This electronic document contains the February 1982 version of *Task 3, Hydrology. Field Data Index*.

It contains the basic text of the July 1981 publication with the replacement pages for February 1982. The map plate appears at the end.

1249

1141

SUSITNA HYDROELECTRIC PROJECT

FIELD DATA INDEX

TASK 3 : HYDROLOGY

JULY 1981

Prepared for:

ACRES

Prepared by:

R&M CONSULTANTS, INC.

ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

ALASKA POWER AUTHORITY

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ENGINEERS
GEOLOGISTS
PLANNERS
SURVEYORS

February 28, 1982 R&M No. 052302

To Users of the Susitna Hydrology Field Data Index:

Enclosed herewith are the pages of the first revision to the July 1981 Field Data Index. Please discard the outdated pages and replace them with the revised ones. The list on the following page identifies which pages have been revised. In addition, each new is identified at the bottom with the note "(Revised 2/82)".

If you are a first-time recipient of the Index, the revised pages should have already been inserted in their proper places.

If there are any additional additions or corrections which you feel should be made, please notify R&M Consultants. The next revision to the Index is expected to be released in July 1982.

Sincerely,

R&M CONSULTANTS, INC.

Jeffrey H. Coffin, P.E.
Senior Civil Engineer/Hydrologist

JHC/kbdd

Enclosure

FIELD DATA INDEX
Pages Revised 2/82

R&M CONSULTANTS, INC. 5024 CORDOVA ▪ BOX 6087 ▪ ANCHORAGE, ALASKA 99502 ▪ PH. 907-279-0483 ▪ TLX. 090-25280

ENGINEERS
GEOLOGISTS
PLANNERS
SURVEYORS

June 25, 1981

R&M No. 052302

The Hydrologic Field Data Index for the Susitna River Feasibility Study has just been updated for 1981. There is a change in format for this new index. It is now enclosed in a 3-ring binder so that future updates can be made by the replacement of only a few pages. These updates will be forthcoming approximately every six months.

The index covers most aspects of hydrologic field data for the Susitna River Basin, including both ongoing and historical. It should prove useful in locating data.

If there are any additions or corrections which you feel should be made, please notify R&M Consultants, Inc.

Very truly yours,

R&M CONSULTANTS, INC.

Stephen Bredthauer

Stephen Bredthauer, P.E.
Senior Civil Engineer

SB/kbw

ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

TASK 3 - HYDROLOGY

FIELD DATA INDEX

FEBRUARY 1982

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ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

TASK 3 - HYDROLOGY

FIELD DATA INDEX

TABLE OF CONTENTS PAGE

APPENDICES

INTRODUCTION

The objective of the Field Data Index & Distribution System is to establish a formal system of conveying information concerning hydrologic and climatologic data availability to each member of the study team. The project data base consists of (a) Historical recorded data up to January 1, 1980; (b) Post 1980 data collected by government agencies and study team members.

Historical files have been researched and available data are documented in this report. Records which could be retrieved or copied exist in R&M Consultants files. Records which are unavailable at this time, are identified as to location of files, data type, and period of record.

There are 15 major data categories assigned to the Susitna Basin. With each major category, each data station is assigned a unique number which identifies the index file containing the data. A convention of upstream to downstream order is used to number each data station. For example, if it is desired to review hydrological data availability in the Susitna River at Gold Creek, the following index numbers would be referenced:

0140	Streamflow Continuous Gaging
0340	Water Quality
0440	Water Temperature
0540	Sediment Discharge

All new data collected by R&M Consultants or other organizations will be added to the index system. An update will be prepared and distributed to personnel listed in Appendix G every six

months. Anyone knowing of additional data that has been collected within or adjacent to the Susitna River Basin is asked to notify R&M Consultants, P.O. Box 6087, Anchorage, Alaska 99503, (907) 279-0483.

Hard copy of the data will be stored in the R&M Consultants and Acres American offices. The data will be made available to project team members and other concerned parties upon request.

Index No.	Description
0130	Susitna River near Watana Damsite - R&M SG-1
	Mean Daily Discharge Records: July 1980 - Present
0140	Susitna River near Gold Creek - USGS Station 15292000
	Mean Daily Discharge Record: August 1949 - Present
0145	Chulitna River near Talkeetna - USGS Station 15292400
	Mean Daily Discharge Record: February 1958 - September 1972 May 1980 - Present
	Annual Instantaneous Peak Flow: 1958-1977, 1980 - Present
0155	Talkeetna River near Talkeetna - USGS Station 15292700
	Mean Daily Discharge Record: June 1964 - Present
0160	Susitna River at Sunshine - USGS Station 15292780
	Mean Daily Discharge Record: May 1981 - Present
	Miscellaneous Discharge Measurements: 1965, 1971, 1977
0161	Deshka River near Willow - USGS Station 15294100
	Mean Daily Discharge Record: October 1978 - Present
0162	Willow Creek near Willow - USGS Station 15294005
	Mean Daily Discharge Record: June 1978 - Present
0163	Deception Creek near Willow - USGS Station 15294010
	Mean Daily Discharge Record: May 1978 - Present

Index No.	Description
0165	Skwentna River near Skwentna - USGS Station 15294300 Mean Daily Discharge Record: August 1959 - Present
0175	Yentna River near Susitna Station Mean Daily Discharge Record: October 1980 - Present
0190	Susitna River near Susitna Station - USGS Station 15294350 Mean Daily Discharge Record: October 1974 - Present

0200 STREAMFLOW PARTIAL RECORDS

All data collected relating to river stage or water discharge for the Susitna River Basin not previously listed under Section 0100: Streamflow Continuous Gaging are included below. This section includes all records from crest stage gages, staff gages or fragmentary data. Agencies collecting the data include: U.S. Geological Survey (USGS), R&M Consultants (R&M) and National Weather Service (NWS). The agency responsible for data collection at each site is indicated by the agency name in parentheses following the period of record.

It should be noted that National Weather Service stations collect river stage data which can be obtained from the NWS Alaska River Forecast Center on a daily basis.

Alaska Department of Fish and Game has additional data on stage and water discharge of selected tributaries and fresh-water sloughs in the Susitna River Basin. Appendix C includes location and period of record for the data available.

All data given below are on file at R&M Consultants according to index number and location, unless marked by an asterisk following the period of record.

Index No.	Description
0201	Raft Creek near Denali - USGS Station 15291000
	Annual Maximum Discharge from Crest-Stage Gage: 1963-1977, 1979 - Present (USGS)
0203	Susitna River at Denali Highway
	Staff Gage: 1981 - Present (R&M)

Index No.	Description
0205	Susitna River at Deadman Creek - R&M CSR-9 Crest-Stage Gage: 1980 - Present (R&M)
0210	Susitna River above Watana Damsite - R&M CSR-8 Crest-Stage Gage (¼-mile upstream of damsite): 1980 - Present (R&M)
0211	Susitna River below Watana Damsite Staff Gage (1 mile downstream of damsite): 1981 - Present (R&M)
0212	Susitna River at Devil Creek Crest Stage Gage: 1981 - Present (R&M)
0215	Susitna River above Devil Canyon - R&M CSR-7 Crest-Stage Gage (1½ miles upstream of D.C. damsite): 1980 - Present (R&M)
0218	Susitna River below Devil Canyon Staff Gage (1 mile downstream of D.C. damsite): 1981 - Present (R&M)
0220	Susitna River at Portage Creek - R&M CSR-6 Crest-Stage Gage: 1980 - Present (R&M)
0225	Susitna River at Sherman - R&M CSR-5 Crest-Stage Gage: 1980 - Present (R&M)
0230	Susitna River at Section 25 - R&M CSR-4 Crest-Stage Gage: 1980 - Present (R&M)

Index No.	Description
0235	Susitna River at Curry - R&M CSR-3 Crest-Stage Gage: 1980 - Present (R&M)
0236	Susitna River at Curry Partial Discharge Record: 1948 (1 date) (USGS) 1949 (1 date) (USGS)
0240	Susitna River near Chase - R&M CSR-2 Crest-Stage Gage: 1980 - Present (R&M)
0245	Susitna River above Susitna-Chulitna Confluence - R&M CSR-1 Crest-Stage Gage: 1980 - Present (R&M)
0246	Talkeetna River at Alaska Railroad Bridge Partial Discharge Record: 1949 (2 dates) (USGS)
0247	Talkeetna River at Alaska Railroad Bridge Partial Stage Record: 1976 - Present (NWS)
0250	Susitna River at Sunshine Partial Discharge Record: 1969-1971, 1976 - Present (NWS)
0251	Montana Creek near Montana - USGS Station 15292800 Crest-Stage Gage: 1963-1972, 1978, 1981 (USGS)
0252	Montana Creek at Parks Highway Partial Stage Record: 1973 - Present (NWS)

Index No.	Description
0253	Goose Creek near Montana - USGS Station 15292900 Crest-Stage Gage: 1963-1971 (USGS)
0254	Caswell Creek near Caswell - USGS Station 15293000 Crest-Stage Gage: 1963 - Present (USGS) Miscellaneous Discharge Measurements: 1963 - 1976, 1979 - Present (USGS)
0255	Little Willow Creek near Kashwitna - USGS Station 15293700 Low-Flow Partial Record: 1978 (USGS)
0255.5	Peters Creek below Purches Creek near Willow Miscellaneous Discharge Measurements: 1979 - Present (USGS)
0255.6	Peters Creek, Tributary to Willow Creek (above confluence with Willow Creek) Miscellaneous Discharge Measurements: 1979 (USGS)
0255.8	Willow Creek above Deception Creek near Willow (2.2 miles downstream of continuous gage) Miscellaneous Discharge Measurements: 1979 (USGS)
0256	Willow Creek at Hatcher Pass Road near Willow - USGS Station 15294002 Low-Flow Partial Record: 1978 - 1979, 1981 - Present (USGS)

Index No.	Description
0256.5	Willow Creek at Alaska Railroad Bridge, 1 mile north of Willow Partial Discharge Record: 1948 (1 date) (USGS)
0257	Deception Creek above Tributary near Houston - USGS Station 15294007 Low-Flow Partial Record: 1978 - Present (USGS)
0257.5	Unnamed Deception Creek Tributary near Willow Miscellaneous Discharge Measurements: 1979 - Present (USGS)
0258	Deception Creek Tributary near Houston - USGS Station 15294008 Low-Flow Partial Record: 1978 - Present (USGS)
0259	Willow Creek at Parks Highway near Willow - USGS Station 15294012 Low-Flow Partial Record: 1978 - Present (USGS)
0260	Willow Creek at Parks Highway near Willow Partial Stage Record: 1973 - Present (NWS)
0265	Kroto Creek (head of Deshka River) near Peters Creek - USGS Station 15294020 Low-Flow Partial Record: 1978 (USGS)
0270	Moose Creek near Talkeetna - USGS Station 15294025 Low-Flow Partial Record: 1972-1975, 1978-1979 (USGS) Partial Discharge Record: 1980 (USGS) Crest-Stage Gage: 1972 - Present (USGS)

Index No.	Description
0272	Peters Creek near Petersville - USGS Station
	Low-Flow Partial Record: 1975-1976, 1977-1978 (USGS)
0274	Peters Creek above Martin Creek at Peters Creek - USGS Station 15294310
	Low-Flow Partial Record: 1975-1976, 1977-1978
0276	Martin Creek at Peters Creek - USGS Station 15294312
	Low-Flow Partial Record: 1978 (USGS)

0300 WATER QUALITY

Water quality data have been collected by the U.S. Geological Survey (USGS) and R&M Consultants (R&M) at several sites within the Susitna River Basin. The locations for which this information is available and the period of record at each site are given below. Since the measurements are only taken periodically the number of measurements, timing and specific parameters measured vary from year to year at any given station. A list of water quality parameters that have been measured by the USGS in the basin is presented in Appendix B. Water quality parameters measured by R&M are included in Appendix F.

Unless indicated by the agency name in parentheses following the period of record, data have been collected by the USGS.

Data collected by the Alaska Department of Fish & Game are all included in Appendix C. Therefore, they have not been listed again in this section.

The data listed in this section are all on file at R&M Consultants according to index number and name, except where dates are marked by an asterisk (*). Most of the data are also available through the U.S. Geological Survey.

Index No.	Description
0310	Susitna River near Denali - USGS Station 15291000 Period of Record: 1957-1966, 1969, 1974 to Present
0311	Raft Creek near Denali - USGS Station 15291100 Period of Record: 1972

Index No.	Description
0313	Clearwater Creek near Paxson - USGS Station 630230146530000 Period of Record: 1958*
0315	Maclaren River near Paxson - USGS Station 15291200 Period of Record: 1958-1961, 1967-1968, 1975
0318	Little Oshetna River near Eureka - USGS Station 621130147391500 Period of Record: 1953*
0320	Susitna River near Cantwell (Vee Canyon) - USGS Station 15291500 Period of Record: 1967-1970, 1980 to Present 1980: June 19 (R&M) August 8 (R&M) September 5 (R&M) September 17 (R&M) October 17 (R&M) 1981: January 13 (R&M) May 20 (R&M) June 18 (R&M) June 30 (R&M) August 2 (R&M) August 3 (R&M) September 15 (R&M) October 7 (R&M)
0330	Susitna River near Watana Damsite - R&M WQ-1 Continuous Water Quality Monitor Period of Record: October 1980 - December 1981 (Station destroyed December 1981) (Parameters monitored are listed in Appendix F.)

Index No.	Description
0335	Susitna River above Portage Creek near Gold Creek - USGS Station 624941149221500 Period of Record: 1977
0339	Gold Creek at Gold Creek - USGS Station 624606149412500 Period of Record: 1977*
0340	Susitna River at Gold Creek - USGS Station 15292000 Period of Record: 1949-1958, 1967-1968, 1975, 1977, 1980 to Present 1980: May 2 August 8 (R&M) August 19 October 7 October 14 (R&M) 1981: January 14 (R&M) January 16 February 12 March 24 May 27 (R&M and USGS) June 30 (R&M) June 23 July 1 (R&M) July 21 August 2 (R&M) August 3 (R&M) August 27 October 8 (R&M) 1982: February 6 (R&M)
0344	Ramsdyre Creek near Petersville - USGS Station 623742150462600 Period of Record: 1979
0344.5	Long Creek near Petersville - USGS Station 623545150435600 Period of Record: 1979

Index No.	Description
0345	Chulitna River near Talkeetna - USGS Station 15292400 Period of Record: 1958-1959, 1967-1972
0355	Talkeetna River near Talkeetna - USGS Station 15292700 Period of Record: 1954, 1966-Present
0360	Susitna River at Sunshine - USGS Station 15292780 Period of Record: 1971, 1975, 1977, 1981 - Present
0361.1	Montana Creek near Montana - USGS Station 15292800 Period of Record: 1971-1972
0361.2	Sheep Creek at Highway near Willow - USGS Station 615945150024300 Period of Record: 1972
0361.3	Caswell Creek near Caswell - USGS Station 15293000 Period of Record: 1972
0361.4	Kashwitna River near Willow - USGS Station 615535150041500 Period of Record: 1972
0362	Willow Creek near Willow - USGS Station 15294005 Period of Record: 1979 - Present
0362.1	Willow Creek below Canyon near Willow - USGS Station 614607149552000 Period of Record: 1972

Index No.	Description
0362.2	Willow Creek at Parks Highway near Willow (USGS Station 15294012) Period of Record: 1972, 1979, 1980
0362.3	Willow Creek at Upper Bridge near Willow - USGS Station 614522149401700 Period of Record: 1972
0362.4	Willow Creek at Hatcher Pass Road near Willow - USGS Station 15294002 Period of Record: 1978-1979
0363	Deception Creek near Willow - USGS Station 15294010 Period of Record: 1978-Present
0363.1	Deception Creek at Mouth near Willow - USGS Station 614552150021000 Period of Record: 1972
0363.3	Deception Creek Tributary near Houston - USGS Station 15294008 Period of Record: 1978-1979, 1980
0363.4	Deception Creek above Tributary near Houston - USGS Station 15294007 Period of Record: 1978-1979, 1980, 1981
0363.5	Unnamed Tributary to Deception Creek near Willow - USGS Station 614446149551000 Period of Record: 1979-1980

Index No.	Description
0365	Skwentna River near Skwentna - USGS Station 15294300 Period of Record: 1959, 1961, 1967-1968, 1974-1975
0366	Yentna River near Skwentna - USGS Station 615815151070000 Period of Record: 1955*
0370	Yentna River near Susitna Station - USGS Station 15294345 Period of Record: 1981: May 20 June 11 July 14 August 11 September 16
0390	Susitna River at Susitna Station - USGS Station 15294350 Period of Record: 1955, 1970, 1975 - Present 1980: February 12 March 12 June 16 July 30 October 10 1981: January 13 April 9 May 21 June 12 July 15 August 12 September 17

0400 WATER TEMPERATURE

Water temperature data have been collected by the U.S. Geological Survey (USGS), R&M Consultants (R&M), and Alaska Department of Fish and Game (ADF&G) at many locations within the Susitna River Basin. The locations for which this information is available and the period of record at each site are given below. Continuous water temperature records are generally available for open-water months only, but the length of record will vary for each site from year to year. Descriptions of the data collected by ADF&G have been included in Appendix C. Therefore, they have not been listed again in this section. It should also be noted that instantaneous temperature measurements have been taken and may be found in the water quality records published by the USGS.

Unless indicated by agency name in parentheses following the period of record, all data have been collected by the USGS.

The data listed in this section are on file at R&M Consultants according to index number and name, except the most recent data collected by the USGS and Talkeetna River data from 1954.

Index No.	Description
0410	Susitna River near Denali - USGS Station 15291000
	Water Temperature Record: 1974 - Present
	Temperature Cross Sections: 1980: May 22 June 24 July 22 August 26 October 1 1981: May 19 June 24 July 21 August 25 September 29

Index No.	Description
0415	Maclaren River near Paxson - USGS Station 15291200
	Miscellaneous Water Temperatures: 1980
0420	Susitna River near Cantwell - USGS Station 15291500
	Water Temperature Record: May 1980 - Present
0430	Susitna River near Watana Damsite
	Water Temperature Record: October 1980 - December 1981
	(Station destroyed December 1981)
0440	Susitna River at Gold Creek - USGS Station 15292000
	Water Temperature Record: 1957, 1974 - Present
	Temperature Cross Sections: 1980: May 14 July 2 August 19 October 7 1981: May 27 June 23 July 21 August 27 September 28
	Miscellaneous Water Temperatures: 1980 and 1981 (R&M)

Index No.	Description
0445	Chulitna River near Talkeetna - USGS Station 15292400
	Water Temperature Record: to begin 1982
	Temperature Cross Sections: 1980: June 3 July 17 September 1 October 22 1981: January 14 February 10 March 25 May 18 June 23 July 20 August 24
	Miscellaneous Water Temperatures: 1980
0455	Talkeetna River near Talkeetna - USGS Station 15292700
	Water Temperature Record: 1954
	Temperature Cross Section: 1980: April 1 April 22 May 23 June 30 July 10 July 28 July 29 September 9 October 15 1981: May 29 June 24 July 22 August 23 September 28
0460	Susitna River near Sunshine - USGS Station 15292780
	Water Temperature Record: 1981 - Present
0462	Willow Creek near Willow - USGS Station 15294005
	Water Temperature Record: 1978 - Present

Index No.	Description
0463	Deception Creek near Willow - USGS Station 15294010
	Water Temperature Record: 1978 - Present
0465	Skwentna River near Skwentna - USGS Station 15294300
	Miscellaneous Water Temperatures: 1967-68, 1974-75, 1980
0475	Yentna River near Susitna Station
	Water Temperature Record: 1981 - Present
	Temperature Cross Sections: 1981: May 20 June 11 July 14 August 11 September 16
0490	Susitna River at Susitna Station - USGS Station 15294350
	Water Temperature Record: 1975 - Present
	Temperature Cross Sections: 1980: February 12 March 12 June 16 July 30 October 10 1981: January 13 April 9 May 21 June 12 July 15 August 12 September 17

0500 SEDIMENT DISCHARGE

Suspended sediment concentration (mg/l), suspended sediment discharge (tons/day) and suspended sediment particle size analysis data have been collected by the U.S. Geological Survey (USGS) and R&M Consultants (R&M) at several sites within the Susitna River Basin. The USGS and R&M Consultants cooperated in 1981 on measurements to determine bedload sediment transport rates as a function of stream discharge, and the size distributions of this sediment. Three measurements were made at each site (Talkeetna River, Chulitna River, and Susitna River at Gold Creek and Sunshine) in 1981.

The locations where sediment information has been collected are listed below. All of the data, except the most recent data collected by the USGS, are on file at R&M Consultants.

Unless indicated by agency name in parentheses following the period of record, all data have been collected by the USGS.

Index No.	Description
0510	Susitna River near Denali - USGS Station 15291000

Sediment Concentration and Sediment Discharge: 1958-Present

1980: May 22
June 24
July 22
August 26
October 1

1981: April 8
May 19
June 24
July 21
August 25

Particle Size Analysis: 1958-Present

Index No.	Description
0515	Maclaren River near Paxson - USGS Station 15291200
	Sediment Concentration and Sediment Discharge: 1958-1968, 1974-1975
	Particle Size Analysis: 1958-1967, 1974-1975
0520	Susitna River near Cantwell - USGS Station 15291500
	Sediment Concentration and Sediment Discharge: 1962-1972 (USGS), 1980 - Present (R&M)
	1980: September 5 (R&M) September 17 (R&M) October 18 (R&M) 1981: January 13 (R&M) May 20 (R&M) June 30 (R&M) August 2 (R&M) August 3 (R&M) September 15 (R&M)
	Particle Size Analysis: 1962-1972, 1980 - Present
0525	Susitna River above Portage Creek near Gold Creek - USGS Station 624941149221500
	Sediment Concentration and Sediment Discharge: 1977
	Particle Size Analysis: 1977
0540	Susitna River at Gold Creek - USGS Station 15292000
	Sediment Concentration and Sediment Discharge: 1952-1957, 1962, 1967, 1974-Present
	1980: May 14 August 19 October 7 October 16 (R&M)

Index No.	Description
0540	Susitna River at Gold Creek (continued)

1981: January 14 (R&M)
January 16
February 12
March 24
May 27 (R&M and USGS)
June 30 (R&M)
June 23
July 21
July 1 (R&M)
August 2 (R&M)
August 3 (R&M)
August 27
September 14 (R&M)

Particle Size Analysis: 1953, 1955-1957, 1962, 1974 - Present

Bedload Sediment Sampling:

1981: July 22
August 26
September 28

0545 Chulitna River near Talkeetna - USGS Station 15292400

Sediment Concentration and Sediment Discharge: 1967 - 1972, 1980 - Present

1980: May 21
June 3
June 23
July 17
September 1
September 30
October 22

1981: January 14
February 10
March 25
May 18
June 23
July 20
August 24
September 28

Index No.	Description
0545	Chulitna River near Talkeetna (continued) Particle Size Analysis: 1967-1972, 1980 - Present Bedload Sediment Sampling: 1981: July 22 August 25 September 29
0555	Talkeetna River near Talkeetna - USGS Station 15292700 Sediment Concentration and Sediment Discharge: 1966 - Present 1980: January 17 April 11 May 15 July 3 August 20 October 8 1981: January 17 February 11 March 26 May 29 June 24 July 22 August 23 September 28 Particle Size Analysis: 1966 - Present Bedload Sediment Sampling: 1981: July 21 August 25 September 29
0560	Susitna River at Sunshine - USGS Station 15292780 Sediment Concentration and Sediment Discharge: 1971, 1977, 1981 - Present Particle Size Analysis: 1971, 1977, 1981 - Present Bedload Sediment Sampling: 1981: July 22 August 26 September 30

Index No.	Description
0561	Montana Creek near Montana - USGS Station 15292800 Sediment Concentration and Sediment Discharge: 1970-1971, 1973 Particle Size Analysis: 1970-1971, 1973
0563	Deception Creek near Willow - USGS Station 15294010 Sediment Concentration and Sediment Discharge: 1978-1981
0565	Skwentna River near Skwentna - USGS Station 15294300 Sediment Concentration and Sediment Discharge: 1967-1968, 1974-1975, 1980 - Present 1980: June 12 August 21 1981: July 13 September 11 Particle Size Analysis: 1967-1968, 1974-1975, 1980 - Present
0575	Yentna River near Susitna Station Sediment Concentration and Sediment Discharge: 1981: January 13 April 9 May 20 June 11 July 15 August 11 September 16 Particle Size Analysis: 1981 - Present

Index No.	Description
0590	Susitna River near Susitna Station - USGS Station 15294350

Sediment Concentration and Sediment Discharge: 1975 - Present

1980: February 12
March 12
June 16
July 30
October 10

1981: January 13
April 9
May 21
June 12
July 15
August 12
September 17

Particle Size Analysis: 1975 - Present

0600 CLIMATE

Climatic data have been collected by the National Oceanic and Atmospheric Administration (NOAA), R&M Consultants (R&M), and others at a number of locations within and adjacent to the Susitna River Basin.

Climatic Data collected by NOAA appear for individual stations in one of two types of reports. The first, entitled "Local Climatological Data, Annual Summary with Comparative Data" is generally the most comprehensive and is published only for stations with over 30 years data. A list of the parameters included in this report is presented in Appendix D. The second, entitled "Annual Climatologic Summary" contains fewer parameters than the first, and a list of the parameters included in this report is presented in Appendix E. It should be noted that all of the parameters listed in the appendices for a particular report may not have actually been measured at any given station.

NOAA also publishes reports entitled "Local Climatological Data, Monthly Summaries". These reports are available for any station publishing an "Annual Summary with Comparative Data", and present most of the parameters contained in the annual summary on a daily basis, with selected parameters also presented on a 3-hour or hourly basis.

Data for stations not covered by the above reports can be obtained from NOAA reports entitled "Climatological Data" (CD's) which are published monthly and contain summary information on all climate stations in the State.

The miscellaneous wind data have been supplied by Mr. Jim Wise of the Arctic Environmental Information and Data Center, and are taken from the manuscript entitled "Wind Power Atlas". The data

are listed by parameter collected. This information is footnoted in the table and listed at the end of the table.

Climate data measured at each R&M station include: air temperature, average wind speed, wind direction, peak wind gust, relative humidity, precipitation, and solar radiation. Snowfall amounts have been measured in a heated precipitation bucket at Watana only. Data are recorded at fifteen-minute intervals at all the stations. An evaporation pan was installed in spring of 1981 at Watana Camp and measurements are taken daily during May -September.

An attempt has been made at ordering climate stations from the upper to the lower Susitna River Basin, with R&M Stations in the upper Susitna River Basin listed first.

Climate data may be obtained through R&M Consultants.

Index Number	Station Name	Measured By	Report[1] Available	Period of Record
0610	Susitna Glacier	R&M	-	7/20/80 - Present
0618	Gracious House	NOAA	B	1959 - 1978
0620	Denali	R&M	-	7/18/80 - Present
0630	Tyone R.	R&M	-	8/27/80 - Present
0635	Vee Canyon	USBR	-	*
0640	Kosina Cr.	R&M	-	8/25/80 - Present
0650	Watana	R&M		4/8/80 - Present
0660	Devil Canyon	R&M	-	7/17/80 - Present
0670	McKinley Park	NOAA	B	1925 - Present
0671	Healy 1	NOAA	-	1922 - 1945
0671	Healy 2	NOAA	B	1972 - Present**
0672	Healy Power Plant I	NOAA	-	**
0673	Healy Power Plant II	NOAA	-	**
0674	Rapids	NOAA	-	**
0674.5	Trims Camp	NOAA	-	1957 - December 1979
0675	Big Delta	NOAA	A	1949 - Present**
0676	Paxson Lake	NOAA	-	1966 - 8/31/79
0676	Paxson	NOAA	A	1974 - Present

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1 NOAA Reports Available:

A Annual Summary with Comparative Data

B - Annual Climatologic Summary

* Miscellaneous Temperature Data (see p. 0600-6)

** Miscellaneous Wind Data also available (see pp. 0600-5 and 0600-6)

Index Number	Station Name	Measured By	Report[1] Available	Period of Record
0677	Gulkana	NOAA	A	1942 - Present**
0678	Summit	NOAA	A	1941 - 10/15/76**
0679	Chulitna R. Lodge	NOAA	B	1971 - Present
0680	Edgemire Lakes	NOAA	B	1971 - 2/28/81
0681	Chulitna Hwy. Camp	NOAA	B	1972 - July 1980
0682	Talkeetna	NOAA	A	1917 - Present**
0683	Willow Hwy. Camp	NOAA	B	1977 - Present
0684	Whites Crossing	NOAA	B	1971 - Present
0685	Puntilla	NOAA	B	1949 - Present
0686	Skwentna	NOAA	B	1949 - Present
0687	Anchorage	NOAA	A	1922 - Present

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1 NOAA Reports Available:

A Annual Summary with Comparative Data

B - Annual Climatologic Summary

** Miscellaneous Wind Data also available (see pp. 0600-5 and 0600-6)

MISCELLANEOUS WIND DATA

Stations: Healy 2, Healy Power Plant I, Healy Power Plant II

Table containing wind speed, percent frequency and cumulative frequency at one meter per second increments. Table containing wind direction frequency in percent. Table containing wind speed and joint frequency.

Station: Rapids

Period summary by combined velocity groups (1 to 12 observations daily) covering 1935 - 1941.

Station: Big Delta

Period summary by combined velocity groups (1 to 3 observations daily) covering 1935 - 1941.

Station: Gulkana

Percentage frequency of occurrence, direction by speed groups - a summary of the data between January 1945 and November 1958.

Station: Summit

Period summary by combined velocity groups (16 observations daily) covering 1940 - 1941.

Station: Talkeetna

Period summary by combined velocity groups (16 observations daily) covering 1940 - 1941.

MISCELLANEOUS TEMPERATURE DATA

Station: Vee Canyon

Three-times daily observations made during March and April 1962 by US Bureau of Reclamation (USBR) drilling crews of temperatures and weather type. Reported in "Engineering Geology of Vee Canyon Damsite", USBR, November 1962.

EVAPORATION DATA

Station Name	Measured by	Period of Record
Watana	R&M	5/7/81 - Present
Matanuska Agr. Exp. Sta.	NOAA	1934 - Present
McKinley Park	NOAA	1969 - Present
Palmer IAS	NOAA	1966 - Present
Fairbanks WSFO AP	NOAA	

Evaporation is read once a day and is recorded in conjunction with wind and maximum and minimum temperatures.

The evaporation data are on file at R&M or, with the exception of Watana, can be obtained directly from the National Weather Service.

0800 SNOW SURVEY

Snow depth and water equivalent data have been collected by the U.S. Soil Conservation Service (SCS), the Alaska Department of Fish and Game (ADF&G) and R&M Consultants. The locations for which this information is available are listed below generally in order from the upstream end to the downstream end of the Susitna Basin.

The ADF&G markers have been established for the purpose of studying the effect of snow depth on game movements. There are 8 locations, each along a tributary stream to the Susitna River with 4 - 6 aerial snow markers at each location. These markers are placed at different elevations moving up the stream valley.

The cross reference numbers for SCS sites listed on the following page correspond to map numbers as published in the Snow Survey Bulletin issued by the Soil Conservation Service. Cross reference numbers for R&M and ADF&G snow courses are arbitrary. These will be changed to map numbers when they are included in the Snow Survey bulletin.

All of the data listed can be obtained from the agency responsible for the snow course or from R&M Consultants.

Index Number	Course Name	Measured By	Cross Reference Number	Years of Record Prior to 1980	Drainage Basin
0802	Cirque	R&M	W-1	-	West Fork Gl.
0803	Ice Cave	R&M	W-2	-	West Fork Gl.
0804	West Fork Gl.*	R&M	W-3	-	West Fork Gl.
0805	Crevasse (abandoned 1981)	R&M	S-1	-	Susitna Gl.
0806	Mt. Hayes*	R&M	S-2	-	Susitna Gl.
0807	Caribou	R&M	S-3	-	Susitna Gl.
0808	Malamute	R&M	S-4	-	Susitna Gl.
0809	Mt. Deborah) (abandoned 1981	R&M	S-5	-	Susitna Gl.
0810	Aurora Peak (abandoned 1981)	R&M	S-6	-	Susitna Gl.
0811	East Fork @ 2850'	R&M	E-2	-	East Fork Gl.
0811.4	East Fork @ 3500'	R&M	E-4	-	East Fork Gl.
0811.2	East Fork @ 5200'	R&M	E-5	-	East Fork Gl.
0812	Pyramid	R&M	E-1	-	East Fork Gl.
0813	Jatu Pass*	R&M	E-3	-	East Fork Gl.
0814	Monahan Flats*	SCS	25	15	West Fork Gl.
0814.2	Boulder North	R&M	C-1	-	Susitna River
0814.4	Valdez Creek	R&M	C-2	-	Susitna River
0815	Denali*	R&M	-	-	Susitna River
0816	Butte Creek	R&M	B-3	-	Butte Creek
0817	Moose (abandoned 1981)	R&M	B-2	-	Butte Creek
0818	Red Fox (abandoned 1981)	R&M	B-1	-	Butte Creek
0819	Clearwater Lake*	SCS	26	14	Maclaren River
0820	Tyone R.*	R&M	-	-	Tyone River
0821	Lake Louise*	SCS	29	15	Tyone River

* Indicates site with snow course and aerial stadia marker, all other aerial stadia markers only.

Index Number	Course Name	Measured By	Cross Reference Number	Years of Record Prior to 1980	Drainage Basin
0822	Little Nelchina	SCS	31	12	Oshetna R.
0823	Kosina Cr.*	R&M	-	-	Kosina Cr.
0824	Oshetna Lake*	SCS	30	15	Oshetna R.
0825	Goose Creek	ADF&G	8	-	Goose Creek
0826	Coal Creek	ADF&G	7	-	Coal Creek
0827	Gaging Station Cr.	ADF&G	6	-	Gaging Station Cr
0828	Jay Creek	ADF&G	5	-	Jay Creek
0829	Kosina Cr.	ADF&G	4	-	Kosina Cr.
0830	Watana Cr.	ADF&G	3	-	Watana Cr.
0831	Fog Cr.	ADF&G	2	-	Fog Cr.
0832	Devil Mountain	ADF&G	1	-	Susitna River
0833	Fog Lakes*	SCS	24	10	Fog Cr.
0834	Watana Camp*	R&M	-	-	Susitna River
0835	Devils Canyon*	R&M	-	-	Susitna River
0836	Devils Canyon	SCS	124	3	Susitna River
0837	Talkeetna R.	SCS	135	2	Talkeetna R.
0838	Chunilna Creek	SCS	137	1	Talkeetna R.
0839	Talkeetna	SCS	22	13	Susitna River
0840	Middle Fork Iron Cr.	SCS	134	1	Talkeetna R.
0841	Rainbow Lake	SCS	136	2	Talkeetna R.
0842	Bald Mt. Lake*	SCS	23	15	Talkeetna R.
0843	Talkeetna R. Pass	SCS	133	1	Talkeetna R.
0844	Sheep River	SCS	132	1	Sheep River
0845	Sheep Creek Cirque	SCS	131	1	Sheep Creek
0846	Upper Kashwitna R.	SCS	130	1	Kashwitna R.
0847	Kashwitna R. Cirque	SCS	129	1	Kashwitna R.

* Indicates site with snow course and aerial stadia marker, all other aerial stadia markers only.

Index Number	Course Name	Measured By	Cross Reference Number	Years of Record Prior to 1980	Drainage Basin
0848	Little Willow Cr.	SCS	128	1	Kashwitna R.
0849	Independence Mine	SCS	33	13	Little Susitna
0850	Deception Cr.*	SCS	142	1	Willow Creek
0851	Mt. Bullion*	SCS	141	2	Willow Creek
0852	Capitol Site*	SCS	140	2	Willow Creek
0853	Willow Airstrip	SCS	32	16	Willow Creek
0854	Jack River	SCS	138	3	Tanana R.
0855	Tokositna Valley	SCS	-	-	Kahiltna R.
0856	Ramsdyke Cr.*	SCS	-	-	Kahiltna R.
0857	Dutch Hills	SCS	-	-	Kahiltna R.
0858	Peters Hills	SCS	21	12	Kahiltna R.
0859	Chelatna Lake	SCS	20	16	Kahiltna R.
0860	Skwentna*	SCS	19	12	Yentna R.
0861	Alexander Lake*	SCS	18	16	Yentna R.
0862	Haggard Cr.*	SCS	48	14	Copper R.
0863	St. Anne Lake*	SCS	28	15	Copper R.

* Indicates site with snow course and aerial stadia marker, all other aerial stadia markers only.

0900 SNOW CREEP

Instrumentation for measuring the effect of snow creep forces on transmission line towers was installed by R&M Consultants during the winter of 1980-81. Two locations were chosen along the proposed transmission line route, a southfacing slope on Tsusena Butte above Watana Camp and a northfacing slope near Devil Canyon.

Some previous research on snow creep was done by the U.S. Army Corps of Engineers in 1974, reported in the following paper:

> Snow Creep Investigations in Southeast Alaska; Meyer, Robert. Alaska District, Army Corps of Engineers.

0920 NEAR WATANA

Installed February 26, 1981

0940 NEAR DEVIL CANYON

Installed February 25, 1981

(Station destroyed December 1981)

1000 FREEZEUP RIVER ICE OBSERVATIONS

Field observations of the freezeup of the Susitna River were taken at regular intervals starting in October 1980. In each survey the river was flown, observations made, and photos taken of the extent of ice cover. Location of the upstream edge of ice, ice jams, ice bridges and amounts of shore ice were noted.

Observers were all from R&M Consultants unless noted otherwise. All this information is on file and may be obtained from R&M Consultants.

Index Number	Date	Area of Ice Observations	Observers
1010	10/12/80	Lower Susitna	B. Drage, J. Coffin
1011	10/13/80	Oblique aerial photographs from Talkeetna to Devil Canyon	B. Drage, L. Grifiths
1012	10/16 - 10/17/80	Yentna River to Susitna Glacier	T. Lavender, (Acres) B. Drage
1013	10/31 - 11/1/80	Talkeetna to Vee Canyon	J. Coffin
1014	11/2 - 11/3/80	Talkeetna to Oshetna River	J. Coffin
1015	11/4/80	Oblique aerial photos with discontinuous coverage from Talkeetna to Devil Canyon	L. Griffiths, L. Nicholson, H. Tomingas
1016	11/11/80	Parks Hwy. Bridge to Kosina Cr.	B. Drage, J. Coffin
1017	11/14/80	Vertical aerial photography from Alexander Creek to Devil Creek	J. Coffin, B. Butera
1018	11/19 - 11/20/80	Willow Creek to Watana	J. Coffin
1019	11/29/80	Cook Inlet to Kosina Cr.	B. Drage

Index Number	Date	Area of Ice Observations	Observers
1020	12/1 - 12/3/80	Talkeetna to Tyone River	J. Coffin
1021	12/2 - 12/3/80	Survey of ice cover formation Talkeetna to Devil Creek	B. Drage, L. Griffiths
1022	12/4 - 12/5/80	Talkeetna to Tyone River	J. Coffin
1023	12/5/80	Vertical aerial photography from Cook Inlet to Watana Creek	L. Griffiths, R. Mourtsen
1024	12/8/80	Survey of ice cover formation between Curry & Sherman	L. Griffiths, B. Butera
1025	12/12/80	Survey of ice cover formation near Gold Creek	L. Griffiths, B. Butera
1026	10/2/81	Talkeetna to Tyone	C. Schoch, L. Fotherby
1027	10/6/81	Cook Inlet to Watana	J. Coffin, B. Butera
1028	10/29/81	Cook Inlet to Curry	S. Bredthauer, L. Fotherby
1029	11/3/81	Talkeetna to Watana	J. Coffin, C. Schoch
1030	11/6/81	Cook Inlet to Watana	B. Butera, L. Fotherby
1031	11/18/81	Cook Inlet to Watana	C. Schoch, B. Butera
1032	12/2/81	Tsusena Creek to Tyone	C. Schoch, B. Butera
1033	12/14/81	Talkeetna to Watana	C. Schoch

1100 WINTER RIVER ICE OBSERVATIONS

Field observations of ice cover conditions on the Susitna River were carried out by R&M personnel through the winter months during the period after freeze-up and prior to spring breakup. Photographs and other field observations document the extent of ice cover, stability, ice thickness, location of open water areas in the main channel and general characteristics of the channel. The results of this work have been used in hydraulic and ice studies for computer simulations of pre-project and predicted post-project conditions at low flow, and also in Environmental Studies to assess potential impacts of regulated flow.

All of the information collected during winter field trips is on file at R&M Consultants.

Index Number	Date	Area of Ice Observations	Observers
1110	12/30/80	Talkeetna to Watana	J. Coffin
1111	1/6/81	Talkeetna to Watana	J. Coffin
1112	1/8/81	Watana to Tyone River	J. Coffin
1113	1/12 - 1/13/81	Talkeetna to Vee Canyon	J. Coffin, L. Griffiths
1114	2/27/81	Measurement of ice thickness and competence at all Crest-Stage Recorder locations except Section 25 and Susitna-Chulitna Confluence	J. Coffin R. Butera C. Schoch
1114.5	3/5/81	Talkeetna to Portage Creek	J. Coffin C. Schoch
1115	3/6/81	Sherman to Talkeetna	J. Coffin C. Schoch
1116	3/16/81	Talkeetna to Denali	C. Schoch

Index Number	Date	Area of Ice Observations	Observers
1117	3/24/81	Talkeetna to Watana Camp	J. Coffin
1118	3/31 - 4/2	Talkeetna to Denali	J. Coffin C. Schoch
1119	4/1/81	Measurement of ice thickness at Watana stream gage site	J. Coffin G. Claggett C. Schoch
1120	4/13 - 4/14/81	Devil Canyon Survey of ice, water surface, water velocities, and bottom profile	J. Coffin R. Butera C. Schoch
1121	1/4 - 1/7/82	Talkeetna to Glaciers	S. Bredthauer J. Coffin
1122	2/3/82	Talkeetna to Glaciers	S. Bredthauer B. Butera

1200 BREAKUP RIVER ICE OBSERVATIONS

Observations were made by R&M personnel during spring breakup on the Susitna River to assess the nature of ice cover breakup, position of ice jams in the channel, extent of flooding upstream of these ice jams, quantity and significance of ice floes and general decay of the ice cover. The information collected will be used for hydraulic and ice studies, as outlined in Subtask 3.06 of the Plan of Study.

All information collected during field trips will be on file at R&M Consultants.

Index No.	Date(s)	Description	Observers
1201	4/13/81	Pre-breakup observations of ice cover condition between Talkeetna and Deadman Creek.	J. Coffin
1205	4/18 - 5/7/81	Summary of breakup observations and measurements by Leon Dick at Deshka - Susitna confluence.	Leon Dick
1210	4/23/81	Reconnaissance from the Deshka River (Kroto Creek) to Devil Creek and water level measurements at Chase crest gage and Gold Creek.	B. Drage L. Griffiths
1215	4/27/81	Aerial reconnaissance of the river from Anchorage to Vee Canyon.	J. Coffin T. Lavender (Acres)
1216	4/27/81	Vertical 35 mm aerial photography from Bell Island to Watana Creek	L. Griffiths R. Mourtsen
1217	4/29/81	Reconnaissance from Kosina Creek to Tsusena Creek and water level measurements taken at selected sites between Talkeetna and Watana Creek.	J. Coffin T. Lavender (Acres)
1219	4/30/81	Summary of trip from Talkeetna to Gold Creek with Glenn Valentine of the Alaska Railroad.	L. Griffiths

Index No.	Date(s)	Description	Observers
1220	4/30 - 5/1/81	Reconnaissance from Talkeetna and Denali.	C. Schoch R. Butera
1221	5/1/81	Reconnaissance Yentna-Susitna confluence to River mile 144 (downstream of Portage Creek) with survey of water levels at selected sites.	B. Drage L. Griffiths
1223	5/2/81	Reconnaissance from the Yentna River confluence to Devil Canyon with surveys of water levels at selected sites.	B. Drage L. Griffiths
1225	5/3/81	Reconnaissance from Yentna River confluence to Devil Canyon with survey of water levels in the vicinity of Gold Creek.	L. Griffiths
1227	5/4/81	Reconnaissance from Talkeetna to Devil Canyon with survey of water levels at selected sites.	L. Griffiths
1229	5/5/81	Reconnaissance from the Parks Highway Bridge to Devil Canyon with survey of water levels at selected sites.	L. Griffiths H. Tomingas
1231	5/6/81	Reconnaissance from the Parks Highway Bridge to above the Indian River with survey of water levels at selected sites.	H. Tomingas
1230	5/6/81	Vertical 35 mm aerial photography from Bell Island to Curry	L. Griffiths R. Mourtsen
1232	5/7/81	Reconnaissance from Talkeetna to Gold Creek with survey of water levels at selected sites.	H. Tomingas
1233	5/7/81	Reconnaissance from Watana to Denali, tracing leads and overflows.	C. Schoch
1235	5/8/81	Reconnaissance from the mouth of the Susitna River to the Tyone River confluence.	J. Coffin G. Krishnan (Acres)

1300 AERIAL PHOTOGRAPHY

This section includes a listing of vertical aerial photography, both low altitude and high altitude, that has been flown over part or all of the Susitna River Basin.

For each set of photographs, the table shows the date of photography, area of coverage, scale and location of the negatives. An agency list with addresses follows the table. More detailed information concerning precise area of coverage and availability of photographs can be obtained through these agencies.

1300 AERIAL PHOTOGRAPHY

Index No.	Date	Area	Scale	BW or Color	Contracting Agency	Location of Negatives
1310	1949-51	Susitna River Basin - Cook Inlet to Devil Canyon	1:40000	BW	USCE	EROS Data Center
1311	1951-54	Denali Highway - West from Maclaren River	1:40000	BW	USCE	EROS Data Center
1312	1951-54	Yentna River - Chelatna Lake	1:40000	BW	USCE	EROS Data Center
1313	1951	Talkeetna	1:40000	BW	USCE	EROS Data Center
1314	1961-62	Cook Inlet to Willow East of Susitna River	1:15840	BW	ADL	ADL (Project Symbol BL)
1315	1961-62	Cook Inlet, Mt. Yenlo West of Susitna River	1:20000	BW	BLM	BLM (Project Symbol GP 103, GP 120)
1316	1962	Delta Islands	1:20000	BW	BLM	BLM (Project Symbol GP 105)
1317	1962	Talkeetna	1:20000	BW	ADL	ADL (Project Symbol TAK)
1318	1962-63	Susitna Valley	1:15840	BW	ADL	ADL (Project Symbol SUS)
1320	1968	Upper Susitna Valley, Chulitna River	1:15840	BW	ADL	ADL (Project Symbol SUTP)
1325	1972	Lake Louise Area	1:24000	C	SDP	ADL (Project Symbol Lk. Lou.)
1330	1974	Devil Canyon	1:30000	BW	DOT	NPAS
1331	1974	Susitna River Basin	1:500000	BW	NASA	EROS Data Center
1332	1974	Cook Inlet to Talkeetna	1:63360	BW	CSSC	NPAS

1300 AERIAL PHOTOGRAPHY (Cont'd)

Index No.	Date	Area	Scale	BW or Color	Contracting Agency	Location of Negatives
1333	1976	Willow Basin	1:24000	BW&C	CSSC	ADL (Project Symbol WIL)
1334	1976-79	Susitna River Basin	1:500000 1:1000000	BW BW	NASA NASA	EROS Data Center EROS Data Center
1335	7/28/77 7/29/77	Susitna River Gold Creek to Glaciers	1:120000	C-IR	BLM	BLM
1336	1978	Susitna River	1:18000	BW	USCE	NPAS
1337	1978	Susitna River	1:72000	BW	USCE	NPAS
1338	4/8/79 8/25/78	Susitna River Cook Inlet to Talkeetna	1:60000 1:120000	C-IR BW	BLM BLM	BLM BLM
1339	8/11/80 8/1/80	Upper Susitna River Basin	1:60000 1:120000	C-IR BW	BLM BLM	BLM BLM
1340	7/19/80	Devil Canyon Reservoir	1:24000	C	R&M	NPAS
1341	7/19/80	Watana Reservoir	1:24000	C	R&M	NPAS
1342	7/19/80	Alternative Access Corridor - Susitna	1:24000	C	R&M	NPAS
1343	8/24/80	Lower Susitna River	1:48000	BW	R&M	NPAS
1344	11/14/80	Susitna River - Delta Islands to Watana Creek	1:60000	BW	R&M	R&M (35 mm Photography)
1345	12/5/80	Susitna River - Cook Inlet to Watana Creek	1:24000	BW	R&M	R&M (35 mm Photography)
1346	4/27/81	Susitna River - Bell Island to Watana Creek	1:24000	BW	R&M	R&M (35 mm Photography)

Index No.	Date	Area	Scale	BW or Color	Contracting Agency	Location of Negatives
1347	5/6/81	Susitna River - Bell Island to Curry	1:24000	BW	R&M	R&M (35 mm photography)
1348	5/26/81	Alternative Access Corridors	1:24000	C	R&M	NPAS
1349	5/26/81	East-west intertie	1:24000	C	R&M	NPAS
1350	8/24/81	Susitna River - Cook Inlet to Devil Canyon (For Vegetation Studies)	1:36,000	C	R&M	TES
1351	10/19/81	Susitna River - Cook Inlet to Talkeetna, 5 miles up Chulitna, 5 miles up Upper Susitna (For Definition of Low Water Channel)	1:60,000	BW	R&M	R&M (35 mm photography)

AERIAL PHOTOGRAPHY
AGENCY LIST

State of Alaska (ADL)
Division of Forest, Land and Water Management
323 E. 4th Avenue
Anchorage, Alaska 99501

U.S. Department of Interior (BLM)
Bureau of Land Management
Federal Building
701 "C" Street
Anchorage, Alaska 99501

Capital Site Selection Committee (CSSC)

State of Alaska (DOT&PF)
Highways
Planning & Research
P.O. Box 589
Douglas, Alaska 99824

North Pacific Aerial Surveys (NPAS)
4241 "B" Street
Anchorage, Alaska 99501

R&M Consultants, Inc. (R&M)
P.O. Box 6087
Anchorage, Alaska 99503

Soil Conservation Service (SCS)
U.S. Department of Agriculture
Federal Center Building
Hyatteville, Maryland

State of Alaska
Division of Parks (SDP)
619 Warehouse Drive
Anchorage, Alaska 99501

Terrestrial Environmental Specialists (TES)
2207 Spenard Rd.
Anchorage, Alaska 99503

U.S. Army Corps of Engineers (USCE)
Alaska District
P.O. Box 7002
Anchorage, Alaska 99510

U.S. Geological Survey (USGS)
EROS Data Center
Sioux Falls, SD 57198

1400 HYDROGRAPHIC SURVEYS

Data on river channel morphology and floodplain characteristics have been collected by R&M Consultants from parts of the Susitna River.

Precise location, date of cross-section survey, plot showing channel geometry, calculated hydraulic parameters and general descriptions of each cross-section site are available for the river reach between Talkeetna and Portage Creek. In addition, longitudinal streambed profiles of the main channel thalweg have been run from Talkeetna to Portage Creek. Miscellaneous cross-sections have also been surveyed near access points to the Lower Susitna (i.e. below Talkeetna).

Channel cross-sections from fresh water sloughs adjacent to the Susitna River have been surveyed by Alaska Department of Fish and Game during 1976. This data has been included as part of Appendix C and therefore has not been listed again in this section.

All of the data in this section are on file at R&M according to index number and location.

Index No.	Dates	Location	Description
1409	1976	Susitna River	Cross-sections surveyed by ADF&G
1410	10/4 - 11/19/80	Talkeetna to Portage Creek	62 cross-sections defining river floodplain and channel geometry
1411	10/11/80	LRX - 18 at river mile 106 to Talkeetna	longitudinal profile of main channel thalweg

Index No.	Dates	Location	Description
1412	10/26 - 10/27/80	Portage Creek to LRX - 18	longitudinal profile of main channel thalweg
1413	3/3 - 3/26/81	Devil Creek to Deadman Creek	23 cross sections defining river floodplain & channel geometry
1414	5/21/81	Portage Creek to Devil Canyon	6 cross sections defining river floodplain & channel geometry
1415	9/22 - 9/26/81	Access channels to Susitna River below Talkeetna	8 cross sections to assess the effects of controlled river discharge on navigation on the Susitna River

1500 GLACIAL OBSERVATIONS

Glacial studies were begun by R&M Consultants and the University of Alaska during 1981. The objective of this program is to identify any problems peculiar to the existence of glaciers in the Susitna Basin. This study assessed whether significant changes in water or sediment yield could occur or if potential lake dumps exist and is oriented toward a long-term glacial observation and study program.

Data were gathered on all major glaciers of the Upper Susitna Basin with the exception of the Eureka and Oshetna Glaciers. Study of the Eureka Glacier was limited to visual observations and aerial photography. The Oshetna Glacier was not considered a major contributor to the flow or sediment regime of the Susitna River and therefore was omitted from this study.

R&M conducted the control and velocity surveys on the West Fork Glacier, West Tributary of Susitna Glacier, Turkey Glacier and East Tributary of Susitna Glacier. The velocity surveys were repeated monthly, May through September, to determine ice movement as an aid in mass balance and glacier dynamics analyses.

A thermocouple string was installed to a depth of 66 feet at an elevation of 7700 feet on the West Tributary of Susitna Glacier to determine the thermal regime of the ice.

Glacial studies were supported by historical data from climate stations and snow surveys in the Susitna Basin, as well as sediment discharge records for the Susitna and Maclaren Rivers.

The results of this data acquisition effort, as well as a thorough description of field procedures and analytical methods, are presented in a report by William Harrison of the Geophysical Institute (Harrison, 1981).

APPENDIX A

GOVERNMENT AGENCIES THAT HAVE COLLECTED OR ANALYZED WATER RESOURCES DATA FOR THE SUSITNA RIVER BASIN

Alaska Department of Fish & Game
333 Raspberry Road
Anchorage, Alaska 99502
Attn: Sport Fish Division

Includes: Water Quality Data in Conjunction with Fisheries Studies

Alaska Department of Natural Resources
Division of Land and Water Management
Water Management Section
323 E. Fourth Avenue
Anchorage, Alaska 99501

Includes: Information on Navigation and Navigability

Alaska District, Corps of Engineers
Hydrology Section
Post Office Box 7002
Anchorage, Alaska 99510

Includes: Data Analysis

Arctic Environmental Information and Data Center
707 A Street
Anchorage, Alaska 99501

Includes: Data Analysis

National Climatic Center
National Oceanic & Atmospheric Administration
Asheville, North Carolina 28810

Includes: Climatic Data

Soil Conservation Service
2221 E. Northern Lights Blvd.
Room 129
Anchorage, Alaska 99501

Includes: Snow Surveys

U.S. Geological Survey
281 E Street
Anchorage, Alaska 99501
Water Resources Division

Includes: Water Discharge
Sediment
Water Quality
Water Temperature

APPENDIX C

DATA COLLECTED BY ALASKA DEPARTMENT OF FISH AND GAME (ADF&G) IN THE SUSITNA RIVER BASIN FROM 1974 - 1978, and 1981

Streamflow, water quality and water temperature data have been collected by the Alaska Department of Fish and Game at a number of locations within the Susitna River Basin. Since the measurements have been taken periodically, the number of measurements, timing and specific parameters measured vary from year to year at any given station. Information available from the Alaska Department of Fish and Game has been included below. These reports are all on file at R&M Consultants.

Barrett, Bruce M. 1974. An assessment study of the anadromous fish populations in the Upper Susitna River watershed between Devil's Canyon and the Chulitna River. Cook Inlet Data Report No. 74-2. Alaska Department of Fish and Game. Division of Commerical Fisheries. 56 pp.

Figure 10: Profile of Susitna River water temperatures for September 4 - 11 at Gold Creek and Devil's Canyon Fishwheel Camp.

Figure 11: Profile of water and air temperatures recorded daily at east bank fishwheel.

WATER TEMPERATURE, WATER QUALITY AND STAGE DATA COLLECTED BY THE ALASKA DEPARTMENT OF FISH AND GAME AFTER 1980

An extensive program of data collection was undertaken by the Alaska Department of Fish and Game (ADF&G) during 1981. The data collected are presented in: "Aquatic Habitat and Instream Flow Project," Susitna Hydro Subtask 7.10, Volumes 1 and 2, by the ADF&G, 1981.

Physiochemical Data for Each General Habitat Evaluation Study Site

Dissolved oxygen, pH, water and air temperatures, turbidity and specific conductance were measured twice monthly at each general habitat evaluation study site, except in the impoundment reach, where these parameters were measured monthly. The data are presented for each site in a graphical format versus specific points in time and in tabular form. For locations, see the above referenced report.

Thermograph Data

Water temperature data were continually recorded at 29 sites in the study area (Table C-1, following) using Ryan Model J-90 thermographs. The data were converted into daily means, calculated as the mean of 12, two hour point temperatures. The temperature data for each thermograph site are presented as a function of time.

Stage Data

Stage data were collected at three Adult Anadromous Fisheries fishwheel sites and each lower-river general habitat evaluation study site (Table C-2, following).

Table C-1 Location and period of record for thermographs installed in Susitna River drainage. Summer 1981.

	LOCATION	R.M.	T.R.M.	PERIOD OF RECORD	GEOGRAPHIC COD
1.	Alexander Creek	10.1	0.5	6/9-10/9	15N07W05CBC
2.	Above Alexander Creek	10.1		6/6-7/15	15N07W05CDB
3.	Yentna River	30.1	2.0	6/5-9/14	17N07W01CAB
4.	Above Yentna River	32.3		6/6-10/9	17N06W07CDB
5.	Deshka River	40.6	1.2	6/10-10/9	19N06W26CBB
6.	Above Deshka River	40.6		--*	19N06W35ACA
7.	Little Willow Creek	50.5	1.0	6/24-9/30	20N05W23CBC
8.	Above Little Willow Creek	50.5		6/24-9/29	20N05W27BAC
9.	Kashwitna River	61.0	0.2	--*	21N05W13AAA
10.	Above Kashwitna River	61.2		8/30-9/27	21N05W13ABA
11.	Montana Creek	77.2		6/12-9/30	23N04W07AAB
12.	Above Montana Creek	77.5		6/12-8/29	23N04W06CAA
13.	Sunshine (Park's Bridge)	83.8		6/2-7/14	24N05W15BAD
14.	Cache Creek Slough	95.5		--*	26N05W35ADC
15.	Talkeetna River	97.0	1.0	6/21-10/2	26N05W24BDA
16.	Chulitna River	98.0		6/20-10/6	26N05W15DAA
17.	Talkeetna Base Camp	103.0		6/20-10/7	27N05W26DDD
18.	Fourth of July Creek	131.3		--*	30N03W03DAC
19.	Above Fourth of July Creek	131.3		6/16-9/28	30N03W03DAB
20.	Gold Creek	136.8		7/24-8/15	31N02W20BAA
21.	Above Gold Creek	136.8		7/24-9/29	31N02W20BAA
22.	Indian River	138.7		7/18-9/29	31N02W09CDA
23.	Above Indian River	138.7		7/19-9/23	31N02W09DCB
24.	Slough 19 (Intragravel)	140.0		--*	31N11W10DBB
25.	Slough 19	140.0		8/27-9/15	31N11W10DBB
26.	Slough 21 (Intragravel)	142.0		8/27-9/29	31N11W02AAA
27.	Slough 21	142.0		8/29-9/29	31N11W02AAA
28.	Portage Creek	148.8		--*	32N01W25CAC
29.	Above Portage Creek	148.8		7/17-10/3	32N01W25CDA

* no data collected
R.M. = River Mile
T.R.M. = Tributary River Mile

Table C-2 Location of staff gages installed in the Susitna River drainage. Summer 1981.

LOCATION	STAFF GAGE #	RIVER MILE	GEOGRAPHIC CODE
Fish Creek	YE011A	7.0	15N07W27AAC
Alexander Creek Site A	YE021B	10.1	15N07W06DCA
	YE021A		
Alexander Creek Site B	YE031A	10.1	16N07W32CCB
Alexander Creek Site C	YE041A	10.1	16N07W30ACD
	YE041B		
	YE042A		
Anderson Creek	YE051B	23.8	17N07W29DDD
	YE051A		
	YE052A		
Kroto Slough Mouth	YE061A	30.1	17N07W01DBC
	YE061B		
	YE061C		
	YE061D		
Mid-Kroto Slough	YE071A	36.3	18N06W16BBC
	YE071B		
	YE072A		
Mainstem Slough	YE081A	31.0	17N06W05CAB
	YE082A		
	YE083A		
	YE081B		
	YE082B		
	YE083A		
Deshka River Site A	YE091A	40.6	19N06W35BDA
	YE091B		
	YE092A		
	YE092B		
Deshka River Site B	YE101A	40.6	19N06W26BCB
	YE101B		
	YE101C		
	YE101D		
Deshka River Site C	YE111A	40.6	19N06W14BCA
	YE111B		
	YE112A		
Lower Delta Island	YE121A	44.0	19N05W19ACB
	YE122A	44.0	19N05W19ADC
	YE123A	45.0	19N05W17BCD
	YE124A	45.0	19N05W17BCB
Little Willow Creek	YE131A	50.5	29N05W27AAD
	YE132A	50.5	29N05W23CBC
	YE133A	50.5	29N05W27BAC
Rustic Wilderness	SU011A	58.1	21N05W25CBD
	SU011B		
	SU011C		
Kashwitna River	SU021A	61.0	21N05W13AAA
	SU022A		

Table C-2 (Continued)

LOCATION	STAFF GAGE #	RIVER MILE	GEOGRAPHIC CODE
Caswell Creek	SU031A SU031B SU031C	63.0	21N04W06BDD
Slough West Bank	SU041A SU041B SU041C	65.6	22N05W27ADC
Sheep Creek Slough	SU051A SU051B	66.1	22N04W30BAB
Goose Creek (Lower) 1	SU061A SU061B	72.0	23N04W31BBC
Goose Creek (Lower) 2	SU071A SU072A SU073A SU072B SU073B SU073C	73.1	23N04W30BBB
Mainstem West Bank	SU081A SU081B SU081C	74.4	23N05W13BCC
Montana Creek	SU091A SU092A SU093A	77.0	23N04W07ABA
Rabideux Creek	SU101A	83.1	23N05W16DDA
Mainstem 1	TA011A TA011B	84.0	24N05W10DCC
Sunshine Creek	TA021A TA021B	85.7	24N05W14AAB
Birch Creek Slough	TA031A TA031B	88.4	25N05W25DCC
Birch Creek	TA041A TA041B	89.2	25N05W25ABD
Cache Creek Slough	TA051A TA051B	95.5	26N05W35ADC
Whiskers Creek Slough	TA071A TA071B TA072A	101.2	26N05W03ADB
Whiskers Creek	TA081A TA081B	101.4	26N05W03AAC
Slough 6A	TA091A TA091B TA092A	112.3	28N05W13CAC
Lane Creek	TA101A TA102A TA103A TA103B TA103C TA104A	113.6	28N05W12ADD
Mainstem 2	TA111A TA111B	114.4	28N04W06CAB

Table C-2 (Continued)

LOCATION	STAFF GAGE #	RIVER MILE	GEOGRAPHIC CODE
Mainstem Susitna - Curry	GC011A	120.7	29N04W10BCD
	GC011B		
Susitna Side Channel	GC021A	121.6	29N04W11BBB
	GC021B		
Mainstem Susitna - Gravel Bar	GC031A	123.8	30N04W26DDD
	GC031B		
	GC031C		
Slough 8A	GC041A	125.3	30N03W30BCD
	GC042A		
Fourth of July Creek	GC051A	131.1	30N03W03DAC
	GC051B		
	GC052A		
	GC052B		
Slough 10	GC061A	133.8	31N03W36AAC
	GC061B		
	GC061C		
	GC061D		
Slough 11	GC071A	135.3	31N02W19DDD
	GC072A		
	GC071B		
Mainstem Susitna - Inside Bend	GC081A	136.9	31N02W17CDA
	GC081B		
	GC081C		
Indian River	GC091A	138.6	31N02W09CDA
	GC091B		
	GC091C		
	GC091D		
	GC092A		
	GC092B		
	GC092C		
	GC092D		
Slough 20	GC101A	140.1	31N02W11BBC
	GC101B		
	GC101C		
	GC102A		
	GC102B		
Mainstem Susitna - Island	GC111A	146.9	32N10W27DBC
	GC112A		
	GC112B		
	GC112C		
	GC112D		
Portage Creek	GC121A	148.8	32N01W25CDB
	GC121B		
	GC121C		
	GC121D		
	GC121E		
	GC122A		
	GC122B		
	GC122C		
	GC123A		

Table C-2 (Continued)

LOCATION	STAFF GAGE #	RIVER MILE	GEOGRAPHIC CODE
Sunshine Base Camp			
Fishwheel EB 1	SB011A SB012A SB012B	79.0	24N05W36BDC
Fishwheel EB 2	SB021A	81.0	24N05W25BAD
Fishwheel WB 2	SB031A	81.0	24N05W26BAA
Fishwheel WB 3	SB041A	81.0	24N05W23CCA
Talkeetna Base Camp			
East Bank Sonar	TB011A	101.0	27N05W26DDA
Upper East Fishwheel	TB021A	101.0	27N05W26DDD
Upper West Fishwheel	TB031A	101.0	27N05W26DAC
Lower East Fishwheel	TB041A	101.0	27N05W35AAA
Lower West Fishwheel	TB051A	101.0	27N05W35AAB
West Bank Sonar	TB061A	101.0	27N05W26DDB
Curry Base			
In Front of Camp	CB011A CB011B CB011C CB011D	120.0	27N04W16DBA
Lower East Fishwheel	CB021A CB021B	120.0	29N04W16DBD
West Bank Fishwheel	CB031A	120.0	29N04W10BCC

APPENDIX F

CLIMATE AND WATER QUALITY PARAMETERS MEASURED BY R&M

Climate Parameters Measured

- Wind Direction
- Wind Speed
- Temperature
- Relative Humidity
- Solar Radiation
- Precipitation
- Peak Wind Gust

Continuous WQ Parameters (Watana Site)

- Temperature
- pH
- Dissoloved Oxygen
- Oxidation - Reduction Potential
- Conductivity
- Temperature - Corrected Conductivity

Water Quality Parameters Measured (Vee Canyon, Gold Creek Sites)

Field:

- Dissolved Oxygen
- pH
- Conductivity
- Temperature
- Carbon Dioxide
- Alkalinity
- Settleable Solids

Laboratory:

- Turbidity
- Total Dissolved Solids
- Total Suspended Solids
- Total Phosphate
- Kjeldahl Nitrogen
- Total Nitrogen
- Nitrate Nitrogen
- Ammonia Nitrogen
- Chemical Oxygen Demand
- Hardness
- Chloride
- Color
- Sulfate
- ICAP Scan(1)
- Uranium
- Radioactivity, Gross Alpha
- Organic Chemicals
- Total Organic Carbon
- Total Inorganic Carbon

(1) ICAP Scan includes:

- Silver
- Aluminum
- Arsenic
- Gold
- Boron
- Barium
- Bismuth
- Calcium
- Cadmium
- Cobalt
- Chromium
- Copper
- Iron
- Mercury
- Potassium
- Magnesium
- Molybdenum
- Sodium
- Nickel
- Manganese
- Phosphorus
- Lead
- Platinum
- Antimony
- Selenium
- Tin
- Strontium
- Titanium
- Vanadium
- Tungsten
- Zinc
- Zirconium

APPENDIX G

FIELD DATA INDEX
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APPENDIX I

R&M FIELD DATA COLLECTION LOG AS OF DECEMBER 15, 1981

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SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: December 15, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(1) River Stage*	Susitna River near Watana Damsite	Scientific Instr. Co. Manometer Stevens Water Level Recorder	6/20/80	Continuous	7/10-12/1/80 4/15/81-12/2/81	Scheduled	Instrument functioning normally.
(2) River Discharge	Susitna River near Watana Damsite	Teledyne-Gurley Price Current Meter Marsh-McBirney Flow Meter	N/A	Unscheduled	8/20/80 8/21/80 9/3/80 9/18/80 10/20/80 4/01/81 5/24/81 6/2/81 7/3/81	Event Event Event Event Event Event Event Event Event	Stage-discharge rating curve and table have been prepared from field measurements.
(3) River Crest Stage* (Susitna River)	(a) Susitna-Chulitna Confluence (LRX-4)	Crest-stage recorder	6/26/80	Unscheduled	7/31/80 7/27/81 8/31/81 11/2/81	Event	Observations are made at recorder following flood events. Water surface elevations are recorded periodically at most of the crest gage sites.
	(b) Chase (LRX-9)	Crest-stage recorder	7/31/80	Unscheduled	12/2/80 7/27/81 11/2/81	Event	
	(c) Curry (LRX-24)	Crest-stage recorder	6/26/80	Unscheduled	7/31/80 7/27/81 8/31/81 11/2/81	Event	
	(d) Section 25 (LRX-28)	Crest-stage recorder	6/26/80	Unscheduled	7/31/80 7/27/81 8/31/81 11/2/81	Event	
	(e) Sherman (LRX-35)	Crest-stage recorder	6/26/80	Unscheduled	7/31/80 7/27/81 8/31/81 11/2/81	Event	
	(f) Portage Creek (LRX-62)	Crest-stage recorder	6/25/80	Unscheduled	9/6/80 11/11/80 7/27/81 11/2/81	Event	

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: December 15, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(3) River Crest Stage* (Susitna River) (Continued)	(g) Devil Canyon Upper	Crest-stage recorder	6/25/80	Unscheduled	7/31/80 5/24/81 5/31/81 7/31/81 9/3/81 9/17/81	Event	
	(h) Devil Creek (URX-121)	Crest-stage recorder	5/24/80	Unscheduled	7/81/81 9/3/81 11/2/81	Event	
	(i) Watana Dam (URX-106.3)	Crest-stage recorder	7/30/80 10/01/80	Unscheduled	7/28/81 9/3/81 11/2/81	Event	
	(j) Deadman Creek (URX-101)	Crest-stage recorder	7/30/80	Unscheduled	7/28/81 9/3/81 11/2/81	Event	
(4) River Stage (Susitna River)	(a) Devil Canyon	Staff Gauge	3/25/81	Unscheduled	3/30/81 4/14/81 5/1/81 5/8/81 5/14/81 5/24/81 5/31/81 6/2/81 6/6/81 7/27/81 7/31/81 8/5/81 8/6/81 8/10/81 8/12/81 9/3/81 9/4/81 9/17/81	Event	Observations are made periodically by field personnel.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: December 15, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(4) River Stage (Susitna River) (Continued)	(b) Watana Damsite	Staff Gauge	4/16/81	Unscheduled	5/7/81 5/21/81 6/1/81 6/3/81 6/9/81 6/10/81 7/28/81 8/5/81 8/12/81	Event	
	(c) Denali Bridge	Staff Gauge	5/31/81	Daily	-	Scheduled	Daily observations by personnel of the Denali Mining Company.
(5) Water Quality (1,2)*	(a) Susitna River near Watana Damsite	Martek Water Quality Data Logger	10/23/80	Continuous	10/23/80-4/16/81, 5/21/81-7/2/81, 8/5/81-Present	Scheduled	Damage to cable caused loss of all but temperature data for period to 7/2/81. Instrument repaired and factory - calibrated in 7/81. Appears to be functioning normally at present. D.O. sensor not working properly from 10/?/81 to 11/3/81.
	(b) Susitna River near Cantwell (Vee Canyon Site)	VWR pH Meter YSI DO Meter YSI S-C-T Meter Van Dorn Sampler Imhoff Cones	N/A	Summer: monthly Winter: 2-3 months	6/19/80	Scheduled	Spring break-up.
					8/8/80	Scheduled	Summer high-flow period (sampled by helicopter).
					9/5/80	Scheduled	Summer low-flow period.
					9/17/80	Sched/Event	Right after heavy rainstorm (post-peak).
					10/17/80	Scheduled	During river freeze-up.
					1/13/81	Scheduled	Winter through-ice sampling.
					5/20/81	Scheduled	After ice breakup, spring.
					6/30/81	Sched/Event	Summer hydrograph - falling limb.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: December 15, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(5) Water Quality (1,2)* (Continued)	(b) Susitna River near Cantwell (Vee Canyon Site)				8/2/81	Event	Summer hydrograph - - rising limb.
					8/3/81	Event	Summer hydrograph - peak.
					8/3/81	Event	Summer hydrograph - falling limb.
					9/15/81	Scheduled	Summer low-flow period.
					10/7/81	Scheduled	During river freeze-up.
	(c) Susitna River at Gold Creek	Same as at Vee Canyon	N/A	Summer: monthly Winter: 2-3 months	8/8/80	Scheduled	Summer high-flow period (sampled by helicopter).
					10/14/80	Scheduled	During river freeze-up.
					1/14/81	Scheduled	Winter through-ice sampling.
					5/27/81	Scheduled	After ice break-up, spring. (Sampled same day by USGS).
					6/30/81	Sched/Event	Summer hydrograph - peak.
					7/1/81	Sched/Event	Summer hydrograph - falling limb.
					8/2/81	Event	Summer hydrograph - peak.
					8/3/81	Event	Summer hydrograph - falling limb.
					9/14/81	Scheduled	Summer low-flow period.
					9/17/81	Scheduled	Samples taken for quality - control check of laboratory.
					10/8/81	Scheduled	During river freeze-up.
(6) Suspended Sediment Discharge	(a) Susitna River near Cantwell (Vee Canyon Site)	Point-integrating Suspended Sediment Sampler	N/A	Summer: monthly Winter: 2-3 months	9/5/80	Scheduled	Summer low-flow period.
					9/17/80	Sched/Event	Right after heavy rainstorm (post-peak).
					10/18/80	Scheduled	During river freeze-up.
					1/13/80	Scheduled	Winter through-ice sampling.
					5/20/81	Scheduled	After ice break-up, spring.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: December 15, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(6) Suspended Sediment Discharge	(a) Susitna River near Cantwell (Vee Canyon Site)				6/30/81	Sched/Event	Summer hydrograph - falling limb.
					8/2/81	Event	Summer hydrograph - rising limb.
					8/3/81	Event	Summer hydrograph - peak.
					8/3/81	Event	Summer hydrograph - falling limb.
					9/15/81	Scheduled	Summer low-flow period.
	(b) Susitna River at Gold Creek	Same as at Vee Canyon	N/A	Summer: monthly Winter: 2-3 months	10/16/80	Scheduled	During river freeze-up.
					1/14/81	Scheduled	Winter through-ice sampling.
					5/27/81	Scheduled	After ice break-up, spring.
					6/30/81	Sched/Event	Summer hydrograph - peak.
					7/1/81	Sched/Event	Summer hydrograph - falling limb.
					8/2/81	Event	Summer hydrograph - peak.
					8/3/81	Event	Summer hydrograph - falling limb.
					9/14/81	Scheduled	Summer low-flow period.
(7) Climate (3)*	(a) Watana Camp	MRI Weather Wizard (WW)	3/13/80	Continuous (15-min.)	4/8/80-Present	Scheduled	**
	(b) Devil Canyon	MRI Weather Wizard	7/17/80	Continuous (15-min.)	7/17/80-Present	Scheduled	**
	(c) Kosina Creek	MRI Weather Wizard	8/25/80	Continuous (15-min.)	8/25/80-Present	Scheduled	**
	(d) Tyone River	MRI Weather Wizard	8/27/80	Continuous (15-min.)	8/27/80-Present	Scheduled	**
	(e) Denali (Susitna Lodge)	MRI Weather Wizard	7/18/80	Continuous(15-min.)	7/18/80-Present	Scheduled	**
	(f) Susitna Glacier	MRI Weather Wizard	7/20/80	Continuous (15-min. or 30-min.)	7/20/80-Present	Scheduled	**

** Occasional gaps in data records due to mechanical or electronic malfunctions or other field problems. Data summaries prepared by MRI for period to 7/1/81. Summaries for more recent data are being prepared by R&M.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: December 15, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(8) Snow Density and Depth (4)*	(a) West Fork Glacier Snow Course	Carpenter Machine Works Snow Sampling Kit Aerial Snow Markers	8/26/80, 8/81	Winter: monthly	01/07/81 2/2-2/3/81 3/6/81 4/2/81 4/30/81	Scheduled	Three aerial markers on and around the glacier.
	(b) Susitna Glacier Snow Course	Same as at West Fork	8/28/80, 9/4/80, 8/81	Winter: monthly	1/7/81 2/2-2/3/81 3/6/81 4/2/81 4/30/81	Scheduled	Three aerial markers on and around the glacier (three of original six markers moved to better locations in 8/81).
	(c) East Fork Glacier Snow Course	Same as West Fork	9/4/80, 8/81	Winter: monthly	1/7/81 2/2-2/3/81 3/6/81 4/2/81 4/30/81	Scheduled	Five aerial markers on and around the glacier (including two additional markers placed on the ice in 8/81).
	(d) Butte Creek Pass	Aerial Snow Markers	9/11/80	Winter: monthly	2/2/81 3/6/81 4/1/81 4/30/81	Scheduled	One aerial marker in vicinity of Butte Creek Pass (two of original three markers removed and used elsewhere).
(9) Ice Buildup during Precipitation*	(a) Watana Camp	Steel Plate	11/80	Unscheduled	Same dates as any winter trip to Watana Camp	Event	Measurements to be made during or immediately after freezing rain. No observed freezing rain to date.
	(b) Denali (Susitna Lodge)	Steel Plate	11/80	Unscheduled	Same dates as Denali climate station runs	Event	Same as at Watana Camp.
(10) In-Cloud Icing (Ice Buildup on Transmission Line)*	(a) Watana Camp	Short Section of Transmission Line	9/10/80, 10/16/80	Unscheduled	Same dates as any winter trip to Watana Camp	Event	Measurements to be made during or immediately after icing conditions. No in-cloud icing has been observed to date.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: December 15, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(10) In-Cloud Icing (Ice Buildup on Transmission Line)*	(b) Denali (Susitna Lodge)	Short Section of Transmission Line	9/11/80, 10/20/80	Unscheduled	Same dates as Denali climate station runs	Event	Same as at Watana Camp.
(11) Snow Creep*	(a) Watana Camp	Dillon Dynamometer Section of Transmission Line Tower	2/26/81	Winter: monthly	3/6/81 3/16/81 4/1/81 10/2/81 11/3/81 12/2/81	Scheduled	Installed on a north-facing slope about 2 miles west of Tsusena Butte.
	(b) Devil Canyon	Dillon Dynamometer Section of Transmission Line Tower	2/25/81	Winter: monthly	3/5/81 3/16/81 3/31/81 10/2/81 11/3/81 12/3/81	Scheduled	Installed on a north-facing slope near the Devil Canyon climate station.
(12) Ice Thickness and Competence*	Susitna River and Tributaries (5)	Ice Auger Measuring Tape	N/A	Winter	2/27/81	Scheduled	Ice thickness surveys were conducted at all CSR locations, except at Section 25 and the Susitna-Chulitna confluence. See parameter (3).
					4/1/81	Scheduled	Adjacent to Watana Streamgauge and in conjunction with through-ice discharge measurements.
(13) Extent of Ice Cover, Locations of Ice Jams*	Susitna River	SLR Camera	N/A	Daily or weekly during Freeze-up and Break-up	10/80 11/80, 12/80 1/81, 2/81 3/81, 4/81 5/81 10/2/81, 10/6/81, 10/29/81, 11/6/81, 11/18/81, 12/14/81	Event	Black & white aerial photos taken 11/14/80, 12/5/80, 4/27/81, 5/6/81.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: December 15, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(14) Glacial Composition and Movement (6)	Susitna Glacier, West Fork Glacier, Turkey Glacier, West Fork Susitna Glacier	Survey Equipment SLR Camera Aerial Photography	5/17-5/18/81 5/30/81	Monthly through July, August, September	5/81 7/30/81 8/11/81 9/2/81	Scheduled	Velocity points, camera mounts and thermocouple were installed. Horizontal control net establish and initial survey conducted. Extensive snow depth and density studies throughout glacier network were conducted.
(15) Evaporation	Watana Camp	Monel, Class A Standard Weather Bureau Evaporation Pan	5/7/81	Daily, May-Sept.	-	Scheduled	Daily observations recorded by camp personnel.
(16) Icing Detector*	Watana Camp	Rosemount Ice Detector with electronic counter	12/5/80	Continuous	1/7/81 2/3/81 3/6/81 3/31/81 4/30/81 6/1/81	Scheduled	Any interruption of AC power is recorded as one count. Counter observed during site visits. No significant amount of icing has been recorded to date.
(17) Bedload Transport*	(a) Susitna River @ Gold Creek	Helley-Smith Sampler	-	Unscheduled	7/22/81 8/26/81 9/28/81	Event	***
	(b) Talkeetna River near Talkeetna	Helley-Smith Sampler	-	Unscheduled	7/21/81 8/25/81 9/29/81	Event	***
	(c) Chulitna River near Talkeetna	Helley-Smith Sampler	-	Unscheduled	7/22/81 8/25/81 9/29/81	Event	***
	(d) Susitna River near Sunshine	Helley-Smith Sampler	-	Unscheduled	7/22/81 8/26/81 9/30/81	Event	***

*** Bedload sampling done jointly and in cooperation with the USGS. The July trip was done at a relatively high flow level, the August one at an intermediate of Susitna River flow level, and the September trip at a relatively low flow.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: December 15, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(18) Sequential Aerial Photography of Susitna River*	N/A	Olympus OM-2 Camera (35-mm film)	-	Unscheduled	11/14/80	Event	Freeze-up, Delta Island to Watana Creek.
					12/5/80	Event	Freeze-up, Cook Inlet to Watana Creek.
					4/27/81	Event	Break-up, Bell Island to Watana Creek.
					5/6/81	Event	Break-up, Bell Island to Curry.
					8/24/81	Event	Medium flow. Cook Inlet to Devil Canyon, for Vegetation Studies.
					10/19/81	Event	Low flow, Cook Inlet to Talkeetna Confluences, for Morphology Studies.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

NOTES:

* An asterisk after a parameter in column one (1) indicates that the entry for that parameter has been altered from the last log's entry.

(1) WQ parameters measured by the continuous water quality monitor: water temperature, dissolved oxygen, conductivity, pH, and oxidation - reduction potential.

(2) WQ parameters measured in the field: dissolved oxygen, water temperature, conductivity, pH, alkalinity, settleable solids, and free carbon dioxide.

(3) Climate parameters measured at each station: air temperature, average wind speed, wind direction, peak wind gust, relative humidity, precipitation, and solar radiation. Snowfall amounts will be measured in heated precipitation bucket at Watana only. Prior to 4/30/81, data were recorded at thirty (30) minute intervals at the Susitna Glacier station and at fifteen (15) minute intervals at all the other stations. Since that date, a 15-minute interval has been used at all stations.

(4) Dates of installation refer to aerial snow survey markers. The actual snow courses are located at one of the markers at each of the three glaciers. There is no snow course at Butte Creek Pass, only an aerial marker. Snow surveys are conducted concurrently at all the climate monitor locations, with the exception of the Susitna Glacier Station, where the snow course is at a more suitable location nearby.

(5) Several sites along the main stem of the Susitna and a few sites on the larger tributaries are to be observed.

(6) Dates of installation refer to snow survey markers.

(7) Last log prepared was as of 10/2/81.

SUSITNA HYDROELECTRIC PROJECT

FIELD DATA INDEX

Prepared by:

R&M CONSULTANTS, INC.

Prepared for:

ACRES AMERICAN, INCORPORATED

JULY 1981

TABLE OF CONTENTS

APPENDICES

INTRODUCTION

The objective of the Field Data Index & Distribution System is to establish a formal system of conveying information concerning hydrologic and climatologic data availability to each member of the study team. The project data base consists of (a) Historical recorded data up to January 1, 1980; (b) Post 1980 data collected by government agencies and study team members.

Historical files have been researched and available data are documented in this report. Records which could be retrieved or copied exist in R&M Consultants files. Records which are unavailable at this time, are identified as to location of files, data type, and period of record.

There are 15 major data categories assigned to the Susitna Basin. With each major category, each data station is assigned a unique number which identifies the index file containing the data. A convention of upstream to downstream order is used to number each data station. For example, if it is desired to review hydrological data availability in the Susitna River at Gold Creek, the following index numbers would be referenced:

0140	Streamflow Continuous Gaging
0340	Water Quality
0440	Water Temperature
0540	Sediment Discharge

All new data collected by R&M Consultants or other organizations will be added to the index system. An update will be prepared and distributed to personnel listed in Appendix G every six

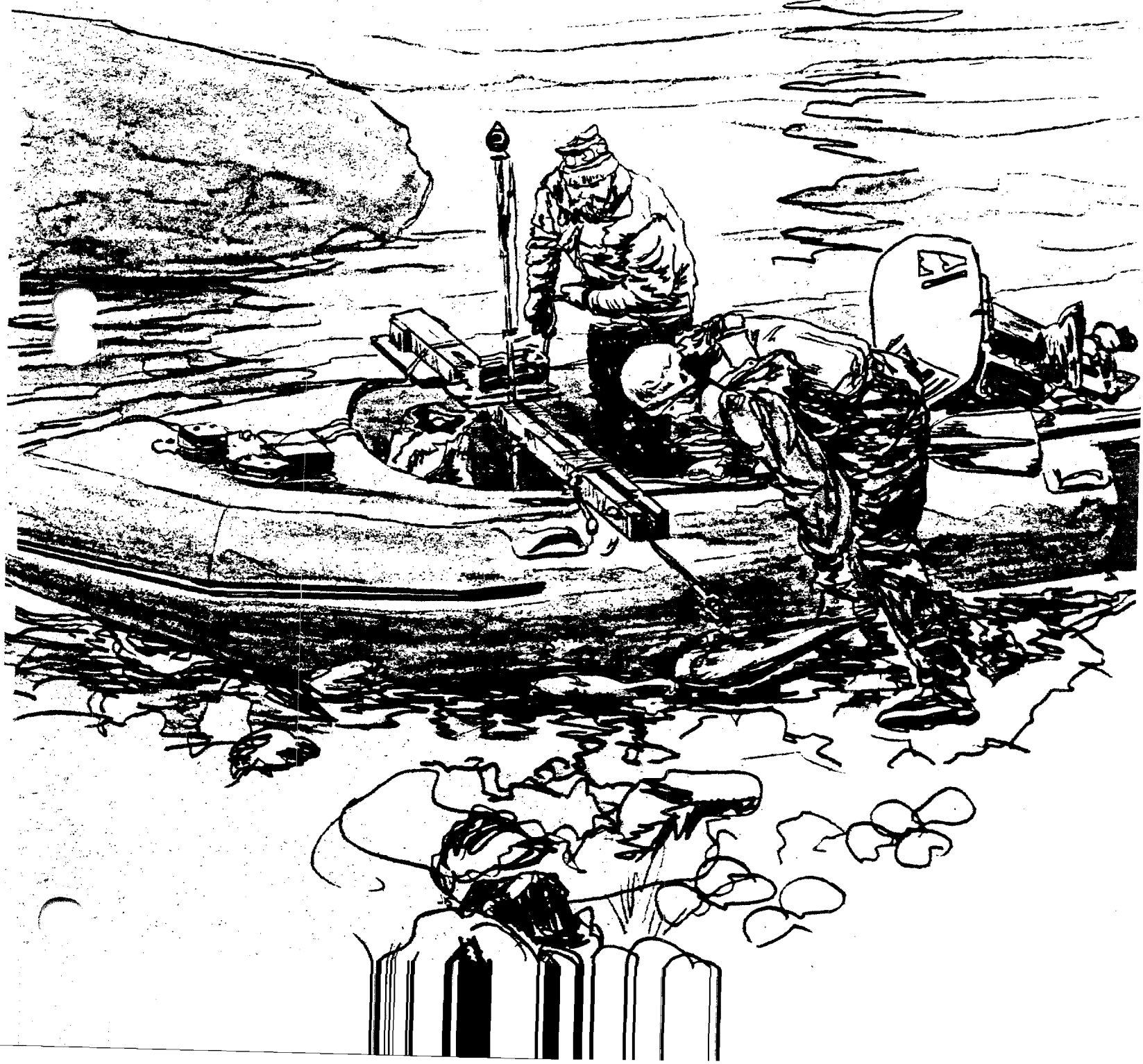
months. Anyone knowing of additional data that has been collected within or adjacent to the Susitna River Basin is asked to notify R&M Consultants, P.O. Box 6087, Anchorage, Alaska 99503, (907) 279-0483.

Hard copy of the data will be stored in the R&M Consultants and Acres American offices. The data will be made available to project team members and other concerned parties upon request.

STREAMFLOW

0100

0200



WATER RESOURCES DATA COLLECTED IN THE SUSITNA RIVER BASIN

0100 STREAMFLOW CONTINUOUS GAGING

Mean daily discharge and/or annual maximum flood peak discharge data have been collected by the U.S. Geological Survey & R&M Consultants at several locations within the Susitna River Basin. The stations for which this information is available and the period of record at each location are listed below. Unless indicated by agency name in parentheses following the period of record, all data has been collected by the USGS. All data listed in this section are on file at R&M Consultants according to index number and name.

Index No.	Description
0110	Susitna River near Denali - USGS Station 15291000
	Mean Daily Discharge Records: May 1957 - September 1966; July 1968 - Present
	Annual Instantaneous Peak Flow: 1957-1963, 1965, 1967, 1967-1979
0115	Maclaren River near Paxson - USGS Station 15291200
	Mean Daily Discharge Records: June 1958 - Present
	Annual Instantaneous Peak Flow: 1958 - 1980
0120	Susitna River near Cantwell - USGS Station 15291500
	Mean Daily Discharge Record: May 1961 - September 1972; May 1980 - Present
	Annual Instantaneous Peak Flow: 1960-1972

Index No.	Description
0130	Susitna River near Watana Damsite - R&M SG-1 Mean Daily Discharge Records: July 1980 - Present Miscellaneous Discharge Measurements: August 20, 1980 (R&M) August 21, 1980 (R&M) September 3, 1980 (R&M) September 18, 1980 (R&M) October 20, 1980 (R&M) April 1, 1981 (R&M) May 24, 1981 (R&M) June 2, 1981 (R&M)
0140	Susitna River near Gold Creek - USGS Station 15292000 Mean Daily Discharge Record: August 1949 - Present Annual Instantaneous Peak Flow: 1950- 1980
0145	Chulitna River near Talkeetna - USGS Station 15292400 Mean Daily Discharge Record: February 1958 - September 1972 Continuous Stage Gage Reactivated: May 1980 Crest Stage Record: 1973-1977 Annual Instantaneous Peak Flow: 1958-1977
0155	Talkeetna River near Talkeetna - USGS Station 15292700 Mean Daily Discharge Record: June 1964 - Present Annual Instantaneous Peak Flow: 1964-1980
0160	Susitna River near Sunshine - USGS Station 15292780 Mean Daily Discharge Record: May 1981 - Present

Index No.	Description
0162	Willow Creek near Willow - USGS Station 15294005
	Mean Daily Discharge Record: June 1978 - Present
0163	Deception Creek near Willow - USGS Station 15294010
	Mean Daily Discharge Record: May 1978 - Present
0165	Skwentna River near Skwentna - USGS Station 15294300
	Mean Daily Discharge Record: August 1959 - Present
	Annual Instantaneous Peak Flow: 1959-1980
0175	Yentna River near Susitna Station
	Mean Daily Discharge Record: October 1980 - Present
0190	Susitna River near Susitna Station - USGS Station 15294350
	Mean Daily Discharge Record: October 1974 - Present

0200 STREAMFLOW PARTIAL RECORDS

All data collected relating to river stage or water discharge for the Susitna River Basin not previously listed under Section 0100: Streamflow Continuous Gaging are included below. This section includes all records from crest stage gages, staff gages or fragmentary data. Agencies collecting the data include: U.S. Geological Survey (USGS), R&M Consultants (R&M) and National Weather Service (NWS). The agency responsible for data collection at each site is indicated by the agency name in parentheses following the period of record.

It should be noted that National Weather Service stations provide real-time river stage data which can be obtained from the NWS Alaska River Forecast Center at any time.

Alaska Department of Fish and Game has additional data on stage and water discharge of selected tributaries and fresh-water sloughs in the Susitna River Basin. Appendix C includes location and period of record for the data available.

All data given below are on file at R&M Consultants according to index number and location, unless marked by an asterisk following the period of record.

Index No.	Description
0201	Raft Creek near Denali - USGS Station 15291000
	Annual Maximum Discharge from Crest-Stage Gage: 1963-1977 (USGS)
0203	Susitna River at Denali Highway
	Staff Gage: 1981 - Present (R&M)

Index No.	Description
0205	Susitna River at Deadman Creek - R&M CSR-9
	Crest-Stage Gage: 1980 - Present (R&M)
0210	Susitna River at Watana Dam Site - R&M CSR-8
	Crest Stage Gage: 1980 - Present (R&M)
	Staff Gage: 1981 (R&M)
0212	Susitna River at Devils Creek
	Crest Stage Gage: 1981 - Present (R&M)
0215	Susitna River at Devil Canyon - R&M CSR-7
	Crest-Stage Gage: 1980 - Present (R&M)
	Staff Gage: 1981 (R&M)
0220	Portage Creek above Gold Creek - R&M CSR-6
	Crest-Stage Gage: 1980 - Present (R&M)
0225	Susitna River at Sherman - R&M CSR-5
	Crest-Stage Gage: 1980 - Present (R&M)
0230	Susitna River at Section 25 - R&M CSR-4
	Crest-Stage Gage: 1980 - Present (R&M)
0235	Susitna River at Curry - R&M CSR-3
	Crest-Stage Gage: 1980 - Present (R&M)
	Partial Discharge Record: 1948 (2 dates) (USGS)

Index No.	Description
0240	Susitna River near Chase - R&M CSR-2 Crest-Stage Gage: 1980 - Present (R&M)
0245	Susitna River above Susitna-Chulitna Confluence - R&M CSR-1 Crest-Stage Gage: 1980 - Present (R&M)
0246	Talkeetna River near Talkeetna Partial Discharge Record: 1949 (2 dates) (USGS)
0247	Talkeetna River at Talkeetna Railroad Bridge Partial Stage Record: 1976 - Present (NWS)
0250	Susitna River at Sunshine - USGS Station 15292780 Partial Discharge Record: 1969-1971, 1976 - Present (NWS)
0251	Montana Creek near Montana - USGS Station 15292800 Crest-Stage Gage: 1963-1972 (USGS)
0252	Montana Creek at Parks Highway Partial Stage Record: 1973 - Present (NWS)
0253	Goose Creek near Montana - USGS Station 15292900 Crest-Stage Gage: 1963-1971 (USGS)
0254	Caswell Creek near Caswell - USGS Station 15293000 Crest-Stage Gage: 1963 - Present (USGS)

Index No.	Description
0255	Little Willow Creek near Kashwitna - USGS Station 15293700 Low-Flow Discharge Record: 1978 (USGS)
0256	Willow Creek at Hatcher Pass Road near Willow - USGS Station 15294002 Low-Flow Discharge Record: 1978 - Present (USGS)
0257	Deception Creek above Tributary near Houston - USGS Station 15294007 Low-Flow Discharge Record: 1978 - Present (USGS)
0258	Deception Creek Tributary near Houston - USGS Station 15294008 Low-Flow Discharge Record: 1978 - Present (USGS)
0259	Willow Creek at Parks Highway near Willow Low-Flow Discharge Record: 1978 - Present (USGS) Partial Stage Record: 1973 - Present (NWS)

WATER QUALITY

0300

0400

0500

0300 WATER QUALITY

Water quality data have been collected by the U.S. Geological Survey and R&M Consultants at several sites within the Susitna River Basin. The locations for which this information is available and the period of record at each site are given below. Since the measurements are only taken periodically the number of measurements, timing and specific parameters measured vary from year to year at any given station. A list of water quality parameters that have been measured by the USGS in the basin is presented in Appendix B. Water quality parameters measured by R&M are included in Appendix F.

Unless indicated by the agency name in parentheses following the period of record, data have been collected by the USGS.

Data collected by the Alaska Department of Fish & Game are all included in Appendix C. Therefore, they have not been listed again in this section.

The data listed in this section are all on file at R&M Consultants according to index number and name, except where dates are marked by an asterisk. Most of the data are also available through the U.S. Geological Survey.

Index No.	Description
0310	Susitna River near Denali - USGS Station 15291000 Period of Record: 1957-1961, 1968, 1976
0311	Raft Creek near Denali - USGS Station 15291100 Period of Record: 1972

Index No.	Description
0313	Clearwater Creek near Paxson - USGS Station 630230146530000 Period of Record: 1958*
0315	Maclaren River near Paxson - USGS Station 15291200 Period of Record: 1958-1961, 1967-1968, 1975
0318	Little Oshetna River near Eureka - USGS Station 621130147391500 Period of Record: 1953*
0320	Susitna River near Cantwell (Vee Canyon) - USGS Station 15291500 Period of Record: 1967-1970 1980: June 19 (R&M) August 8 (R&M) September 5 (R&M) September 17 (R&M) October 17 (R&M) 1981: January 13 (R&M) May 20 (R&M) June 18 (R&M)
0330	Susitna River near Watana Damsite - R&M WQ-1 Continuous Water Quality Monitor Period of Record: October 23, 1980 - April 16, 1981 May 21, 1981 - Present
0335	Susitna River above Portage Creek near Gold Creek - USGS Station 624941149221500 Period of Record: 1977
0339	Gold Creek at Gold Creek - USGS Station 624606149412500 Period of Record: 1977*

Index No.	Description
0340	Susitna River at Gold Creek - USGS Station 15292000 Period of Record: 1949-1958, 1967-1968, 1975, 1977 1980: May 2 August 8 (R&M) August 19 October 7 October 14 (R&M) 1981: January 14 (R&M) January 16 February 12 March 24 May 27 (R&M and USGS) June 17 (R&M) June 23 July 21
0345	Chulitna River near Talkeetna - USGS Station 15292400 Period of Record: 1958-1959, 1967-1968, 1970
0355	Talkeetna River near Talkeetna - USGS Station 15292700 Period of Record: 1954, 1967-Present
0360	Susitna River at Sunshine - USGS Station 15292780 Period of Record: 1975, 1977, 1981
0361.1	Montana Creek near Montana - USGS Station 15292800 Period of Record: 1971-1972
0361.2	Sheep Creek at Highway near Willow - USGS Station 615945150024300 Period of Record: 1972
0361.3	Caswell Creek near Caswell - USGS Station 15293000 Period of Record: 1972

Index No.	Description
0361.4	Kashwitna River near Willow - USGS Station 615535150041500 Period of Record: 1972
0362.3	Willow Creek at Upper Bridge near Willow - USGS Station 614522149401700 Period of Record: 1972
0362.4	Willow Creek at Hatcher Pass Road near Willow - USGS Station 15294002 Period of Record: 1978-Present
0362	Willow Creek near Willow - USGS Station 15294005 Period of Record: 1972
0362.1	Willow Creek below Canyon near Willow - USGS Station 614607149552000 Period of Record: 1972
0362.2	Willow Creek at Parks Highway near Willow Period of Record: 1972
0363	Deception Creek near Willow - USGS Station 15294010 Period of Record: 1978-Present
0363.1	Deception Creek at Mouth near Willow - USGS Station 614552150021000 Period of Record: 1972
0363.2	Deception Creek above Tributary near Houston - USGS Station 15294009 Period of Record: 1978-Present

Index No.	Description
0363.3	Deception Creek Tributary near Houston - USGS Station 15294008 Period of Record: 1978-Present
0365	Skwentna River near Skwentna - USGS Station 15294300 Period of Record: 1959, 1961, 1967-1968
0366	Yentna River near Skwentna - USGS Station 615815151070000 Period of Record: 1955*
0390	Susitna River at Susitna Station - USGS Station 15294350 Period of Record: 1955, 1970, 1975-1979 1980: February 12 March 12 June 16 July 30 October 10 1981: January 13 April 9 May 21 June 12 July 15

0400 WATER TEMPERATURE

Water temperature data have been collected by the U.S. Geological Survey, R&M Consultants and Alaska Department of Fish and Game (ADF&G) at many locations within the Susitna River Basin. The locations for which this information is available and the period of record at each site are given below. Continuous water temperature records are generally available for open-water months only, but the length of record will vary for each site from year to year. Data collected by ADF&G have all been included in Appendix C. Therefore, they have not been listed again in this section. It should also be noted that instantaneous temperature measurements have been taken and may be found in the water quality records published by the USGS.

Unless indicated by agency name in parentheses following the period of record, all data have been collected by the USGS.

The data listed in this section are on file at R&M Consultants according to index number and name, except the most recent data collected by the USGS and Talkeetna River data from 1954.

Index No.	Description
0410	Susitna River near Denali - USGS Station 15291000
	Water Temperature Record: 1974 - 1980
	Temperature Cross Sections: 1980: May 22 June 24 July 22 August 26 October 1 1981: May 19 June 24 July 21

Index No.	Description
0415	Maclaren River near Paxson - USGS Station 15291200
	Miscellaneous Water Temperatures: 1980
0420	Susitna River near Cantwell - USGS Station 15291500
	Water Temperature Record: May 1980 - Present
0430	Susitna River near Watana Damsite
	Water Temperature Record: October 23, 1980 - April 16, 1981 (R&M) May 16, 1981 - Present (R&M)
0440	Susitna River at Gold Creek - USGS Station 15292000
	Water Temperature Record: 1957, 1974-1980
	Temperature Cross Sections: 1980: May 14 July 2 August 19 October 7 1981: May 27 June 23 July 21
	Miscellaneous Water Temperatures: 1980 and 1981 (R&M)

Index No.	Description
0445	Chulitna River near Talkeetna - USGS Station 15292400
	Water Temperature Record: to begin 1981
	Temperature Cross Sections: 1980: June 3 July 17 September 1 October 22 1981: January 14 February 10 March 25 May 18 June 23 July 20
	Miscellaneous Water Temperatures: 1980
0455	Talkeetna River near Talkeetna - USGS Station 15292700
	Water Temperature Record: 1954
	Temperature Cross Section: 1980: April 1 April 22 May 23 June 30 July 10 July 28 July 29 September 9 October 15 1981: May 29 June 24 July 22
0460	Susitna River near Sunshine - USGS Station 15292780
	Water Temperature Record: 1981 - Present
0462	Willow Creek near Willow - USGS Station 15294005
	Water Temperature Record: 1978-1979

Index No.	Description
0463	Deception Creek near Willow - USGS Station 15294010
	Water Temperature Record: 1978 - Present
0465	Skwentna River near Skwentna - USGS Station 15294300
	Miscellaneous Water Temperatures: 1967-68, 1974-75
	Temperature Cross Sections: 1980: April 14 June 12 August 21 October 17
0475	Yentna River near Susitna Station
	Water Temperature Record: 1981 - Present
0490	Susitna River at Susitna Station - USGS Station 15294350
	Water Temperature Record: 1975 - Present

0500 SEDIMENT DISCHARGE

Suspended sediment concentration (mg/l) suspended sediment discharge (tons/day) and suspended sediment particle size analysis data have been collected by the U.S. Geological Survey (USGS) and R&M Consultants (R&M) at several sites within the Susitna River Basin. The USGS and R&M Consultants will be cooperating on measurements to determine bedload sediment transport rates as a function of stream discharge, and the size distributions of this sediment. Three measurements will be made at each site in 1981.

The locations where this information has been collected are listed below. All of the data, except the most recent data collected by the USGS, are on file at R&M Consultants.

Unless indicated by agency name in parentheses following the period of record, all data have been collected by the USGS.

Index No.	Description
0510	Susitna River near Denali - USGS Station 15291000

Sediment Concentration and Sediment Discharge: 1958-1979

1980: May 22
June 24
July 22
August 26
October 1

1981: April 8
May 19
June 24
July 21

Particle Size Analysis: 1958-Present

Index No.	Description
0515	Maclaren River near Paxson - USGS Station 15291200 Sediment Concentration and Sediment Discharge: 1958-1968, 1974-1975 Particle Size Analysis: 1958-1967, 1974-1975
0520	Susitna River near Cantwell - USGS Station 15291500 Sediment Concentration and Sediment Discharge: 1962-1972 1980: September 5 (R&M) September 17 (R&M) October 17 (R&M) 1981: January 13 (R&M) May 28 (R&M) June 18 (R&M) Particle Size Analysis: 1962-1972, 1980
0525	Susitna River above Portage Creek near Gold Creek - USGS Station 624941149221500 Sediment Concentration and Sediment Discharge: 1977 Particle Size Analysis: 1977
0540	Susitna River at Gold Creek - USGS Station 15292000 Sediment Concentration and Sediment Discharge: 1952-1957, 1962, 1967, 1974-1979 1980: May 14 August 19 October 7 October 16 (R&M) 1981: January 14 (R&M) January 16 February 12 March 24 May 27 (R&M and USGS) June 17 (R&M) June 23 July 21

Index No.	Description
	Particle Size Analysis: 1953, 1955-1957, 1962, 1974-1980 Bedload Sediment Sampling: Proposed for 1981
0545	Chulitna River near Talkeetna - USGS Station 15292400
	Sediment Concentration and Sediment Discharge: 1967 - 1972 1980: May 21 June 3 June 23 July 17 September 1 September 30 October 22 1981: January February March May
	Particle Size Analysis: 1967-1972, 1980 Bedload Sediment Sampling: Proposed for 1981
0555	Talkeetna River near Talkeetna - USGS Station 15292700
	Sediment Concentration and Sediment Discharge: 1966-1979 1980: February 15 April 11 May 15 July 3 July 14 August 14 October 8 1981: January 17 February 11 March 26 May 29 June 24 July 22
	Particle Size Analysis: 1966-1980 Bedload Sediment Sampling: Proposed for 1981

Index No.	Description
0560	Susitna River at Sunshine - USGS Station 15292780 Sediment Concentration and Sediment Discharge: 1971, 1977, 1981 Particle Size Analysis: 1971, 1977 Bedload Sediment Sampling: Proposed for 1981
0561	Montana Creek near Montana - USGS Station 15292800 Sediment Concentration and Sediment Discharge: 1970-1971, 1973 Particle Size Analysis: 1970-1971, 1973
0563	Deception Creek near Willow - USGS Station 15294010 Sediment Concentration and Sediment Discharge: 1978-1980
0565	Skwentna River near Skwentna - USGS Station 15294300 Sediment Concentration and Sediment Discharge: 1967-1968, 1974-1975 1980: June 12 August 21 Particle Size Analysis: 1967-1968, 1974-1975, 1980
0575	Yentna River near Susitna Station Sediment Concentration and Sediment Discharge: 1981: January 13 April 9 May 20 June 11 July 15

Index No.	Description
0590	Susitna River near Susitna Station - USGS Station 15294350

Sediment Concentration and Sediment Discharge: 1975 - 1979

1980: February 12
March 12
June 16
July 30
October 10

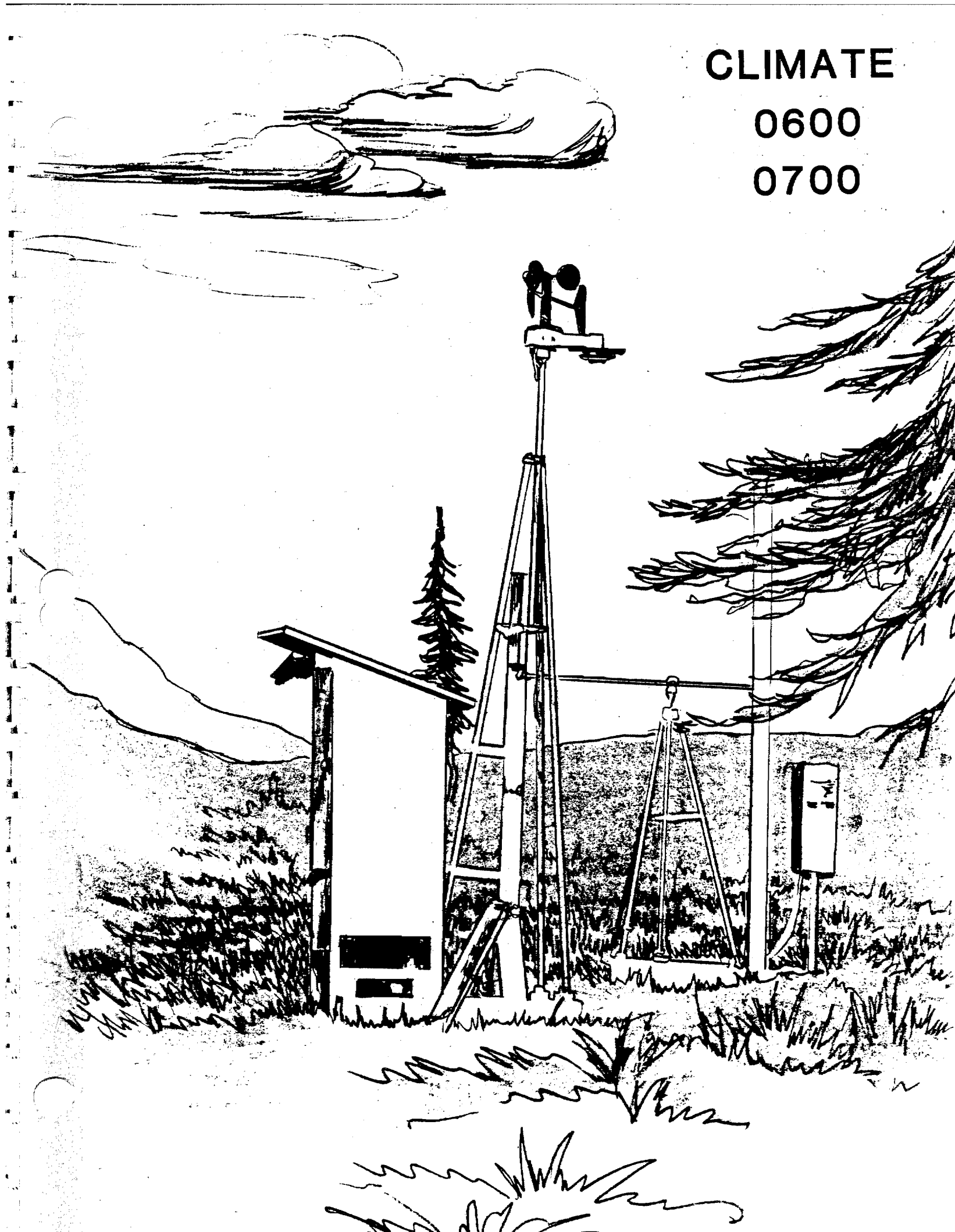
1981: January 13
April 9
May 21
June 12
July 15

Particle Size Analysis: 1975 - 1980

CLIMATE

0600

0700



0600 CLIMATE

Climatic data have been collected by the National Oceanic and Atmospheric Administration, R&M Consultants, and others at a number of locations within and adjacent to the Susitna River Basin.

Climatic Data collected by NOAA appear for individual stations in one of two types of reports. The first, entitled "Local Climatological Data, Annual Summary with Comparative Data" is generally the most comprehensive and is published only for stations with over 30 years data. A list of the parameters included in this report is presented in Appendix D. The second, entitled "Annual Climatologic Summary" contains fewer parameters than the first, and a list of the parameters included in this report is presented in Appendix E. It should be noted that all of the parameters listed in the appendices for a particular report may not have actually been measured at any given station.

NOAA also publishes reports entitled "Local Climatological Data, Monthly Summaries". These reports are available for any station publishing an "Annual Summary with Comparative Data", and present most of the parameters contained in the annual summary on a daily basis, with selected parameters also presented on a 3-hour or hourly basis.

Data for stations not covered by the above reports can be obtained from NOAA reports entitled "Climatological Data" (CD's) which are published monthly and contain summary information on all climate stations in the State.

The miscellaneous wind data have been supplied by Mr. Jim Wise of the Arctic Environmental Information and Data Center, and are taken from manuscript entitled the "Wind Power Atlas". The data are listed by parameter collected. This information is footnoted in the table and listed at the end of the table.

Climate data measured at each R&M station include: air temperature, average wind speed, wind direction, peak wind gust, relative humidity, precipitation, and solar radiation. Snowfall amounts will be measured in a heated precipitation bucket at Watana only. Data are recorded at at fifteen-minute intervals at all the stations. An evaporation pan was installed in spring of 1981 at Watana Camp and measurements are taken daily.

An attempt has been made at ordering climate stations from the upper to the lower Susitna River Basin, with R&M Stations in the upper Susitna River Basin listed first.

Climate data may be obtained through R&M Consultants.

Index Number	Station Name	Measured By	Report[1] Available	Period of Record
0610	Susitna Glacier	R&M	-	7/20 - 8/12/80 8/28 - 4/10/81 4/30/81 - Present
0618	Gracious House	NOAA	B	1960 - 1978
0620	Denali	R&M	-	7/18 - 9/18/80 10/17 - Present
0630	Tyone R.	R&M	-	8/27 - 8/30/80 10/22 - 12/5/80 1/9 - 2/12/81 3/4/81 - Present
0635	Vee Canyon	USBR	-	*
0640	Kosina Cr.	R&M	-	8/25/80 - 1/8/81 2/3/81 - Present
0650	Watana	R&M		4/8 - 6/13/80 6/19 - 7/30 8/28 - 10/2 10/17 - Present
0660	Devil Canyon	R&M	-	7/17 - 8/13/80 10/16 - Present
0670	McKinley Park	NOAA	B	1925 - Present
0671	Healy 1	NOAA	-	1922 - 1945
0671	Healy 2	NOAA	B	1972 - Present**
0672	Healy Power Plant I	NOAA	-	**
0673	Healy Power Plant II	NOAA	-	**

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1 NOAA Reports Available:

A Annual Summary with Comparative Data

B - Annual Climatologic Summary

* Miscellaneous Temperature Data (see p. 0600-6)

** Miscellaneous Wind Data (see p.p. 0600-5 and 0600-6)

Index Number	Station Name	Measured By	Report[1] Available	Period of Record
0674	Rapids	NOAA	-	**
0674.5	Trims Camp	NOAA	-	1957 - December 1979
0675	Big Delta	NOAA	A	1949 - Present**
0676	Paxson Lake	NOAA	-	1966 - Present
0676	Paxson	NOAA	A	1974 - Present
0677	Gulkana	NOAA	A	1943 - Present**
0678	Summit	NOAA	A	1946 - Present**
0679	Chulitna R. Lodge	NOAA	B	1971 - Present
0680	Edgemire Lakes	NOAA	B	1971 - Present
0681	Chulitna Hwy. Camp	NOAA	B	1972 - Present
0682	Talkeetna	NOAA	A	1917 - Present**
0683	Willow Hwy. Camp	NOAA	B	1977 - Present
0684	Whites Crossing	NOAA	B	1971 - Present
0685	Puntilla	NOAA	B	1949 - Present
0686	Skwentna	NOAA	B	1949 - Present
0687	Anchorage	NOAA	A	1922 - Present

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1 NOAA Reports Available:

A Annual Summary with Comparative Data

B - Annual Climatologic Summary

** Miscellaneous Wind Data (see p.p. 0600-5 and 0600-6)

MISCELLANEOUS WIND DATA

Stations: Healy 2, Healy Power Plant I, Healy Power Plant II

Table containing wind speed percent frequency and cumulative frequency at one meter per second increments. Table containing wind direction frequency in percent. Table containing wind speed and joint frequency.

Station: Rapids

Period summary by combined velocity groups (1 to 12 observations daily) covering 1935 - 1941.

Station: Big Delta

Period summary by combined velocity groups (1 to 3 observations daily) covering 1935 - 1941.

Station: Gulkana

Percentage frequency of occurrence, direction by speed groups - a summary of the data between January 1945 and November 1958.

Station: Summit

Period summary by combined velocity groups (16 observations daily) covering 1940 - 1941.

Station: Talkeetna

Period summary by combined velocity groups (16 observations daily) covering 1940 - 1941.

MISCELLANEOUSE TEMPERATURE DATA

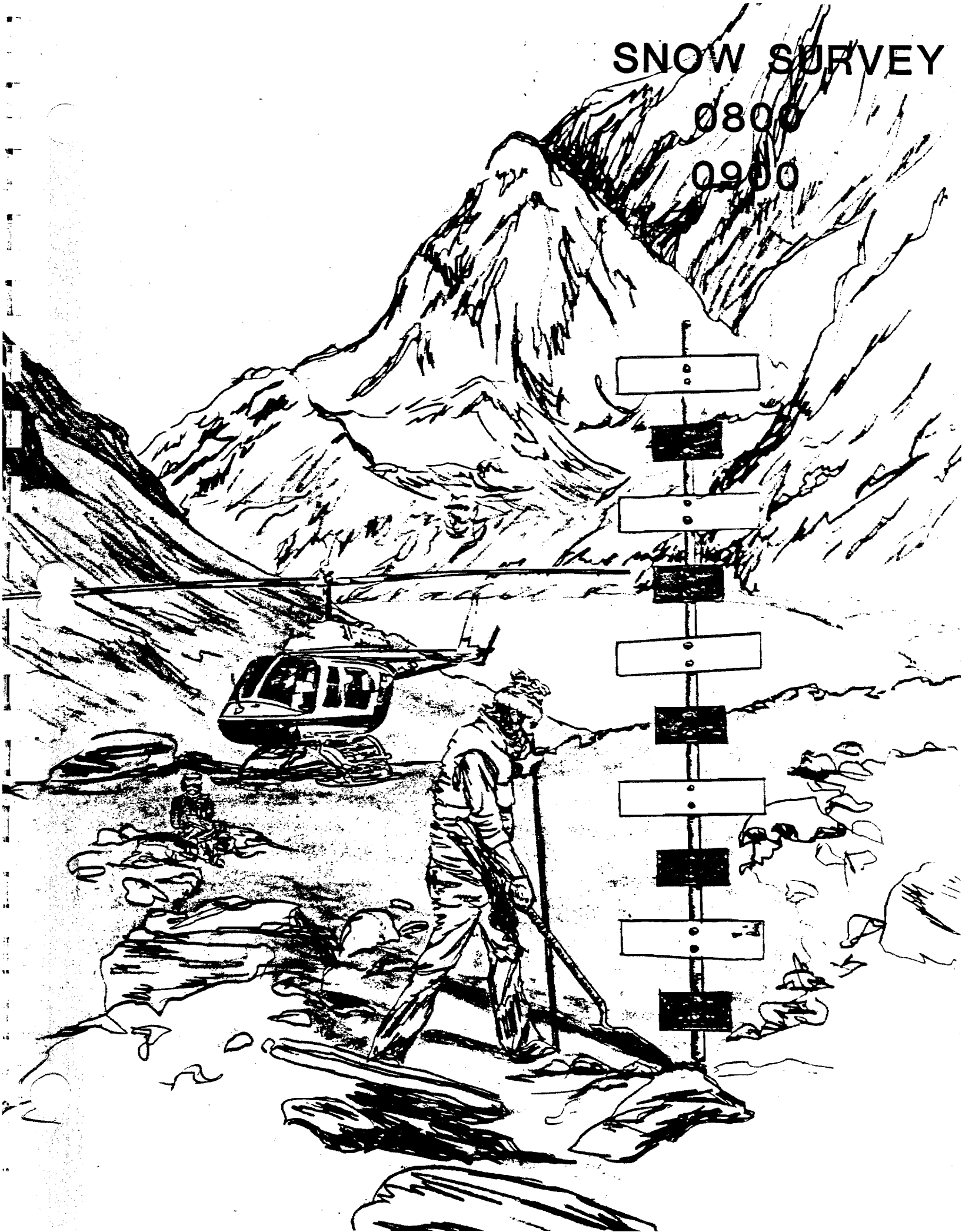
Station: Vee Canyon

Three-times daily observations made during March and April 1962 by US Bureau of Reclamation drilling crews of temperatures and weather type. Reported in "Engineering Geology of Vee Canyon Damsite", USBR, November 1962.

0700 FREEZING RAIN AND ICING

Instrumentation for the measurement of freezing rain and in cloud icing (ice buildup on transmission lines) has recently been installed by R&M Consultants in the Susitna River Basin. Both parameters are measured at each site. In addition, an electrically - operated ice detector and counter instrument has been installed at the Watana site. Data collected from these sites will be on file at R&M Consultants according to index number and name.

Index No.	Description
0710	Denali (Susitna Lodge)
	In-cloud icing apparatus installed October 20, 1980
	Freezing rain apparatus installed November 12, 1980
0730	Watana Camp
	In-cloud icing apparatus installed October 16, 1980
	Freezing rain apparatus installed November 12, 1980


SNOW SURVEY
0800
0900

0800 SNOW SURVEY

Snow depth and water equivalent data have been collected by the U.S. Soil Conservation Service, the Alaska Department of Fish and Game and R&M Consultants. The locations for which this information is available are listed below generally in order from the upstream end to the downstream end of the Susitna Basin.

The ADF&G markers have been established for the purpose of studying the effect of snow depth on game movements. There are 8 locations each along a tributary stream to the Susitna River with 4 - 6 aerial snow markers at each location. These markers are placed at different elevations moving up the stream valley.

The cross reference numbers for SCS sites listed on the following page correspond to map numbers as published in the Snow Survey Bulletin issued by the Soil Conservation Service. Cross reference numbers for R&M and ADF&G snow courses are arbitrary. These will be changed to map numbers when they are included in the Snow Survey bulletin.

All of the data listed can be obtained from the agency responsible for the snow course or from R&M Consultants.

Index Number	Course Name	Measured By	Cross Reference Number	Years of Record Prior to 1980	Drainage Basin
0802	Cirque	R&M	W-1	-	West Fork Gl.
0803	Ice Cave	R&M	W-2	-	West Fork Gl.
0804	West Fork Gl.*	R&M	W-3	-	West Fork G.
0805	Crevasse	R&M	S-1	-	Susitna Gl.
0806	Mt. Hayes*	R&M	S-2	-	Susitna Gl.
0807	Caribou	R&M	S-3	-	Susitna Gl.
0808	Malamute	R&M	S-4	-	Susitna Gl.
0809	Mt. Deborah	R&M	S-5	-	Susitna Gl.
0810	Aurora Peak	R&M	S-6	-	Susitna Gl.
0811	East Fork	R&M	E-2	-	East Fork Gl.
0812	Pyramid	R&M	E-1	-	East Fork Gl.
0813	Jatu Pass*	R&M	E-3	-	East Fork Gl.
0814	Monahan Flats*	SCS	25	15	West Fork Gl.
0815	Denali*	R&M	-	-	Susitna River
0816	Butte Creek	R&M	B-3	-	Butte Creek
0817	Moose	R&M	B-2	-	Butte Creek
0818	Red Fox	R&M	B-1	-	Butte Creek
0819	Clearwater Lake*	SCS	26	14	Maclaren River
0820	Tyone R.*	R&M	-	-	Tyone River
0821	Lake Louise*	SCS	29	15	Tyone River
0822	Little Nelchina	SCS	31	12	Oshetna R.
0823	Kosina Cr.*	R&M	-	-	Kosina Cr.
0824	Oshetna Lake*	SCS	30	15	Oshetna R.
0825	Goose Creek	ADF&G	8	-	Goose Creek
0826	Coal Creek	ADF&G	7	-	Coal Creek
0827	Gaging Station Cr.	ADF&G	6	-	Gaging Station Cr.

* Indicates site with snow course and aerial stadia marker, all other aerial stadia markers only.

Index Number	Course Name	Measured By	Cross Reference Number	Years of Record Prior to 1980	Drainage Basin
0828	Jay Creek	ADF&G	5	-	Jay Creek
0829	Kosina Cr.	ADF&G	4	-	Kosina Cr.
0830	Watana Cr.	ADF&G	3	-	Watana Cr.
0831	Fog Cr.	ADF&G	2	-	Fog Cr.
0832	Devil Mountain	ADF&G	1	-	Susitna River
0833	Fog Lakes*	SCS	24	10	Fog Cr.
0834	Watana Camp*	R&M	-	-	Susitna River
0835	Devils Canyon*	R&M	-	-	Susitna River
0836	Devils Canyon	SCS	124	3	Susitna River
0837	Talkeetna R.	SCS	135	2	Talkeetna R.
0838	Chunilna Creek	SCS	137	1	Talkeetna R.
0839	Talkeetna	SCS	22	13	Susitna River
0840	Middle Fork Iron Cr.	SCS	134	1	Talkeetna R.
0841	Rainbow Lake	SCS	136	2	Talkeetna R.
0842	Bald Mt. Lake*	SCS	23	15	Talkeetna R.
0843	Talkeetna R. Pass	SCS	133	1	Talkeetna R.
0844	Sheep River	SCS	132	1	Sheep River
0845	Sheep Creek Cirque	SCS	131	1	Sheep Creek
0846	Upper Kashwitna R.	SCS	130	1	Kashwitna R.
0847	Kashwitna R. Cirque	SCS	129	1	Kashwitna R.
0848	Little Willow Cr.	SCS	128	1	Kashwitna R.
0849	Independence Mine	SCS	33	13	Willow Creek
0850	Deception Cr.*	SCS	142	1	Willow Creek
0851	Mt. Bullion*	SCS	141	2	Willow Creek
0852	Capitol Site*	SCS	140	2	Willow Creek
0853	Willow Airstrip	SCS	32	16	Willow Creek

* Indicates site with snow course and aerial stadia marker, all other aerial stadia markers only.

Index Number	Course Name	Measured By	Cross Reference Number	Years of Record Prior to 1980	Drainage Basin
0854	Jack River	SCS	138	3	Tananna R.
0855	Tokositna Valley	SCS	-	-	Kahiltna R.
0856	Ramsdyke Cr.*	SCS	-	-	Kahiltna R.
0857	Dutch Hills	SCS	-	-	Kahiltna R.
0858	Peters Hills	SCS	21	12	Kahiltna R.
0859	Chelatna Lake	SCS	20	16	Kahiltna R.
0860	Skwentna*	SCS	19	12	Yentna R.
0861	Alexander Lake*	SCS	18	16	Yentna R.
0862	Haggard Cr.*	SCS	48	14	Copper R.
0863	St. Anne Lake*	SCS	28	15	Copper R.

* Indicates site with snow course and aerial stadia marker, all other aerial stadia markers only.

0900 SNOW CREEP

Instrumentation for measuring the effect of snow creep forces on transmission line towers was installed by R&M Consultants during the winter of 1980-81. Two locations were chosen along the proposed transmission line route, a southfacing slope on Tsusena Butte above Watana Camp and a northfacing slope near Devil Canyon.

Some previous research on snow creep was done by the U.S. Army Corps of Engineers in 1974, reported in the following paper:

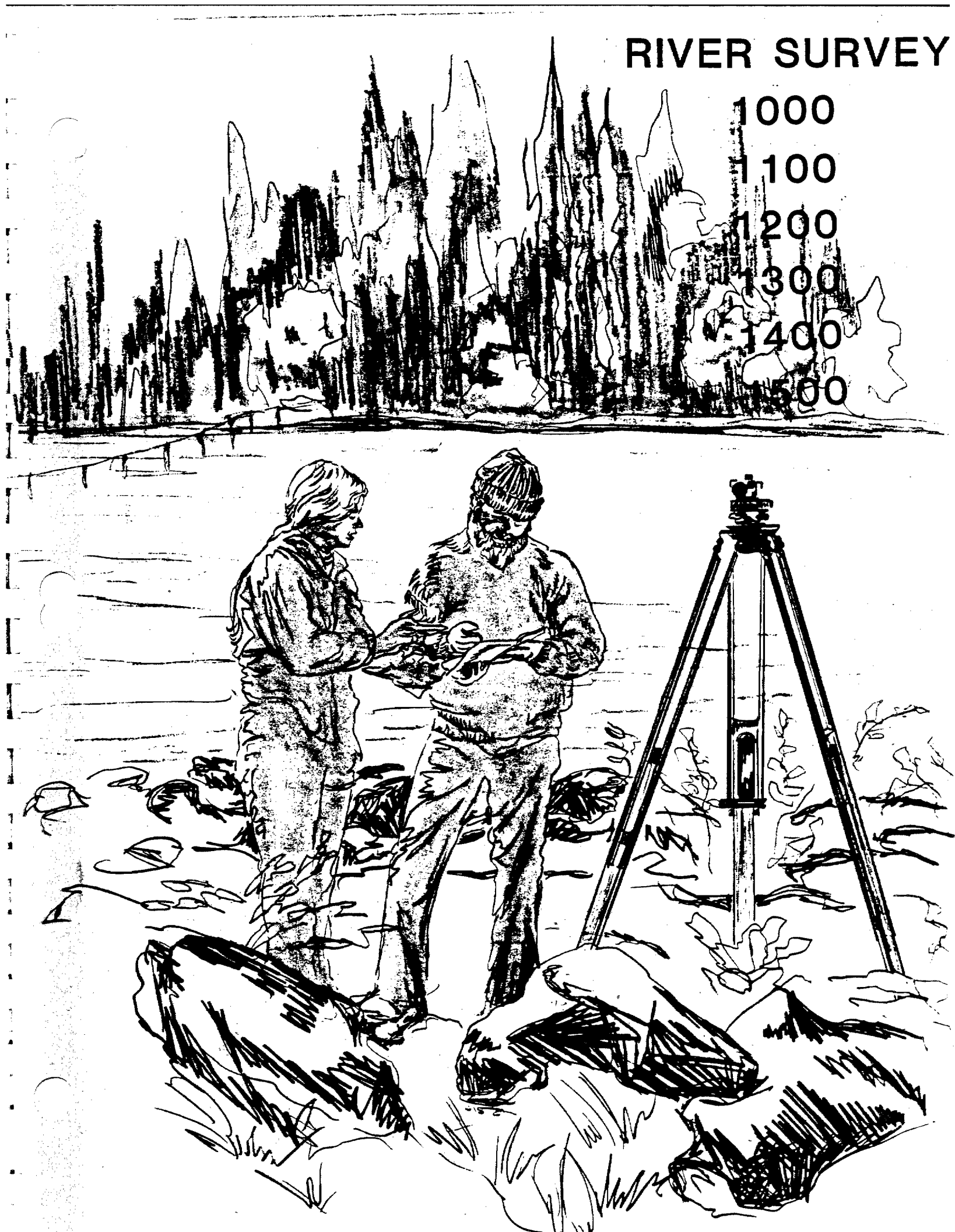
> Snow Creep Investigations in Southeast Alaska; Meyer, Robert. Alaska District, Army Corps of Engineers.

0920 NEAR WATANA

Installed February 26, 1981

0940 NEAR DEVIL CANYON

Installed February 25, 1981


RIVER SURVEY
1000
1100
1200
1300
1400
1500

1000 FREEZEUP RIVER ICE OBSERVATIONS

Field observations of the freezeup of the Susitna River were taken at regular intervals starting in October 1980. In each survey the river was flown, observations made, and photos taken of the extent of ice cover. Location of the upstream edge of ice, ice jams, ice bridges and amounts of shore ice were noted.

All this information is on file and may be obtained from R&M Consultants.

Index Number	Date	Area of Ice Observations	Observers
1010	10/12/80	Lower Susitna	B. Drage, J. Coffin
1011	10/13/80	Oblique aerial photographs from Talkeetna to Devil Canyon	B. Drage, L. Grifiths (R&M)
1012	10/16 - 10/17/80	Yentna River to Susitna Glacier	T. Lavender, B. Drage
1013	10/31 - 11/1/80	Talkeetna to Vee Canyon	J. Coffin (R&M)
1014	11/2 - 11/3/80	Talkeetna to Oshetna River	J. Coffin (R&M)
1015	11/4/80	Oblique aerial photos with discontinuous coverage from Talkeetna to Devil Canyon	L. Griffiths, L. Nicholson, H. Tomingas (R&M)
1016	11/11/80	Parks Hwy. Bridge to Kosina Cr.	B. Drage, J. Coffin
1017	11/14/80	Vertical aerial photography from Alexander Creek to Devil Creek	J. Coffin, B. Butera (R&M)
1018	11/19 - 11/20/80	Willow Creek to Watana	J. Coffin (R&M)
1019	11/29/80	Cook Inlet to Kosina Cr.	B. Drage

Index Number	Date	Area of Ice Observations	Observers
1020	12/1 - 12/3/80	Talkeetna to Tyone River	J. Coffin (R&M)
1021	12/2 - 12/3/80	Survey of ice cover formation Talkeetna to Devil Creek	B. Drage, L. Griffiths (R&M)
1022	12/4 - 12/5/80	Talkeetna to Tyone River	J. Coffin (R&M)
1023	12/5/80	Vertical aerial photography from Cook Inlet to Watana Creek	L. Griffiths, R. Mourtsen (R&M)
1024	12/8/80	Survey of ice cover formation between Curry & Sherman	L. Griffiths, B. Butera (R&M)
1025	12/12/80	Survey of ice cover formation near Gold Creek	L. Griffiths, B. Butera (R&M)

1100 WINTER RIVER ICE OBSERVATIONS

Field observations of ice cover conditions on the Susitna River were carried out by R&M personnel through the winter months during the period after freeze-up and prior to spring breakup. Photographs and other field observations document the extent of ice cover, stability, ice thickness, location of open water areas in the main channel and general characteristics of the channel. The results of this work will be used in Subtask 3.06, hydraulic and ice studies, for computer simulations of pre-project to predicted post-project conditions at low flow, and also in Task 7, environmental studies, to assess potential impacts of regulated flow.

All of the information collected during winter field trips will be on file at R&M Consultants.

Index Number	Date	Area of Ice Observations	Observers
1110	12/30/80	Talkeetna to Watana	J. Coffin
1111	1/6/81	Talkeetna to Watana	J. Coffin
1112	1/8/81	Watana to Tyone River	J. Coffin
1113	1/12 - 1/13/81	Talkeetna to Vee Canyon	J. Coffin, L. Griffiths
1114	2/27/81	Measurement of ice thickness and competence at all Crest-Stage Recorder locations except Section 25 and Susitna-Chulitna Confluence	J. Coffin R. Butera C. Schoch
1115	3/6/81	Sherman to Talkeetna	J. Coffin C. Schoch
1116	3/16/81	Talkeetna to Denali	C. Schoch

Index Number	Date	Area of Ice Observations	Observers
1117	3/24/81	Talkeetna to Watana Camp	J. Coffin
1118	3/31 - 4/2	Talkeetna to Denali	J. Coffin C. Schoch
1119	4/1/81	Measurement of ice thickness at Watana stream gage site	J. Coffin G. Claggett C. Schoch
1120	4/13 - 4/14/81	Devil Canyon Survey of ice, water surface, water velocities, and bottom profile	J. Coffin R. Butera C. Schoch

1200 BREAKUP RIVER ICE OBSERVATIONS

Observations were made by R&M personnel during spring breakup on the Susitna River to assess the nature of ice cover breakup, position of ice jams in the channel, extent of flooding upstream of these ice jams, quantity and significance of ice floes and general decay of the ice cover. The information collected will be used for hydraulic and ice studies, as outlined in Subtask 3.06 of the Plan of Study.

All information collected during field trips will be on file at R&M Consultants.

Index No.	Date(s)	Description	Observers
1150	April 13	Pre-breakup observations of ice cover condition between Talkeetna and Deadman Creek.	J. Coffin
1205	April 18 - May 7	Summary of breakup observations and measurements by Leon Dick at Deshka - Susitna confluence.	Leon Dick
1210	April 23	Reconnaissance from the Deshka River (Kroto Creek) to Devil Creek and water level measurements at Chase crest gage and Gold Creek.	B. Drage L. Griffiths
1215	April 27	Aerial reconnaissance of the river from Anchorage to Vee Canyon.	J. Coffin T. Lavender (Acres)
1216	April 27	Vertical 35 mm aerial photography from Bell Island to Watana Creek	L. Griffiths R. Mourtsen
1217	April 29	Reconnaissance from Kosina Creek to Tsusena Creek and water level measurements taken at selected sites between Talkeetna and Watana Creek.	J. Coffin T. Lavender (Acres)
219	April 30	Summary of trip from Talkeetna to Gold Creek with Glenn Valentine of the Alaska Railroad.	

Index No.	Date(s)	Description	Observers
1220	April 30 - May 1	Reconnaissance from Talkeetna and Denali.	C. Schoch R. Butera
1221	May 1	Reconnaissance Yentna-Susitna confluence to River mile 144 (downstream of Portage Creek) with survey of water levels at selected sites.	B. Drage L. Griffiths
1223	May 2	Reconnaissance from the Yentna River confluence to Devil Canyon with surveys of water levels at selected sites.	B. Drage L. Griffiths
1225	May 3	Reconnaissance from Yentna River confluence to Devil Canyon with survey of water levels in the vicinity of Gold Creek.	L. Griffiths
1227	May 4	Reconnaissance from Talkeetna to Devil Canyon with survey of water levels at selected sites.	L. Griffiths
1229	May 5	Reconnaissance from the Parks Highway Bridge to Devil Canyon with survey of water levels at selected sites.	L. Griffiths H. Tomingas
1231	May 6	Reconnaissance from the Parks Highway Bridge to above the Indian River with survey of water levels at selected sites.	H. Tomingas
1230	May 6	Vertical 35 mm aerial photography from Bell Island to Curry	L. Griffiths R. Mourtsen
1232	May 7	Reconnaissance from Talkeetna to Gold Creek with survey of water levels at selected sites.	H. Tomingas
1233	May 7	Reconnaissance from Watana to Denali, tracing leads and overflows.	C. Schoch
1235	May 8	Reconnaissance from the mouth of the Susitna River to the Tyone River confluence.	J. Coffin G. Krishnan (Acres)

1300 AERIAL PHOTOGRAPHY

This section includes a listing of vertical aerial photography, both low altitude and high altitude, that has been flown over part or all of the Susitna River Basin.

For each set of photographs, the table shows the date of photography, area of coverage, scale and location of the negatives. An agency list with addresses follows the table. More detailed information concerning precise area of coverage and availability of photographs can be obtained through these agencies.

1300 AERIAL PHOTOGRAPHY

Index No.	Date	Area	Scale	BW or Color	Contracting Agency	Location of Negatives
1310	1951	Susitna River Basin - Cook Inlet to Jay Creek	1:40000	BW	USCE	EROS Data Center
1311	1951-54	Denali Highway - West from Maclaren River	1:40000	BW	USCE	EROS Data Center
1312	1951-54	Yentna River - Chelatna Lake	1:40000	BW	USCE	EROS Data Center
1313	1951	Talkeetna	1:40000	BW	USCE	EROS Data Center
1314	1961-62	Cook Inlet to Willow East of Susitna River	1:15840	BW	ADL	ADL (Project Symbol BL)
1315	1961-62	Cook Inlet, Mt. Yenlo West of Susitna River	1:20000	BW	BLM	BLM (Project Symbol GP 103, GP 120)
1316	1962	Delta Islands	1:20000	BW	BLM	BLM (Project Symbol GP 105)
1317	1962	Talkeetna	1:20000	BW	ADL	ADL (Project Symbol TAK)
1318	1962-63	Susitna Valley	1:15840	BW	ADL	ADL (Project Symbol SUS)
1320	1968	Upper Susitna Valley, Chulitna River	1:15840	BW	ADL	ADL (Project Symbol SUTP)
1325	1972	Lake Louise Area	1:24000	C	SDP	ADL (Project Symbol Lk. Lou.)
1330	1974	Devil Canyon	1:30000	BW	DOT	NPAS
1331	1974	Susitna River Basin	1:500000	BW	NASA	EROS Data Center
1332	1974	Cook Inlet to Talkeetna	1:63360	BW	CSSC	NPAS
1333	1976	Willow Basin	1:24000	BW&C	CSSC	ADL (Project Symbol WIL)

1300 AERIAL PHOTOGRAPHY (Cont'd)

Index No.	Date	Area	Scale	BW or Color	Contracting Agency	Location of Negatives
1334	1976-79	Susitna River Basin	1:500000 1:1000000	BW BW	NASA NASA	EROS Data Center EROS Data Center
1335	1977	Susitna River Basin	1:120000	C-IR	BLM	BLM
1336	1978	Susitna River	1:18000	BW	USCE	NPAS
1337	1978	Susitna River	1:72000	BW	USCE	NPAS
1338	1978-79	Cook Inlet to Talkeetna	1:60000 1:120000	C-IR BW	BLM BLM	BLM BLM
1339	1980	Upper Susitna River Basin	1:60000 1:120000	C-IR BW	BLM BLM	BLM BLM
1340	7/19/80	Devil Canyon Reservoir	1:24000	C	R&M	NPAS
1341	7/19/80	Watana Reservoir	1:24000	C	R&M	NPAS
1342	7/19/80	Alternative Access Corridor - Susitna	1:24000	C	R&M	NPAS
1343	8/24/80	Lower Susitna River	1:48000	BW	R&M	NPAS
1344	11/14/80	Susitna River - Delta Islands to Watana Creek	1:60000	BW	R&M	R&M (35 mm Photography)
1345	12/5/80	Susitna River - Cook Inlet to Watana Creek	1:24000	BW	R&M	R&M (35 mm Photography)
1346	4/27/81	Susitna River - Bell Island to Watana Creek	1:24000	BW	R&M	R&M (35 mm Photography)
1347	5/6/81	Susitna River - Bell Island to Curry	1:24000	BW	R&M	R&M (35 mm photography)

AERIAL PHOTOGRAPHY
AGENCY LIST

State of Alaska (ADL)
Division of Forest, Land and Water Management
323 E. 4th Avenue
Anchorage, Alaska 99501

U.S. Department of Interior (BLM)
Bureau of Land Management
Federal Building
701 "C" Street
Anchorage, Alaska 99501

Capital Site Selection Committee (CSSC)

State of Alaska (DOT&PF)
Highways
Planning & Research
P.O. Box 589
Douglas, Alaska 99824

North Pacific Aerial Surveys (NPAS)
4241 "B" Street
Anchorage, Alaska 99501

R&M Consultants, Inc. (R&M)
P.O. Box 6087
Anchorage, Alaska 99503

U.S. Soil Conservation Service (SCS)
U.S. Department of Agriculture
Federal Center Building
Hyatterville, Maryland

State of Alaska
Division of Parks (SDP)
619 Warehouse Drive
Anchorage, Alaska 99501

U.S. Army Corps of Engineers (USCE)
Alaska District
P.O. Box 7002
Anchorage, Alaska 99510

U.S. Geological Survey (USGS)
EROS Data Center
Sioux Falls, SD 57198

1400 HYDROGRAPHIC SURVEYS

Data on River channel morphology and floodplain characteristics have been collected by R&M Consultants from parts of the Susitna River.

Precise location, date of cross-section survey, plot showing channel geometry, calculated hydraulic parameters and general descriptions of each cross-section site are available for the river reach between Talkeetna and Portage Creek.

In addition, longitudinal streambed profiles of the main channel thalweg have been run from Talkeetna to Portage Creek.

Channel cross-sections from fresh water sloughs adjacent to the Susitna River have been surveyed by Alaska Department of Fish and Game during 1976. This data has been included as part of Appendix C and therefore has not been listed again in this section.

All of the data in this section are on file at R&M according to index number and location.

Index No.	Dates	Location	Description
1409	1976	Susitna River	Cross-sections surveyed by ADF&G
1410	10/4 - 11/19/80	Talkeetna to Portage Creek	62 cross-sections defining river floodplain and channel geometry
1411	10/11/80	LRX - 18 at river mile 106 to Talkeetna	longitudinal profile of main channel thalweg
1412	10/26 - 10/27/80	Portage Creek to LRX - 18	longitudinal profile of main channel thalweg

Index No.	Dates	Location	Description
1413	3/3 - 3/26/81	Devil Creek to Deadman Creek	23 cross sections defining river floodplain & channel geometry
1414	5/21/81	Portage Creek to Devil Canyon	6 cross sections defining river floodplain & channel geometry

1500 GLACIAL OBSERVATIONS

The main objective of glacial studies undertaken by R&M Consultants & Dr. Will Harrison of the Geophysical Institute in Fairbanks is to conduct a reconnaissance-level investigation of the primary glaciers feeding the Susitna River Basin. This will be used to assess whether significant changes in water or sediment yield could occur, if potential lake dumps exist and to develop a long term glacial observation and study program oriented toward hydropower development if it is warranted.

Glacial studies will be supported by historical data from climate stations and snow surveys in the Susitna Basin, as well as, sediment discharge records for the Susitna and Maclaren Rivers. This sediment discharge data will be used to develop mean annual and seasonal sediment production rates for glacial basins.

Other data is also available for the glacial area of the Susitna Basin. Oblique aerial photography taken by Larry Mayo with the USGS in Fairbanks, documenting glacial morphology short term changes indicating glacier activity can be obtained through the USGS photo lab in Tacoma, Washington. Vertical aerial photography from 1950 will be augmented by new photography in 1981 to see if glacier volume changes can be estimated by comparison of photography covering the same area over time, and to further document surface features, such as glacier-dammed lakes. This information can also be used to determine the effects of long and short-term volume changes on hydrological regime.

With the cooperation of the Geophysical Institute, R&M Consultants installed a 20 meter thermocouple at 5,500 feet on the west fork of the Susitna Galacier in May of 1981. Connected to a potentimeter, monthly readings of temperature variations through the ice are being observed and will provide input on glacier dynamics.

Velocity of the glaciers is also being monitored by means of an accurately surveyed control network surrounding the glacier and a monument embedded 3 meters in the ice. Movement of the marker, in the ice, relative to the fixed control net will be observed monthly throughout the summer of 1981. Velocity markers and control surveys were established on the West Fork Glacier, and the three ice fields under the name of Susitna Glacier.

One major event has been monitored by Austin Post in 1952, and reported in this paper from 1960:

> The exceptional advance of the Muldrow, Black Rapids & Susitna Glaciers: Journal of Geophysical Research, v. 65, pp. 3703-3712.

Information collected for glacier studies will be on file at R&M Consultants.

APPENDIX A

GOVERNMENT AGENCIES THAT HAVE COLLECTED OR ANALYZED WATER RESOURCES DATA FOR THE SUSITNA RIVER BASIN

Alaska Department of Fish & Game
333 Raspberry Road
Anchorage, Alaska 99502
Attn: Sport Fish Division

Includes: Water Quality Data in Conjunction with Fisheries Studies

National Climatic Center
National Oceanic & Atmospheric Administration
Asheville, North Carolina 28810

Includes: Climatic Data

Alaska District, Corps of Engineers
Hydrology Section
Post Office Box 7002
Anchorage, Alaska 99510

Includes: Data Analysis

Soil Conservation Service
2221 E. Northern Lights Blvd.
Room 129
Anchorage, Alaska 99501

Includes: Snow Surveys

Arctic Environmental Information and Data Center
707 A Street
Anchorage, Alaska 99501

Includes: Data Analysis

U.S. Geological Survey
281 E Street
Anchorage, Alaska 99501
Water Resources Division

Includes: Water Discharge
Sediment
Water Quality
Water Temperature

APPENDIX B

WATER QUALITY PARAMETERS THAT HAVE BEEN SAMPLED BY THE USGS WITHIN THE SUSITNA RIVER BASIN

Site Parameters

Available for each sample

- Date
- Time
- Instantaneous Stream Flow (cfs)

Occasionally available for sample

- Sampling Depth (ft)
- Stream Width (ft)
- Percent of Total Depth
- Sample Location in Cross Section (ft from left bank)

Physical Parameters

- Color (Platinum - Cobalt Units)
- Hardness (mg/l as $CaCO_3$)
- Hardness, Noncarbonate (mg/l as $CaCO_3$)
- Methylene Blue Active Substance
- pH
- Solids, Dissolved (tons/day, tons/ac-ft)

Solids, Dissolved Residue at 105°C (mg/l)
Solids, Dissolved Residue at 180°C (mg/l)
Solids, Suspended Residue at 180°C (mg/l)
Specific Conductance (Micromhos/centimeter)
Temperature, Instantaneous (°C)
Turbidity (Jackson Turbidity Units)

Inorganic Parameters

Alkalinity (mg/l as $CaCO_3$)
Aluminum, Total Recoverable (ug/l as Al)
Arsenic, Dissolved (ug/l as As)
Arsenic, Total (ug/l as As)
Arsenic, Total Suspended (ug/l as As)
Barium, Dissolved (ug/l as Ba)
Barium, Total Recoverable (ug/l as Ba)
Beryllium, Dissolved (ug/l as Be)
Bicarbonate (mg/l as HCO_3)
Boron, Dissolved (ug/l as B)
Cadmium, Dissolved (ug/l as Cd)
Cadmium, Total Recoverable (ug/l as Cd)
Calcium, Dissolved (mg/l as Ca)
Carbon Dioxide, Dissolved (mg/l as CO_2)
Carbonate (mg/l as CO_3)
Chloride, Dissolved (mg/l as Cl)
Chromium, Dissolved (ug/l as Cr)
Chromium, Dissolved Hexavalent (ug/l as Cr)
Chromium, Suspended Recoverable (ug/l as Cr)
Chromium, Total Recoverable (ug/l as Cr)
Cobalt, Dissolved (ug/l as Co)
Copper, Dissolved (ug/l as Cu)
Copper, Total Recoverable (ug/l as Cu)
Cyanide, Total (mg/l as Cn)

Fluoride, Dissolved (mg/l as F)
Iron (ug/l as Fe)
Iron, Dissolved (ug/l as Fe)
Iron, Total Recoverable (ug/l as Fe)
Lead, Dissolved (ug/l as Pb)
Lead, Total Recoverable (ug/l as Pb)
Lithium, Dissolved (ug/l as Li)
Magnesium, Dissolved (mg/l as Mg)
Manganese (ug/l as Mn)
Manganese, Dissolved (ug/l as Mn)
Manganese, Total Recoverable (ug/l as Mn)
Mercury, Dissolved (ug/l as Hg)
Mercury, Total Recoverable (ug/l as Hg)
Molybdenum, Dissolved (ug/l as Mo)
Molybdenum, Total Recoverable (ug/l as Mo)
Nickel, Dissolved (ug/l as Ni)
Nickel, Total Recoverable (ug/l as Ni)
Nitrogen, Dissolved Ammonia (mg/l as N, mg/l as NH_4)
Nitrogen, Dissolved Nitrate (mg/l as N, mg/l as NO_3)
Nitrogen, Dissolved Nitrate + Nitrite (mg/l as N)
Nitrogen, Total (mg/l as NO_3)
Nitrogen, Total Ammonia (mg/l as N)
Nitrogen, Total Ammonia + Organic (mg/l as N)
Nitrogen, Total Nitrate (mg/l as N, mg/l as NO_3)
Nitrogen, Total Nitrate + Nitrite (mg/l as N)
Nitrogen, Total Nitrite (mg/l as N)
Nitrogen, Total Organic (mg/l as N)
Oxygen, Dissolved (mg/l, percent saturation)
Phosphate, Dissolved Ortho (mg/l as PO_4)
Phosphate, Total (mg/l as PO_4)
Phosphorus, Total (mg/l as P)
Phosphorus, Dissolved (mg/l as P)
Phosphorus, Dissolved Ortho (mg/l as P)
Potassium, Dissolved (mg/l as K)

Selenium, Dissolved (ug/l as Se)
Selenium, Total (ug/l as Se)
Silica, Dissolved (mg/l as SiO_2)
Silver, Dissolved (ug/l as Ag)
Silver, suspended recoverable (ug/l as Ag)
Silver, total recoverable (ug/l as Ag)
Sodium Adsorption Ratio
Sodium, Dissolved (mg/l as Na)
Sodium, Percent
Sodium + Potassium, Dissolved (mg/l as Na)
Strontium, Dissolved (ug/l as Sr)
Sulfate, Dissolved (mg/l as SO_4)
Uranium, Dissolved - Extraction (ug/l)
Uranium, Dissolved - Direct Flourometric (pci/l)
Zinc, Dissolved (ug/l as Zn)
Zinc, Total Recoverable (ug/l as Zn)

Organic Parameters

Aldrin, Total (ug/l)
Aldrin, Total in Bottom Material (ug/kg)
Biochemical Oxygen Demand, Five Day (mg/l)
Chlordane, Total (ug/l)
Chlordane, Total in Bottom Material (ug/kg)
2,4-D, Total (ug/l)
2,4-D, Total in Bottom Material (ug/kg)
DDD, Total (ug/l)
DDD, Total in Bottom Material (ug/kg)
DDE, Total (ug/l)
DDE, Total in Bottom Material (ug/kg)
DDT, Total (ug/l)
DDT, Total in Bottom Material (ug/kg)
Diazinon, Total (ug/l)

Dieldrin, Total (ug/l)
Dieldrin, Total in Bottom Material (ug/kg)
Endosulfan, Total (ug/l)
Endosulfan, Total in Bottom Material (ug/kg)
Endrin, Total (ug/l)
Endrin, Total in Bottom Material (ug/kg)
Ethion, Total (ug/l)
Ethion, Total in Bottom Material (ug/kg)
Heptachlor., Total (ug/l)
Heptachlor., Total in Bottom Material (ug/kg)
Heptachlor., Total Epoxide (ug/l)
Heptachlor., Total Epoxide in Bottom Material (ug/kg)
Lindane, Total (ug/l)
Lindane, Total in Bottom Material (ug/kg)
Malathion, Total (ug/l)
Malathion, Total in Bottom Material (ug/kg)
Mirex, Total (ug/l)
Napthalenes, Total Polychlor (ug/l)
Parathion, Total (ug/l)
Parathion, Total in Bottom Material (ug/kg)
Parathion, Total Methyl (ug/l)
Parathion, Total Methyl in Bottom Material (ug/kg)
PCB, Total (ug/l)
PCB, Total in Bottom Material (ug/kg)
PCN, Total in Bottom Material (ug/kg)
Perthane, Total (ug/l)
Phenols (ug/l)
Silvex, Total (ug/l)
Silvex, Total in Bottom Material (ug/kg)
2, 4, 5 - T, Total (ug/l)
2, 4, 5 - T, Total in Bottom Material (ug/kg)
Toxaphene, Total (ug/l)
Toxaphene, Total in Bottom Material (ug/kg)
Trithion, Total (ug/l)

Trithion, Total in Bottom Material (ug/kg)
Trithion, Total Methyl (ug/l)
Trithion, Total Methyl in Bottom Material (ug/kg)
Vanadium, Dissolved (ug/l as V)

Radioactive Parameters

Alpha, Dissolved Gross (pci/l as U-NAT, ug/l as U-NAT)
Alpha, Total Suspended Gross (pci/l as U-NAT, pci/g as U-NAT, ug/l as U-NAT)
Beta, Dissolved Gross (pci/l as Cs-137, pci/l as Sr/Yt - 90)
Beta, Total Suspended Gross (pci/l as Cs-137, pci/g as Sr/Yt - 90, pci/g as Cs-137)
Radium 226, Dissolved - Random Method (pci/l)

Coliform Bacteria

Coliform, Fecal - 0.45 UM-MF (Cols./100 ml.)
Coliform, Fecal - 0.7 UM-MF (Cols./100 ml.)
Coliform, Streptococci Fecal (Cols./100 ml.)
Coliform, Streptococci Fecal - KF Agar (Cols./100 ml.)
Coliform, Total - Delayed (Cols./100 ml.)
Coliform, Total - Immediate (Cols./100 ml.)

APPENDIX C

DATA COLLECTED BY ALASKA DEPARTMENT OF FISH AND GAME (ADF&G) FROM THE SUSITNA RIVER BASIN BETWEEN 1974 and 1978

Streamflow, water quality and water temperature data have been collected by the Alaska Department of Fish and Game at a number of locations within the Susitna River Basin. Since the measurements have been taken periodically, the number of measurements, timing and specific parameters measured vary from year to year at any given station. Information available from the Alaska Department of Fish and Game has been included below. These reports are all on file at R&M Consultants.

Barrett, Bruce M. 1974. An assessment study of the anadromous fish populations in the Upper Susitna River watershed between Devil's Canyon and the Chulitna River. Cook Inlet Data Report No. 74-2. Alaska Department of Fish and Game. Division of Commerical Fisheries. 56 pp.

Figure 10: Profile of Susitna River water temperatures for September 4 - 11 at Gold Creek and Devil's Canyon Fishwheel Camp.

Figure 11: Profile of water and air temperatures recorded daily at east bank fishwheel.

Friese, Nancy V. 1975. Preauthorization assessment of anadromous fish populations of the Upper Susitna River watershed in the vicinity of the proposed Devil's Canyon Hydroelectric project. Cook Inlet Data Report No. 75-2. Alaska Department of Fish and Game - Division of Commerical Fisheries. 121 pp.

Table 10: Survey of winter conditions in Indian River, Lane Creek and Gold Creek.

Table 11: Analysis of Water Conditions in Indian River, at Chase Creek, 1974 - 1975.

Table 12: Analysis of Water Conditions at Gold Creek, 1974 - 1975.

Table 13: Analysis of water conditions at Parks Highway Bridge, 1974 - 1975.

Riis, James C. 1975. Pre-authorization assessment of the Susitna River Hydroelectric Projects: preliminary investigations of water quality and aquatic species composition. Alaska Department of Fish and Game. Division of Sport Fish. 61pp.

Figure 1: Daily water temperature in the Susitna River at Parks Highway Bridge, June 20 - September 23, 1975.

Figure 2: Maximum daily water temperatures of Birch Creek, April 11 - August 30, 1975.

Figure 3: Maximum daily water temperatures for Willow Creek, April 10 - September 23, 1975.

Riis, James C., 1977. Pre-authorization assessment of the proposed Susitna River Hydroelectric Projects: preliminary investigations of water quality and aquatic species composition. Alaska Department of Fish and Game. Division of Sport Fish. 91 pp.

Appendix A

Table 1: Water quality data collected from the Susitna River at the Parks Highway Bridge between July 21 and October 1, 1976.

Table 2: Water quality data collected from the Susitna River at the Gold Creek Railroad Bridge between July 13 and October 1, 1976.

Table 3: Water quality data collected from the Susitna River upstream of Portage Creek between July 15 and October 29, 1976.

Table 4: Water quality data collected from sloughs 8 and 10, between June 25 and September 30, 1976.

Table 5: Water quality data collected from sloughs 11 and 13 between June 23 and September 30, 1976.

Table 6: Water quality data collected from Sloughs 14 & 15 between June 25 and September 30, 1976.

Table 7: Water quality data collected from Sloughs 16 & 17 between June 24 and September 29, 1976.

Table 8: Water quality data collected from Sloughs 18 & 19 between June 15 and September 29, 1976.

Table 9: Water quality data collected from slough 20 between June 24 - September 29, 1976.

Table 10: Water quality data collected from Willow Creek, Little Willow Creek, Kashwitna River and Caswell Creek between July 21 and October 12, 1976.

Table 11: Water quality data collected from Sheep Creek, Goose Creek and Montana Creek between July 21 and October 12, 1976.

Table 12: Water quality data collected from Slough 3c and Chase Creek between June 26 and October 1, 1976.

Table 13: Water quality data collected from Fourth of July Creek, Gold Creek, Indian River and Portage Creek between July 17 and September 28, 1976.

Table 14: Daily maximum and minimum water temperatures in the Susitna River at Parks Highway Bridge, June 26 - October 26, 1976.

Table 15: Daily maximum and minimum water temperatures in the Susitna River above Chase Creek, June 21 - September 29, 1976.

Table 16: Daily maximum and minimum water temperatures in the Susitan River between Devil's Canyon and Portage Creek, June 22 - October 30, 1976.

Table 17: Daily maximum and minimum water temperatures in Birch Creek, June 26 - December 2, 1976.

Table 19: Slough 8 cross sections and stage gage information.

Table 20: Slough 10 cross sections and stage gage information.

Table 21: Slough 11 cross sections and stage gage information.

Table 22: Slough 13 cross sections and stage gage information.

Table 23: Slough 14 cross sections and stage gage information.

Table 24: Slough 15 cross sections and stage gage information.

Table 25: Slough 16 cross sections and stage gage information.

Table 26: Slough 17 cross sections and stage gage information.

Table 27: Slough 18 cross sections and stage gage information.

Table 28: Slough 19 cross sections and stage gage information.

Table 29: Slough 20 cross sections and stage gage information.

Table 30: Slough 3C cross sections and stage gage information.

Table 31: Chase Creek cross sections and stage gage information.

Table 32: Tributary flow data, 1976.

Riis, James C. and Friese, Nancy V., 1978. Fisheries and Habitat Investigations of the Susitna River - A preliminary study of potential impacts of the Devil's Canyon and Watana Hydroelectric Projects. Alaska Department of Fish and Game, Division of Sport & Commerical Fish. 116 pp.

Table 8: Water quality data from selected tributaries to the Susitna River, 1977.

Table 10: Water flows of Montana, Rabideux and Willow Creeks from May through November, 1977.

Table 11: Daily maximum and minimum water temperatures from the Susitna River at the Parks Highway Bridge, June 27 - October 12, 1977.

Appendix II

Table 2: Water quality data from sloughs and clearwater tributaries of the Susitna River, June 14 - October 5, 1977.

Table 3: Daily maximum and minimum water temperatures in Rabideux Creek, May 25 - October 23, 1977.

APPENDIX D

CLIMATOLOGICAL PARAMETERS WHICH APPEAR IN THE NOAA REPORTS ENTITLED "LOCAL CLIMATOLOGICAL DATA, ANNUAL SUMMARY WITH COMPARATIVE DATA"

1. Meteorological Data For The Current Year

Temperature (°F)

Average Daily Maximum, for each month.
Average Daily Maximum, for the year.
Average Daily Minimum, for each month.
Average Daily Minimum, for the year.
Average, for each month.
Average, for the year.
Highest, and Date of Occurrence, for each month.
Highest, and Date of Occurrence, for the year.
Lowest, and Date of Occurrence, for each month.
Lowest, and Date of Occurrence, for the year.

Degree Days (Base 65°F)

Number of Heating, for each month.
Number of Heating, for the year.
Number of Cooling, for each month.
Number of Cooling, for the year.

Precipitation (Inches)

Total Inches of Water Equivalent, for each month.

Total Inches of Water Equivalent, for the year.

Greatest Amount of Water Equivalent in 24 hours and the Date of Occurrence, for each month.

Greatest Amount of Water Equivalent in 24 hours and the Date of Occurrence, for the year.

Total Inches of Snow and/or Ice Pellets, for each month.

Total Inches of Snow and/or Ice Pellets, for the year.

Greatest Amount of Snow and/or Ice Pellets in 24 hours and the Date of Occurrence, for each month.

Greatest Amount of Snow and/or Ice Pellets in 24 hours and the Date of Occurrence, for the year.

Relative Humidity (Percent)

Average Relative Humidity at hour 0200, for each month.
Average Relative Humidity at hour 0200, for the year.
Average Relative Humidity at hour 0800, for each month.
Average Relative Humidity at hour 0800, for the year.
Average Relative Humidity at hour 1400, for each month.
Average Relative Humidity at hour 1400, for the year.
Average Relative Humidity at hour 2000, for each month.
Average Relative Humidity at hour 2000, for the year.

Wind

Resultant Direction, for each month.
Resultant Direction, for the year.
Resultant Speed (m.p.h.), for each month.
Resultant Speed (m.p.h.), for the year.
Average Speed (m.p.h.), for each month.
Average Speed (m.p.h.), for the year.
Speed of the Fastest Mile (m.p.h.), for each month.
Speed of the Fastest Mile, (m.p.h.) for the year.
Direction and Date of Occurrence of the Fastest Mile, for each month.
Direction and Date of Occurrence of the Fastest Mile, for the year.

Miscellaneous

Percent of Possible Sunshine, for each month.
Percent of Possible Sunshine, for the year.
Average Sky Cover, tenths, sunrise to sunset, for each month.
Average Sky Cover, tenths, sunrise to sunset, for the year.
Number of Clear Days, sunrise to sunset, for each month.
Number of Clear Days, sunrise to sunset, for the year.
Number of Partly Cloudy Days, sunrise to sunset, for each month.
Number of Partly Cloudy Days, sunrise to sunset, for the year.
Number of Cloudy Days, sunrise to sunset, for each month.
Number of Cloudy Days, sunrise to sunset, for the year.
Number of Days with 0.01 inch or more of Precipitation, for each month.
Number of Days with 0.01 inch or more of Precipitation, for the year.

Number of Days with 1.0 inch or more of Snow and/or Ice Pellets, for each month.

Number of Days with 1.0 inch or more of Snow and/or Ice Pellets, for the year.

Number of Days with Thunderstorms, for each month.

Number of Days with Thunderstorms, for each year.

Number of Days with Heavy Fog, visibility 1/4 mile or less for each month.

Number of Days with Heavy Fog, visibility 1/4 mile or less for the year.

Number of Days when the Maximum Temperature was 90°F and above, for each month.

Number of Days when the Maximum Temperature was 90°F and above, for the year.

Number of Days when the Maximum Temperature was 32°F and below, for the year.

Number of Days when the Maximum Temperature was 32°F and below, for the year.

Number of Days when the Minimum Temperature was 32°F and below, for each month.

Number of days when the Minimum Temperature was 32°F and Below, for the year.

Number of Days when the Minimum Temperature was 0°F and below, for each month.

Number of Days when the Minimum Temperature was 0°F and below, for the year.

Average Station Pressure (mb), for each month.

Average Station Pressure (mb), for the year.

2. Normals*, Means, and Extremes

Temperature (°F)

Normal Daily Maximum, for each month.
Normal Daily Maximum, for a year.
Normal Daily Minimum, for each month.
Normal Daily Minimum, for a year.
Normal Monthly, for each month.
Normal Yearly.
Record High and Year of Occurrence, for each month.
Record High and Date of Occurrence.
Record Low and Year of Occurrence, for each month.
Record Low and Date of Occurrence.

Degree Days (Base 65°F)

Normal Number of Heating, for each month.
Normal Number of Heating, for a year.
Normal Number of Cooling, for each month.
Normal Number of Cooling, for a year.

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* Normals are based on the previous 30 years of record.

Precipitation (Inches)

Normal Total Inches of Water Equivalent, for each month.

Normal Yearly Total Inches of Water Equivalent.

Maximum Monthly Total Inches of Water Equivalent and Year of Occurrence, for each month.

Maximum Monthly Total Inches of Water Equivalent and Date of occurrence.

Minimum Monthly Total Inches of Water Equivalent and Date of Occurrence, for each month.

Minimum Monthly Total Inches of Water Equivalent and Date of Occurrence.

Maximum Total Inches of Water Equivalent in 24 hours and Date of Occurrence, for each month.

Maximum Total Inches of Water Equivalent in 24 hours and Date of Occurrence.

Maximum Monthly Total Inches of Snow and/or Ice Pellets and Date of Occurrence, for each month.

Maximum Monthly Total Inches of Snow and/or Ice Pellets and Date of Occurrence.

Maximum Inches of Snow and/or Ice Pellets in 24 hours and Date of Occurrence, for each month.

Maximum Inches of Snow and/or Ice Pellets in 24 hours and Date of Occurrence.

Relative Humidity (Percent)

Normal Relative Humidity at hour 0200, for each month.
Normal Yearly Relative Humidity at hour 0200.
Normal Relative Humidity at hour 0800, for each month.
Normal Yearly Relative Humidity at hour 0800.
Normal Relative Humidity at hour 1400, for each month.
Normal Yearly Relative Humidity at hour 1400.
Normal Relative Humidity at hour 2000, for each month.
Normal Yearly Relative Humidity at hour 2000.

Wind

Mean Monthly Speed (m.p.h.), for each month.
Mean Yearly Speed (m.p.h.).
Prevailing Direction, for each month.
Yearly Prevailing Direction.

Maximum Speed, Direction, and Date of Occurrence of the Fastest Mile, for each month.

Maximum Speed, Direction, and Date of Occurrence of the Fastest Mile.

Miscellaneous

Mean Percent of Possible Sunshine, for each month.
Mean Yearly Percent of Possible Sunshine.
Mean Sky Cover, tenths, sunrise to sunset, for each month.

Mean Yearly Sky Cover, tenths, sunrise to sunset.
Mean Number of Clear Days, sunrise to sunset, for each month.
Mean Yearly Number of Clear Days, sunrise to sunset.

Mean Number of Partly Cloudy Days, sunrise to sunset, for each month.

Mean Yearly Number of Partly Cloudy Days, sunrise to sunset.
Mean Number of Cloudy Days, sunrise to sunset, for each month.
Mean Yearly Number of Cloudy Days, sunrise to sunset.

Mean Number of Days with 0.01 inch or more of Precipitation, for each month.

Mean Yearly Number of Days with 0.01 inch or more of Precipitation.

Mean Number of Days with 1.0 inch or more of Snow and/or Ice Pellets, for each month.

Mean Yearly Number of Days with 1.0 inch or more of Snow and/or Ice Pellets.

Mean Number of Days with Thunderstorms, for each month.
Mean Yearly Number of Days with Thunderstorms.

Mean Number of Days with Heavy Fog, visibility 1/4 mile or less, for each month.

Mean Yearly Number of Days with Heavy Fog, visibility 1/4 mile or less.

Mean Number of Days when the Maximum Daily Temperature is 90°F and above, for each month.

Mean Yearly Number of Days when the Maximum Daily Temperature is 90°F and above.

Mean Number of Days when the Maximum Daily Temperature is 32°F and below, for each month.

Mean Yearly Number of Days when the Maximum Daily Temperature is 32°F and below.

Mean Number of Days when the Minimum Daily Temperature is 32°F and below, for each month.

Mean Yearly Number of Days when the Minimum Daily Temperature is 32°F and below.

Mean Number of Days when the Minimum Daily Temperature is 0°F and below, for each month.

Mean Yearly Number of Days when the Minimum Daily Temperature is 0°F and below.

Average Station Pressure (mb), for each month.

Average Yearly Station Pressure (mb).

3. Average Temperature

Both the monthly and the annual average air temperatures are given for the period of record.

4. Precipitation

Both the monthly and the annual amounts of precipitation (in inches) are given for the period of record.

5. Heating Degree Days

Both the monthly and the annual number of heating degree days are given for the period of record.

6. Cooling Degree Days

Both the monthly and the annual number of cooling degree days are given for the period of record.

7. Snowfall

Both the monthly and the annual amounts of snowfall are given for the period of record.

APPENDIX E

CLIMATOLOGICAL PARAMETERS WHICH APPEAR IN THE NOAA REPORTS ENTITLED "ANNUAL CLIMATOLOGICAL SUMMARY"

Temperature (°F)

Mean Maximum Temperature, for each month.
Mean Maximum Temperature, for the year.
Mean Minimum Temperature for each month.
Mean Minimum Temperature for the year.
Mean Temperature for each month.
Mean Temperature for the year.
Total Degree Days, for each month.
Total Degree Days, for the year.
Highest Temperature and Date of Occurrence, for each month.
Highest Temperature and Date of Occurrence, for the year.
Lowest Temperature and Date of Occurrence, for each month.
Lowest Temperature and Date of Occurrence, for the year.

Number of Days when the Maximum Temperature was 90°F and above, for each month.

Number of Days when the Maximum Temperature was 90°F and above, for the year.

Number of Days when the Maximum Temperature was 32°F and below, for each month.

Number of Days when the Maximum Temperature was 32°F and below, for the year.

Number of Days when the Minimum Temperature was 32°F and below, for each month.

Number of Days when the Minimum Temperature was 32°F and below, for the year.

Number of Days when the Minimum Temperature was 0°F and below, for each month.

Number of Days when the Minimum Temperature was 0°F and below, for the year.

Precipitation (Inches)

Total Amount of Precipitation, for each month.
Total Amount of Precipitation, for the year.

Greatest Amount of Precipitation in 24 hours and Date of Occurrence, for each month.

Greatest Amount of Precipitation in 24 hours and Date of Occurrence, for the year.

Total Amount of Snow and/or Sleet, for each month.
Total Amount of Snow and/or Sleet, for the year.

Greatest Depth of Snow and/or Sleet and Date of Occurrence, for each month.

Greatest Depth of Snow and/or Sleet and Date of Occurrence, for the year.

Number of Days with 0.10 inch or more of Precipitation, for each month.
Number of Days with 0.10 inch or more of Precipitation, for the year.
Number of Days with 0.50 inch or more of Precipitation, for the year.
Number of Days with 0.50 inch or more of Precipitation, for each month.
Number of Days with 1.0 inch or more of Precipitation, for each month.
Number of Days with 1.0 inch or more of Precipitation, for the year.

APPENDIX F

CLIMATE AND WATER QUALITY PARAMETERS MEASURED BY R&M

Climate Parameters Measured

- Wind Direction
- Wind Speed
- Temperature
- Relative Humidity
- Solar Radiation
- Precipitation
- Peak Wind Gust

Continuous WQ Parameters

- Temperature
- pH
- Dissoloved Oxygen
- Oxidation - Reduction Potential
- Conductivity
- Temperature - Corrected Conductivity

Water Quality Parameters Measured

Field:

- Dissolved Oxygen
- pH
- Conductivity
- Temperature
- Carbon Dioxide
- Alkalinity
- Settleable Solids

Laboratory:

- Turbidity
- Total Dissolved Solids
- Total Suspended Solids
- Total Phosphate
- Kjeldahl Nitrogen
- Total Nitrogen
- Nitrate Nitrogen
- Ammonia Nitrogen
- Chemical Oxygen Demand
- Hardness
- Chloride
- Color
- Sulfate
- ICAP Scan(1)
- Uranium
- Radioactivity, Gross Alpha
- Organic Chemicals
- Total Organic Carbon
- Total Inorganic Carbon

(1) ICAP Scan includes:

- Silver
- Aluminum
- Arsenic
- Gold
- Boron
- Barium
- Bismuth
- Calcium
- Cadmium
- Cobalt
- Chromium
- Copper
- Iron
- Mercury
- Potassium
- Magnesium
- Molybdenum
- Sodium
- Nickel
- Manganese
- Phosphorus
- Lead
- Platinum
- Antimony
- Selenium
- Tin
- Strontium
- Titanium
- Vanadium
- Tungsten
- Zinc
- Zirconium

APPENDIX G

FIELD DATA INDEX
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APPENDIX H

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* Indicates reports on file at R&M Consultants.

APPENDIX I

R&M FIELD DATA COLLECTION LOG AS OF JUNE 9, 1981

susi6/g Page 1

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: June 9, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(1) River Stage*	Susitna River near Watana Damsite	Scientific Instr. Co. Manometer Stevens Water Level Recorder	6/20/80	Continuous	7/10-12/1/80 4/15/81-Present	Scheduled	Instrument was reactivated prior to breakup. Bubble tube and pipe were destroyed by ice flow. System was repaired and extended on 5/12/81
(2) River Discharge*	Susitna River near Watana Damsite	Teledyne-Gurley Price Current Meter Marsh-McBirney Flow Meter	N/A	Unscheduled	8/20/80 8/21/80 9/3/80 9/18/80 10/20/80 4/01/81 5/24/81 6/2/81	Event Event Event Event Event Event Event Event	Measurements to be made at several different river stages to define stage-discharge relationship at gage site.
(3) River Crest Stage* (Susitna River)	(a) Susitna-Chulitna Confluence	Crest-stage recorder	6/26/80	Unscheduled	7/31/80 5/18/81	Event	Observations are made at recorder following flood events. The stations destroyed during breakup were replaced on 6/2/81. Stage, water surface and velocity measurements were conducted at sites a, b, d, e on 6/2/81, at g and h on 5/24/81, at sites i and j on 5/21/81.
	(b) Chase	Crest-stage recorder	7/31/80	Unscheduled	5/18/81	Event	
	(c) Curry	Crest-stage recorder	6/26/80	Unscheduled	7/31/80 5/18/81	Event	
	(d) Section 25	Crest-stage recorder	6/26/80	Unscheduled	7/31/80 6/1/81	Event	
	(e) Sherman	Crest-stage recorder	6/26/80	Unscheduled	7/31/80 5/18/81	Event	
	(f) Portage Creek	Crest-stage recorder	6/25/80	Unscheduled	5/18/81 6/1/81	Event	
	(g) Devils Canyon Upper	Crest-stage recorder	6/25/80	Unscheduled	7/31/80 5/24/81	Event	

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: June 9, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(3) River Crest Stage* (Susitna River) (Continued)	(h) Devils Creek	Crest-stage recorder	5/24/80	Unscheduled	-	Event	
	(i) Watana Dam	Crest-stage recorder	7/30/80 10/01/80	Unscheduled	5/21/81	Event	
	(j) Deadman Creek	Crest-stage recorder	7/30/80	Unscheduled	5/21/81	Event	
(4) River Stage* (Susitna River)	(a) Devils Canyon	Staff Gauge	3/25/81	Unscheduled	3/30/81 4/14/81 5/1/81 5/8/81 5/24/81 5/31/81 6/2/81 6/6/81	Event	Observations are made periodically by field personnel.
	(b) Watana Damsite	Staff Gauge	4/16/81	Unscheduled	5/7/81 5/21/81 6/1/81 6/3/81	Event	
	(c) Denali Bridge	Staff Gauge	5/31/81	Daily	-	Scheduled	Daily observations by personnel of the Denali Mining Company.
(5) Water Quality (1,2)*	(a) Susitna River near Watana Damsite	Martek Water Quality Data Loggers	10/23/80	Continuous	10/23/80-4/16/81 5/21/81-Present	Scheduled	Unit was removed to prevent damage during breakup, and to perform maintenance and calibration procedures. Unit recalibrated on 6/8/81.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: June 9, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(5) Water Quality (1,2)* (Continued)	(b) Susitna River near Cantwell (Vee Canyon Site)	VWR pH Meter YSI DO Meter YSI S-C-T Meter Van Dorn Sampler Imhoff Cones	N/A	Summer: monthly Winter: 2-3 months	6/19/80	Scheduled	Spring break-up.
					8/8/80	Scheduled	Summer high-flow period (sampled by helicopter).
					9/5/80	Scheduled	Summer low-flow period.
					9/17/80	Sched/Event	Right after heavy rainstorm (post-peak).
					10/17/80	Scheduled	During river freeze-up.
					1/13/81	Scheduled	Winter through-ice sampling.
					5/20/81	Scheduled	After ice breakup, spring.
	(c) Susitna River at Gold Creek	Same as at Vee Canyon	N/A	Summer: monthly Winter: 2-3 months	8/8/80	Scheduled	Summer high-flow period (sampled by helicopter).
					10/14/80	Scheduled	During river freeze-up.
					1/14/81	Scheduled	Winter through-ice sampling.
					5/27/81	Scheduled	After ice break-up, spring.
(6) Sediment Discharge*	(a) Susitna River near Cantwell (Vee Canyon Site)	Point-integrating Suspended Sediment Sampler	N/A	Summer: monthly Winter: 2-3 months	9/5/80	Scheduled	Summer low-flow period.
					9/17/80	Sched/Event	Right after heavy rainstorm (post-peak). Sampling schedule hindered by loss of upriver boat.
					10/18/80	Scheduled	During river freeze-up.
					1/13/80	Scheduled	Winter through-ice sampling.
					5/20/81	Scheduled	After ice break-up, spring.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: June 9, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(6) Sediment Discharge* (Continued)	(b) Susitna River at Gold Creek	Same as at Vee Canyon	N/A	Summer: monthly Winter: 2-3 months	- -	- -	Sampling scheduled hindered by lack of downriver boat.
					10/16/80	Scheduled	During river freeze-up.
					1/14/81	Scheduled	Winter through-ice sampling.
					5/27/81	Scheduled	After ice break-up, spring. Concurrent with USGS for data comparison.
(7) Climate (3)*	(a) Watana Camp	MRI Weater Wizard (WW)	3/13/80	Continuous	4/8-6/13/80 6/19-7/30/80 8/28-10/2/80 10/17-Present	Scheduled	Missing data results from a faulty solar panel, electronic malfunctions and an improper cassette tape. **
	(b) Devils Canyon	MRI Weather Wizard	7/17/80	Continuous	7/17-8/13/80 9/19/80 10/16/81-Pres.	Scheduled	Missing data indicates electronic malfunctions in WW.**
	(c) Kosina Creek	MRI Weather Wizard	8/25/80	Continuous	8/25/80-1/8/81 1/15-1/16/81 2/3/81-Present	Scheduled	Missing data indicates electronic malfunctions in WW.**
	(d) Tyone River	MRI Weather Wizard	8/27/80	Continuous	8/27-8/30/80 10/22-12/5/80 1/9-2/12/81 3/4/81-Present	Scheduled	Missing data indicates electronic malfunctions in WW.**
	(e) Denali (Susitna Lodge)	MRI Weather Wizard	7/18/80	Continuous	7/18-9/18/80 10/17/80-Pres.	Scheduled	**
	(f) Susitna Glacier	MRI Weather Wizard	7/20/80	Continuous	7/20-8/12/80 8/28/80-4/10/81 4/30/81-Present	Scheduled	Missing data caused by voltage surges and a faulty recorder unit.**

** Preliminary review of data quality completed on 5/29/81.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: June 9, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(8) Snow Density and Depth (4)*	(a) West Fork Glacier Snow Course	Carpenter Machine Works Snow Sampling Kit Aerial Snow Markers	8/26/80	Winter: monthly	01/07/81 2/2-2/3/81 3/6/81 4/2/81 4/30/81	Scheduled	Three aerial markers on and around the glacier.
	(b) Susitna Glacier Snow Course	Same as at West Fork	8/28/80, 9/4/80	Winter: monthly	1/7/81 2/2-2/3/81 3/6/81 4/2/81 4/30/81	Scheduled	Six aerial markers on and around the glacier. Three markers will be moved to better locations in 8/81.
	(c) East Fork Glacier Snow Course	Same as West Fork	9/4/80	Winter: monthly	1/7/81 2/2-2/3/81 3/6/81 4/2/81 4/30/81	Scheduled	Three aerial markers on and around the glacier. Two additional markers will be placed on the ice in 8/81.
	(d) Butte Creek Pass	Aerial Snow Markers	9/11/80	Winter: monthly	2/2/81 3/6/81 4/1/81 4/30/81	Scheduled	Three aerial markers in vicinity of Butte Creek Pass. Two of these markers will be removed and used elsewhere.
(9) Ice Buildup during Precipitation	(a) Watana Camp	Steel Plate	11/80	Unscheduled	-	Event	Measurements to be made during or immediately after freezing rain. No observed freezing rain to date.
	(b) Denali (Susitna Lodge)	Steel Plate	11/80	Unscheduled	-	Event	
	(c) Healy	Steel Plate	11/81 (proposed)	Unscheduled	-	Event	
(10) In-Cloud Icing (Ice Buildup on Transmission Line)	(a) Watana Camp	Short Section of Transmission Line	9/10/80, 10/16/80	Unscheduled	-	Event	Measurements to be made during or immediately after icing conditions. No in-cloud icing has been observed to date.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: June 9, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(10) In-Cloud Icing (Ice Buildup) (Continued)	(b) Denali (Susitna Lodge)	Short Section of Transmission Line	9/11/80, 10/20/80	Unscheduled	- 3/6/81	Event	No in-cloud icing has been observed to date.
	(c) Healy	Short Section of Transmission Line	1981 (proposed)	Unscheduled	-	Event	
(11) Snow Creep*	(a) Watana Camp	Dillon Dynamometer Section of Trans-mission Line Tower	2/26/81	Winter: monthly	3/6/81 3/16/81 4/1/81	Scheduled	Installed on a north-facing slope about 2 miles west of Tsusena Butte.
	(b) Devils Canyon	Dillon Dynamometer Section of Trans-mission Line Tower	2/25/81	Winter: monthly	3/5/81 3/16/81 3/31/81	Scheduled	Installed on a north-facing slope near the Devils Canyon climate station.
	(c) Healy	Dillon Dynamometer Section Trans-mission Line Tower	1981 (proposed)	Winter: monthly	--	Scheduled	Observed to date.
(12) Ice Thickness and Competence*	Susitna River and Tributaries (5)	Ice Auger Measuring Tape Ice Penetrometer	N/A	Winter	2/27/81	Scheduled	Ice thickness surveys were conducted at all CSR locations, except at Section 25 and the Susitna-Chulitna confluence. See parameter (3).
					4/1/81	Scheduled	Adjacent to Watana Stream gauge and in conjunction with through-ice discharge measurements.
(13) Extent of Ice Cover, Locations of Ice Jams*	Susitna River	SLR Camera	N/A	Daily or weekly during Freeze-up and Break-up	10/80 11/80, 12/80 1/81, 2/81 3/81, 4/81 5/81	Event	Black & white aerial photos taken 11/14/80, 12/5/80, 4/27/81, 5/6/81.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

Status As of: June 9, 1981

Parameter Measured	Station Location	Type of Instrument Used	Date of Installation	Observation Frequency	Dates of Observation	Type of Observation	Comments
(14) Glacial Composition and Movement (6)*	Susitna Glacier, West Fork Glacier, Turkey Glacier, West Fork Susitna Glacier	Survey Equipment SLR Camera Aerial Photography	5/17-5/18/81 5/30/81	Monthly through July, August, September	5/81	Scheduled	Aerial photography to define surface features of glacier, proposed for 1981. Velocity points, camera mounts, and thermocouple were installed. Horizontal control net established and initial survey conducted. Extensive snow depth and density studies throughout glacier network were conducted.
(15) Evaporation	Watana Camp	Monel, Class A Standard Weather Bureau Evaporation Pan	5/7/81	Daily, May-Sept.	-	Scheduled	Daily observations recorded by camp personnel.
(16) Icing Detector	Watana Camp	Rosemount Ice Detector with electronic counter	12/5/80	Continuous	1/7/81 2/3/81 3/6/81 3/31/81 4/30/81 6/1/81	Scheduled	Any interruption of AC power is recorded as one count. No significant amount of icing has been recorded to date.

SUSITNA HYDROELECTRIC PROJECT
Subtask 3.03 - Hydrology Field Observation Log

NOTES:

* An asterisk after a parameter in column one (1) indicates that the entry for that parameter has been altered from the last log's entry.

(1) WQ parameters measured by the continuous water quality monitor: water temperature, dissolved oxygen, conductivity, pH, and oxidation - reduction potential.

(2) WQ parameters measured in the field: dissolved oxygen, water temperature, conductivity, pH, alkalinity, settleable solids, and free carbon dioxide.

(3) Climate parameters measured at each station: air temperature, average wind speed, wind direction, peak wind gust, relative humidity, precipitation, and solar radiation. Snowfall amounts will be measured in heated precipitation bucket at Watana only. Data are recorded at thirty (30) minute intervals at the Susitna Glacier station and at fifteen (15) minute intervals at all the other stations.

(4) Dates of installation refer to aerial snow survey markers. The actual snow courses are located at one of the markers at each of the three glaciers. There is no snow course at Butte Creek Pass, only aerial markers. Snow surveys are conducted concurrently at all the climate monitor locations, with the exception of the Susitna Glacier Station, where the snow course is at a more suitable location.

(5) Several sites along the main stem of the Susitna and a few sites on the larger tributaries are to be observed.

(6) Dates of installation refer to snow survey markers.

(7) Last log prepared was as of 3/16/81.

KEY TO DATA COLLECTION PROGRAMS AT MAJOR STATIONS IN THE SUSITNA RIVER BASIN

STATION	Streamflow Gaging	Crest Stage Gage	Staff Gage	Water Quality (1)	Water Temperature	Sediment Discharge	Bedload Sampling (3)	Climate	In-cloud Icing	Freezing Rain	Snow Creep
(A) Susitna River near Denali	X		X		X	X		X	X	X	
(B) Susitna River at Vee Canyon	X		X	X	X	X					
(C) Susitna River near Watana Damsite	X	X		X[2]	X			X	X	X	X
(D) Susitna River near Devils Canyon		X	X					X			X
(E) Susitna River at Gold Creek	X			X	X	X	X				
(F) Chulitna River near Talkeetna	X				X	X	X				
(G) Talkeetna River near Talkeetna	X			X	X	X	X				
(H) Susitna River near Sunshine[4]	X				X	X	X				
(I) Skwentna River near Skwentna	X			X	X	X		X			
(J) Yentna River near Susitna Station	X				X	X					
(K) Susitna River at Susitna Station	X			X	X	X					

NOTES:

(1) Parameters Measured listed in Appendix F
(2) Continuous water quality monitor installed
(3) Proposed - data collection to begin 1981

NOTES:

The letters before each station name in the table is used on the map to mark the approximate location of the non-streamgage sites, where applicable. At each location, only the streamgage symbol and index number are given.

STATIONS	INDEX NUMBERING
■ STREAMFLOW - CONTINUOUS RECORD	0100
□ STREAMFLOW - PARTIAL RECORD	0200
⊕ WATER QUALITY	0300
T WATER TEMPERATURE	0400
★ SEDIMENT DISCHARGE	0500
⊙ CLIMATE	0600
⊢ FREEZING RAIN and INCLOUD ICING	0700
• SNOW COURSE	0800
∧ SNOW CREEP	0900

ACRES

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

PLATE 1:

DATA COLLECTION STATIONS FOR SUSITNA RIVER BASIN

DATE	NO.	REVISIONS	CH.	APP.	APP.

R&M CONSULTANTS, INC.

DEPARTMENT

PROJECT 052302

DATE 6-26-81

SCALE

DRAWING NO.

SHEET 1 OF 1

REV.

DRAWING No. ____ SHEET ____ OF ____ REV. ____

BRUNING 44-132 40973

APPLIED MECHANICS	ARCHITECTURAL	CIVIL	CONSTRUCTION	ELECTRICAL	GEOTECHNICAL	HYDRAULIC	MECHANICAL		DESIGNED	DRAWN	CHECKED