1,860	3,936	2,316	516	3,264	7,140	4,188	936
1956	2,436	3,360	2,988	276	4,368	6,024	5,376	216
1957	3,288	3,084	2,880	696	5,940	5,580	5,220	1,260
1958	2,412	2,628	2,124	144	4,380	4,776	3,840	264
1959	3,144	2,364	2,616	612	5,712	4,284	4,764	1,116
1960	3,252	3,852	3,048	408	5,904	7.008	5,532	180
1961	2,832	3,384	2,556	360	5,124	6,120	4,632	660
1962	2,868	3,960	2,976	0	5,208	7,176	5,388	0
1963	1,704	3,708	2,904	1,704	3,084	6,720	5,268	3,084
1964	2,244	2,880	2,076	804	4,056	5,208	3,768	1,452
1965	1,992	3,984	2,832	1,680	3,624	7,260	5,160	3,060
1966	2,712	2,964	2,280	924	4,920	5,376	4,152	504
1967	2,604	3,180	2,988	864	4,716	5,760	5,412	1,572
1968	2,292	3,312	2,712	168	4,140	5,988	4,908	312
1969	1,680	1,728	888	324	3,048	3,312	1,704	624
1970	2,448	3,816	2,820	0	4,440	6,900	5,100	0
1971	2,436	3,564	3,312	492	4,380	6,312	5,952	876
1972	2,196	4,500	3,300	0	3,996	8,172	5,988	0
1973	2,292	3,324	2,052	240	4,152	6,012	3,720	432
1974	1,896	1,968	1,896	792	3,444	3,552	3,444	1,428
1975	2,280	3,672	2,976	996	4,128	6,636	5,376	1,788
1976	1,416	1,824	1,524	300	2,568	3,300	2,748	552
1977	2,772	3,516	3,720	744	5,616	6,744	6,360	1,344
1978	1,200	1,872	1,992	564	2,160	3,396	3,612	1,032
1979	2,028	3,228	2,856	1,104	3,672	5,844	5,184	2,004

Source: R&M

Table 9

MONTHLY STREAMFLOWS ADJUSTED FOR GLACIERS WASTE
SUSITNA RIVER AT WATANA

	Scenario 4				Scenario 5			
Year	June	July	Aug	Sept	June	July	Aug	Sept
1950	14,800	16,949	14,538	6,708	13,480	15,125	12,666	6,216
1951	16,130	18,527	13,670	16,162	14,198	12,083	11,462	15,322
1952	23,565	19,039	15,076	11,259	21,777	16,543	13,216	10,995
1953	22,381	18,339	17,318	11,730	16,610	12,051	13,298	10,338
1954	17,209	14,488	18,237	8,386	15,361	12,436	16,449	7,750
1955	23,081	19,852	21,221	12,932	21,617	16,648	19,349	12,511
1956	24,736	22,471	16,165	12,911	22,804	19,807	13,777	12,978
1957	21,987	16,865	14,438	14,145	19,335	14,369	12,098	13,581
1958	19,686	17,125	16,719	5,835	17,718	14,977	15,003	5,715
1959	15,186	18,129	2,324	11,855	12,618	16,209	19,176	11,351
1960	9,981	15,654	16,275	15,678	7,329	12,498	13,791	15,906
1961	19,952	16,456	16,924	9,786	17,660	13,720	14,848	9,486
1962	33,149	19,489	16,911	12,746	30,809	16,268	14,489	12,746
1963	18,959	25,059	18,107	9,096	17,579	22,097	15,743	7,716
1964	40,598	17,703	11,972	6,220	38,786	14,875	16,284	6,072
1965	19,221	19,252	14,562	14,546	17,584	15,776	12,234	13,166
1966	23,228	13,190	15,111	8,710	21,020	10,778	13,239	8,290
1967	22,108	18,807	23,117	12,809	19,006	16,227	20,693	12,101
1968	23,412	18,771	11,456	6,996	21,564	16,095	9,239	6,852
1969	12,282	13,116	6,884	3,936	10,914	11,532	6,068	3,636
1970	11,951	14,594	13,444	7,224	9,959	11,510	11,164	7,224
1971	25,177	17,622	24,135	11,607	23,233	14,814	21,995	11,313
1972	25,233	15,320	14,210	10,956	23,433	11,648	11,522	10,956
1973	21,567	13,027	15,965	7,866	19,707	10,339	14,297	7,668
1974	12,885	14,004	11,628	8,704	11,337	12,420	10,080	8,358
1975	24,409	19,758	12,151	12,077	22,561	16,794	9,751	11,287
1976	18,528	15,191	16,870	5,412	17,426	13,715	15,646	5,160
1977	28,581	16,191	13,087	7,867	26,337	12,163	15,447	9,269
1978	16,077	16,513	11,429	6,569	15,117	14,989	9,800	6,101
1979	20,877	21,684	13,815	7,993	19,233	14,068	11,487	7,093

Source: R&M

Table 10

PAN EVAPORATION (INCHES)
McKINLEY PARK

Year	Months				
	May	Jun	Jul	Aug	Sep
1967		3.97	3.20	2.42	
1968		3.31	3.67	2.25	
1969			3.48	2.39	
1970			3.35	2.20	
1971		6.38	3.75	2.06	
1972		3.97	4.10	2.61	
1973		3.37	3.25	1.55	
1974					
1975					
1976					
1977		3.77	4.02	3.37	
1978		3.02	3.46	3.31	
1979		2.81	2.97	2.73	
1980		4.04	2.92	1.88	
1981		3.24	1.89	2.18	
Average		3.78	3.35	2.41	

Table 11

PAN EVAPORATION (INCHES)
MATANUSKA AGRICULTURAL EXPERIMENTAL STATION

	Months				
Year	May	Jun	Jul	Aug	Sep
1951			4.16	2.21	1.79
1952		4.45		2.98	1.64
1953	3.99	4.96	4.89	2.58	1.71
1954	4.74	4.80	4.10	3.03	2.23
1955		3.48	4.91	3.96	2.50
1956	4.83	4.32	4.44		1.47
195[illegible]	6.41	5.45	4.80	3.59	2.03
1958	4.35	5.00	3.97	3.53	2.00
1959	4.76	5.23	2.79	2.82	1.46
1960	3.76	4.44	3.59	2.47	1.08
1961	5.18	4.17	3.40	2.41	1.62
1962	3.66	4.09	3.85	2.81	1.66
1963		3.56	3.42	2.50	1.48
1964		4.04		3.06	1.60
1965		4.18	7.19	4.34	
1966	3.56	4.08	4.36	2.60	2.25
1967	4.35	3.07	3.99	2.91	1.76
1968		4.57	3.56	3.30	1.66
1969		5.42	4.38	3.53	2.07
1970			5.03	3.13	2.36
1971	5.34	4.93	4.90	2.69	1.57
1972	3.43	4.06	4.90	3.79	2.63
1973	5.05	3.56	4.38	3.52	
1974	5.06	4.96	3.96	3.79	2.20
1975	4.20	3.56	3.16	3.17	1.73
1976	4.22	5.34	4.55	3.21	2.13
1977	4.11	5.20	5.24	3.18	1.84
1978	4.60	3.01	3.33	3.23	1.70
1979	4.84	3.90	4.01	3.73	2.54
1980	3.72	2.98	3.27	2.74	
1981	4.41	3.98	2.82	2.25	
Average	4.48	4.30	4.18	3.10	1.88

Table 12

COMPARISON OF MONTHLY TEMPERATURES (°F)

Month	Watana[1/]	McKinley Park[2/]
May	41	41
June	48	52
July	51	54
August	43	50
September	40	41

1/ Based on the data collected by R&M (Susitna Hydroelectric Project, Processed Climatological data, April 1980 through September 1982, volume 5, Watana Stations, two volumes) for the years 1981, 82 and 83.

2/ For the period 1951-75, taken from NOAA Climatography of the United States No. 60, Climate of Alaska.

Table 13

NET RESERVOIR EVAPORATION
WATANA RESERVOIR

Month	Average Pan Evaporation (in)	Lake Evaporation (in)	Average Precipitation (in)
Jan	0	0	1.20
Feb	0	0	1.20
Mar	0	0	1.20
Apr	0	0	0.60
May	3.67	2.67	1.50
Jun	3.53	2.47	4.80
Jul	3.43	2.40	6.30
Aug	2.54	1.78	4.80
Sep	1.54	1.08	2.70
Oct	0	0	1.80
Nov	0	0	1.80
Dec	0	0	2.10
Total	14.71	10.40	30.0

Table 14

CLIMATOLOGICAL DATA

Year	Month	Watana		Devil Canyon	
		Temperature (°C)	Precipitation (mm)	Temperature (°C)	Precipitation (mm)
1980	May	4.6	14.6		
	Jun	9.1	55.0		
	Jul	11.9	107.6		
	Aug				
	Sep				
	Oct			0.2	
	Nov	-7.2	2.0	-5.1	
	Dec	-21.1	0.2	-17.9	
1981	Jan	-4.5	1.6	-2.5	
	Feb			-7.3	
	Mar	-4.3	18.4	-1.8	
	Apr	-4.3	1.2	-1.8	1.2
	May	7.6	44.0	8.7	39.0
	Jun	9.3	129.8	10.0	166.4
	Jul	9.3	170.6	9.3	176.6
	Aug	2.0	165.6		
	Sep	4.0	77.2		
	Oct	-2.1	25.0	-.4	
	Nov	-10.4	5.6	-8.3	
	Dec	-13.7	7.0	-11.6	
1982	Jan	-19.6	0.0	-17.0	
	Feb				
	Mar			-7.1	
	Apr	-4.5	7.2	-2.7	21.0
	May	2.3	25.8	4.4	22.0
	Jun	8.6	87.4	9.9	85.2
	Jul	10.8	109.2	11.7	106.4
	Aug	10.0	58.2	10.8	35.0
	Sep	5.0	100.8	6.0	156.6

Table 15

MONTHLY PERCENTAGES OF PRECIPITATION

Month	Matanuska		McKinley Park	
	Precipitation (in)	Percent of Annual	Precipitation (in)	Percent of Annual
Jan	0.79	5	0.68	4
Feb	0.63	4	0.61	4
Mar	0.52	3	0.60	4
Apr	0.62	4	0.38	2
May	0.75	5	0.82	5
Jun	1.61	10	2.51	16
Jul	2.40	15	3.25	21
Aug	2.61	18	2.48	16
Sep	2.31	15	1.43	9
Oct	1.39	9	0.92	6
Nov	0.93	6	0.90	6
Dec	0.93	6	0.96	7

EXHIBITS

STREAM GAGING STATION				WATER YEAR
SERIAL NO.	USGS NO.	DRAINAGE AREA MI^2	NAME	1949 1950 · 1951 1952 1953 1954 1955 · 1956 1957 1958 1959 1960 · 1961 1962 1963 1964 1965 · 1966 1967 1968 1969 1970 · 1971 1972 1973 1974 1975 · 1976 1977 1978 1979
1.	15291000	950	SUSITNA RIVER NR. DENALI	
2.	15291200	280	MACLAREN RIVER NR. PAXSON	
3.	15291500	4,140	SUSITNA RIVER AT CANTWELL	
4.	15292000	6,160	SUSITNA RIVER AT GOLD CREEK	
5.	15292400	2,570	CHULITNA RIVER NR. TALKEETNA	
6.	15292700	2,006	TALKEETNA RIVER NR. TALKEETNA	
7.	15294300	2,250	SKWENTNA RIVER NR. SKWENTNA	
8.	15294350	19,400	SUSITNA RIVER AT SUSITNA STATION	

OBSERVED DATA

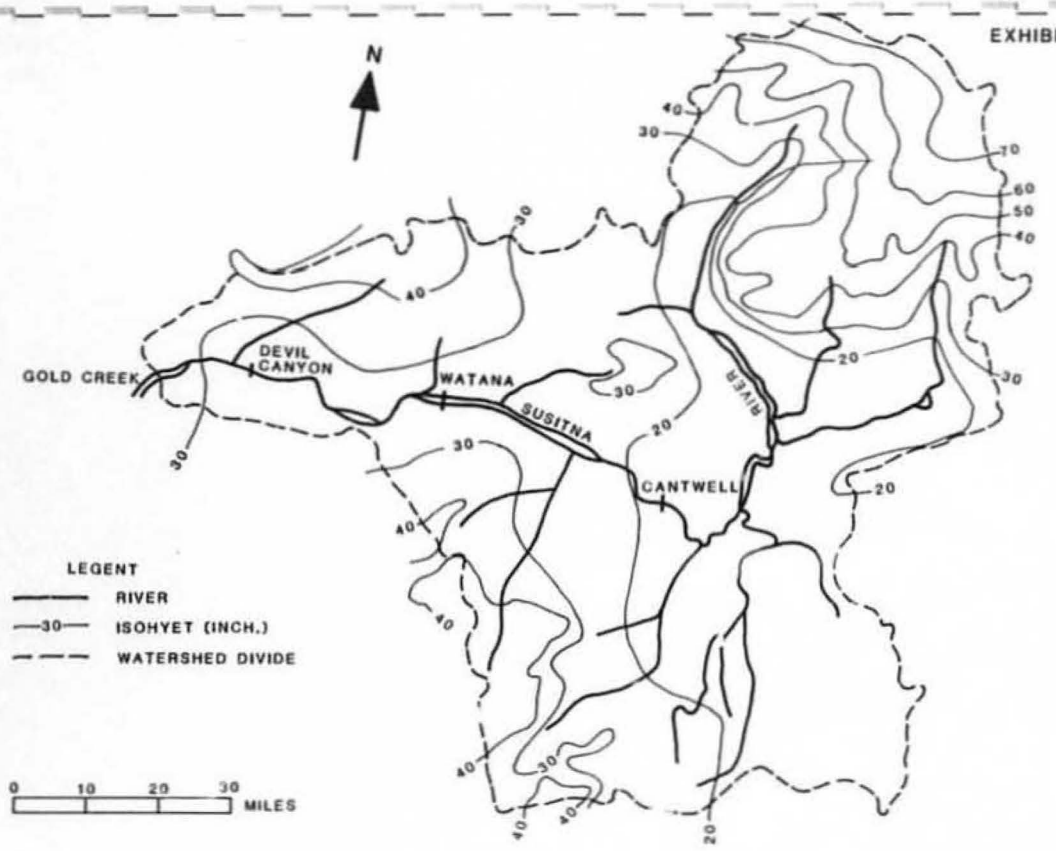
FILLED - IN DATA

SUSITNA HYDROELECTRIC PROJECT

STREAMFLIW DATA USED IN TIME SERIES ANALYSIS

HARZA-EBASCO SUSITNA JOINT VENTURE

EXHIBIT 2



HARZA-EBASCO SUSITNA JOINT VENTURE

SUSITNS HYDROELECTRIC PROJECT
MEAN ANNUAL PRECIPITATION MAP