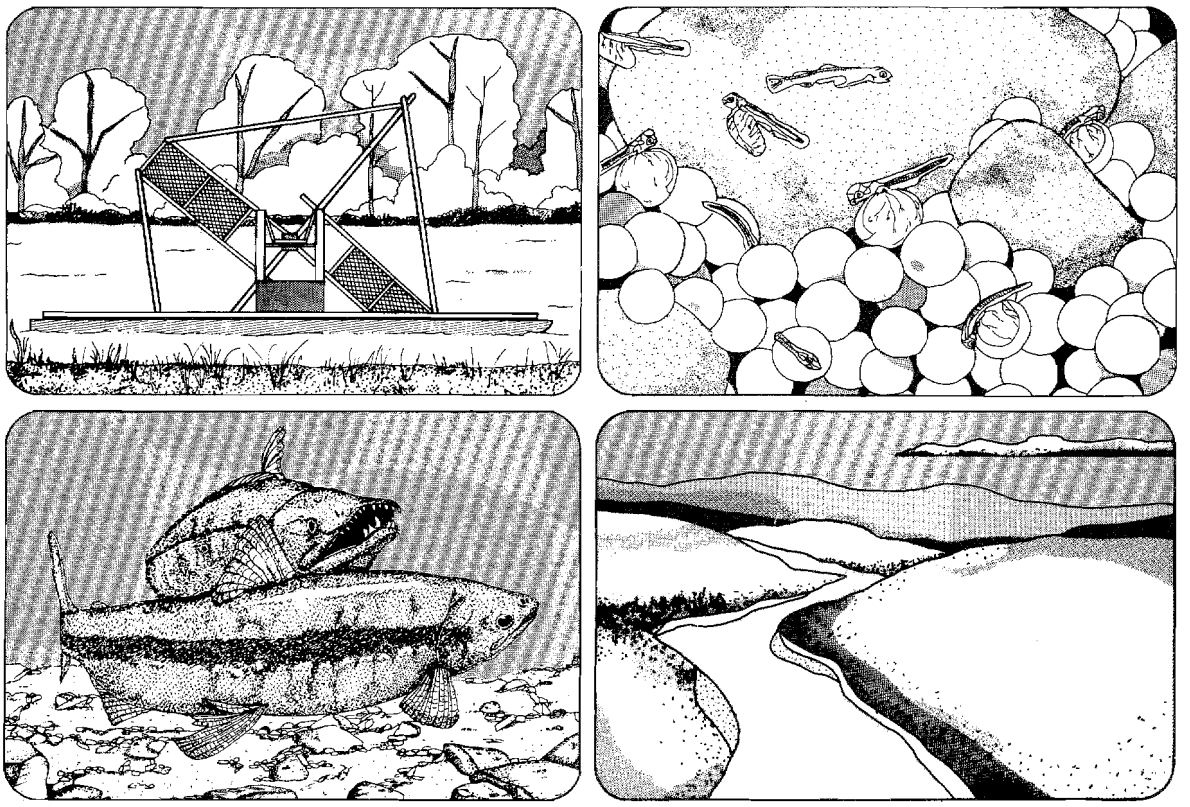
Thompson



REPORT NO. 3

AQUATIC HABITAT AND INSTREAM FLOW INVESTIGATIONS (MAY-OCTOBER 1983)

Chapter 2: Channel Geometry Investigations

ALASKA DEPARTMENT OF FISH AND GAME
SUSITNA HYDRO AQUATIC STUDIES REPORT SERIES

ALASKA DEPARTMENT OF FISH AND GAME
SUSITNA HYDRO AQUATIC STUDIES

REPORT NO. 3

AQUATIC HABITAT AND INSTREAM FLOW INVESTIGATIONS (MAY-OCTOBER 1983)

Chapter 2: Channel Geometry Investigations

Edited by:

Christopher C. Estes
and
Douglas S. Vincent-Lang

Prepared for:

ALASKA POWER AUTHORITY
334 W. FIFTH AVE.
ANCHORAGE, ALASKA 99501

PREFACE

This report is one of a series of reports prepared for the Alaska Power Authority (APA) by the Alaska Department of Fish and Game (ADF&G) to provide information to be used in evaluating the feasibility of the proposed Susitna Hydroelectric Project. The ADF&G Susitna Hydro Aquatic Studies program was initiated in November 1980. The five year study program was divided into three study sections: Adult Anadromous Fish Studies (AA), Resident and Juvenile Anadromous Studies (RJ), and Aquatic Habitat and Instream Flow Studies (AH). Reports prepared by the ADF&G prior to 1983 on this subject are available from the APA.

The information in this report summarizes the findings of the 1983 open water field season investigations. Beginning with the 1983 reports, all reports were sequentially numbered as part of the Alaska Department of Fish and Game Susitna Hydro Aquatic Studies Report Series.

TITLES IN THE 1983 SERIES

Report Number	Title	Publication Date
1	Adult Anadromous Fish Investigations: May - October 1983	April 1984
2	Resident and Juvenile Anadromous Fish Investigations: May - October 1983	July 1984
3	Aquatic Habitat and Instream Flow Investigations: May - October 1983	1984
4	Access and Transmission Corridor Aquatic Investigations: May - October 1983	1984

This report, "Aquatic Habitat and Instream Flow Investigations" is divided into two parts. Part I, the "Hydrologic and Water Quality Investigations", is a compilation of the physical and chemical data collected by th ADF&G Su Hydro Aquatic Studies team during 1983. These data are arranged by individual variables and geographic location for ease of access to user agencies. The combined data set represents the available physical habitat of the study area within the Cook Inlet to Oshetna River reach of the Susitna River. Part II, the "Adult Anadromous Fish Habitat Investigations", describes the subset of available habitat compiled in Part 1 that is utilized by adult anadromous fish studied in the middle and lower Susitna River (Cook Inlet to Devil Canyon) study area. The studies primarily emphasize the utilization of side slough and side channel habitats of the middle reach of the Susitna River for spawning (Figure A). It represents the first stage of development for an instream flow relationships analysis report which will be prepared by E.W. Trihey and Associates.

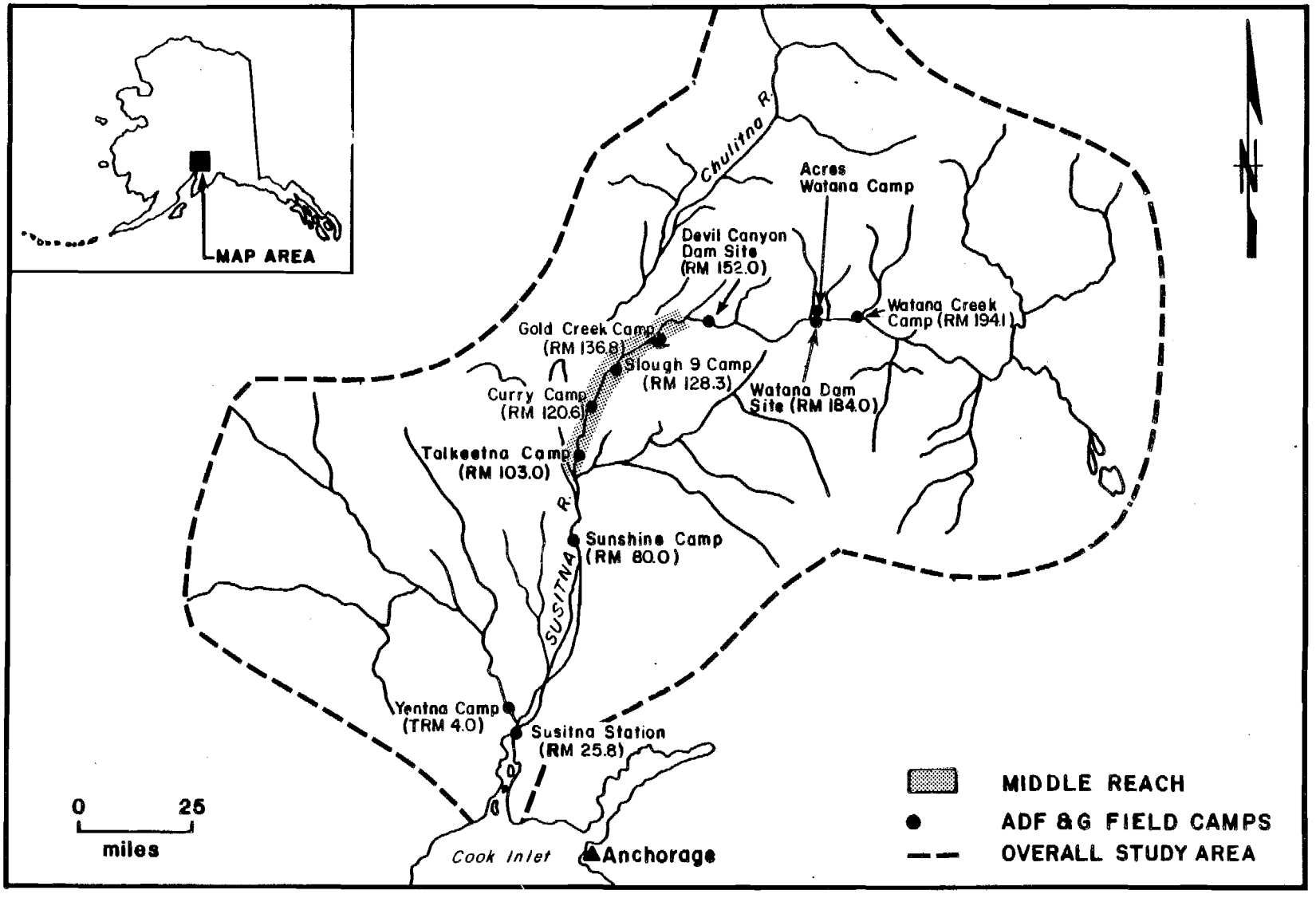


Figure A. Susitna River drainage basin.

CONTENTS OF REPORT NO. 3

Part One

Part Two

Questions concerning this and prior reports should be directed to:

Alaska Power Authority
334 W. 5th Avenue
Anchorage, Alaska 99501
Telephone (907) 276-0001

Channel Geometry Investigations of the Susitna River Basin

1984 Report No. 3, Chapter 2

by: Tim Quane, Isaac Queral, Theresa Keklak, and Don Seagren,

Alaska Department of Fish and Game
Susitna Hydro Aquatic Studies
2207 Spenard Rd.
Anchorage, Alaska 99503

ABSTRACT

Channel geometry data have been collected by the Alaska Department of Fish and Game Susitna Hydro Aquatic Studies Feasibility Study Team since 1982 at twenty-one side channel, upland and side slough and tributary habitats located in the Talkeetna to Devil Canyon reach of the Susitna River. These data have been used to describe the channel characteristics of these study sites. Thalweg profiles, depicting the overall gradient, extent of backwater, and substrate composition of the site, were constructed from the data for four side channel and thirteen upland and side sloughs. Cross section profiles, illustrating the cross sectional channel characteristics and wetted surface area as a response to stage changes, were also developed for selected stage/discharge monitoring stations within these study sites. These data are used by other project biologists and engineers to evaluate the impact of hydroelectric development on the Susitna River.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF TABLES

LIST OF TABLES

LIST OF APPENDIX A TABLES

LIST OF APPENDIX A TABLES (Continued)

LIST OF APPENDIX B TABLES

LIST OF APPENDIX B TABLES (Continued)

LIST OF APPENDIX B TABLES (Continued)

LIST OF APPENDIX B TABLES (Continued)

LIST OF APPENDIX B TABLES (Continued)

1.0 INTRODUCTION

1.1 Background

The Alaska Department of Fish and Game (ADF&G) Su Hydro Aquatic Feasibility Study Team has collected channel geometry data since 1981 in association with stage/discharge and fish habitat data. The primary emphasis of these studies has been to define the hydraulic conditions present within selected side slough habitats in the Talkeetna to Devil Canyon reach of the Susitna River and to determine how these hydraulic conditions influence fish habitat availability and utilization. Results of these investigations (ADF&G 1981, 1982) have been used to determine the mainstem discharges required to breach the heads of selected side sloughs, passage conditions present within selected side sloughs and side channels as a function of mainstem discharge, and spawning habitat availability and utilization.

1.2 Objectives

The primary objective of the FY84 open water field season (May 1 - October 15, 1983) channel geometry program was to collect channel geometry data in side channels, sloughs (side and upland), and tributaries to support fishery and hydraulic studies. Results of the channel geometry study are summarized in this report. Fishery and/or hydraulic studies utilizing these results will be presented in other chapters of this report and other reports.

The channel geometry program was divided into two studies; the thalweg profile study and the cross sectional profile study.

1.2.1 Thalweg Profile Study

The objectives of the 1983 open water field season thalweg data collection program were to develop thalweg profiles to:

1. evaluate the influence of mainstem discharge on passage within selected side channel, side slough, and upland slough study sites (Chapter 6, Report 3); and,

2. illustrate the influence that mainstem discharge, gradient, and channel morphology have on the formation of backwater within selected side channel, side slough, and upland slough study sites.

1.2.2 Cross Sectional Profile Study

The objectives of the 1983 open water field season cross section data collection program were to develop cross sectional profiles to:

1. evaluate the influence of mainstem discharge on specific passage conditions that exist within selected side channel and side slough study sites (Chapter 6, Report 3);

2. assist in determining the mainstem discharge required to breach the head portions of selected side channel and side slough habitats (Chapter 1, Report 3); and,

3. assist in describing the hydraulic conditions of each stage monitoring station at side channel, slough (upland and side) and tributary study locations (Chapter 1, Report 3; Chapter 7, Report 3).

2.0 METHODS

2.1 Site Selection

2.1.1 Thalweg Profile Surveys

During the 1983 open water field season thalweg profiles were surveyed at sites listed in Table 2-1 and Figure 2-1. Thalweg profiles were developed for all sites where passage conditions were evaluated.

2.1.2 Cross Sectional Profile Surveys

Cross sectional data were collected during the 1983 open water season at locations presented in Table 2-1 and Figure 2-1. Survey data were collected at each stage monitoring station (staff gage site) located in side channel, slough and tributary study sites. These data were collected to support the passage investigations study (Chapter 6, Report 3), the stage/discharge investigations study (Chapter 1, Report 3), the hydraulic modeling study (Chapter 7, Report 3), and the spawning habitat evaluation study (Chapter 7, Report 3).

2.2 Field Data Collection

2.2.1 Thalweg Data Collection Procedures

Thalweg survey data were collected along the entire length of the slough or side channel using the standard surveying techniques of differential leveling. Points of significant morphological features such as tops and bottoms of riffles and pools were noted as thalweg points. Information collected for each thalweg point included streambed elevation, water surface elevation, substrate, and distance between thalweg points. The specific techniques and procedures used to collect thalweg survey data are presented in the FY84 ADF&G Procedures Manual (ADF&G 1984). Substrate was assessed visually at each thalweg point using the classification system presented in Table 2-2.

2.2.2 Cross Sectional Data Collection Procedures

For most study sites, cross sectional profiles were developed using survey data collected at transects within selected study sites. Cross sectional information included streambed elevations, water surface elevations, and horizontal distance from bank headpin. The survey techniques and procedures used in the collection of cross sectional data are presented in the ADF&G FY84 Procedures Manual, (ADF&G 1984).

Cross sectional profiles of Indian River and Portage Creek were constructed from streamflow measurement data. Water surface elevations and horizontal distances were recorded at each flow measurement point along a transect. The streambed elevations were derived by subtracting the depth of the water column from the water surface elevation recorded at each flow measurement point. Flow measurement techniques and data collection techniques are presented in the ADF&G FY84 Procedures Manual (ADF&G 1984).

Table 2-1. Channel geometry study sites in side channel, side slough, and upland slough habitats of the Susitna River during the 1983 open water season.

Site	River Mile
Side Channels	
Mainstem 2 Side Channel	114.4
Side Channel 10	133.8
Upper Side Channel 11	136.2
Side Channel 21	140.6
Side Sloughs	
Whiskers Creek Slough	101.2
8	113.6
8A	125.3
9	128.3
9A	133.2
11	135.3
16	137.7
16B	137.9
20	140.1
21	141.8
22	144.3
Upland Sloughs	
6A	112.3
10	133.8
19	140.0
Tributaries	
Fourth of July Creek	131.1
Gold Creek	136.8
Indian River	138.6
Portage Creek	148.8

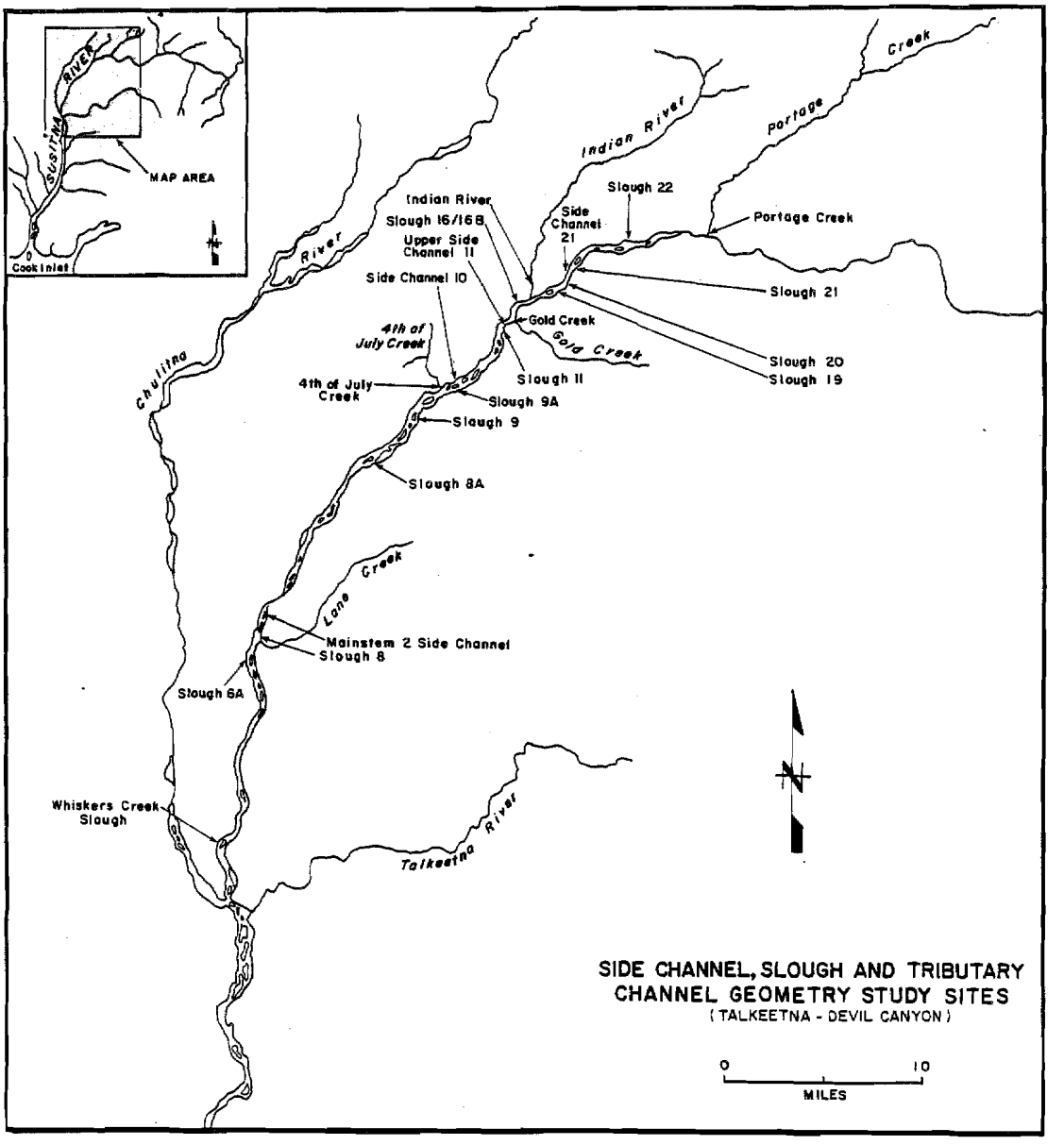


Figure 2-1. Locations of channel geometry study sites in side channel, slough, and tributary habitats of the Susitna River during the 1983 open water season.

Table 2-2. Substrate classification system used during the 1983 open water season

Silt	
Sand	
Fine Gravel	1/4 - 1 in
Gauge Gravel	1 - 3 in
Rubble	3 - 5 in
Cobble	5- 10 in
Boulder	10 in

2.3 Analytical Approach

2.3.1 Thalweg Profile Study Analysis

Thalweg profiles consist of a series of elevations of the deepest part of a stream channel and the corresponding water surface elevation determined for each thalweg point. Thalweg profiles transverse the entire length of the study site with the thalweg survey data plotted as streambed elevations and water surface elevations.

Water surface elevations determined from staff gage readings and the corresponding mainstem Susitna River discharge at Gold Creek (USGS gaging station 15292000) were also plotted on the thalweg figures. The water surface elevations illustrated represent the range of water surface elevations observed during the 1983 open water season.

Areas of backwater were determined from the water surface elevation profiles at various mainstem Susitna River discharges at Gold Creek (USGS gaging station 15292000) and the channel geometry of the study site.

Streambed gradients of the study sites are determined by dividing the difference between the thalweg (streambed) elevation of the most downstream portion of the thalweg profile (usually the mouth of the side channel or slough) and the thalweg elevation at the most upstream portion (head) by the length of the thalweg survey. The general substrate composition of the channel is illustrated beneath the thalweg profile.

Mainstem gradients corresponding to the study sites were determined by dividing the difference between the known elevation of the upstream Lower River Cross Section (LRX) and the elevation of the LRX just downstream of the study site by the distance between the points.

The general substrate compositon of the channel is illustrated beneath the thalweg profile.

Thalweg profiles are used to evaluate potential passage problems in the study sites as determined by the depth of water within the study channel corresponding to various mainstem Susitna River discharges.

2.3.2 Cross Sectional Profile Study Analysis

Cross sectional survey data consists of a series of elevations perpendicular to the stream channel, beginning from the left bank (looking upstream) continuing to the right bank, including every major change in channel topography. Data were graphed as streambed elevation versus horizontal distance. Included in the cross sectional profiles of side channels and sloughs (side and upland) are a series of water surface elevations determined from staff gage readings and the corresponding mainstem Susitna River discharge recorded at Gold Creek (USGS gaging station 15292000). Illustrated on the cross sectional profiles of tributary discharge stations are water surface elevations determined from staff gage readings and the corresponding streamflow of the

tributary. The water surface elevations illustrated on the cross sections represent the range of water surface elevations observed during the 1983 open water season.

Cross sectional profiles are used to support modeling studies and to assist in determining the hydraulic conditions governing the study site.

3.0 RESULTS

Thalweg and cross sectional profiles developed from survey data collected in the Talkeetna to Devil Canyon reach of the Susitna River are presented according to the following habitat types: side channel, slough (side and upland), and tributary.

3.1 Side Channel Habitats

Survey data used in the development of thalweg profiles were collected at four side channels in the Talkeetna to Devil Canyon reach of the Susitna River during the 1983 open water season. The thalweg data recorded are presented in Appendix Tables 2-A-1 to 2-A-5. The cross sectional survey data were collected at five side channels and are listed in Appendix Tables 2-B-1 to 2-B-17.

Thalweg profiles and cross sectional profiles produced for study sites in side channel habitats are presented below by site.

3.1.1 Mainstem 2 Side Channel (RM 114.4)

Mainstem 2 Side Channel (RM 114.4) located on the east bank of the Susitna River, is a Y-shaped channel approximately one mile long. Approximately 1,600 upstream of the mouth the northwest (left) channel is joined by the northeast (right) channel. Each channel is separated from the mainstem by a large vegetated island.

The thalweg profiles of Mainstem 2 Side Channel (Figure 2-2), were developed from survey data collected during a non-breaching mainstem discharge of 9,080 cfs and an estimated side channel flow of less than 1 cfs. Substrate in the northwest channel is primarily silt and sand in the backwater area, and gravel or rubble in the upper portion. Cobble and boulder substrate predominate in the northeast channel.

The backwater area in the northwest channel extends upstream at least 1,200 feet at mainstem discharges between 16,000 and 21,700 cfs (USGS gaging station 15292000). At a mainstem discharge of 31,700 cfs the backwater area in the northwest channel increases to approximately 2,000 feet upstream. The backwater area is reduced to approximately 800 feet into the northwest channel at a mainstem discharge of 9,080 cfs. In the northeast channel very little backwater effect has been observed over the full range of mainstem discharge occurring during 1983.

The gradient of the northwest and northeast channels is 10.2 and 12.5 ft/mi respectively. The corresponding mainstem Susitna River gradient is 9.2 ft/mi.

Cross sectional profiles developed for Mainstem 2 Side Channel are presented in Figure 2-3. Each of the seven sites corresponds to the location of a staff gage (Table 2-3).

3.1.2 Side Channel 10 (RM 133.8)

Side Channel 10 (RM 133.8) located on the west bank of the Susitna River, is approximately 0.5 mi long and is separated from the mainstem

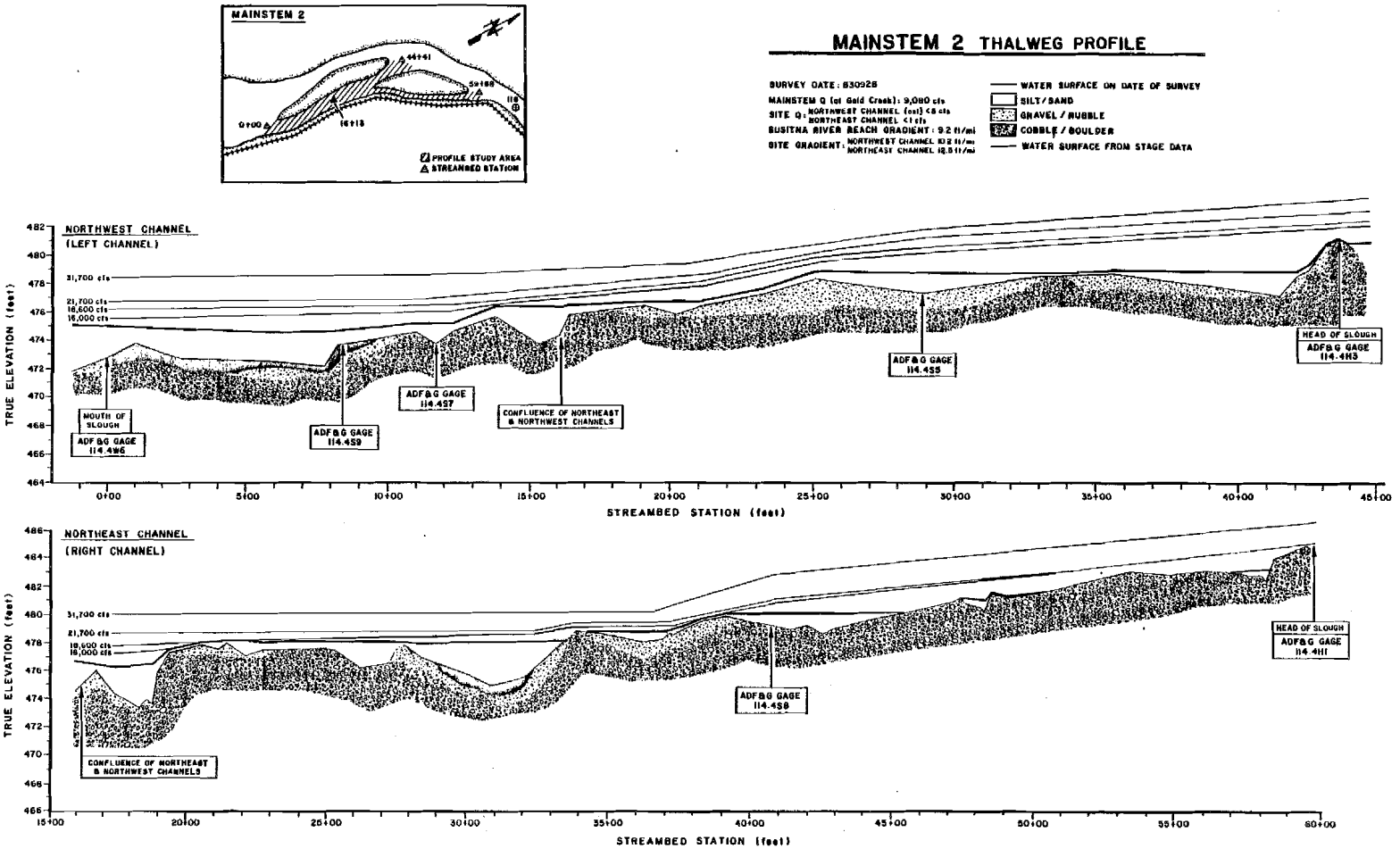
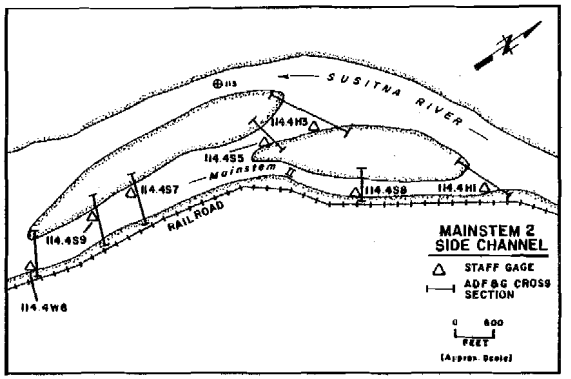
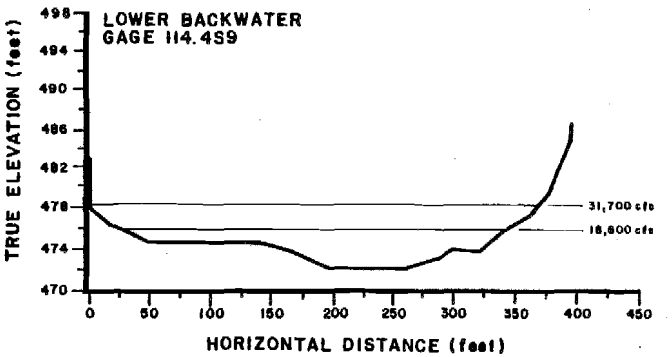
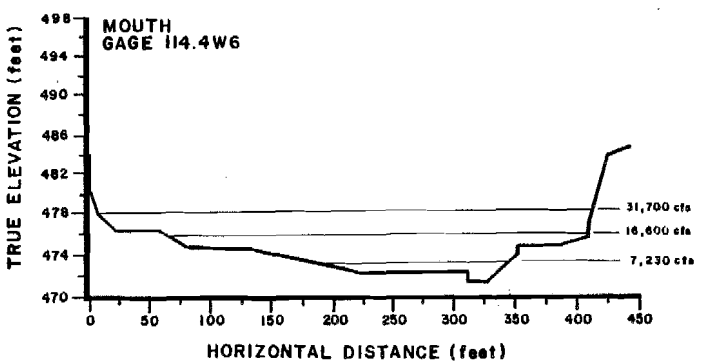


Figure 2-2. Streambed (thalweg) profile of Mainstem 2 Side Channel (RM 114.4) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).







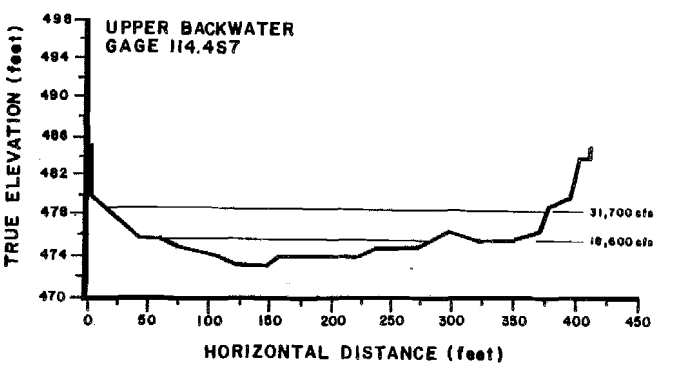
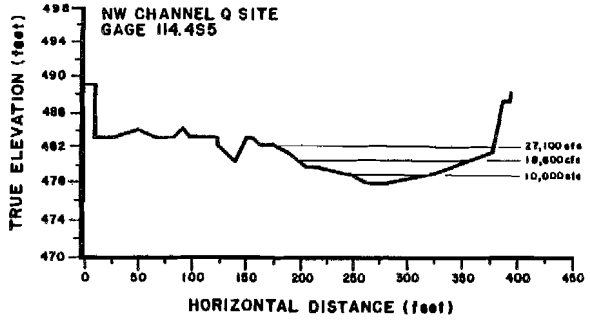
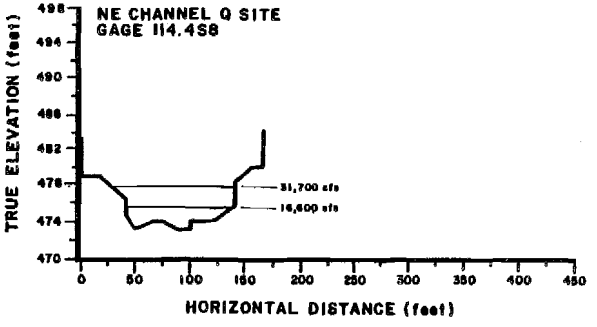
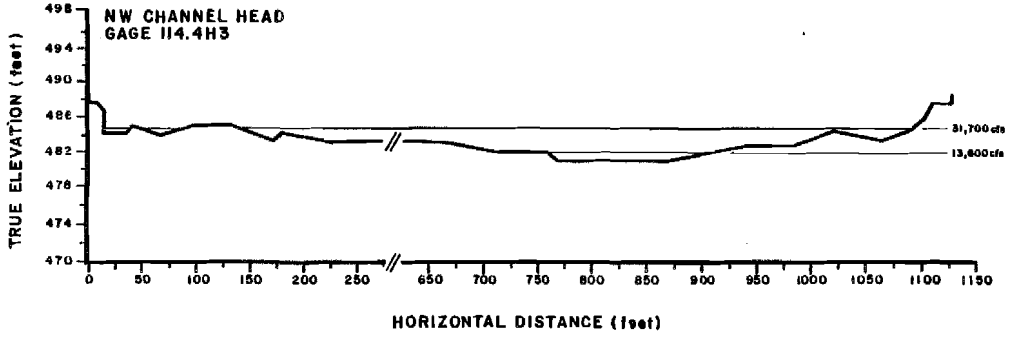


Figure 2-3. Cross sectional profiles of the staff gage sites in Mainstem 2 Side Channel (RM 114.4) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 15292000).







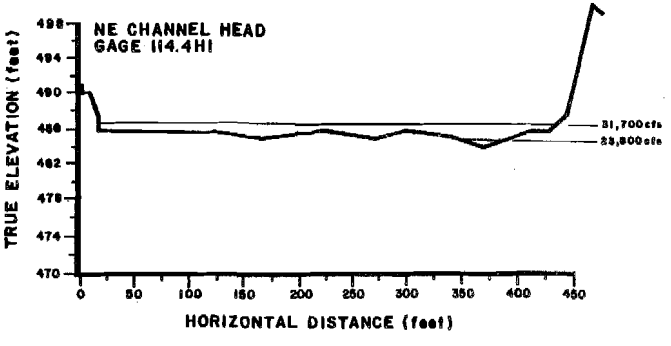


Figure 2-3 (continued). Cross sectional profiles of the staff gage sites in Mainstem 2 Side Channel (RM 114.4) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-3. Cross sectional profile sites in Mainstem 2 Side Channel (RM 114.4), 1983.

Site	Staff Gage	Date Obtained	Agency
Mouth	114.4W6	9/22/83	ADF&G
Lower Backwater	114.4S9	9/22/83	ADF&G
Upper Backwater	114.4S7	9/22/83	ADF&G
NE Channel Discharge Station	114.4S8	7/04.83	ADF&G
NW Channel Discharge Station	114.4S5	8/06/83	ADF&G
NE Channel Head	114.4H1	9/23/83	ADF&G
NW Channel Head	114.4H3	9/24/83	ADF&G

by a large gravel bar. Slough 10 enters Side Channel 10 approximately 379 feet upstream from the mouth of the side channel.

Survey data collected for the development of the thalweg profile (Figure 2-4) of Side Channel 10 was recorded on two occasions both during non-breaching mainstem discharges. Survey data for stations -3+20 to 3+79 were recorded at a Susitna River discharge of 18,600 cfs (USGS gaging station 15292000). Stations 5+62 to 26+87 were surveyed during a mainstem discharge of 12,200 cfs. Side Channel 10 flow was estimated to be less than 1 cfs on both survey dates. The backwater pool area illustrated in the thalweg profile consists of a thick layer of silt and sand. Alternating pools and riffles occur upstream of the backwater area. Substrate is primarily cobble/boulder or gravel/rubble with silt deposited in the pool areas.

The backwater area extends approximately 1,200 feet upstream of the mouth area at mainstem discharge greater than 18,600 cfs. At a mainstem discharge of approximately 12,200 cfs, a reduced area of backwater occurs extending upstream approximately 400 ft above the mouth. The gradient of Side Channel 10 is approximately 22.3 ft/mi, while the gradient of the adjacent mainstem area is 9.0 ft/mi.

During the 1983 season, cross sectional data were collected at six locations in Side Channel 10 (Table 2-4). The surveys which were conducted in support of the physical habitat modeling study are presented in Chapter 7. Cross sections of the mouth and head of Side Channel 10 are presented in Figure 2-5.

3.1.3 Upper Side Channel 11 (RM 136.2)

Upper Side Channel 11 (RM 136.2) located on the east bank of the Susitna River, is a single channel approximately 0.4 mi in length and is separated from the mainstem by a well vegetated island. Approximately 1,400 feet upstream from the mouth, Upper Side Channel 11 is connected with the head of Slough 11.

The backwater area in upper Side Channel 11 extends approximately 450 to 500 ft into the side channel with corresponding mainstem discharges of 11,400 to 31,700 cfs (Figure 2-6). Thalweg survey data were collected during a breaching mainstem discharge of 18,900 cfs and an estimated side channel flow of 55 cfs.

Above the backwater area, Upper Side Channel 11 consists of a series of long riffles and pools. Silt and sand deposits occur in the backwater and pool areas. Cobble and boulder substrate predominate in the riffle areas.

The gradient of Upper Side Channel 11 is approximately 23.6 ft/mi and the corresponding mainstem gradient is 16. ft/mi.

Cross sectional survey data were collected at five staff gage locations in Upper Side Channel 11 (Table 2-5). Cross sections developed from data collected at the head and mouth gages are presented in Figure 2-7.

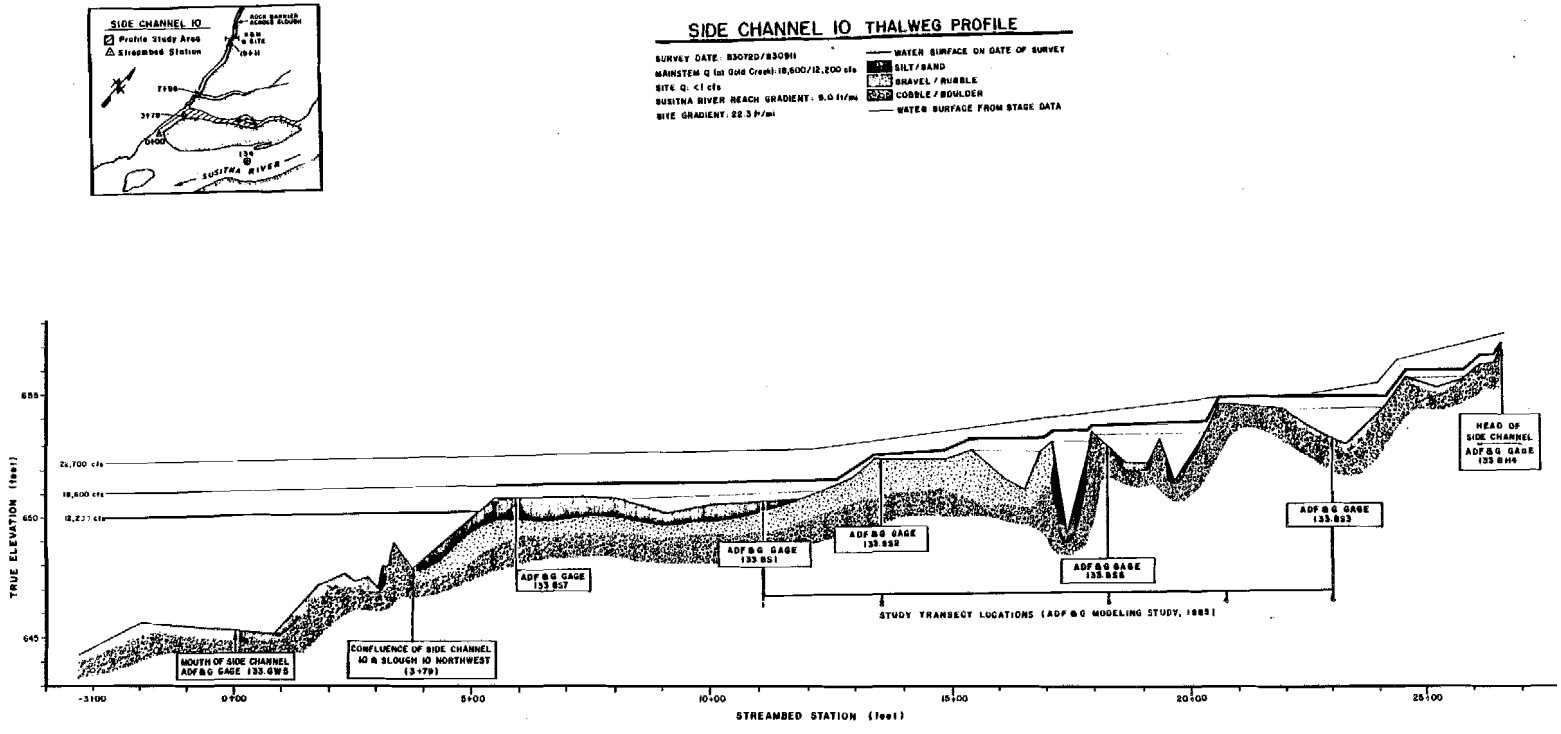
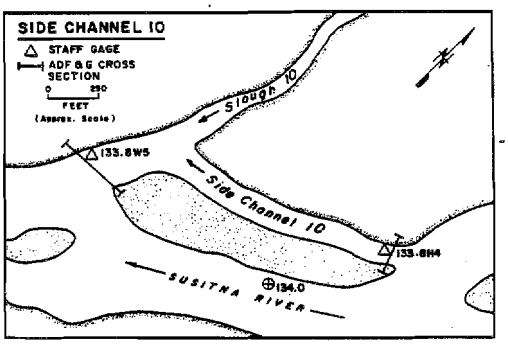


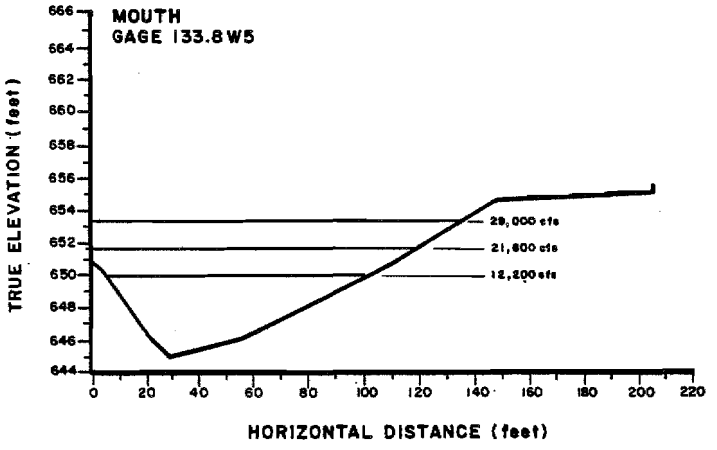
Figure 2-4. Streambed (thalweg) profile of Side Channel 10 (RM 133.8) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-4. Cross sectional profile sites in Side Channel 10 (RM 133.8), 1983.

Site	Staff Gage	Date Obtained	Agency
Mouth	133.8W5	7/17/83	ADF&G
ADF&G Model[1] Transect 1	133.8S1	1983	ADF&G
ADF&G Model[1] Transect 2	133.8S2	1983	ADF&G
ADF&G Model[1] Transect 3	133.8S6	1983	ADF&G
ADF&G Model[1] Transect 5	133.8S3	1983	ADF&G
Head	133.8H4	9/11/83	ADF&G

[1] Cross section presented in Chapter 7.





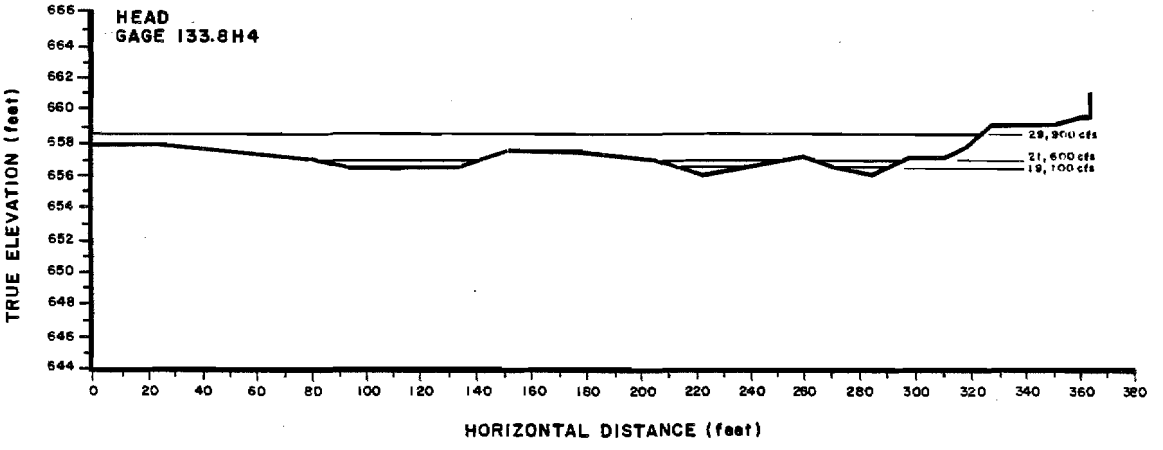


Figure 2-5. Cross sectional profiles of the staff gage sites in Side Channel 10 (RM 133.8) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 152900)

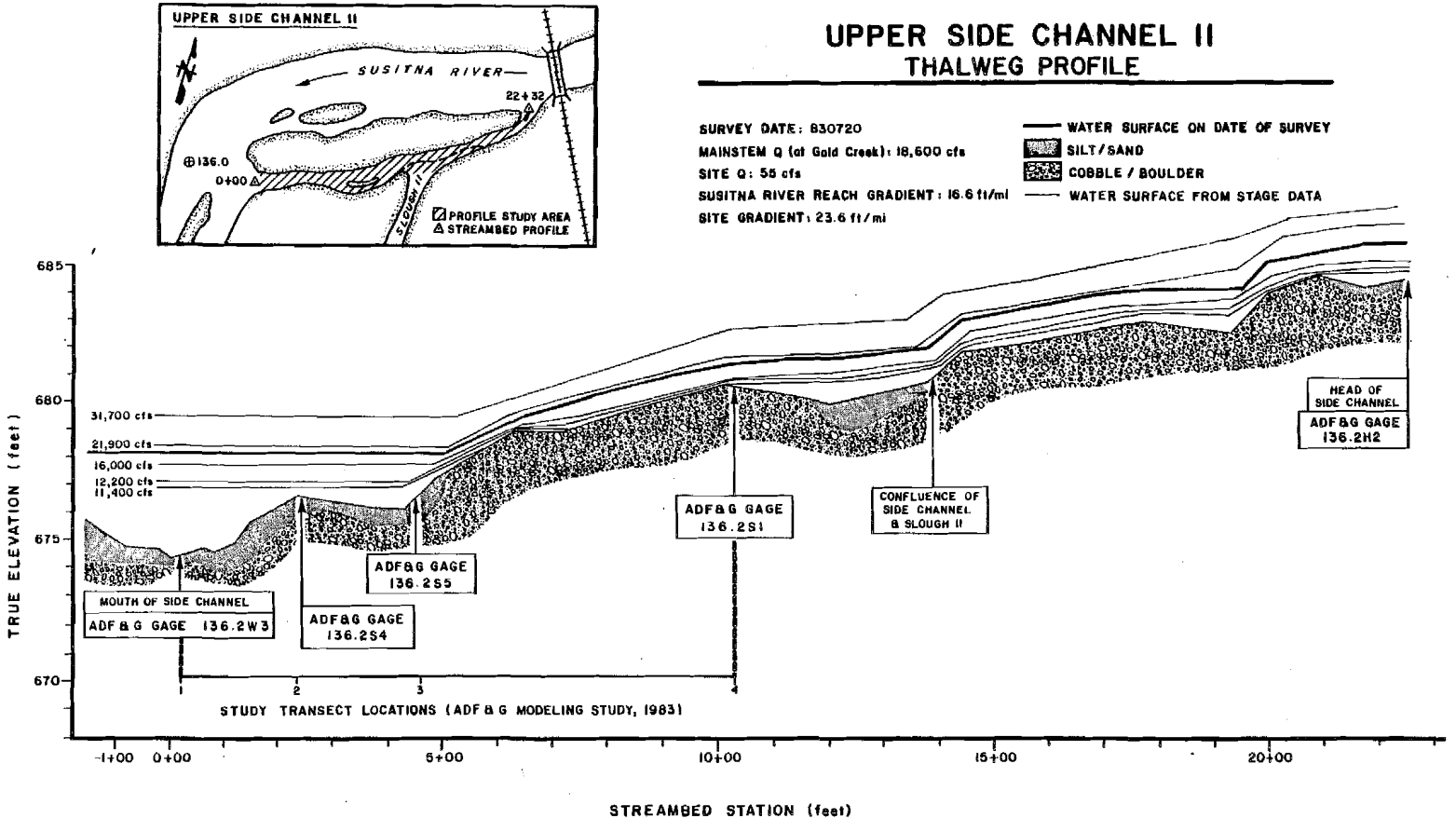
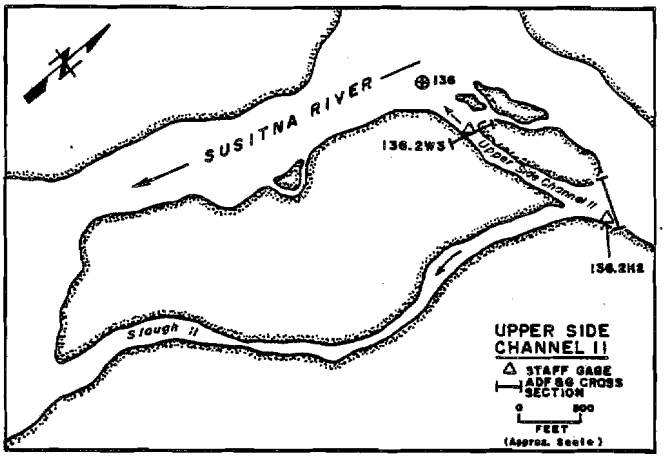


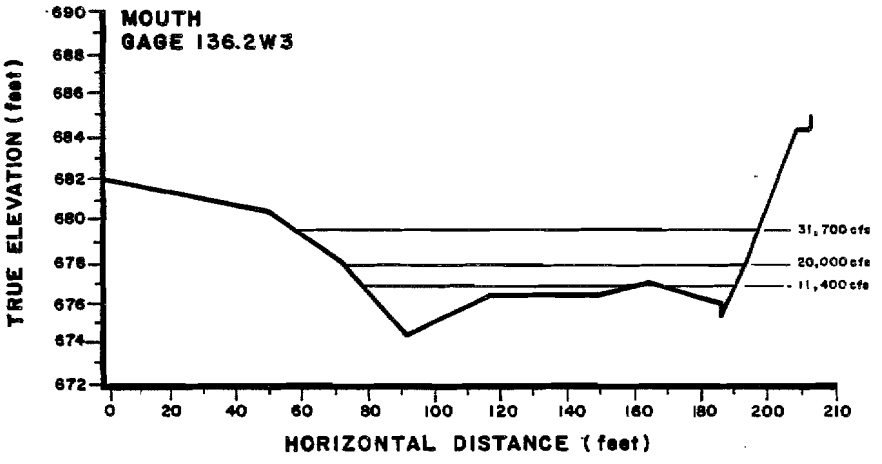
Figure 2-6. Streambed (thalweg) profile of Upper Side Channel 11 (RM 136.2) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-5. Cross sectional profile sites in Upper Side Channel 11 (RM 136.2), 1983.

Site	Staff Gage	Date Obtained	Agency
Mouth, ADF&G Model Transect 1	136.2W3	7/20/83	ADF&G
ADF&G Model[1] Transect 2	136.2S4	1983	ADF&G
ADF&G Model[1] Transect 3	136.2S5	1983	ADF&G
ADF&G Model[1] Transect 4 Q Site	136.2S1	1983	ADF&G
Head	136.2H2	7/18/83	ADF&G

[1] Cross section presented in Chapter 7.





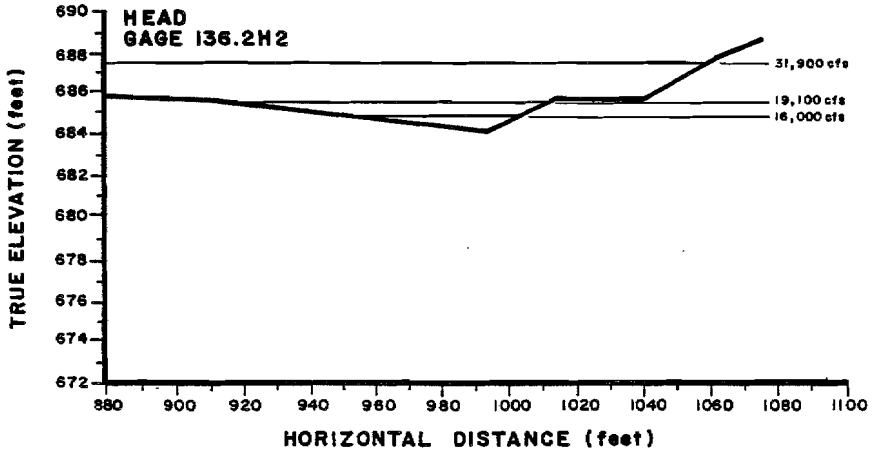


Figure 2-7. Cross sectional profiles of the staff gage sites in Upper Side Channel 11 (RM 136.2) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Cross sectional profiles of the habitat modeling locations are presented in Chapter 7. The cross section of Upper Side Channel 11 gage 136.2H2 is restricted to that portion of the channel which is generally breached during the open water season.

3.1.4 Side Channel 21 (RM 140.6)

Side Channel 21 (RM 140.6) is a relatively straight, single channel, approximately 0.9 mi long and is located on the south bank of the Susitna River. It is separated from the mainstem by a series of well vegetated islands and gravel bars. At sufficient mainstem discharge, turbid mainstem water enters the side channel through several intermittent channels. The mouth of Side Slough 21 flows directly into the upper portion of Side Channel 21.

The thalweg profile of Side Channel 21 (Figure 2-8) shows that in general, pools are located in the mouth and head areas. Beginning from station -50+00, the backwater area extends approximately 1500 ft into the side channel at mainstem discharges exceeding 16,000 cfs. The thalweg figure was developed from data recorded during a non-breaching mainstem discharge of 7,800 cfs and an estimated side channel flow of 5 cfs. Substrate in Side Channel 21 is predominantly cobble/boulder with silt/sand deposits in the mouth and pool areas.

The gradient of Side Channel 21 is 12.4 ft/mi and the corresponding mainstem gradient is 16.6 ft/mi.

Cross sectional data was recorded at 10 sites within Side Channel 21 during the 1983 open water season (Table 2-6). Cross sections corresponding to the locations of staff gages are presented in Figure 2-9. Cross sections developed in support of the habitat modeling study are presented in Chapter 7.

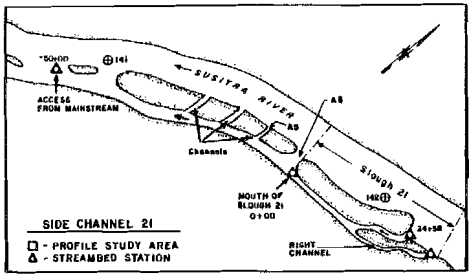
3.2 Side Slough Habitats

Survey data necessary for the development of thalweg profiles were collected at ten side sloughs in the Talkeetna to Devil Canyon reach of the Susitna River. The thalweg data recorded are listed in Appendix Tables 2-A-6 to 2-A-13. Cross sectional surveys were conducted at nine side sloughs. The cross section data are presented in Appendix Tables 2-B-18 to 2-B-49.

Thalweg profiles and cross sectional profiles produced for study sites in side slough habitats are presented below by site.

3.2.1 Whiskers Creek Side Slough (RM 101.2)

Whiskers Creek Side Slough (RM 101.2) located on the west bank of the Susitna River, is a single channel approximately 0.6 mile long. The slough is separated from the mainstem by a well vegetated island. Whiskers Creek enters the slough approximately 1,200 feet upstream of the slough mouth.



SIDE CHANNEL 21
THALWEG PROFILE

SURVEY DATE: 821014
MAINSTEM Q (at Gold Creek): 7,800 cfs
SITE Q: 5 cfs
SUSITNA RIVER REACH GRADIENT: 16.6 ft/mi
SITE GRADIENT: 12.4 ft/mi

WATER SURFACE ON DATE OF SURVEY
SILT/SAND
COBBLE / BOULDER
WATER SURFACE FROM STAGE DATA

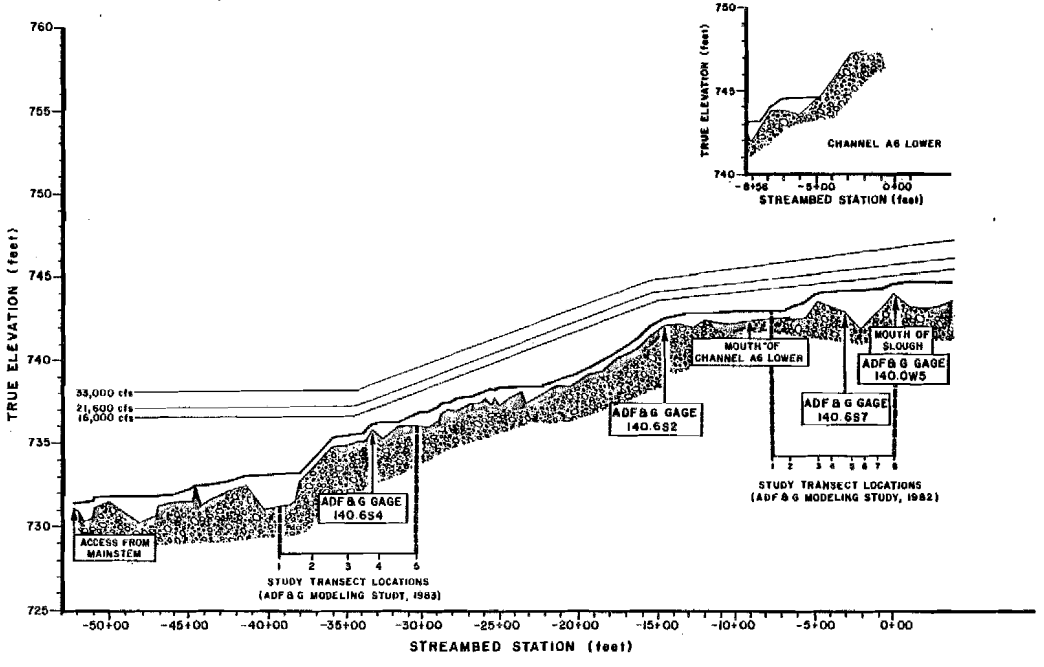


Figure 2-8. Streambed (thalweg) profile of Side Channel 21 (RM 140.6) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-6. Cross sectional profile sites in Side Channel 21 (RM 140.6), 1983.

Site	Staff Gage	Date Obtained	Agency
Mouth	140.6W1	9/12/83	ADF&G
ADF&G Model[1] Transect 1	---	1983[2]	ADF&G
ADF&G Model[1] Transect 2	---	1983[2]	ADF&G
ADF&G Model[1] Transect 3	---	1983[2]	ADF&G
ADF&G Model, Lower Q Site Transect 4	140.6S4	1983[2]	ADF&G
ADF&G Model[1] Transect 5	---	1983[2]	ADF&G
Mid-Channel	140.6S2	9/13/83	ADF&G
Channel A5 Head	140.6S3	7/11/82	R&M Consultants
Upper Q Site Station	140.6S7	9/13/83	ADF&G
Channel A6 Head	140.6H5	7/11/82	R&M Consultants

[1] Cross section presented in Chapter 7.

[2] No staff gage station located at this site.

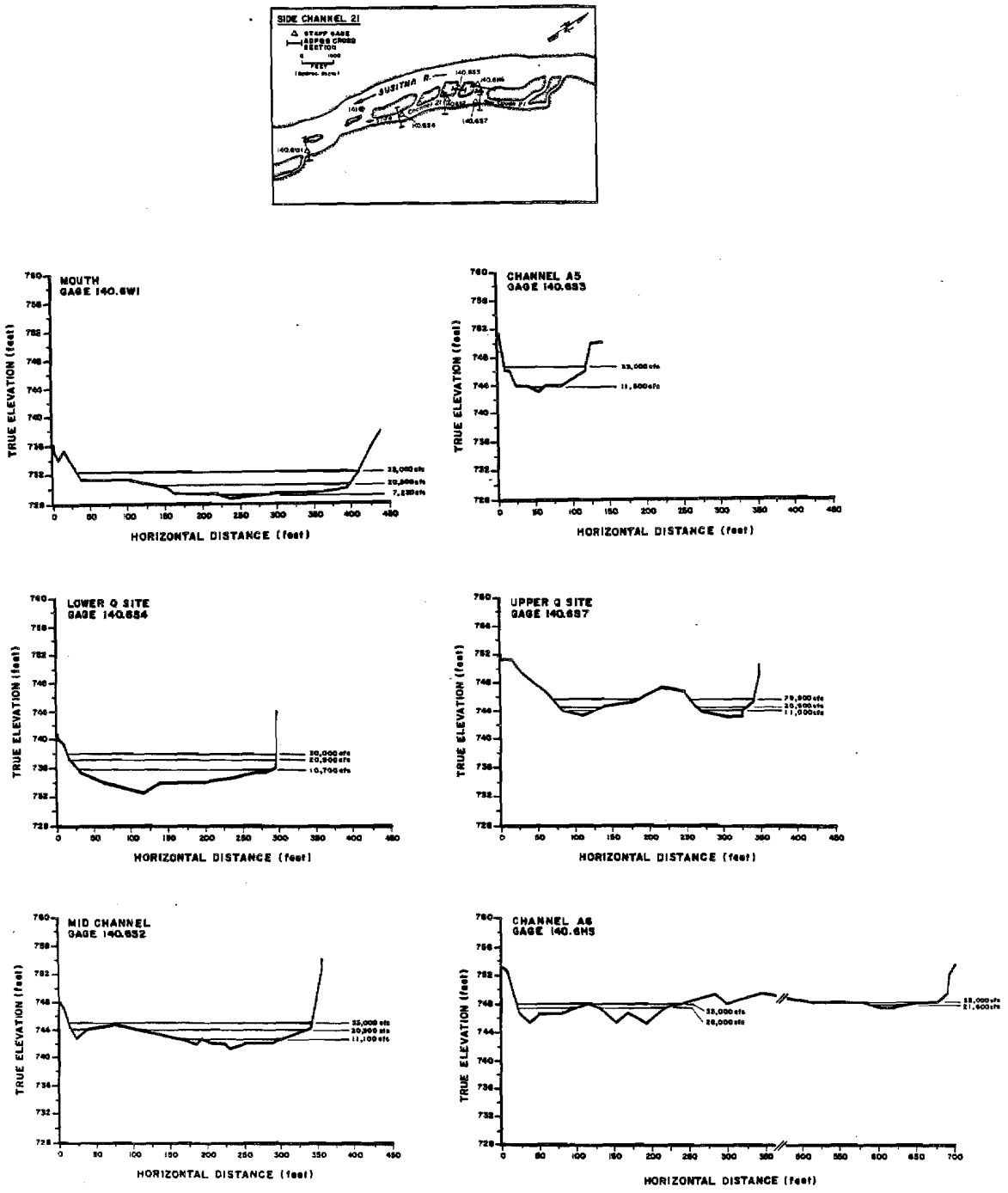


Figure 2-9. Cross sectional profiles of the staff gage sites in Side Channel 21 (RM 140.6) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200)

A backwater pool, illustrated in the thalweg profile (Figure 2-10) extends at least 500 feet into the channel at mainstem discharges greater than 12,200 cfs. At a mainstem discharge exceeding 24,000 cfs the backwater area increases to at least 1,000 feet. The thalweg figure was developed from data recorded during a non-breaching mainstem discharge of 9,080 cfs and an estimated slough flow of less than 2 cfs. Substrate in the lower slough is primarily gravel, while rubble/cobble predominate in the upper slough areas.

The gradient of Whiskers Creek Side Slough is approximately 9.2 ft/mi while the adjacent mainstem gradient is 4.9 ft/mi.

Cross sectional survey data were collected at three staff gage locations in Whiskers Creek Side Slough (Table 2-7). The resulting cross sections are presented in Figure 2-11.

3.2.2 Side Slough 8 (RM 113.6)

Side Slough 8 (RM 113.6), known also as Lane Creek Slough, is located on the east bank of the Susitna River. The slough is approximately 0.4 mile long and is separated from the mainstem by a well vegetated gravel bar. An area of backwater occurs at the mouth during periods of moderate to high mainstem flows. However, no thalweg or stage data were recorded to determine the extent of the backwater area and corresponding mainstem discharges.

During the 1983 open water season cross sectional survey data were recorded at three staff gage locations and at a site located below the mouth (Table 2-8). The cross sectional profiles are presented in Figure 2-12.

3.2.3 Side Slough 8A (RM 126.2)

Side Slough 8A (RM 126.2) is located on the east bank of the Susitna River. The slough is approximately two miles long and is separated from the mainstem by a large vegetated gravel bar. Approximately 2,500 ft upstream of the mouth, the slough divides into two forks: the northeast (right) channel and the northwest (left) channel. A beaver dam is located upstream approximately 2,000 feet from the mouth. A series of beaver dams are also found upstream in the northeast channel.

The backwater area in Side Slough 8A extends approximately 1,000 feet into the slough from the mouth during mainstem discharges as low as 10,000 cfs (Figure 2-13). At mainstem discharges exceeding 31,000 cfs backwater extends at least 1,400 ft. upstream from the mouth. The thalweg profile extends from the mouth to the head of the northeast channel. Data for stations -3+74 to 38+23 were collected at a non-breaching mainstem discharge of 6,750 cfs with an estimated slough flow of 20 cfs. Stations 38+73 to 106+63 were surveyed during a non-breaching mainstem discharge of 7,110 cfs and an estimated slough flow of 20 cfs. Thalweg survey data were not collected in the northwest (left) channel.

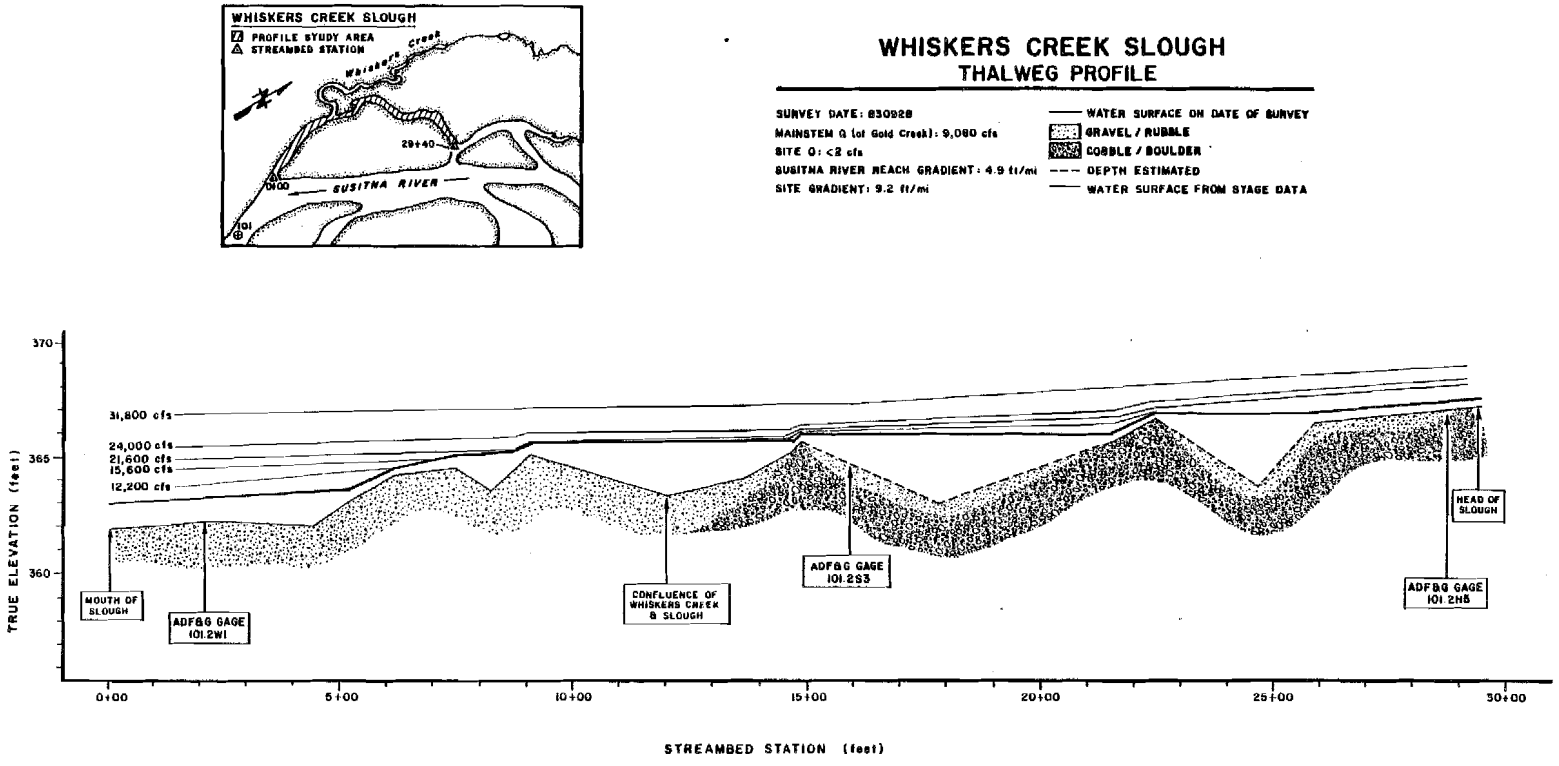
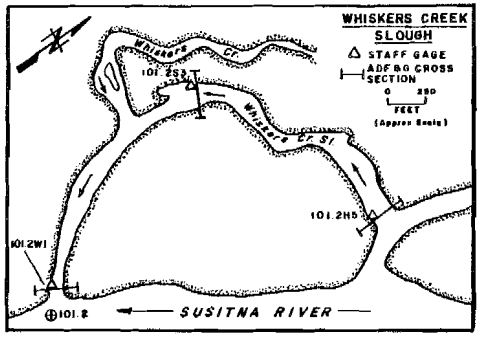
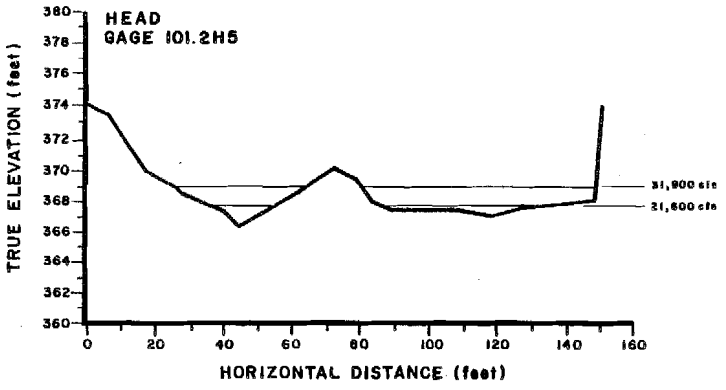


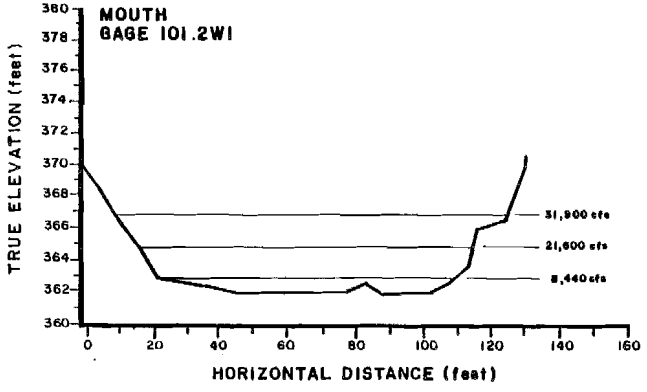
Figure 2-10. Streambed (thalweg) profile of Whiskers Creek Side Slough (RM 101.2) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-7. Cross sectional profile sites in Whiskers Creek Side Slough (RM 101.2), 1983.

Site	Staff Gage	Date Obtained	Agency
Mouth	101.2W1	9/11/83	ADF&G
Discharge Station	101.2S3	7/03/83	ADF&G
Head	101.2H5	7/03/83	ADF&G







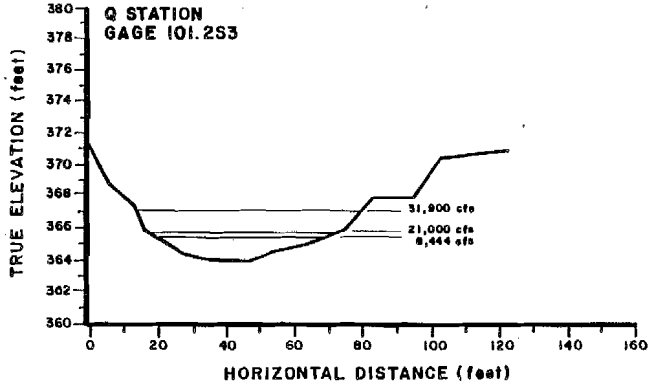


Figure 2-11. Cross sectional profiles of the staff gage sites in Whiskers Creek Side Slough (RM 101.2) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-8. Cross sectional profile sites in Side Slough 8 (RM 113.6), 1983.

Site	Staff Gage	Date Obtained	Agency
Below Mouth	---[1]	9/12/83	ADF&G
Mouth	113.6W8	7/05/83	ADF&G
Discharge Station	113.6S2	7/05/83	ADF&G
Head	113.6H4	7/05/83	ADF&G

[1] No staff gage station located at this site.

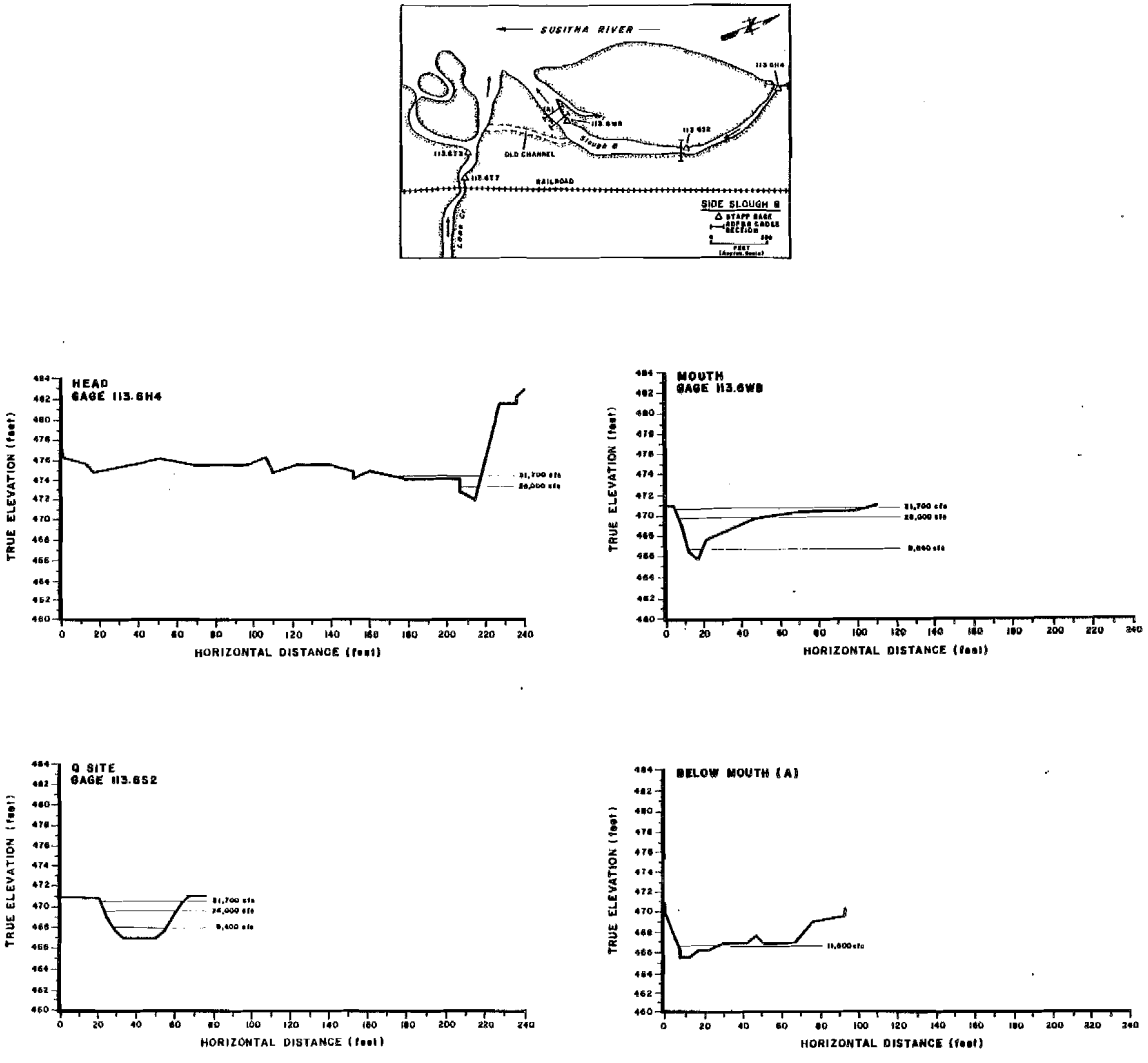


Figure 2-12. Cross sectional profiles of the staff gage sites in Side Slough 8 (RM 113.6) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

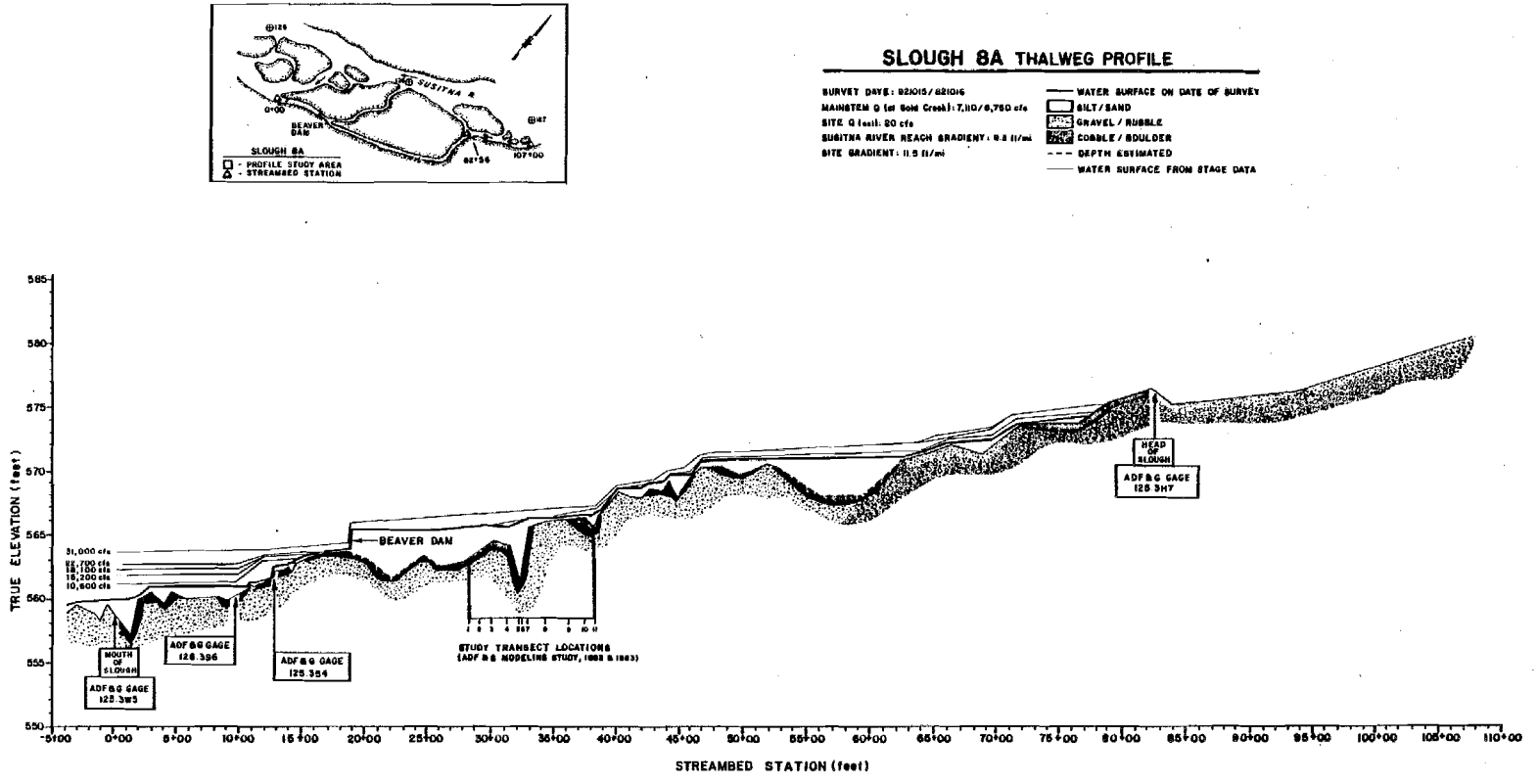


Figure 2-13. Streambed (thalweg) profile of Side Slough 8A (RM 125.3) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Gravel and rubble are the predominant substrate types in the lower slough and cobble/boulder predominate in the upper slough areas. The backwater area and the beaver dam pools are primarily silt and sand. Substrate in the northwest fork is mainly rubble/cobble.

The gradient of the slough is 11.5 ft/mi while the corresponding mainstem gradient is 9.2 ft/mi.

Cross sectional data were collected at seventeen locations in Side Slough 8A during the 1983 open water season (Table 2-9). The surveys which were conducted to support the modeling study are presented in Chapter 7. Cross sections surveyed at six staff gage locations are presented in Figure 2-14.

3.2.4 Side Slough 9 (RM 128.3)

Side Slough 9 is approximately 1.2 miles long and is located on the east bank of the Susitna River. The slough is separated from the mainstem by a large vegetated island. Two small tributaries located approximately 500 and 3,000 ft upstream from the mouth flow into the slough. Near the head, Slough 9 is joined by a small upland slough referred to as Slough 9B.

Data for the development of the thalweg profile of Slough 9 (Figure 2-15) were collected on three occasions. Stations -8+76 to 14+32 were surveyed during a mainstem discharge of 12,500 cfs and an estimated slough flow of 8 cfs. Data were collected at stations 16+47 to 33+57 at a mainstem discharge of 14,400 and an estimated slough flow of 8 cfs. The remaining stations were surveyed at a mainstem discharge of 7,950 and an estimated slough flow of 8 cfs.

The backwater area extends at least 500 feet upstream at mainstem discharges exceeding 15,200 cfs. At higher discharges the backwater area is increased. Substrate in the backwater areas is primarily composed of shifting sand or silt bars. Upstream of the backwater area the substrate is primarily gravel/rubble and cobble/boulder with silt deposits in the pool areas.

The gradient of Slough 9 is 13.8 ft/mi while the corresponding mainstem gradient is 8.7 ft/mi.

Cross sectional survey data were collected at ten locations in Slough 9 (Table 2-10). Cross sections of habitat modeling transects are presented in Chapter 7. The cross sections corresponding to three staff gage locations are presented in Figure 2-16.

3.2.5 Side Slough 9A (RM 133.2)

Side Slough 9A (RM 133.2) is approximately 3,300 ft long and is located on the east bank of the Susitna River. The slough is separated from the mainstem by a large vegetated island.

The thalweg profile data of Slough 9A were collected during a non-breaching mainstem discharge of 9,400 cfs and an estimated slough flow

Table 2-9. Cross sectional profile sites in Side Slough 8A (RM 125.3), 1983.

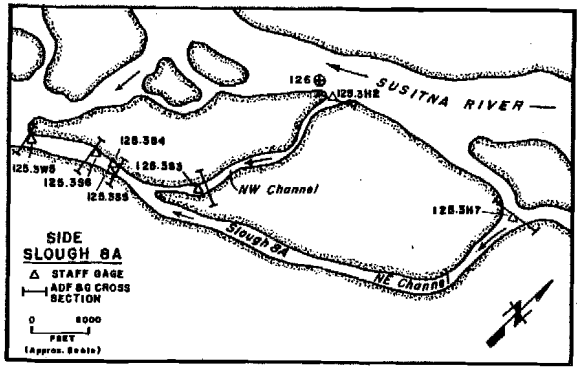
Site	Staff Gage	Date Obtained	Agency
Mouth	125.3W5	10/19/83	ADF&G
Upper Backwater	125.3S6	7/18/83	ADF&G
Lower Slough 8A Discharge Station	125.3S4	7/18/83	ADF&G
NW Channel Q Site	125.3S3	7/18/83	ADF&G
ADF&G Model[1] Transect 1	---[2]	1983	ADF&G
ADF&G Model[1] Transect 2	---[2]	1983	ADF&G
ADF&G Model[1] Transect 3	---[2]	1983	ADF&G
ADF&G Model[1] Transect 4	---[2]	1983	ADF&G
ADF&G Model[1] Transect 5	---[2]	1983	ADF&G
ADF&G Model[1] Transect 6	---[2]	1983	ADF&G
ADF&G Model[1] Transect 7	---[2]	1983	ADF&G
ADF&G Model[1] Transect 8	---[2]	1983	ADF&G
ADF&G Model[1] Transect 9	---[2]	1983	ADF&G
ADF&G Model[1] Transect 10	---[2]	1983	ADF&G

Table 2-9 (Continued).

Site	Staff Gage	Date Obtained	Agency
ADF&G Model[1] Transect 11	---[2]	1983	ADF&G
NE Channel Head	125.3H7	8/4/83	ADF&G
NW Channel Head	125.3S3	7/18/83	ADF&G

[1] Cross section presented in Chapter 7.

[2] No staff gage station located at this site.



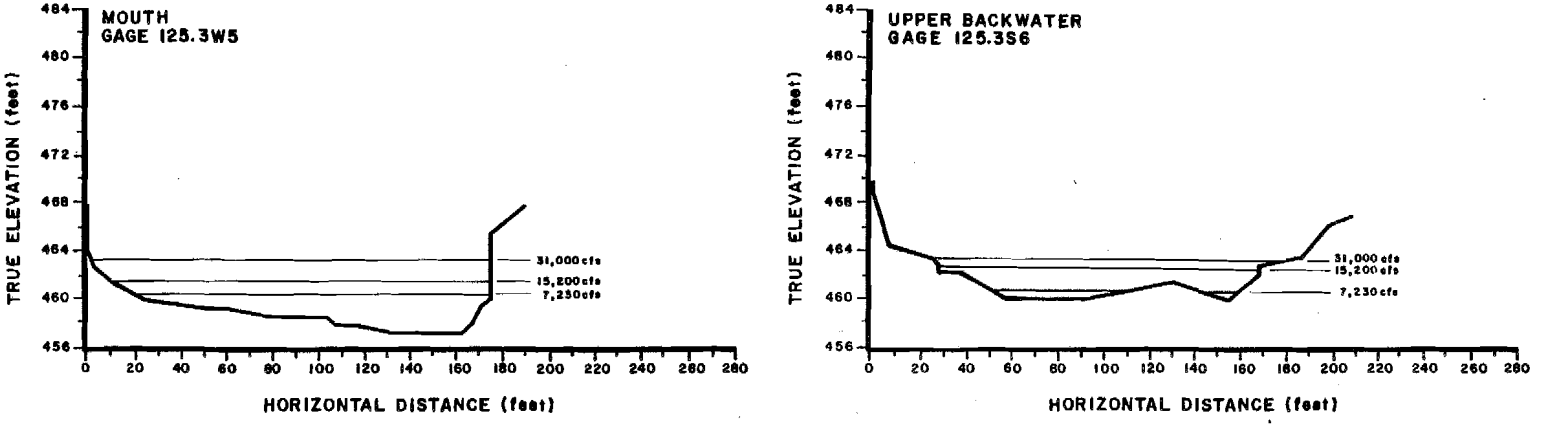
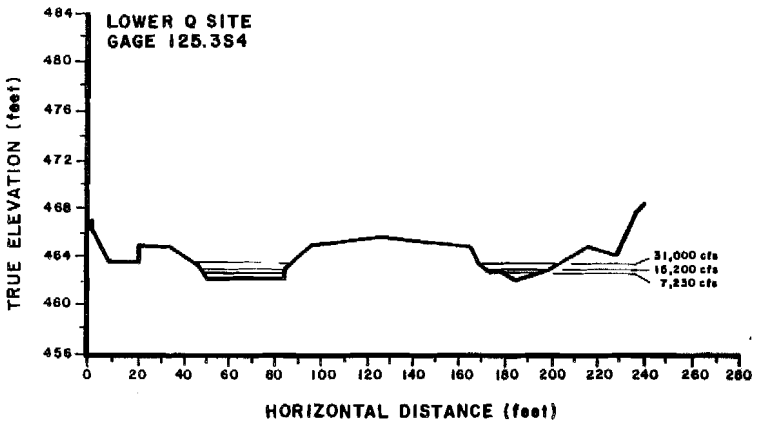
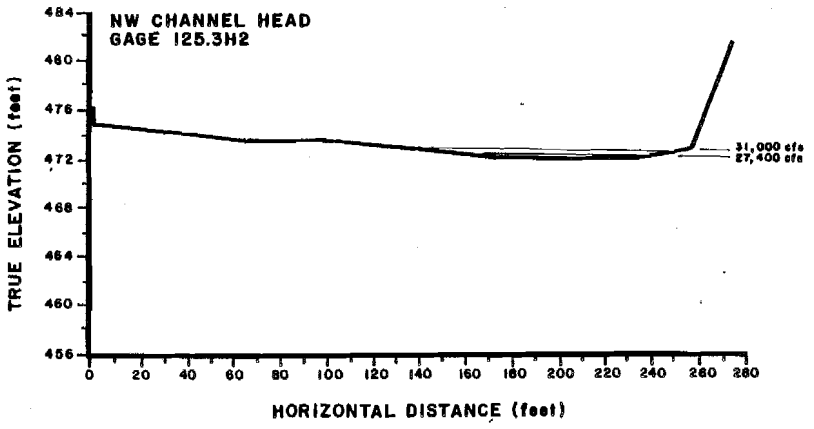
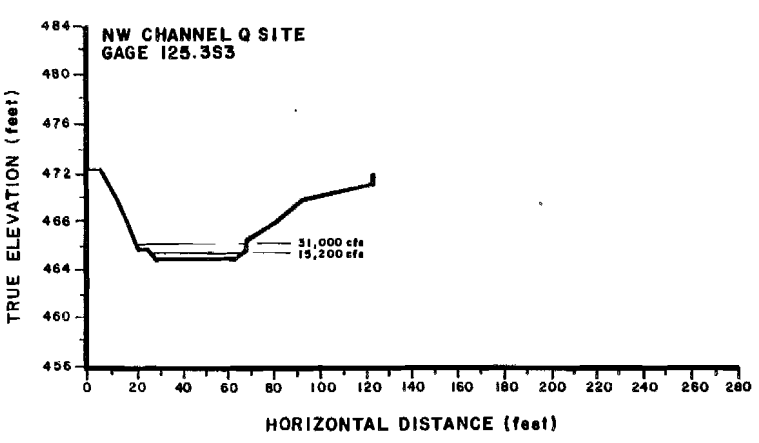


Figure 2-14. Cross sectional profiles of the staff gage sites in Side Slough 8A (RM 125.3) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).







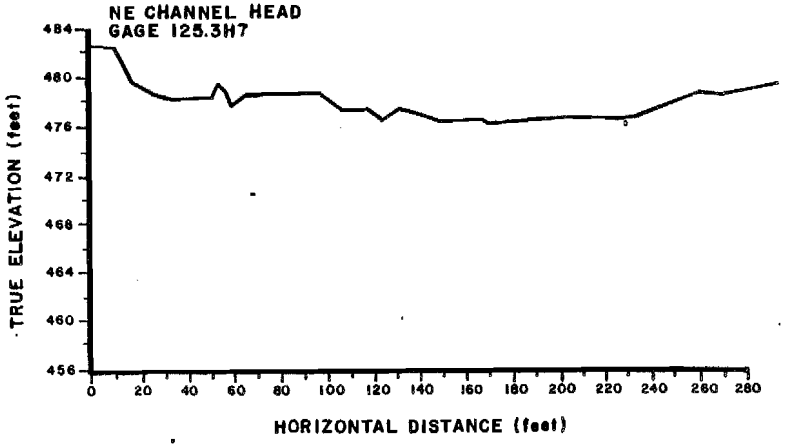
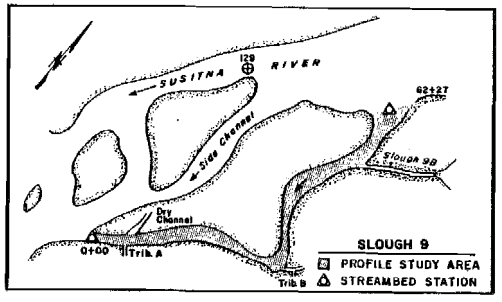


Figure 2-14 (continued). Cross sectional profiles of the staff gage sites in Side Slough 8A (RM 125.3) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).



SLOUGH 9 THALWEG PROFILE

SURVEY DATE: 820824/820812/821012
MAINSTEM Q (at Gold Creek): 12,500/14,400/7,950 cfs
SITE Q (est): 8 cfs
SUSITNA RIVER REACH GRADIENT: 8.7 ft/mi
SITE GRADIENT: 13.8 ft/mi

WATER SURFACE ON DATE OF SURVEY
SILT / SAND
GRAVEL / RUBBLE
COBBLE / BOULDER
WATER SURFACE FROM STAGE DATA

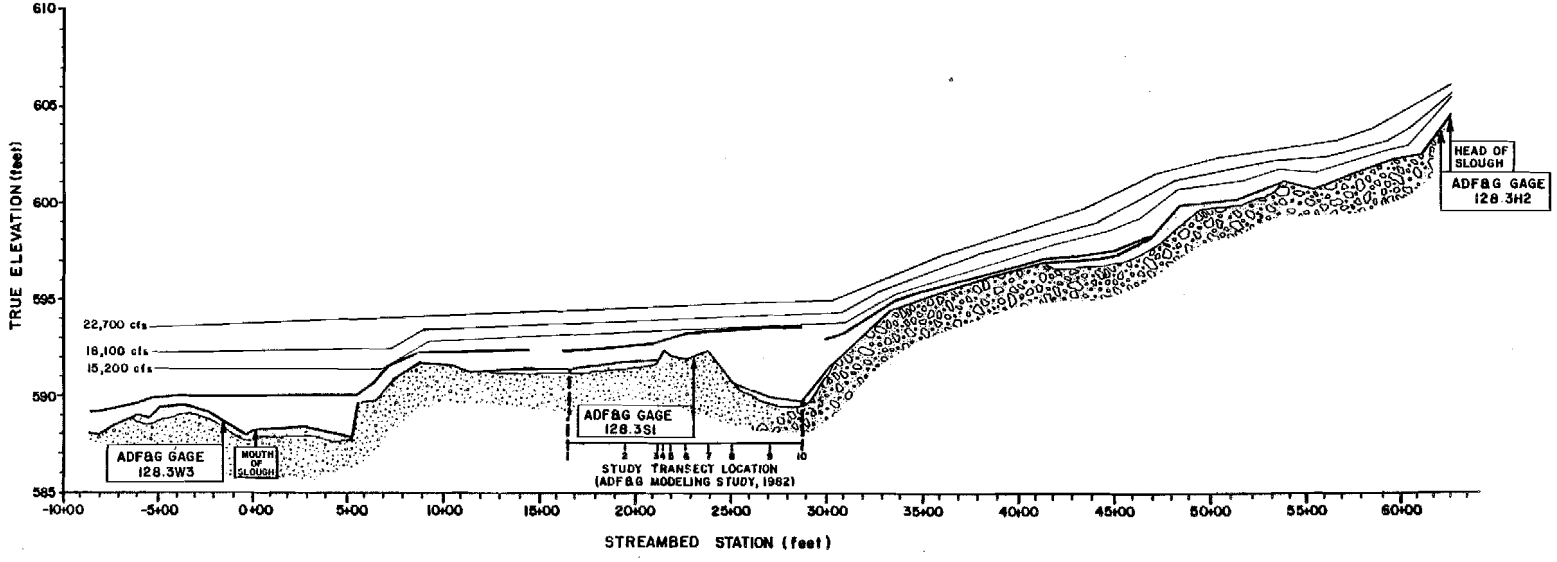


Figure 2-15. Streambed (thalweg) profile of Side Slough 9 (RM 128.3) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-10. Cross sectional profile sites in Side Slough 9 (RM 128.3), 1983.

Site	Staff Gage	Date Obtained	Agency
Mouth	128.3W3	9/14/83	ADF&G
ADF&G Model[1] Transect 1	---[2]	8/3/83	ADF&G
ADF&G Model[1] Transect 2	---[2]	1983	ADF&G
ADF&G Model[1] Transect 4	---[2]	1983	ADF&G
ADF&G Model[1] Transect 6 Q Station	128.3S1	1983	ADF&G
ADF&G Model[1] Transect 7	---[2]	1983	ADF&G
ADF&G Model[1] Transect 8	---[2]	1983	ADF&G
ADF&G Model[1] Transect 9	---[2]	1983	ADF&G
ADF&G Model[1] Transect 10	---[2]	1983	ADF&G
Head	128.3H3	8/23/83	ADF&G

[1] Cross section presented in Chapter 7.

[2] No staff gage station located at this site.

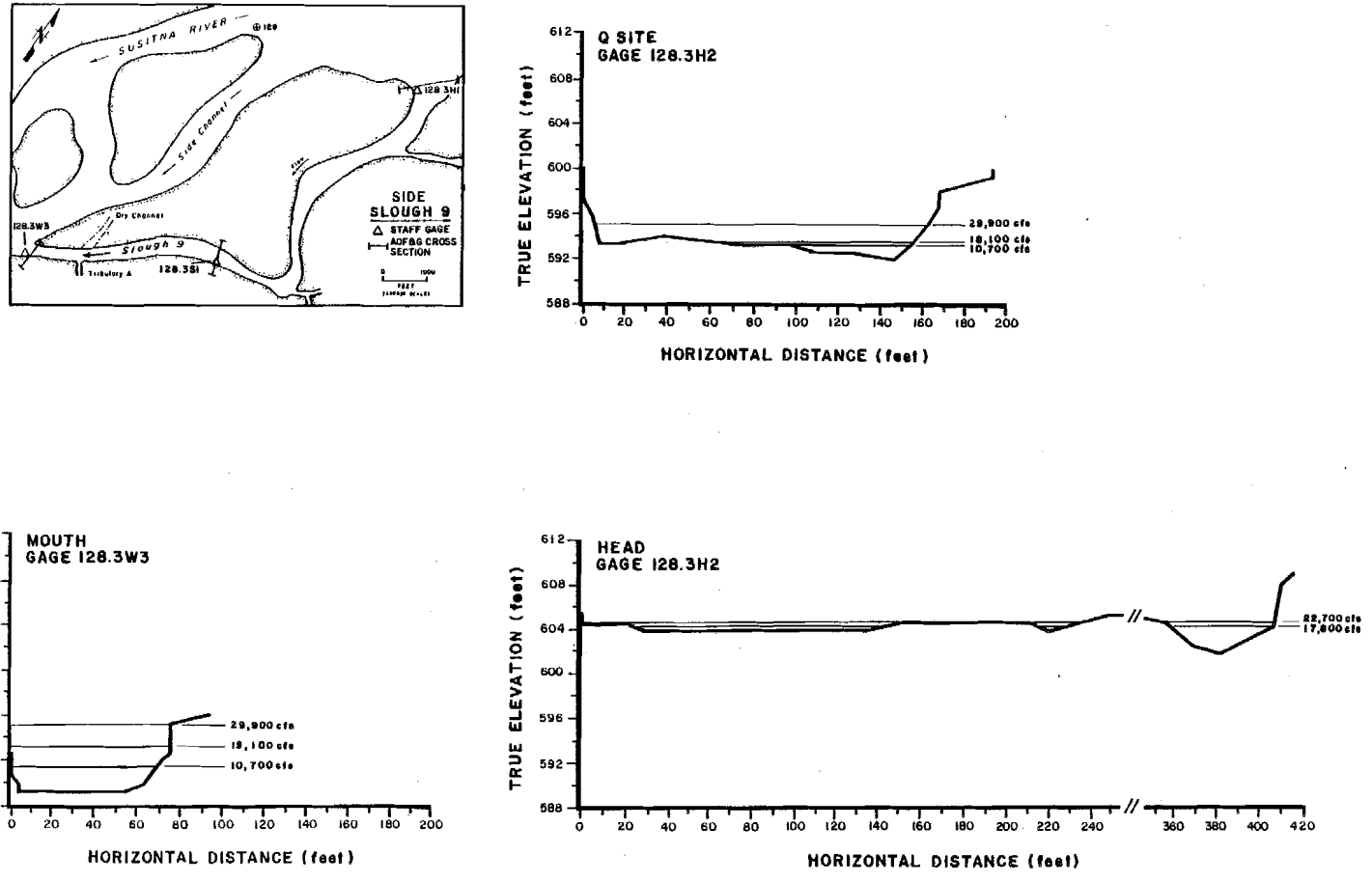


Figure 2-16. Cross sectional profiles of the staff gage sites in Side Slough 9 (RM 128.3) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

of 5 cfs. The thalweg profile of Slough 9A is presented in Figure 2-17. Although a backwater area has been observed at Slough 9A, data necessary to determine the extent of the backwater area have not been collected. The mouth (backwater area) is composed primarily of silt and sand. Above the backwater area the slough is characterized by a series of riffles and pools. Although cobble/boulder is the predominant substrate, gravel and rubble are found in the riffle areas. Silt/sand deposits are contained in the pool areas.

The gradient of Side Slough 9A is 15.7 ft/mi and the adjacent mainstem gradient is 11.1 ft/mi.

Cross sectional survey data were not collected at Side Slough 9A.

3.2.6 Side Slough 11 (RM 135.7)

Side Slough 11 (RM 135.7) is located on the east bank of the Susitna River and is approximately one mile long. The slough is separated from the mainstem by a large vegetated island. The head and mouth of Slough 11 are joined by side channels of the mainstem Susitna River.

The thalweg profile (Figure 2-18) of Slough 11 was developed from data collected at a non-breaching mainstem discharge of 6,600 cfs and an estimated slough flow of 3 cfs. At mainstem discharges between 10,600 and 37,000 cfs the backwater area extends approximately 200 ft upstream.

Substrate in the backwater area is mainly gravel/rubble with silt and sand deposits. Above the backwater area, substrate in Side Slough 11 is predominantly gravel/rubble. The upper portion of the slough is composed primarily of cobble/boulder substrate.

The gradient of Slough 11 is 19.8 ft/mi while the corresponding mainstem gradient is 10.3 ft/mi.

Cross sectional profile data were collected at three staff gage locations in Side Slough 11 (Table 2-11). The cross sectional profiles are presented in Figure 2-19.

3.2.7 Side Sloughs 16/16B (RM 137.7)

Side Sloughs 16 and 16B (RM 137.7) are located on the west bank of the Susitna River. The mouth of Slough 16B is joined by the head of Slough 16. The Slough 16/16B complex is approximately 0.6 miles long. Each slough is separated from the mainstem by a large gravel bar and a well vegetated island.

One thalweg profile of the Slough 16/16B complex was developed (Figure 2-20). The thalweg survey data were collected during a non-breaching mainstem discharge of 16,500 cfs and an estimated slough flow of less than 1 cfs. At this time, a backwater area was observed extending approximately 600 feet upstream from the mouth of Slough 16. No stage and corresponding discharge data were collected to further define the

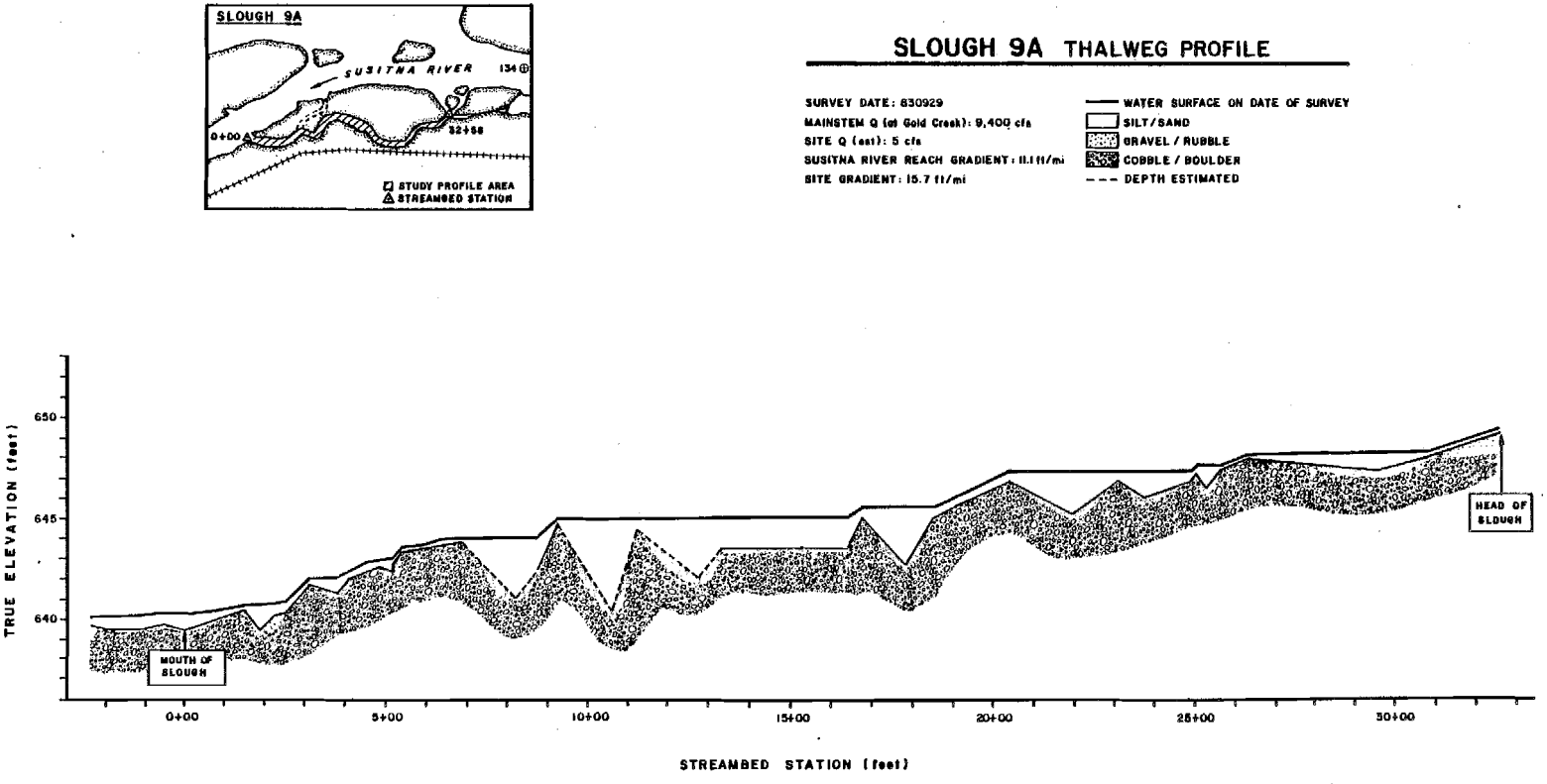


Figure 2-17. Streambed (thalweg) profile of Side Slough 9A (RM 133.2) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

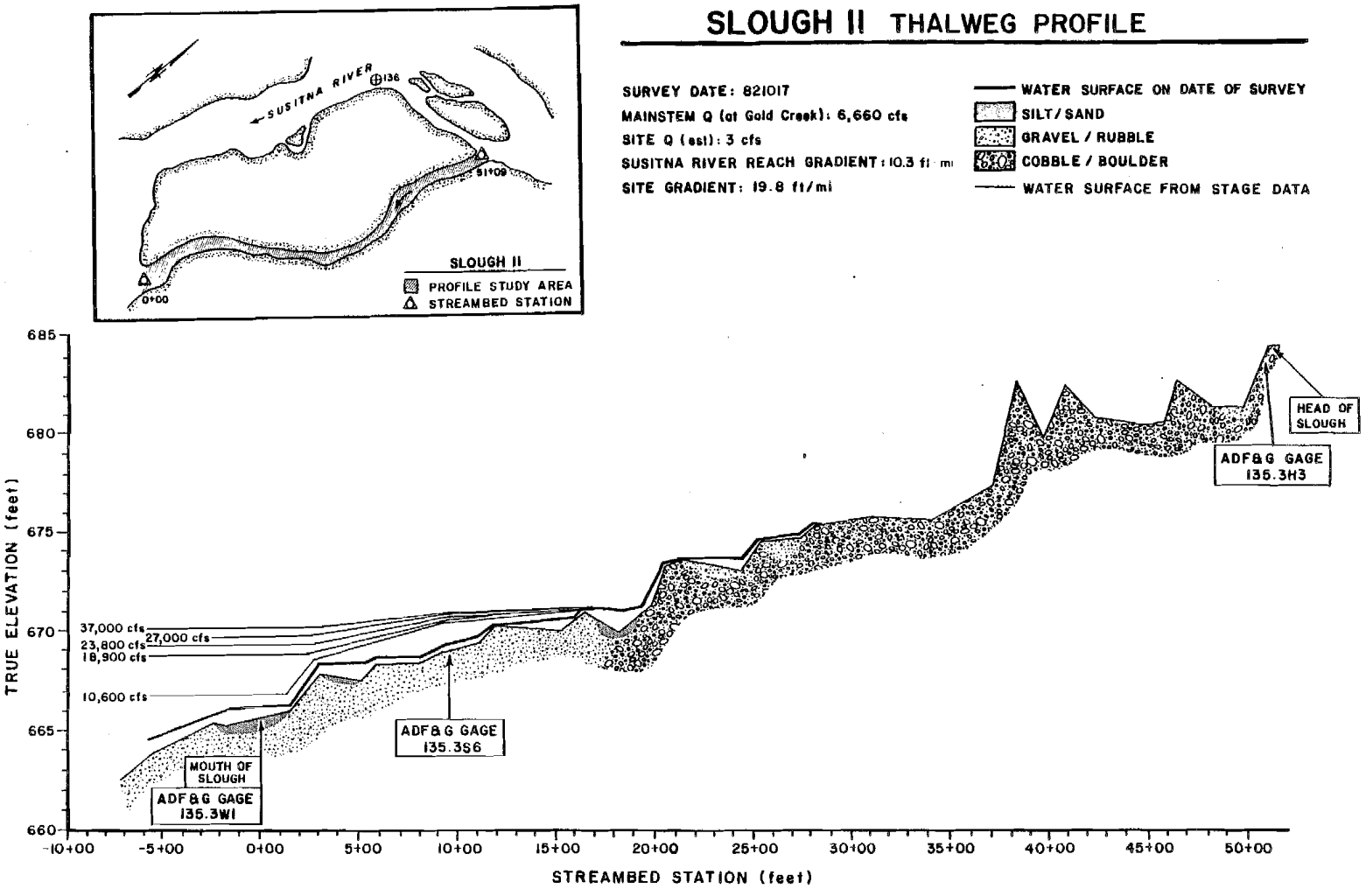


Figure 2-18. Streambed (thalweg) profile of Side Slough 11 (RM 135.7) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-11. Cross sectional profile sites in Side Slough 11 (RM 135.7), 1983.

Site	Staff Gage	Date Obtained	Agency
Mouth	135.3W1	10/19/83	ADF&G
Discharge Station	135.3S6	6/29/83	ADF&G
Head	135.3H3	7/28/82	R&M Consultants

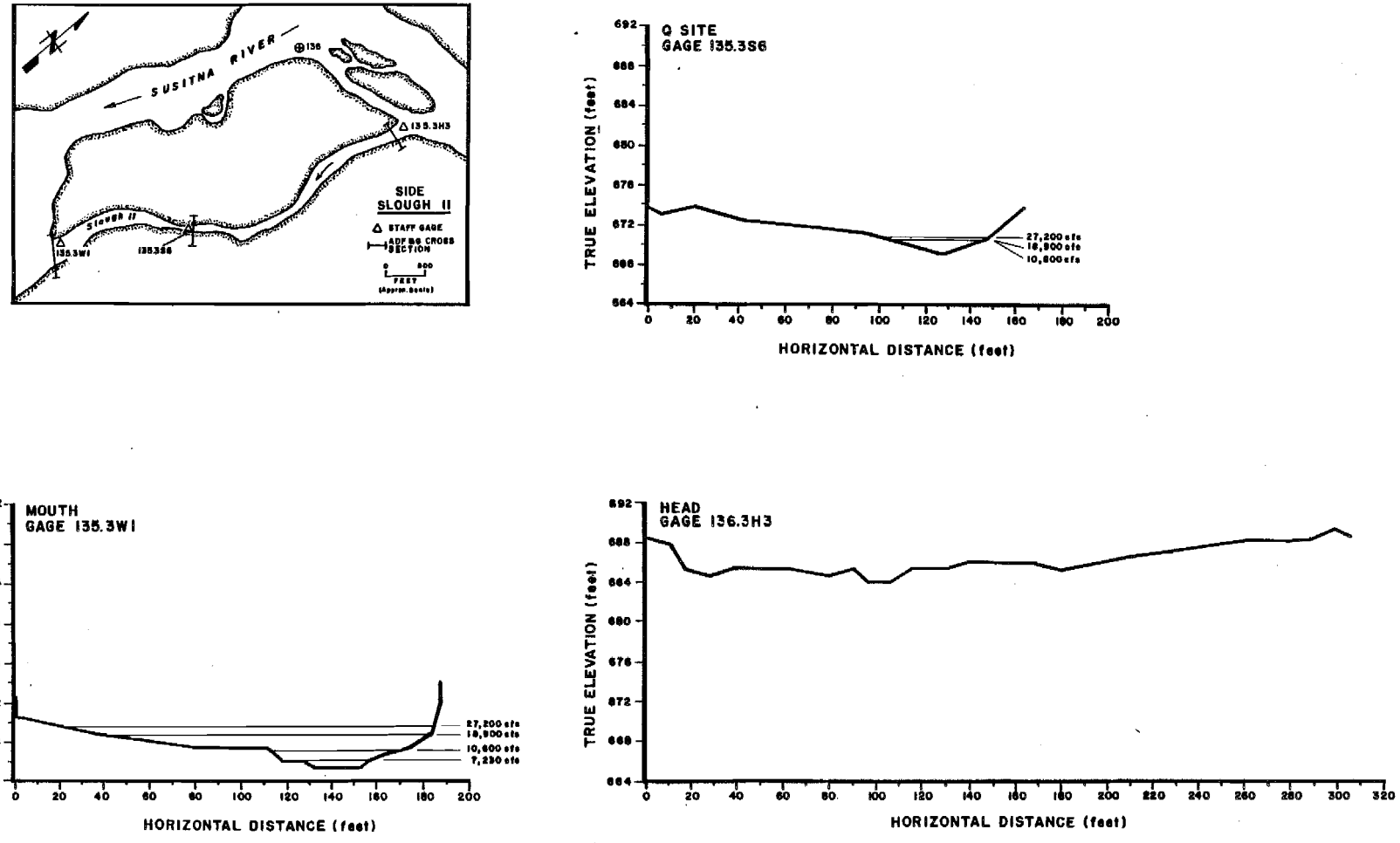


Figure 2-19. Cross sectional profiles of the staff gage sites in Side Slough 11 (RM 135.7) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

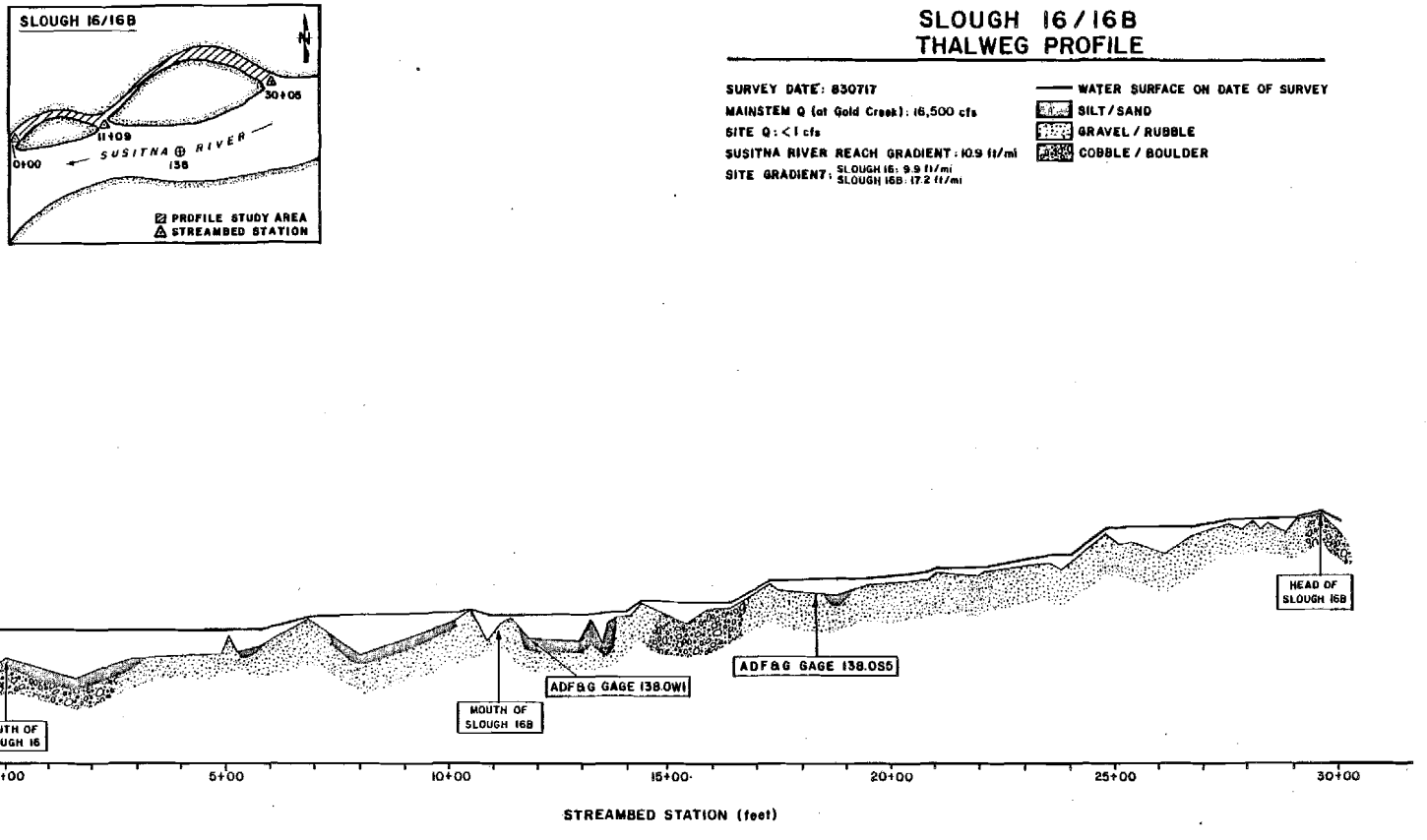


Figure 2-20. Streambed (thalweg) profile of Side Slough 16/16B (RM 137.7) and surveyed water surface elevation corresponding to a mainstem Susitna River discharge of 16,500 cfs at Gold Creek (USGS gaging station 1529200).

backwater effects which occur in Side Slough 16. A backwater area has not been observed at the mouth of Side Slough 16B.

Substrate in the backwater area of Slough 16 is primarily silt and sand. The upper portion of Slough 16, and Slough 16B are characterized by a series of pools and riffles. Substrate is composed mainly of gravel and rubble, however, cobble/boulder are found in some areas. The pool areas are deposited with silt and sand.

The gradient of Slough 16 is 9.9 ft/mi, while Slough 16B has a gradient of 17.2 ft/mi. The gradient of the mainstem adjacent to the Slough 16/16B complex is 10.9 ft/mi.

Cross sectional profile data were collected at only two staff gage locations in Slough 16B (Table 2-12). The resultant figures are presented in Figure 2-21. Cross section surveys were not conducted at Slough 16.

3.2.8 Side Slough 20 (RM 140.2)

Side Slough 20 (RM 140.2) located on the south bank of the Susitna River is a single channel slough approximately 0.5 mi long. The slough is separated from the mainstem Susitna River by a large vegetated island. Two tributaries flow into Slough 20. Waterfall Creek enters approximately 1,500 feet upstream from the mouth, and a small unnamed tributary enters near the head of the slough.

The thalweg profile (Figure 2-22) of Slough 20 was developed from data collected during a non-breaching mainstem discharge of 18,600 cfs and a slough flow of 5 cfs. At mainstem discharges exceeding 8,480 cfs the backwater area extends approximately 300 feet into the slough. The backwater area increases at higher mainstem discharges. Silt and sand predominate in the backwater area of Side Slough 20. Above the backwater area, Side Slough 20 consists of alternating pools and riffles. Substrate is composed of gravel/rubble with areas of cobble/boulder at the head. Pools contain deposits of silt and sand.

The gradient of Side Slough 20 is 13.5 ft/mi and the corresponding mainstem gradient is 13.4 ft/mi.

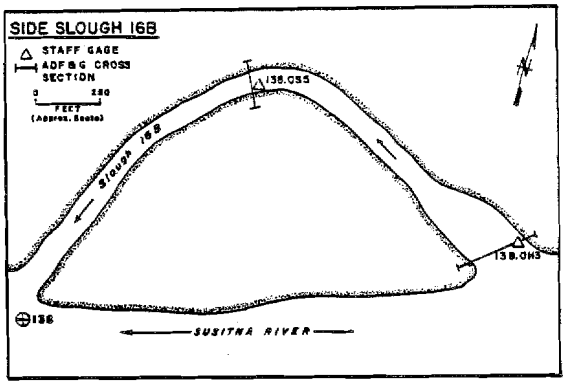
Cross sectional surveys were conducted in 1982 by R&M Consultants at three staff gage locations (Table 2-13). The cross sections are presented in Figure 2-23.

3.2.9 Side Slough 21 (RM 141.8)

Side Slough 21 located on the south bank of the Susitna River, is approximately 3,000 ft long. The slough is separated from the mainstem by a large vegetated gravel bar. Approximately 1,500 feet upstream from the mouth, Slough 21 divides into two forks: a northwest (left) channel and a northeast (right) channel. The mouth of Slough 21 flows directly into the head of Side Channel 21 where a pool is formed (Figure 2-24).

Table 2-12. Cross sectional profile sites in Side Slough 16B (RM 137.9), 1982.

Site	Staff Gage	Date Obtained	Agency
Discharge Station	138.0S5	7/24/82	R&M Consultants
Head	138.0H3	7/22/82	R&M Consultants



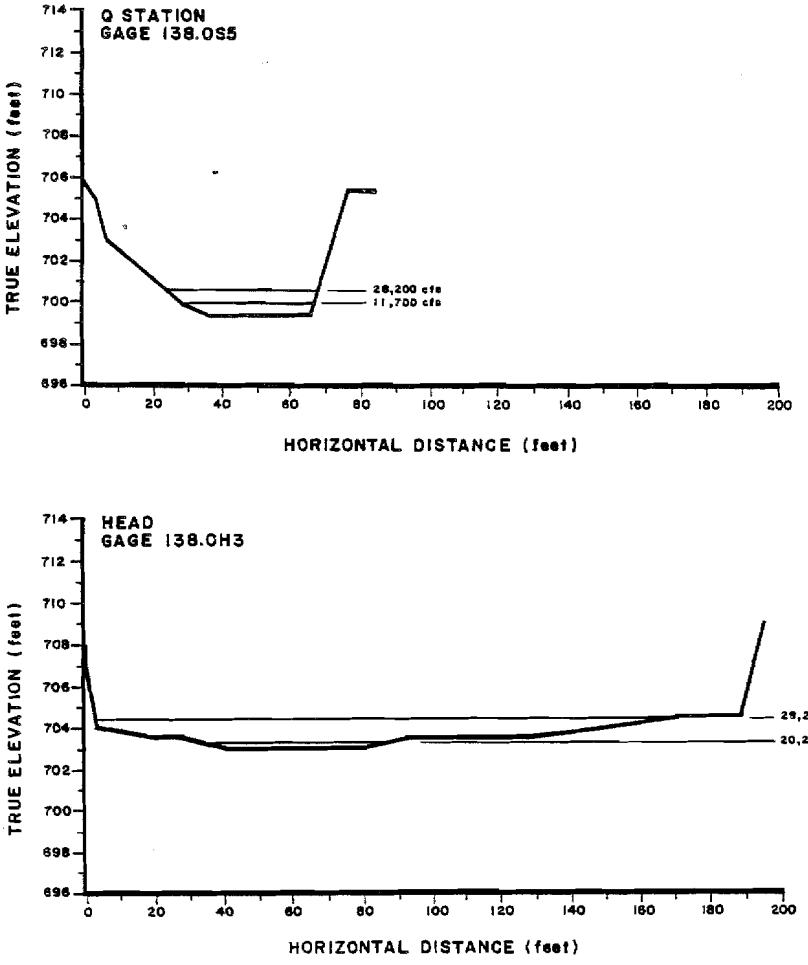


Figure 2-21. Cross sectional profiles of the staff gage sites in Side Slough 16B (RM 137.9) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

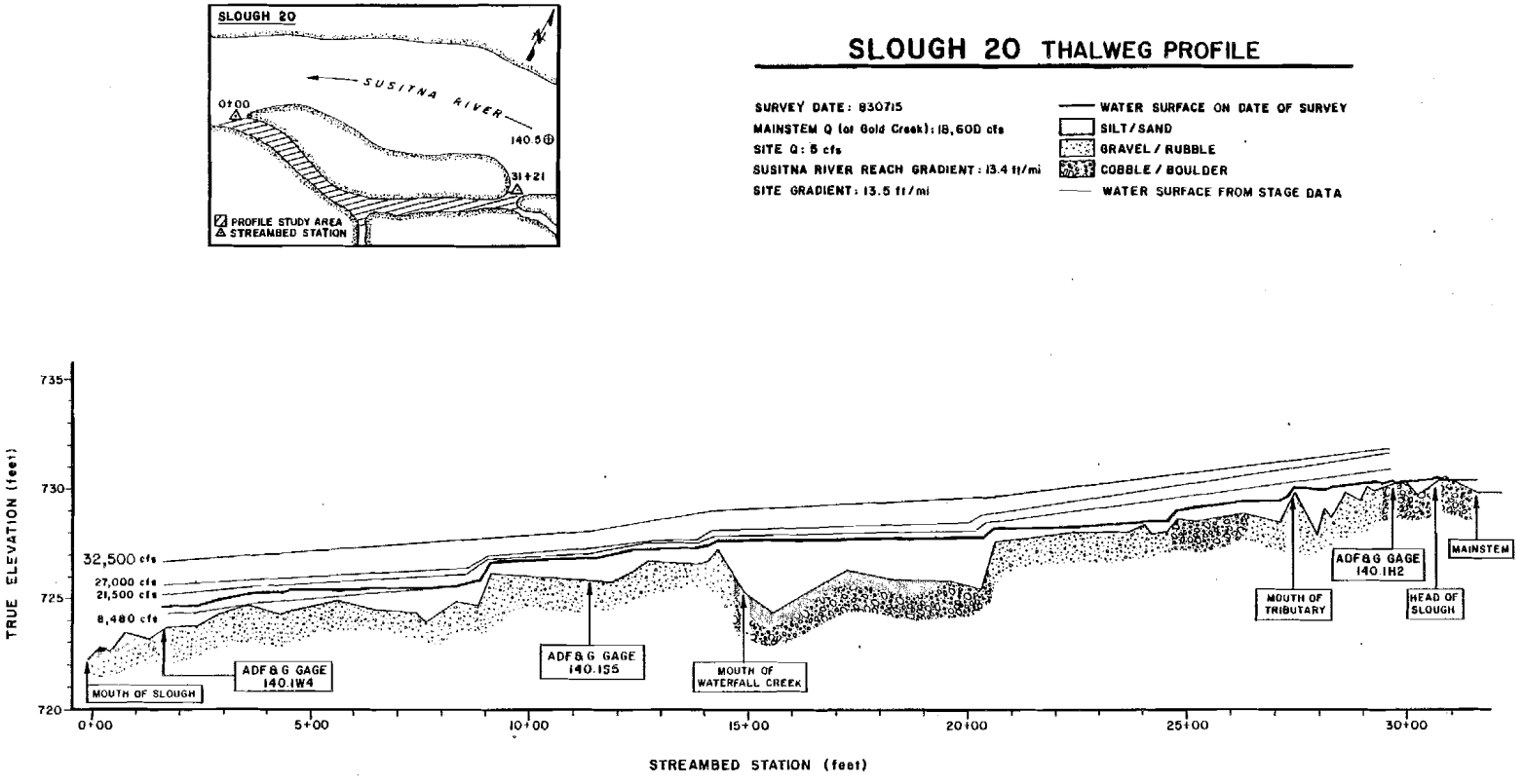


Figure 2-22. Streambed (thalweg) profile of Side Slough 20 (RM 140.2) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-13. Cross sectional profile sites in Side Slough 20 (RM 140.2), 1982.

Site	Staff Gage	Date Obtained	Agency
Mouth	140.1W4	7/24/82	R&M Consultants
Discharge Station	140.1S5	7/24/82	R&M Consultants
Head	140.1H3	7/27/82	R&M Consultants

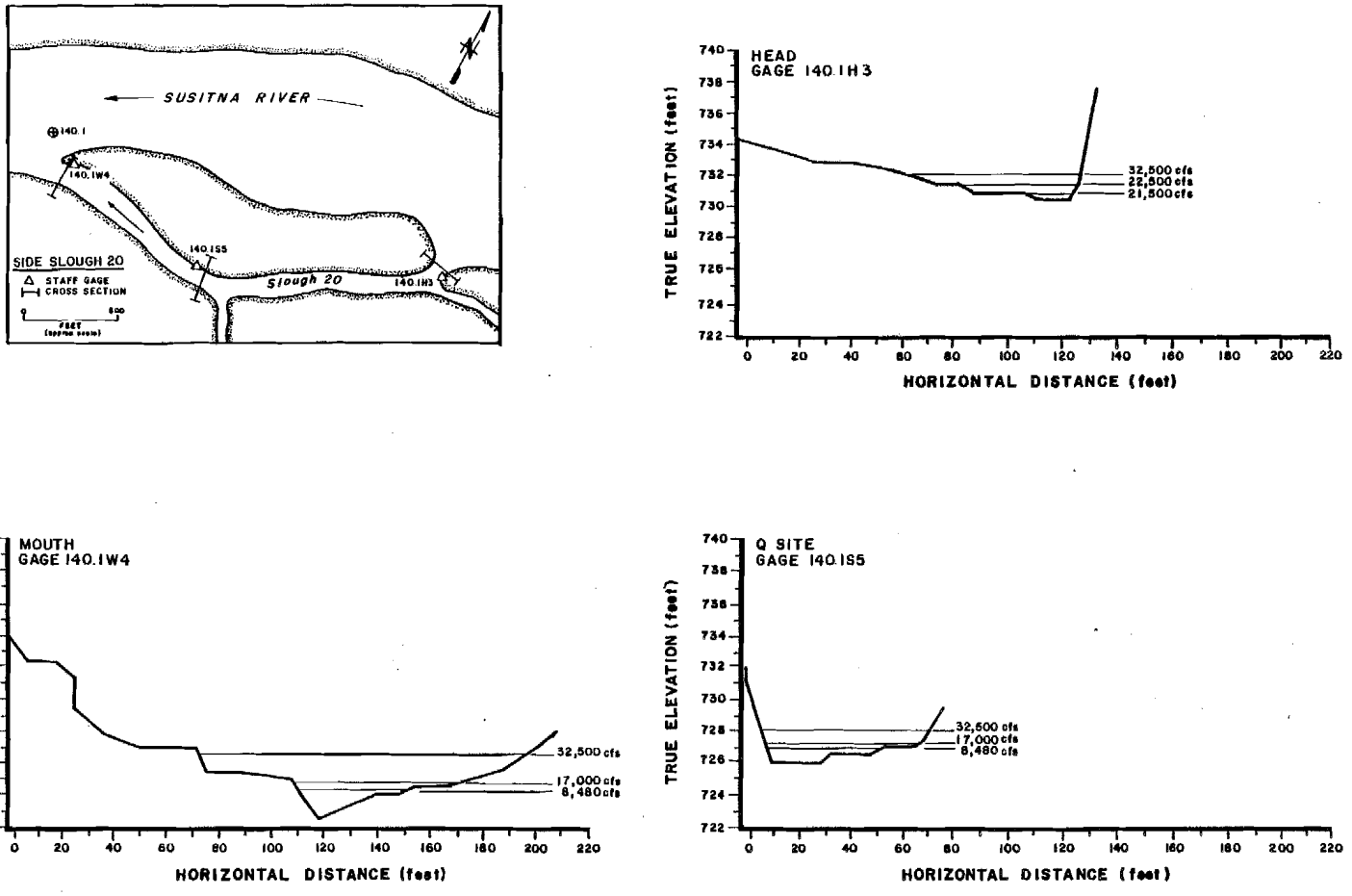


Figure 2-23. Cross sectional profiles of the staff gage sites in Side Slough 20 (RM 140.2) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

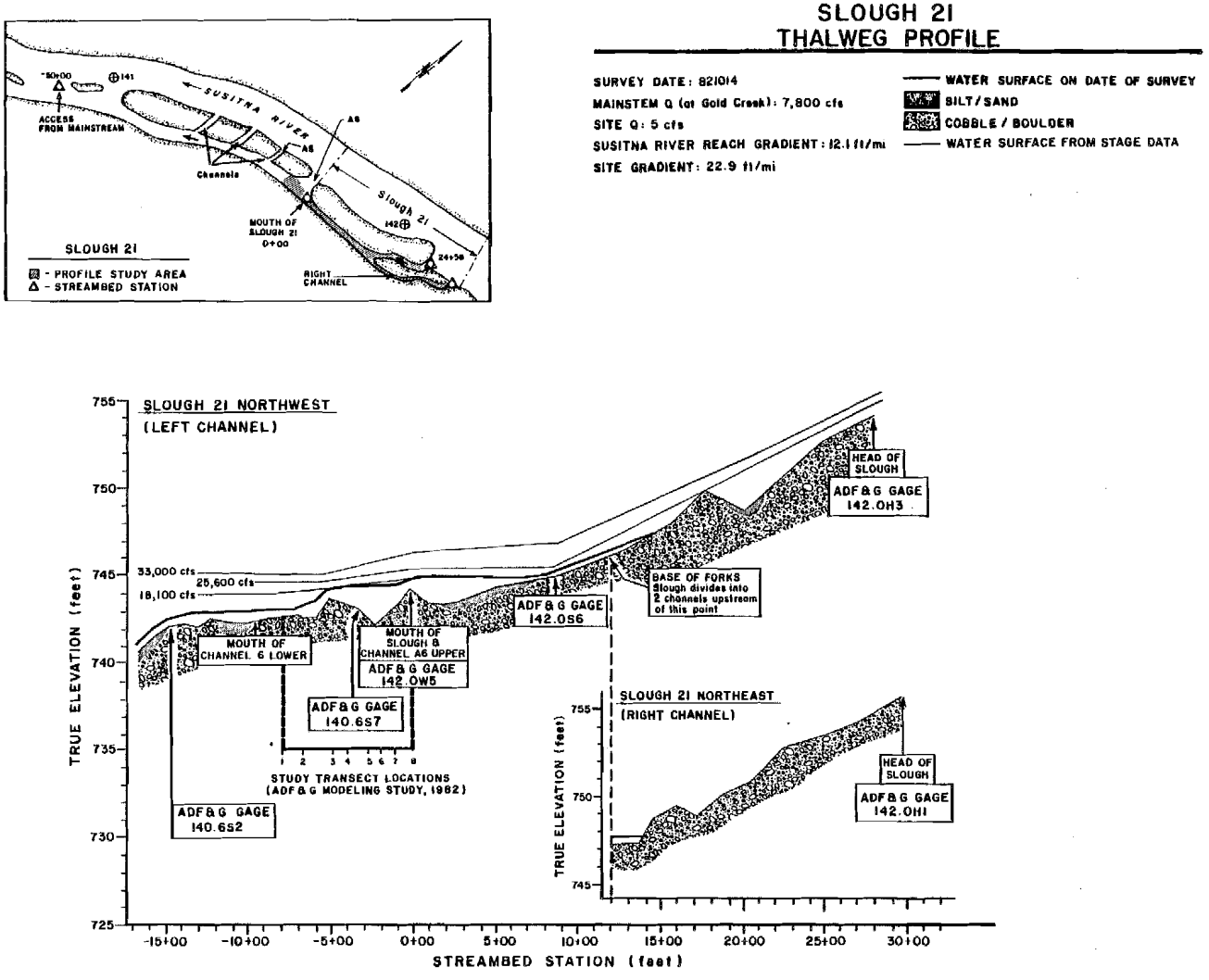


Figure 2-24. Streambed (thalweg) profile of Side Slough 21 (RM 141.8) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Thalweg survey data of Side Slough 21 were collected during a mainstem discharge of 7,800 and an estimated slough flow of 5 cfs. No backwater has been observed in Side Slough 21. Cobble and boulder are the predominant substrate types found in Slough 21. The pool areas contain deposits of silt and sand.

The gradient of Side Slough 21 is 22.9 ft/mi, while the corresponding mainstem gradient is 12.1 ft/mi.

Cross sectional survey data were collected at eight locations in Side Slough 21 (Table 2-14). Cross sectional surveys conducted in support of the physical habitat modeling study are presented in Chapter 7. Cross sections which correspond to four staff gage locations are presented in Figure 2-25.

3.2.10 Side Slough 22 (RM 144.2)

Side Slough 22 (RM 144.2) is approximately 0.5 mi long and is located on the north bank of the Susitna River. The slough is separated from the mainstem Susitna River by a vegetated island. A small tributary flows into the slough approximately 2,000 ft upstream from the slough mouth.

The thalweg profile of Slough 22 was developed from data collected at a non-breaching mainstem discharge of 16,400 cfs and slough flow of 3 cfs (Figure 2-26). A long riffle extending approximately 300 ft upstream of the mouth of Slough 22. The next 1,100 ft is characterized by two long, deep pools. Above the pools, the slough gradient increases to form a riffle area separatig two shallow pools.

An area of backwater extends above the first riffle to the second large pool, approximately 1,400 ft, at mainstem discharges greater than 23,000 cfs. Cobble and boulder predominate throughout the slough with deposits of gravel/rubble found in the riffle areas. The pool areas contain sand and silt.

The overall gradient of Side Slough 22 is 15.0 ft/mi and the corresponding mainstem gradient is 11.5 ft/mi.

Survey data were collected at three staff gage locations in Side Slough 22 (Table 2-15). The resultant cross sectional figures are presented in Figure 2-27.

3.3 Upland Slough Habitats

Thalweg profile survey data were collected in three upland sloughs in the Talkeetna to Devil Canyon reach of the Susitna River. The survey data are presented in Appendix Tables 2-A-14 to 2-A-17.

Two upland sloughs were surveyed for the collection of cross sectional data. These data are presented in Appendix Tables 2-B-50 and 2-B-54.

The thalweg profile figures and cross sections are presented below by site.

Table 2-14. Cross sectional profile sites in Side Slough 21 (RM 141.8), 1982, 1983.

ADF&G Model[1] Transect 3	---[2]	1983	ADF&G
ADF&G Model[1] Transect 4	---[2]	1983	ADF&G
ADF&G Model[1] Transect 5	---[2]	1983	ADF&G
ADF&G Model[1] Transect 6	---[2]	1983	ADF&G
ADF&G Model[1] Transect 7	---[2]	1983	ADF&G
Mouth	142.0W5	5/17/83	ADF&G
Discharge Station	142.0S6	5/17/83	ADF&G
NW Channel Head	142.0H3	7/11/82	R&M Consultants
NE Channel Head	142.0H1	7/11/82	R&M Consultants

[1] Cross section presented in Chapter 7.

[2] No staff gage station located at this site.

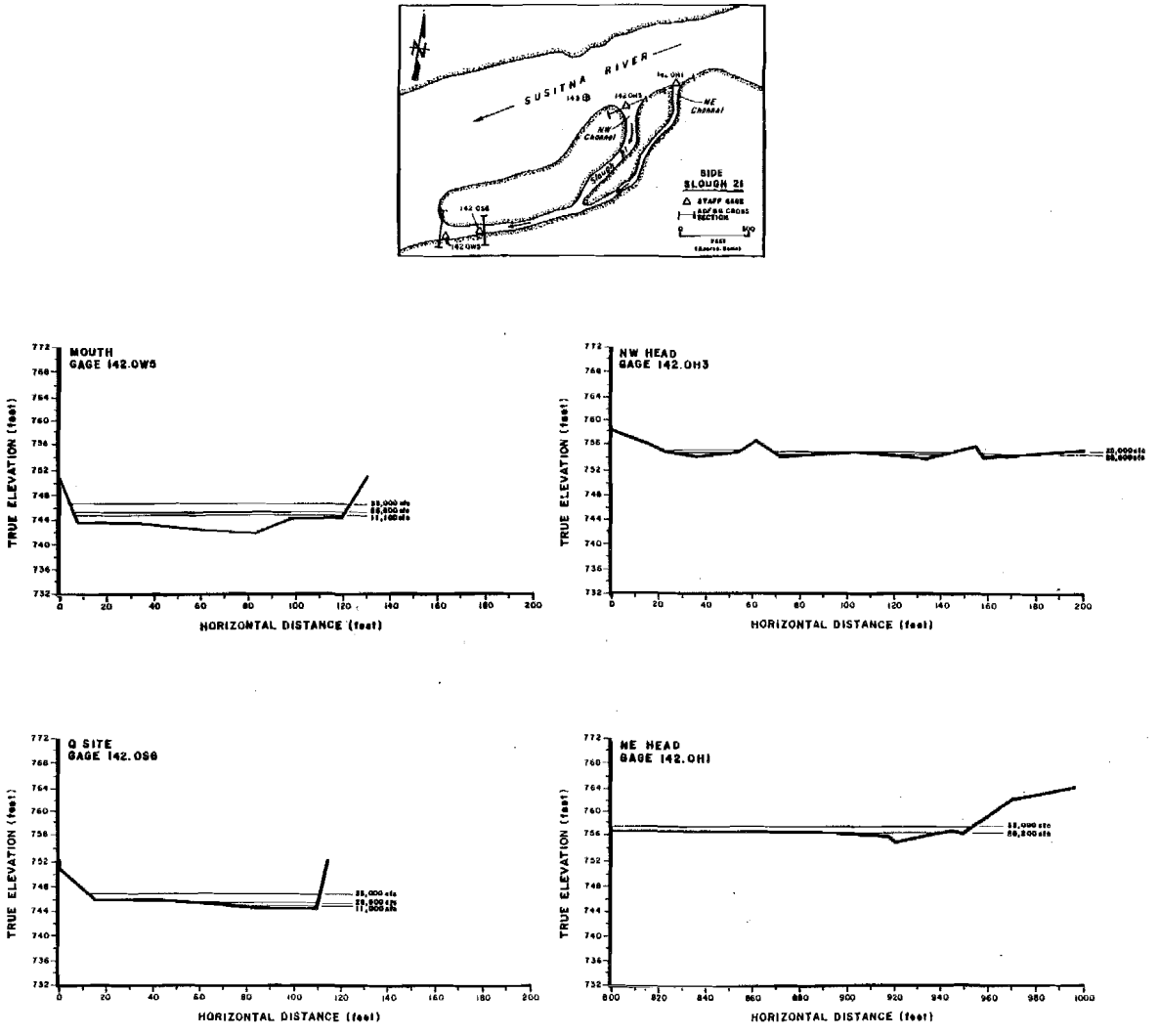
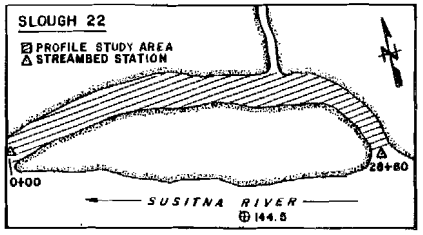


Figure 2-25. Cross sectional profiles of the staff gage sites in Side Slough 21 (RM 141.8) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).



SLOUGH 22 THALWEG PROFILE

SURVEY DATE: 830716
MAINSTEM Q (at Gold Creek): 16,400 cfs
SITE Q: 3 cfs
SUSITNA RIVER REACH GRADIENT: 11.5 ft/mi
SITE GRADIENT: 15.0 ft/mi

WATER SURFACE ON DATE OF SURVEY
SILT/SAND
GRAVEL / RUBBLE
COBBLE / BOULDER
WATER SURFACE FROM STAGE DATA

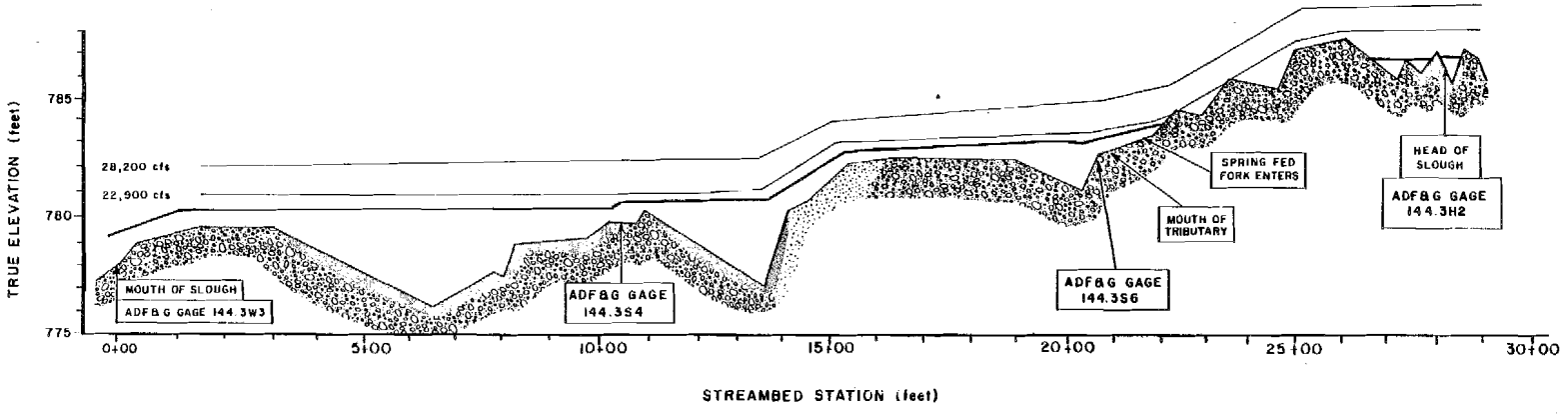


Figure 2-26. Streambed (thalweg) profile of Side Slough 22 (RM 144.2) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-15. Cross sectional profile sites in Side Slough 22 (RM 144.2), 1982, 1983.

Site	Staff Gage	Date Obtained	Agency
Mouth	144.3W3	9/15/83	ADF&G
Mid-Slough	144.3S4	7/10/82	R&M Consultants
Discharge Station	144.3S6	7/10/82	R&M Consultants
Head	144.3H2	9/15/83	ADF&G

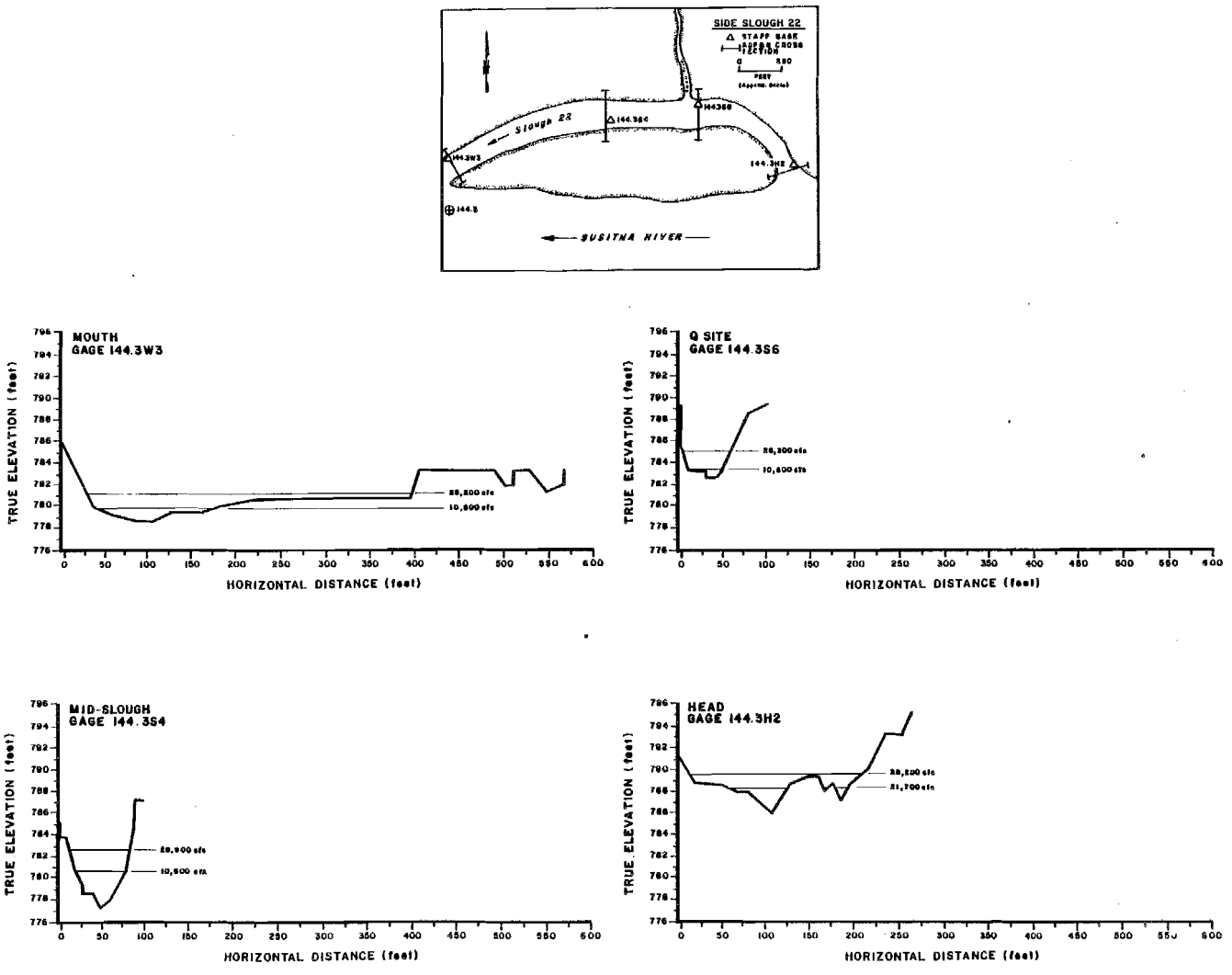


Figure 2-27. Cross sectional profiles of the staff gage sites in Side Slough 22 (RM 144.2) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

3.3.1 Upland Slough 6A (RM 112.3)

Upland Slough 6A (RM 112.3) located on the west bank of the Susitna River, is approximately 1,500 ft long. Approximately 1,200 ft upstream from the mouth, the slough divides into two forks: a northwest (left) channel and a northeast (right) channel. A beaver dam is located in both channels approximately 1,300 ft from the mouth.

The thalweg profile (Figure 2-28) of Upland Slough 6A was constructed from data collected during a mainstem discharge of 11,600 cfs and an estimated slough flow of less than 1 cfs. A backwater area extends from the mouth approximately 1,200 feet upstream at mainstem discharges as low as 0,600 cfs. Substrate in Slough 6A is composed primarily of silt and sand.

The gradient of Slough 6A is 6.0 ft/mi and the adjacent mainstem gradient is 10.6 ft/mi.

Cross sectional survey data were collected at two staff gage locations in Slough 6A (Table 2-16). The cross sectional profiles are presented in Figure 2-29.

3.3.2 Upland Slough 10 (RM 133.8)

Upland Slough 10 (RM 133.8) is located on the west bank of the Susitna River. Approximately 300 ft from the mouth, Slough 10 divides into two forks, a northeast (right) channel and a northwest (left) channel. The northeast channel is approximately 1,000 feet long while the northwest channel is approximately 1,500 feet in length. Slough 10 flows directly into Side Channel 10 approximately 400 feet upstream from the mouth of the side channel.

The thalweg profile (Figure 2-30) of Upland Slough 10 was developed from survey data collected during a mainstem Susitna River discharge of 12,200 cfs and estimated slough flow of less than 1 cfs. A backwater area in the northwest channel extends approximately 1,000 ft upstream from the slough mouth at a mainstem discharge of 12,200 cfs. A backwater area approximately 300 ft in length was observed in the northeast channel during the same mainstem discharge. No stage data were collected to further quantify the extent of the backwater areas at various mainstem discharges.

Both the northeast and northwest channels are a series of pools and riffles. Substrate in the northwest channel is boulder/cobble with deposits of silt and sand in the riffle and pool areas. The northeast channel is characterized by boulder/cobble with thick deposits of silt and sand.

The gradient of the northwest channel is 13.5 ft/mi, while the northeast channel gradient is 21.8 ft/mi. The corresponding mainstem gradient is 8.9 ft/mi.

Cross sectional survey data were not collected in Slough 10.

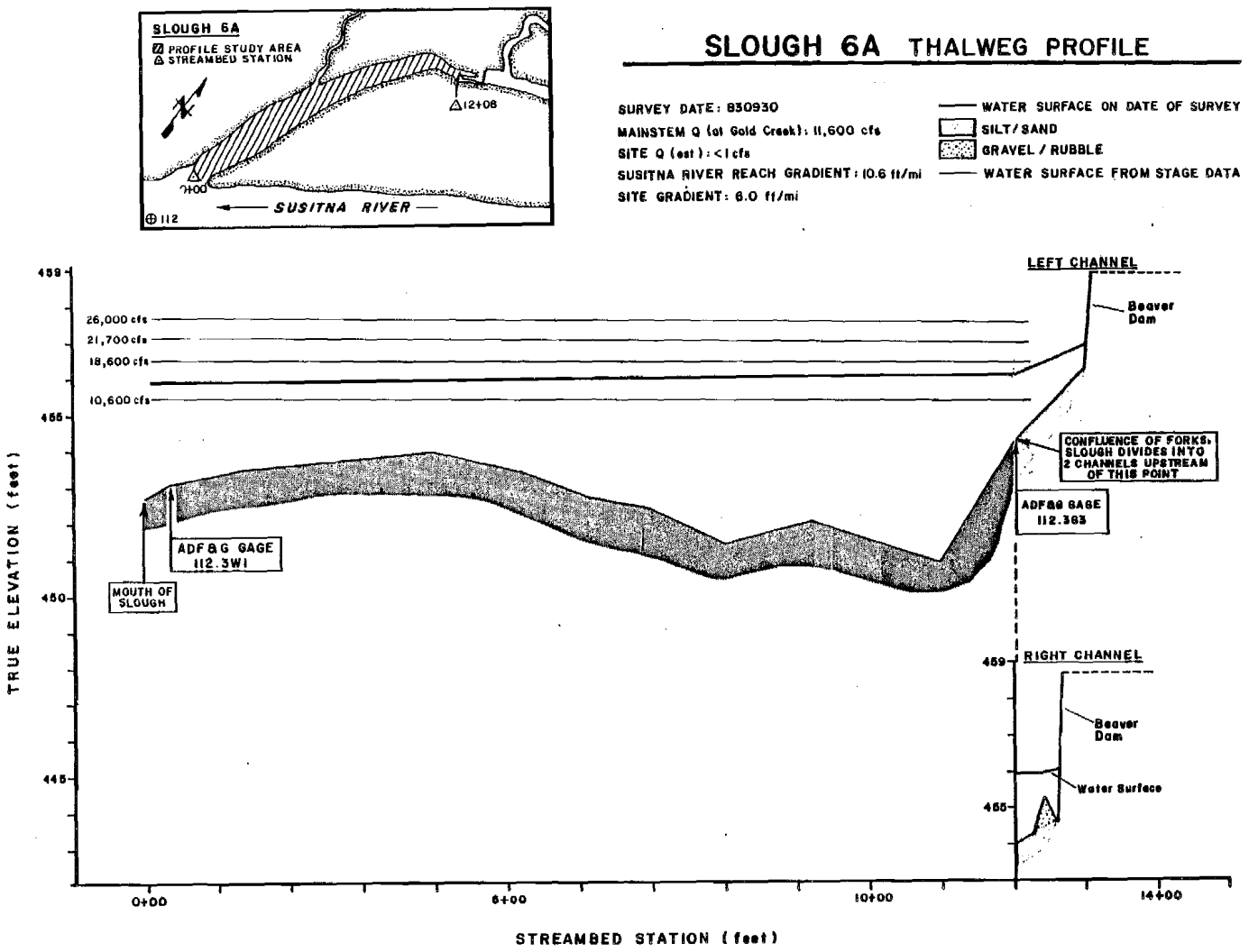
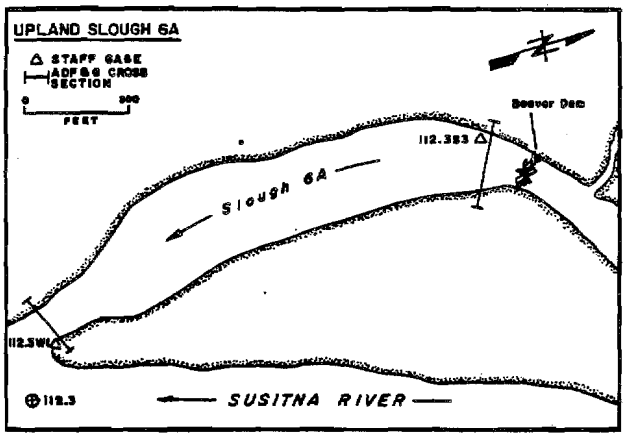
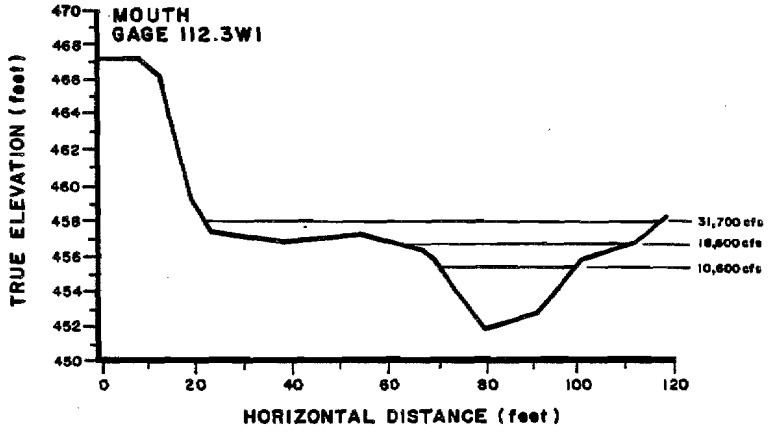


Figure 2-28. Streambed (thalweg) profile of Upland Slough 6A (RM 112.3) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-16. Cross sectional profile sites in Upland Slough 6A (RM 112.3), 1983.

Site	Staff Gage	Date Obtained	Agency
Mouth	112.3W1	7/5/83	ADF&G
Backwater	112.3S3	9/10/83	ADF&G





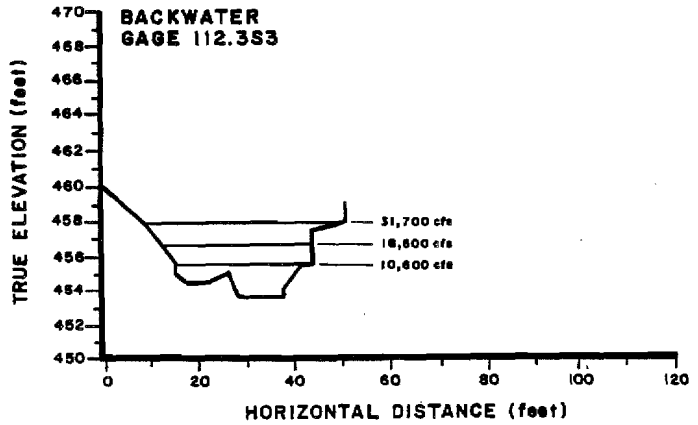
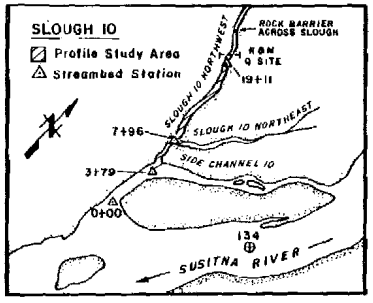
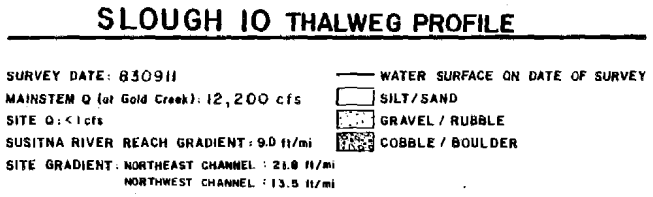
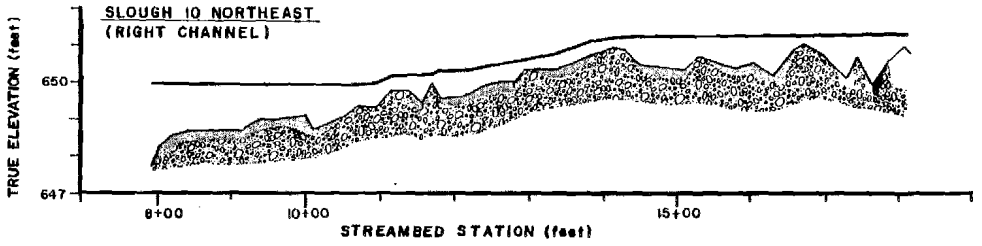


Figure 2-29. Cross sectional profiles of the staff gage sites in Upland Slough 6A (RM 112.3) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).







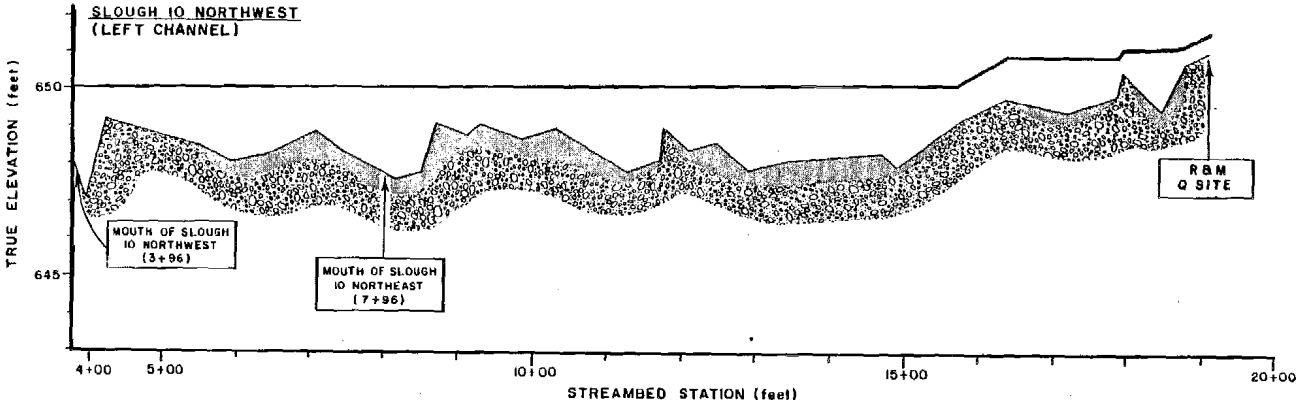


Figure 2-30. Streambed (thalweg) profile of Upland Slough 10 (RM 133.8) and surveyed water surface elevation corresponding to a mainstem Susitna River discharge of 12,200 cfs at Gold Creek (USGS gaging station 1529200).

3.3.3 Upland Slough 19 (RM 140.0)

Upland Slough 19 (RM 140.0) is approximately 1,000 ft long and is located on the east bank of the Susitna River. A side channel of the Susitna River connects the slough with the mainstem.

A thalweg profile was developed in Slough 19 (Figure 2-31) during a mainstem discharge of 10,300 cfs and slough flow less than 1 cfs. At mainstem discharges exceeding 10,700 cfs, the backwater area extends approximately 300 feet up from the slough mouth.

Substrate in the backwater area consists of silt and sand. Upstream of the backwater area the substrate is composed of gravel/rubble or cobble/-boulder.

The gradient of Upland Slough 19 is 16.9 ft/mi and the adjacent mainstem gradient is 14.1 ft/mi.

Cross sectional survey data were collected at three staff gage locations in Upland Slough 19 (Table 2-17). The cross sectional profiles are presented in Figure 2-32.

3.4 Tributary Habitats

Cross sectional survey data were collected at discharge sites located at four tributaries in the Talkeetna to Devil Canyon reach of the Susitna River. The survey data are presented in Appendix Tbles 2-B-55 to 2-B-58. Cross sectional profiles are presented below by site.

3.4.1 Fourth of July Creek (RM 131.1)

Fourth of July Creek (RM 131.1) is a steep gradient, clear water stream with a narrow streambed channel. A cross sectional profile of the discharge station is presented in Figure 2-33.

3.4.2 Gold Creek (RM 136.8)

Gold Creek is located on the east bank of the Susitna River. It can be characterized as a steep gradient, fast running stream with many pool and riffle areas. A cross sectional profile developed for the discharge station in Gold Creek is presented in Figure 2-34.

3.4.3 Indian River (RM 138.6)

Indian River (Figure 2-1) is located on the east bank of the Susitna River. The channel is highly braided from the mouth to an area approximately one mile upstream. A cross sectional profile of the discharge station in Indian River was developed from streamflow measurement data (Figure 2-35). The stage/discharge investigations of Indian River (Chapter 1) indicate that substantial bedload movement occurred at the discharge station in 1983.

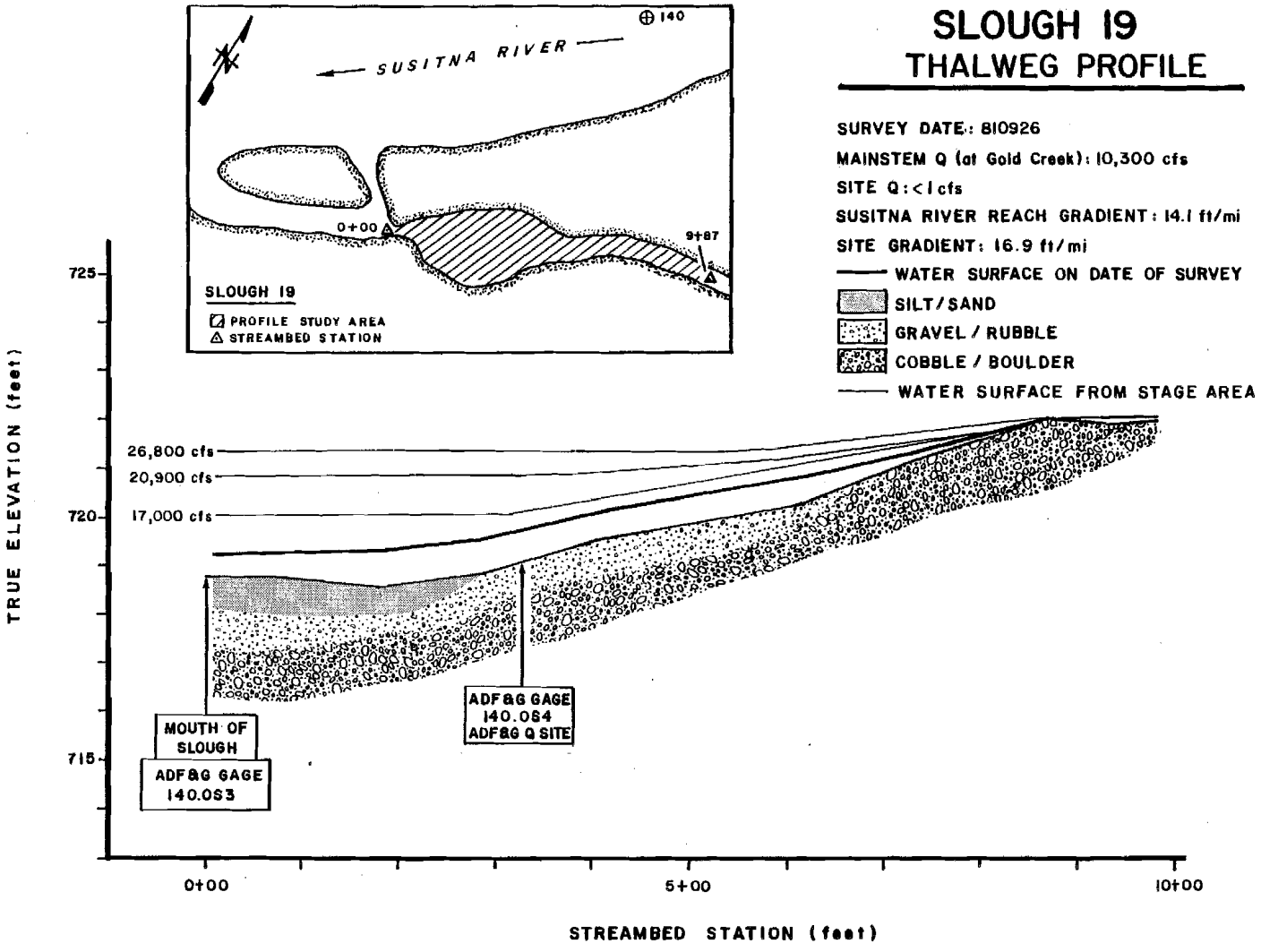
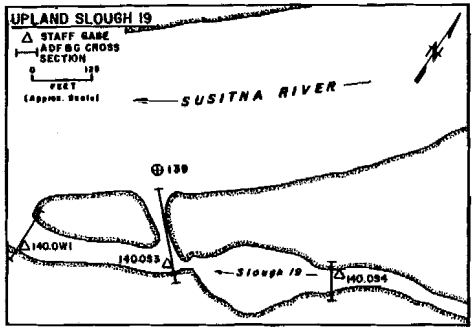
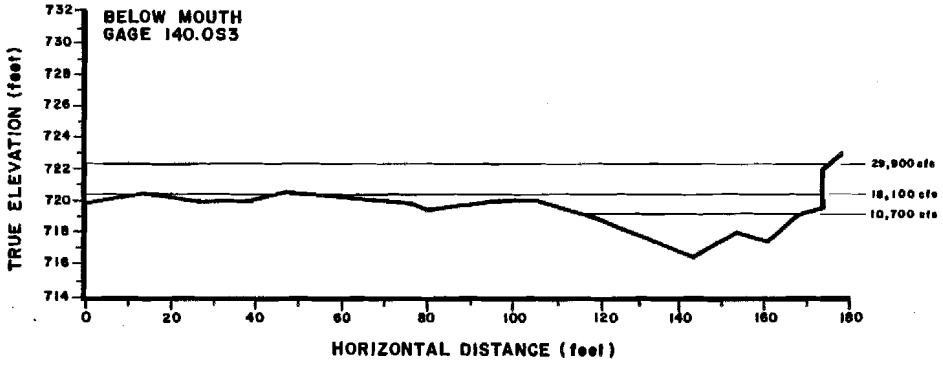


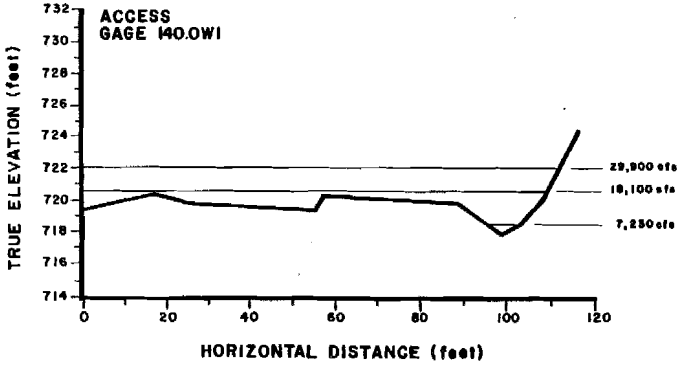
Figure 2-31. Streambed (thalweg) profile of Upland Slough 19 (RM 140.0) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).

Table 2-17. Cross sectional profile sites within Upland Slough 19 (RM 140.0), 1983.

Site	Staff Gage	Date Obtained	Agency
Access	140.0W1	9/14/83	ADF&G
Below Mouth	140.0S3	9/14/83	ADF&G
Discharge Station	140.0S4	9/14/83	ADF&G







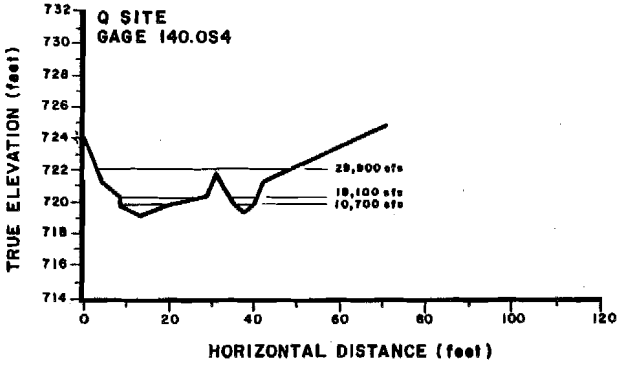
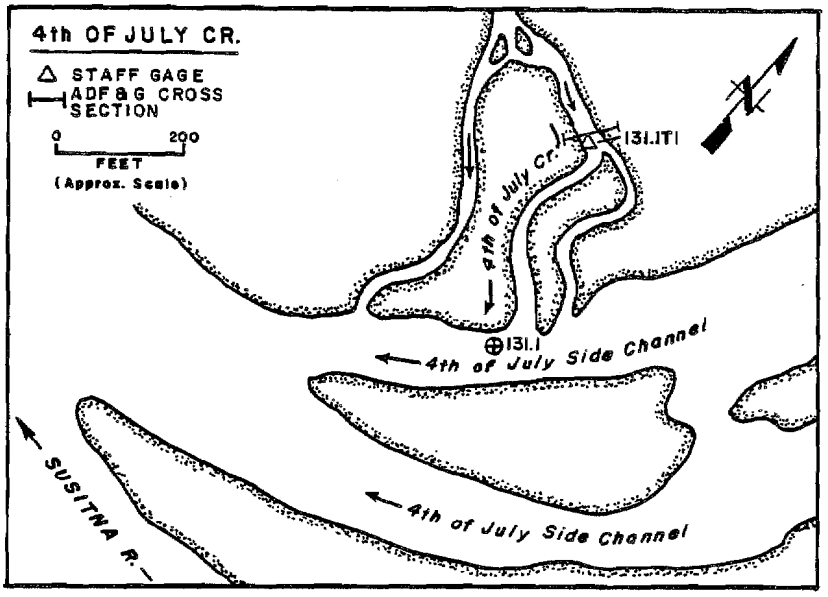


Figure 2-32. Cross sectional profiles of the staff gage sites in Upland Slough 19 (RM 140.0) and water surface elevations corresponding to various mainstem Susitna River discharges at Gold Creek (USGS gaging station 1529200).



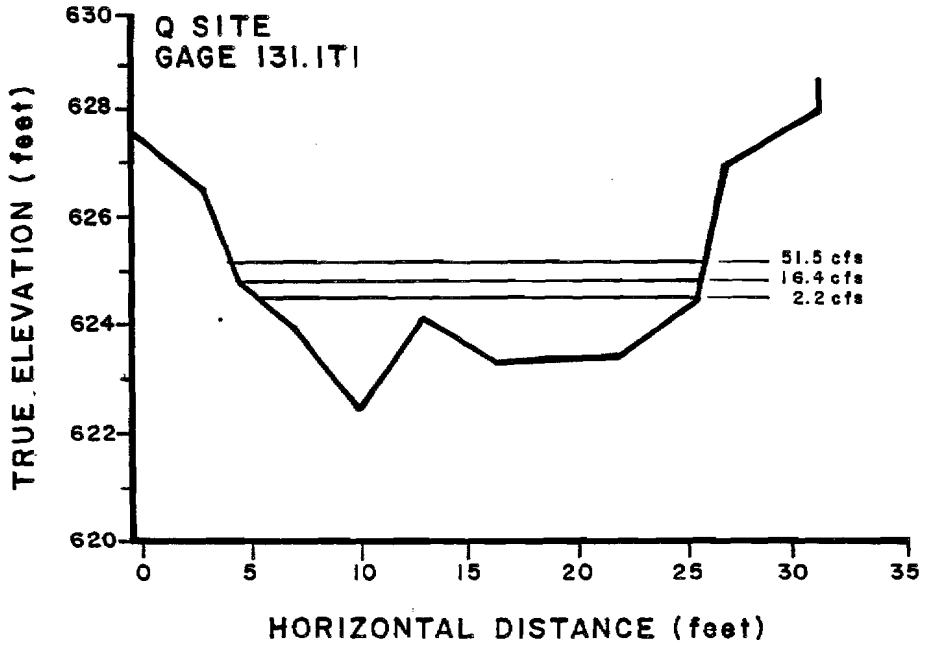
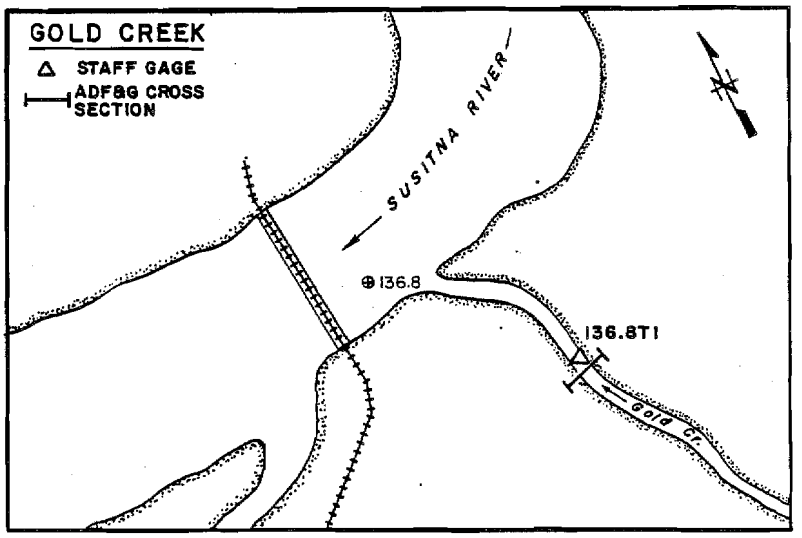


Figure 2-33. Cross sectional profile of the discharge station in Fourth of July Creek (RM 131.1) and water surface elevations corresponding to various streamflows.



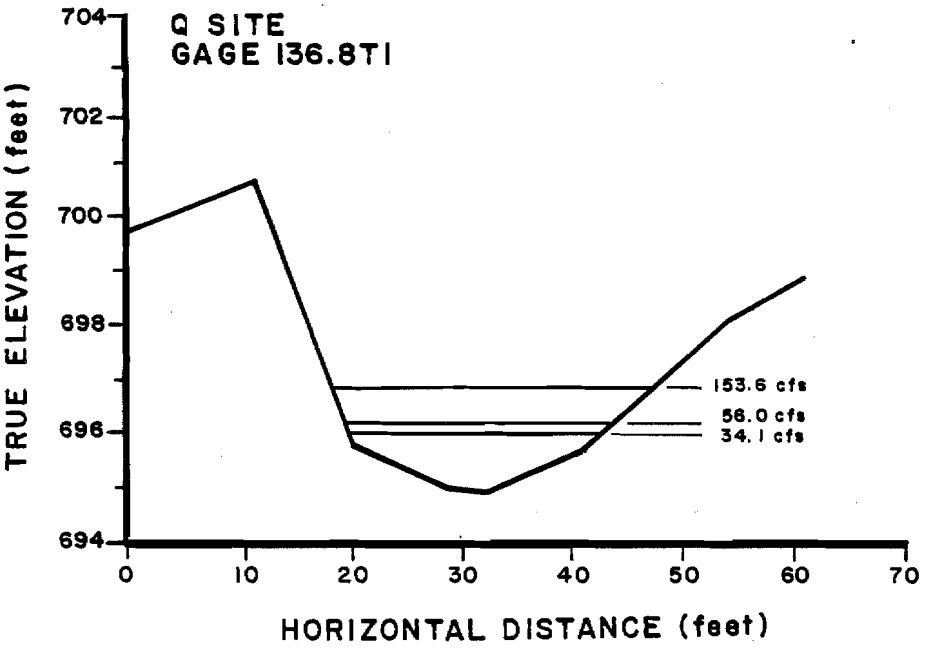
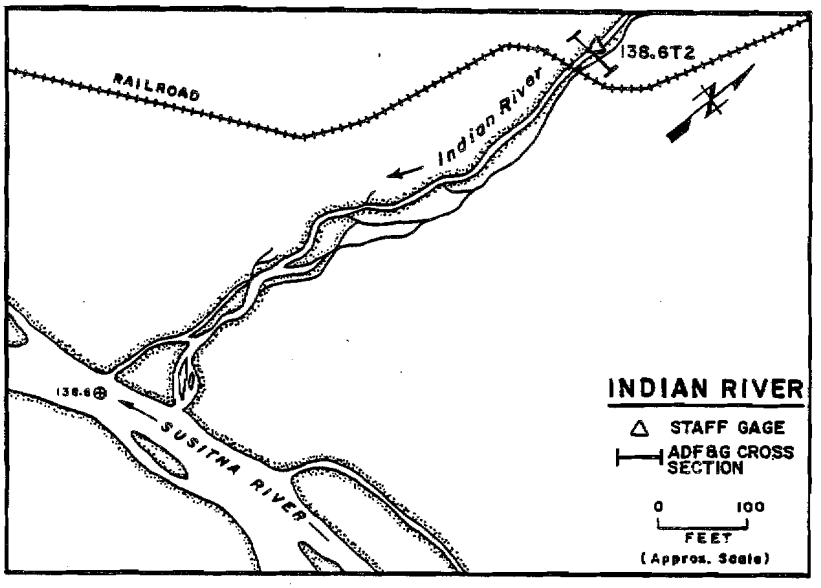


Figure 2-34. Cross sectional profile of the discharge station in Gold Creek (RM 136.8) and water surface elevations corresponding to various streamflows.



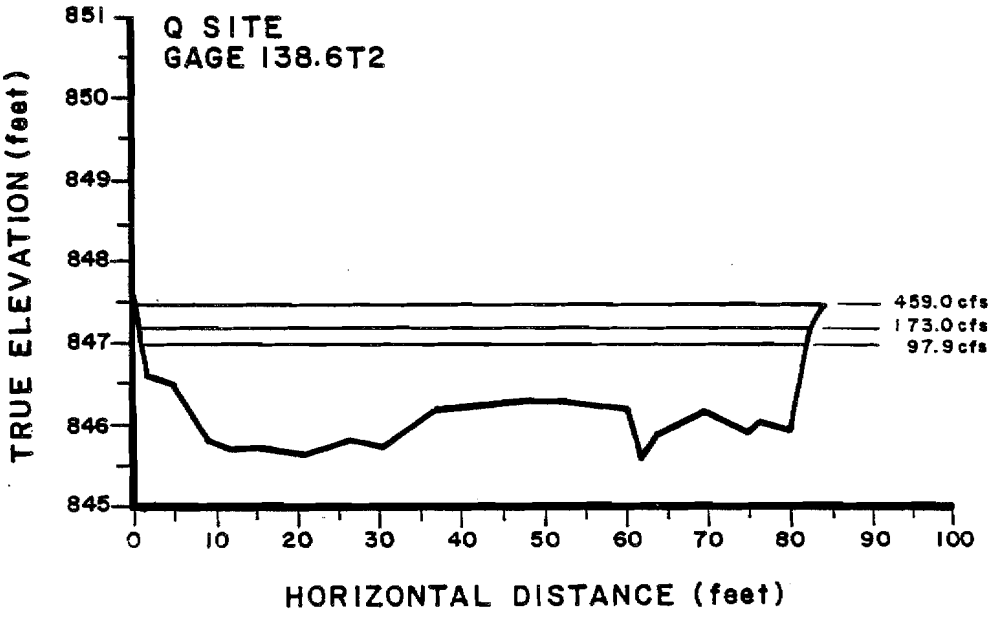


Figure 2-35. Cross sectional profile of the discharge station in Indian River (RM 138.6) and water surface elevations corresponding to various streamflows.

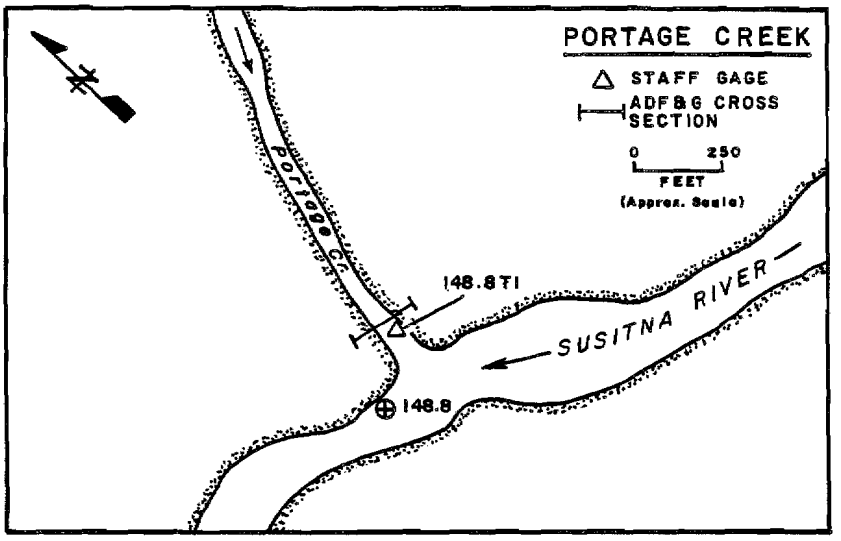
3.4.4 Portage Creek (RM 148.9)

Portage Creek is located on the north bank of the Susitna River. It is a large, fast running tributary with many pool and riffle areas. A cross sectional profile of the discharge station was developed from streamflow measurement data (Figure 2-36).

3.5 General Results

Figure 2-37 is a gradient profile of the reach of the Susitna River from Talkeetna to Devil Canyon and includes the locations of the channel geometry study sites. This profile was developed form data collected by R&M Consultants in 1982 (R&M, 1982).

Table 2-18 lists the gradients of the thalweg profile study sites, the adjacent mainstem Susitna River gradients, and the gradients of the backwater areas within the study sites. Also included are the ranges of the backwater areas observed and the corresponding range of mainstem Susitna River discharges.



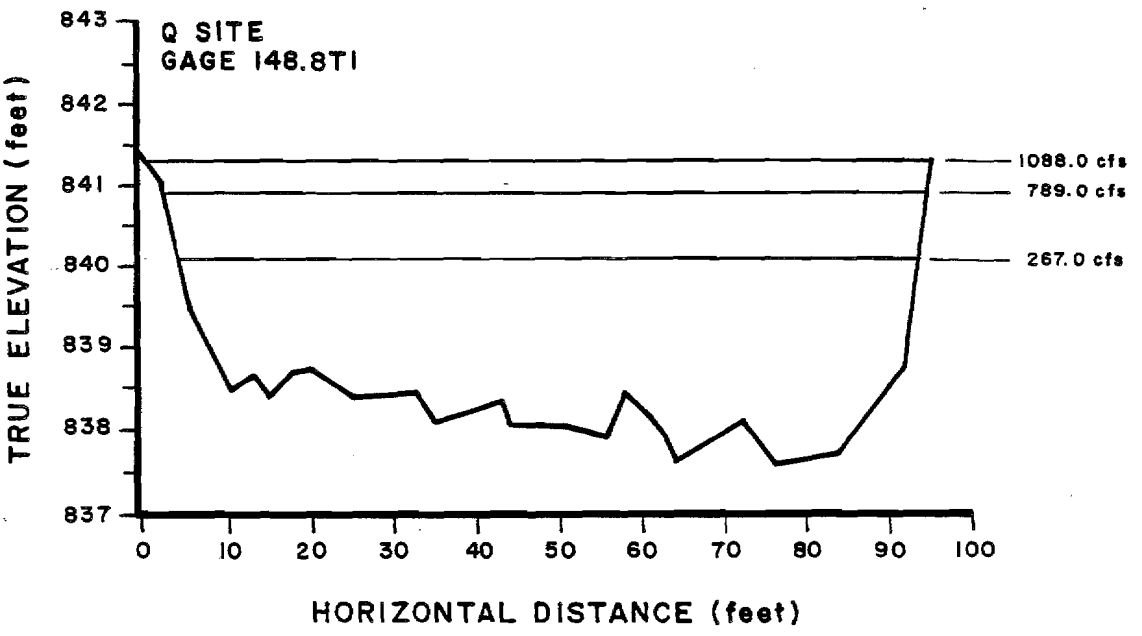


Figure 2-36. Cross sectional profile of the discharge station in Portage Creek (RM 148.8) and water surface elevations corresponding to various streamflows.

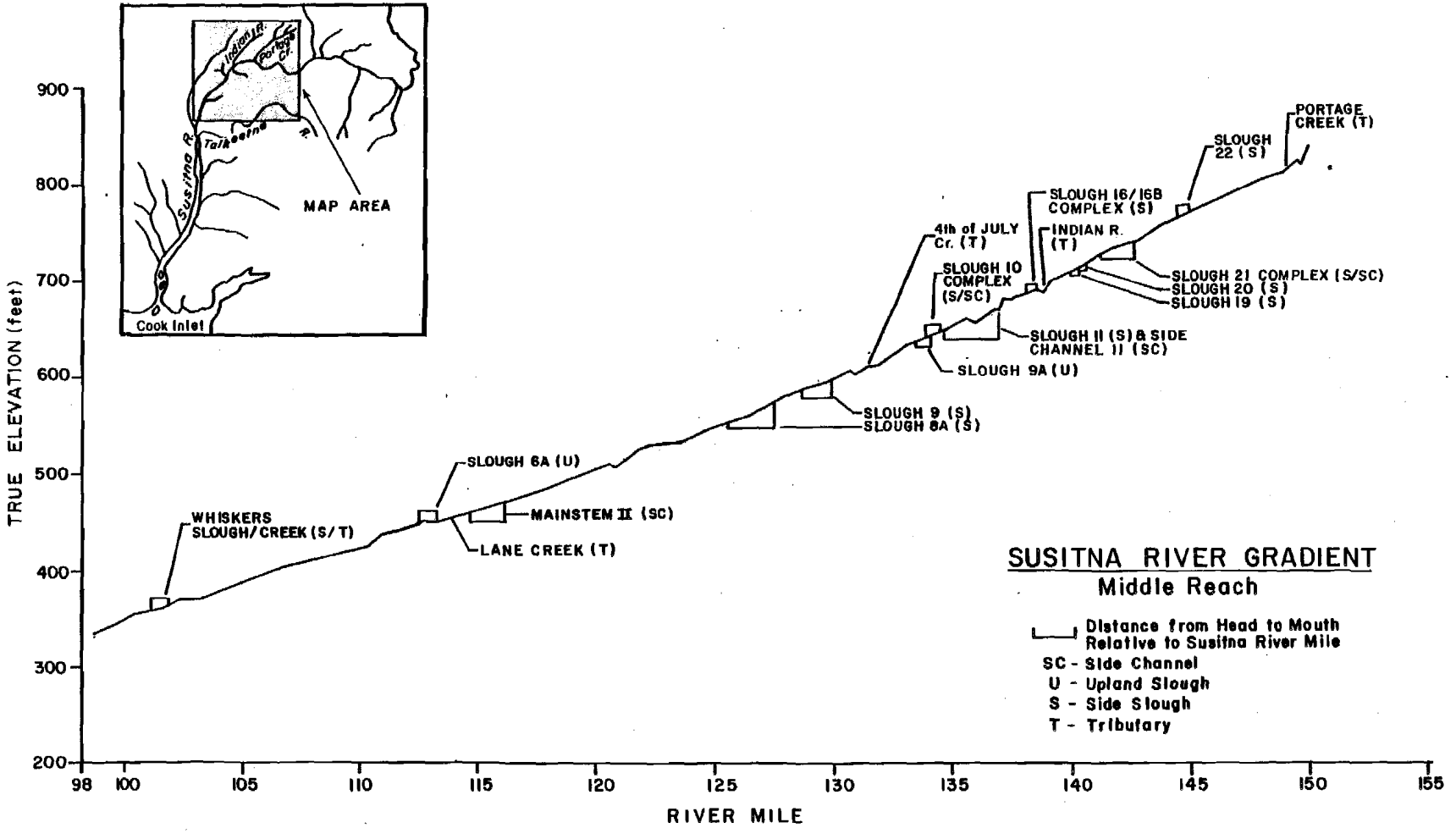


Figure 2-37. Gradient profile of the Middle Reach of the Susitna River (Talkeetna to Portage Creek).

TABLE 2-18. Summary of site gradients, adjacent mainstem Susitna River gradients, and backwater areas in side channels and sloughs (side and upland) corresponding to mainstem discharges, 1983.

SITE	RM	SITE GRADIENT (FT/MI)	MAINSTEM GRADIENT (FT/MI)	GRADIENT OF BACKWATER AREA (FT/MI)	RANGE OF OBSERVED BACKWATER AREA FROM MOUTH OF STUDY SITE (FT)	CORRESPONDING RANGE OF MAINSTEM DISCHARGE (CFS)
Mainstem 2 Side Channel - NW	114.4	10.2	9.2	6.33	800 - 2,000	9,000 - 31,700
Mainstem 2 Side Channel - NE	114.4	12.5	9.2	--	No backwater area observed	
Side Channel 10	133.8	22.3	9.0	22.4	400 - 1,200	12,200 - 22,700
Upper Side Channel 11	136.2	23.6	16.6	24.4	500[1]	11,400 - 31,700
Side Channel 21	140.6	12.4	16.6	9.5	1,500[1]	16,000 - 33,000
Whiskers Creek Side Slough	101.2	9.2	4.9	9.5	500 - 1,000	12,200 - 31,800
Side Slough 8A	125.3	11.5	9.3	10.8	1,000 - 1,400	10,600 - 31,000
Side Slough 9	128.3	13.8	8.7	12.4	500[1]	15,200 - 22,700
Side Slough 9A	133.2	15.7	11.1	--	No data	
Side Slough 11	135.3	19.8	10.3	17.0	200[1]	10,600 - 32,000
Side Slough 16	137.7	9.9	10.9	6.9	600	16,500[2]
Side Slough 16B	137.9	17.2	10.9	--	No backwater area observed	
Side Slough 20	140.1	13.5	13.4	26.1	300[1]	8,480 - 32,000
Side Slough 21	141.8	22.9	12.1	--	No backwater area observed	
Side Slough 22	144.3	15.0	11.5	9.6	1,400[1]	22,900 - 28,000
Upland Slough 6A	112.3	6.0	10.6	10.6	1,200[1]	10,600 - 26,000
Upland Slough 10 NE	133.8	21.8	9.0	20.2	300[2]	12,200[2]
Upland Slough 10 NW	133.8	13.5	9.0	2.6	1,000[2]	12,200[2]
Upland Slough 19	140.0	16.9	14.1	1.0	300[1]	10,300 - 26,800

[1] Backwater area restricted over a range of mainstem discharges.

[2] Observation limited to single mainstem discharge with backwater area noted during thalweg survey.

4.0 DISCUSSION

Channel geometry data have been collected since 1982 at 21 side channel, upland and side slough, and tributary habitats located in the middle reach of the Susitna River. These data were collected to describe the relative channel characteristics of these study sites. This data supports the evaluation of passage conditions (Sautner et al. 1984) and spawning (Vincent-Lang et al. 1984) and rearing (Schmidt et al. 1984) habitat modeling within these study sites and the evaluation of mainstem discharge effects on the hydraulic conditions of these study sites (Quane et al. 1984).

Thalweg profiles, depicting the streambed gradient and substrate composition, were constructed for four side channel and 13 upland and side sloughs. Generally, upland and side sloughs were found to have less gradients than do side channels. Ranges and means of gradients measured at study slough and side channels are 6.0-22.9 ft/mi and 14.8 ft/mi and 10.2 to 23.6 ft/mi and 16.2 ft/mi, respectively (Table 2-18). Additionally, substrates in upland and side sloughs are smaller than substrate observed in side channels.

Water surface elevations obtained at high, medium, and low mainstem discharges were illustrated on the thalweg profile of each study site to depict the presence and extent of backwater as a function of mainstem discharge at each study site. Backwater was observed to occur during evaluated discharges at all but two of the study sites (Side Sloughs 16B and 21). Backwater areas, extending up to 1,500 ft, were found to occur at the remaining 15 slough and side channel study sites (Table 2-18).

Cross section profile, illustrating the cross sectional channel characteristics of slough and side channel study sites, were also constructed for selected stage and discharge monitoring stations within study sites. These profiles were used to validate assumptions used in the derivation of rating curves. Additionally, water surface elevations, obtained from stage reading at high, medium, and low flows, were superimposed on each cross section profile to graphically depict the response of wetted surface area to changes in mainstem discharge at each study site.

5.0 GLOSSARY

Backwater Area - A reach of stream with reduced or no velocity and a rise in stage resulting from a hydraulic or physical barrier. Backwater areas in habitats adjacent to the Susitna River usually are due to an increase in mainstem discharge and occur at the mouth of or within a side channel or slough.

Breaching - The overtopping of the head of a side channel or side slough by the mainstem river.

Clearwater Plume - the extension of the clearwater of a tributary into the turbid mainstem at and below the confluenceof the two. Due to the different densities of the mainstem and tributary waters, these two water bodies do not readily mix, causing a clearly defined clearwater extension of the tributary along the river bank at end below the actual confluence. Size of the plume is a function of tributary flow and mainstem discharge.

Datapod - A dual channel, electronic instrument capable of simultaneously measuring and recording from each channel on a continuous basis. Datapods have been used to monitor stage, temperature and dissolved gas concentrations.

Discharge - Discharge, or streamflow, is defined as the volume rate of flow of water passing a specific location for a specific point in time. Dimensions are usually expressed as cubic feet per second (cfs). For the purpose of this report discharge will refer specifically to mainstem habitat and streamflow for side channel, slough and tributary habitats.

DSM - A non-volatile, ultraviolet (UV) erasable, solid state data storage module capable of storing approximately 3 months of stage, temperature or dissolved gas concentration data.

Gaging Station - A location which has been established for monitoring stage, flow and/or discharge.

Habitat - The surrounding environmental conditions to which a particular species and life stage of fish responds both behaviorally and physiologically.

Head - The upstream or point of origin of a lotic water body.

Lower Reach (of the Susitna River) - The segment of the Susitna River between Cook Inlet and the Chulitna River confluence. (See also middle reach and upper reach).

Mainstem Habitat - Consists of those portions of the Susitna River that normally convey water throughout the year. Both single and multiple channel reaches are included in this habitat category. Groundwater and tributary inflow appear to be inconsequential contributors to the overall characteristics of mainstem habitat. Mainstem habitat is typically characterized by high water velocities and well armored streambeds. Substrates generally consist of boulder

and cobble size materials with interstitial spaces filled with a grout-like mixture of small gravels and glacial sands. Suspended sediment concentrations and turbidity are high during summer due to the influence of glacial melt-water. Discharges recede in early fall and the mainstem clears appreciably in October. An ice cover forms on the river in late November or December.

Mean Daily Discharge - The computed mean mainstem discharge per 24 hour period for a USGS gaging station.

Middle Reach (of the Susitna River) - The segment of the Susitna River between the Chulitna River confluence and Devil Canyon. (See also lower reach and upper reach).

Monitoring Station - A station set up for the collection of a particular data base.

Mouth - The downstream confluence of a lotic water body with another water body.

Overtopping - See breaching.

Peripheral Habitats - Aquatic habitats adjacent to the mainstem Susitna River habitat (e.g. side channel, side slough, upland slough, tributary mouth and/or tributary habitats).

Side Channel Habitat - Consists of those portions of the Susitna River that normally convey water during the open water season but become appreciably dewatered during periods of low mainstem discharge. Side channel habitat may exist either in well defined overflow channels, or in poorly defined water courses flowing through partially submerged gravel bars and islands along the margins of the mainstem river. Side channel streambed elevations are typically lower than the mean monthly water surface elevations of the mainstem Susitna River observed during June, July, and August. Side channel habitats are characterized by shallower depths, lower velocities and smaller streambed materials than the adjacent habitat of the mainstem river.

Side Slough Habitat - is located in overflow channels between the edge of the floodplain and the mainstem and side channels of the Susitna River. It is usually separated from the mainstem and/or side channels by well vegetated bars. An exposed alluvial berm often separates the head of the slough from mainstem discharge or side channel flows. The controlling streambed/bank elevations at the upstream end of the side sloughs are slightly less than the water surface elevations of the mean monthly discharges of the mainstem Susitna River observed for June, July, and August. At intermediate and low-discharge periods, the side sloughs convey clear water from small tributaries and/or upwelling groundwater. These clear water inflows are essential contributors to the existence of this habitat

type. The water surface elevation of the Susitna River generally causes a backwater to extend well up into the slough from its lower end. Even though this substantial backwater exists, the sloughs function hydraulically very much like small stream systems and several hundred feet of the slough channel often conveys water independent of mainstem backwater effects. At high discharges the water surface elevations of the mainstem river is sufficient to overtop the upper end of the slough. Surface water temperatures in the side sloughs during summer months are principally a function of air temperature, solar radiation, and the temperature of the local runoff.

Stage - The height of the water surface above an established datum plane. Stage can be converted to true water surface elevation if the observations are converted into project datum.

Streamflow - Same as discharge but refers specifically to side channel, slough and tributary habitats whereas discharge denotes streamflow in mainstem habitats. See Discharge.

Tributary Habitat - Consists of the full complement of hydraulic and morphologic conditions that occur in the tributaries. Their seasonal flow, sediment, and thermal regimes reflect the integration of the hydrology, geology, and climate of the tributary drainage. The physical attributes of tributary habitat are not dependent on mainstem conditions.

Tributary Mouth Habitat - Extends from the uppermost point in the tributary influenced by mainstem Susitna River or slough backwater effects to the downstream extent of the tributary plume which extends into the mainstem Susitna River or slough.

Upland Slough Habitat - Differs from side slough habitat in that the upstream end of the slough does not interconnect with the surface waters of the mainstem Susitna River or its side channels even at high mainstem discharges. These sloughs are characterized by the presence of beaver dams and an accumulation of silt covering the substrate resulting from the absence of mainstem scouring discharges.

Upper Reach (of the Susitna River) - The segment of the Susitna River between Devil Canyon and the headwaters (See also lower reach and middle reach).

USGS Water Year - The USGS water year runs from October to September and the years designation is determined by the end of the period. The 1983 water year occurs from October 1 of 1982 to September 30 of 1983.

6.0 CONTRIBUTORS

PROJECT LEADER	
Aquatic Habitat and Instream Flow Project Leader	Christopher Estes
PRIMARY AUTHORS	Tim Quane Isaac Queral Theresa Keklak Don Seagren
REPORT COORDINATORS	Douglas Vincent-Lang Tim Quane Camille Stephens Theresa Keklak
EDITORS	Douglas Vincent-Lang Camille Stephens Theresa Keklak
DATA PROCESSING	Allen Bingham
DATA COLLECTION	Aquatic Habitat Staff
DRAFTING	Sally Donovan Carol Hepler
TYPING	Skeers Word Processing

7.0 ACKNOWLEDGEMENTS

Funding for this study was provided by the State of Alaska, Alaska Power Authority. Input into study design was provided by E.W. Trihey & Associates.

8.0 LITERATURE CITED

Alaska Department of Fish and Game (ADF&G). 1982. Susitna Hydro Aquatic Studies, Phase II, Basic Data Report; Vol. 4: Aquatic Habitat and Instream Flow Studies, Parts I and II. Anchorage, Alaska. Prepared for Acres American, Anchorage, Alaska.

_____ 1983. Aquatic Studies Procedures Manual. Phase II. Prepared for Acres American, Inc., Anchorage, Alaska.

Quane, T., P. Morrow, and T.Withrow. 1984. Chapter 1: Stage and discharge investigations. In Report No. 3: Aquatic Habitat and Instream Flow Investigations (May - October 1983). C. Estes and D. Vincent-Lang, eds. Alaska Department of Fish and Game, Susitna Hydro Aquatic Studies. Anchorage, Alaska.

R&M Consultants, Inc. 1982. Susitna Hydroelectric Project: Hydrographic Surveys Report. Prepared for Acres American, Inc., Anchorage, Alaska.

Sautner, J., L. Vining, and L. Rundquist. 1984. Chapter 6: An evaluation of passage conditions for adult salmon in sloughs and side channels of the middle Susitna River. In Report No. 3: Aquatic Habitat and Instream Flow Investigations (May - October 1983). C. Estes and D. Vincent-Lang, eds. Alaska Department of Fish and Game, Susitna Hydro Aquatic Studies. Anchorage, Alaska.

Schmidt, D., S. Hale, D. Crawford, and P. Suchanek. 1984. Report No. 2: Resident and juvenile anadromous fish investigations (May - October 1983). Alaska Department of Fish and Game, Susitna Hydro Aquatic Studies. Anchorage, Alaska.

Vincent-Lang, D., A. Hoffmann, A. Bingham, C. Estes, D. Hilliard, C. Steward, E. Trihey, and S. Crumley. 1984. Chapter 7: An evaluation of chum and sockeye salmon spawning habitat in sloughs and side channels of the middle Susitna River. In Report No. 3: Aquatic Habitat and Instream Flow Investigations (May - October 1983). C. Estes and D. Vincent-Lang, eds. Alaska Department of Fish and Game, Susitna Hydro Aquatic Studies. Anchorage, Alaska.

U.S. Geological Survey (USGS). 1982. Water Resources Data for Alaska: Water Year 1982. USGS Water - Data Report AK-82-1. Anchorage, Alaska.

9.0 APPENDICES

9.0 APPENDICES

TERMS USED IN THALWEG AND CROSS SECTIONAL DATA TABLES

Bench Mark - That point in the immediate vicinity of the study site (i.e., head pin, nail in tree base or ground) which is assigned an elevation (usually 100 feet) from which relative elevations of headpins, the water surface and stream bed were determined. All bench marks are surveyed into project datum to obtain true elevation.

Comments - Unique or important characteristics of the channel at a particular station (i.e., riffle, pool, staff gage location, modeling transect location, etc.)

Depth - The distance from the water surface of the surface to the substrate at the point where the thalweg elevation was surveyed.

Dewatered - No water present at time of thalweg survey. At higher flows, water may be present.

Distance - The linear measurement between two points or stations.

LWE - Left bank water edge

LWS - Left bank water surface

Point - Refers to a station where an elevation was determined and is numbered from the mouth upstream.

RWE - Right bank water edge

RWS - Right bank water surface

Station - The upstream (positive) or downstream (negative) distance referenced from the month of a slough. The mouth is assigned the station 0+00 (note that this definition differs from that used in cross-section tables).

Substrate - The predominant particle size in the immediate area where the thalweg elevation was surveyed based on the following criteria (Modified Wentworth Scale).

SI - Silt (very fine particles)
SA - Sand (fine particles)
SG - Small gravel (0.25" to 1" diameters)
LG - Large gravel (1" to 3" diameters)
RU - Rubble (3" to 5" diameters)
CO - Cobble (5" to 10" diameters)
BO - Boulder (10" diameters and greater)

TBM - Temporary bench mark (see definition for bench mark).

Thalweg - The line following the deepest part or middle of the bed or channel of a river or stream (Arnette, J.J. 1975). The baisc definition has been expanded to include sloughs and side channels.

Thalweg Elevation - The elevation of the lowest point in a cross section at a particular station.

TR - ADF&G modeling study transect

WSEL - Water surface elevation.

Appendix 2-A

LIST OF APPENDIX A TABLES

LIST OF APPENDIX A TABLES (Continued)

Appendix Table 2-A-1. Data used to develop the streambed (thalweg) profile of Mainstem 2 - Northwest (left) Channel (RM 114.4), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		-1 + 21	471.86	2.99	474.85	CORU	Mainstem
	121						
2		0 + 00	472.61	2.17	474.78	SICO	Mouth of Mainstem II, Backwater
	100						
3		1 + 06	473.74	0.90	474.64	SI	High point in backwater pool
	185						
4		2 + 91	472.47	2.03	474.50	SICO	Backwater
	308						
5		5 + 99	472.47	2.07	474.54	SICO	Backwater pool
	197						
6		7 + 96	472.08	2.44	474.52	SICO	Backwater pool
	30						
7		8 + 26	473.60	0.82	474.42	SI	Riffle/backwater
	276						
8		11 + 02	474.45	0.36	474.81	RUCO	Pool/riffle
	58						
9		11 + 60	473.66	1.17	474.83	LGCO	Pool at Gage 114.4 S7, mid pool
	79						
10		12 + 39	474.53	0.32	474.85	LGCO	Riffle/pool
	147						
11		13 + 86	475.82	0.39	476.21	RUCO	Pool/riffle
	150						
12		15 + 36	473.48	2.74	476.22	RULG	Pool
	77						
13		16 + 13	474.21	2.01	476.22	RUCO	Pool, right channel joins at this point
	34						
14		16 + 47	475.74	0.47	476.26	RUCO	Riffle/pool
	272						
15		19 + 19	476.30	0.39	476.69	RULG	Pool/riffle
	99						

Appendix Table 2-A-1. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		20 + 18	475.88	0.80	476.68	RULG	Pool
	88						
17		21 + 06	476.32	0.28	476.60	RULG	Riffle/pool
	214						
18		23 + 20	477.11	0.37	477.48	LGRU	Riffle
	184						
19		25 + 04	478.34	0.36	478.70	LGRU	Pool/riffle
	327						
20		28 + 91	477.29	1.44	478.73	RULG	Pool
	417						
21		33 + 08	478.32	0.27	478.59	LGRU	Riffle/pool
	232						
22		35 + 40	478.60	0.35	478.95	CORU	Pool/riffle
	359						
23		38 + 99	477.66	1.14	478.80	RUCO	Pool
	354						
24		41 + 53	477.11	1.71	478.82	RUCO	Pool
	50						
25		42 + 03	478.61	0.22	478.83	CORU	Riffle/pool
	38						
26		42 + 41	479.09	0.30	479.39	CORU	
	61						
27		43 + 02	481.09	0.00	481.09	CORU	High point
	50						
28		43 + 52	480.90	0.00	480.90	CORU	At gage 114.4 H3B
	54						
29		44 + 06	480.30	0.38	480.68	RUCO	Edge of solid ice
	35						
30		44 + 41	478.85	1.85	480.70	RUCO	Mainstem, head of left fork

Appendix Table 2-A-2. Data used to develop the streambed (thalweg) profile of Mainstem 2 - Northeast (right) Channel (RM 114.4), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		16 + 13	474.21	2.01	476.22	RUCO	Mouth of right channel
	60						
2		16 + 73	475.63	0.57	476.20	LGCO	
	12						
3		16 + 85	475.94	0.27	476.18	LGCO	
	28						
4		17 + 13	475.13	0.97	476.10	LGCO	
	35						
5		17 + 48	474.09	2.00	476.09	LGCO	
	78						
6		18 + 26	473.29	2.85	476.14	LGCO	
	43						
7		18 + 69	473.85	2.30	476.15	LGCO	
	18						
8		18 + 87	473.41	2.75	476.16	COLG	
	18						
9		19 + 05	475.77	0.40	476.17	COLG	
	16						
10		19 + 21	476.63	0.15	476.78	COLG	
	32						
11		19 + 53	477.20	0.15	477.35	COLG	
	111						
12		20 + 64	477.65	0.10	477.75	COLG	
	54						
13		21 + 18	477.17	0.60	477.77	COLG	
	39						
14		21 + 57	477.46	0.30	477.76	COLG	
	60						
15		22 + 17	476.82	0.95	477.77	COLG	
	67						

Appendix Table 2-A-2. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		22 + 84	477.32	0.40	477.22	COLG	
	106						
17		23 + 90	477.35	0.40	477.75	COLG	
	117						
18		25 + 07	477.38	0.45	477.83	COLG	
	36						
19		25 + 43	477.24	0.52	477.76	COLG	
	87						
20		26 + 30	475.87	1.90	477.77	COLG	
	95						
21		27 + 25	476.32	1.40	477.72	LG	
	12						
22		27 + 37	476.77	1.00	477.77	LG	
	9						
23		27 + 46	477.35	0.42	477.70	LG	
	34						
24		27 + 80	477.72	0.05	477.77	LG	
	68						
25		28 + 48	476.69	0.95	477.64	COLG	
	162						
26		30 + 10	475.44	2.20	477.64	SASG	
	86						
27		30 + 96	474.48	3.20	477.68	SACO	
	112						
28		32 + 08	475.05	2.65	477.70	LGSG	
	177						
29		33 + 85	478.77	0.00	478.77	COLG	
	77						
30		34 + 62	478.30	0.10	478.40	COLG	
	170						

Appendix Table 2-A-2. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
31		36 + 32	477.62	0.80	478.42	COLG	
	71						
32		37 + 03	477.92	0.50	478.42	COLG	
	15						
33		37 + 18	478.38	0.20	478.58	COLG	
	13						
34		37 + 31	478.29	0.29	478.58	COLG	
	52						
35		37 + 83	478.65	0.10	478.75	COLG	
	63						
36		38 + 46	479.55	0.10	479.65	COLG	
	74						
37		39 + 20	479.67	0.10	479.77	COLG	
	13						
38		39 + 33	479.62	0.15	479.77	BOCO	
	83						
39		40 + 16	479.28	0.50	479.78	BOCO	
	132						
40		41 + 48	478.47	1.32	479.79	BOCO	
	59						
41		42 + 07	478.81	1.00	479.81	BOCO	
	47						
42		42 + 54	478.40	1.40	479.80	BOCO	
	42						
43		42 + 96	478.84	0.95	479.79	BOCO	
	140						
44		44 + 36	479.33	0.40	479.73	BOCO	
	98						
45		45 + 34	479.71	0.00	479.71	BOCO	
	135						
46		46 + 69	480.25	0.00	480.25	BOCO	
	63						

Appendix Table 2-A-2. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
47		47 + 32	480.51	0.00	480.51	BOCO	
	16						
48		47 + 48	480.68	0.00	480.68	BOCO	
	11						
49		47 + 59	480.14	0.40	480.54	BOCO	
	58						
50		48 + 17	480.05	0.41	480.46	BOCO	
	26						
51		48 + 43	479.83	0.64	480.47	BOCO	
	24						
52		48 + 67	481.54	0.00	481.54	BOCO	
	53						
53		49 + 20	481.00	0.00	481.00	BOCO	
	114						
54		50 + 34	481.12	0.00	481.12	BOCO	
	305						
55		53 + 39	482.71	0.00	482.71	BOCO	
	161						
56		55 + 00	482.59	0.00	482.59	BOCO	
	141						
57		56 + 41	482.77	0.00	482.77	BOCO	
	57						
58		56 + 98	482.65	0.00	482.65	BOCO	
	41						
59		57 + 39	482.55	0.10	482.65	BOCO	
	27						
60		57 + 66	482.42	0.25	482.67	BOCO	
	41						
61		58 + 07	482.55	0.12	482.67	BOCO	
	19						

Appendix Table 2-A-2. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
62		58 + 26	481.80	0.89	482.69	BOCO	
	14						
63		58 + 40	482.61	0.00	482.61	BOCO	
	6						
64		58 + 46	483.84	0.00	483.84	BOCO	
	142						
65		59 + 88	484.55	0.00	484.55	BOCO	

Appendix Table 2-A-3. Data used to develop the streambed thalweg profile of Side Channel 10 (RM 133.8), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		-3 + 29	644.26	5.40	649.66	SIBO	Mainstem
	134						
2		-1 + 95	645.63	4.16	649.79	SIBO	Mainstem
	195						
3		0 + 00	645.29	4.57	649.86	SIBO	Mouth at Gage 133.8 W5A, Pool - backwater
	84						
4		0 + 84	645.10	4.67	649.77	SIBO	Pool - backwater
	96						
5		1 + 80	647.20	2.66	649.86	SIBO	Pool - backwater
	53						
6		2 + 33	647.63	2.15	649.78	SIBO	Pool - backwater
	23						
7		2 + 56	647.34	2.49	649.83	SIBO	Pool - backwater
	26						
8		2 + 82	647.55	2.28	649.83	SIBO	Pool - backwater
	22						
9		3 + 04	647.06	2.76	649.82	SIBO	Pool - backwater
	9						
10		3 + 13	647.40	2.44	649.84	SISA	Pool - backwater
	11						
11		3 + 24	647.98	1.82	649.80	SISA	Pool - backwater
	14						
12		3 + 38	649.07	0.77	649.84	CO	Riffle
	41						

Appendix Table 2-A-3. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
13		3 + 79	647.67	2.18	649.85	CO	
	183						
14		5 + 62	650.67	0.51	651.18	SILT	Pool
	185						
15		7 + 47	650.69	0.51	651.20		
	64						
16		8 + 11	650.57	0.63	651.20		Backwater pool
	115						
17		9 + 26	649.85	1.36	651.21		
	85						
18		10 + 11	650.32	0.90	651.22	CO	
	197						
19		12 + 08	650.42	0.83	651.25		Bottom riffle
	81						
20		12 + 89	651.04	0.28	651.32		Bottom next riffle
	18						
21		13 + 07	651.33	0.31	651.64		Top of riffle
	52						
22		13 + 59	652.02	0.22	652.24		Top of riffle
	154						
23		15 + 13	652.05	0.36	652.41		Bottom of riffle
	52						
24		15 + 65	652.46	0.36	652.82		Top riffle
	73						
25		16 + 38	651.19	1.66	652.85		
	35						
26		16 + 73	650.72	2.12	652.84		Bottom pool
	35						
27		17 + 08	652.36	0.49	652.85		Bottom of riffle
	28						

Appendix Table 2-A-3. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
28		17 + 36	652.67	0.45	653.12		Top of riffle
	32						
29		17 + 68	648.94	4.22	653.16		Bottom of pool
	38						
30		18 + 06	652.26	0.93	653.19		Bottom of riffle
	10						
31		18 + 16	653.11	0.30	653.41		Top riffle
	74						
32		18 + 90	651.81	1.68	653.49		Pool
	46						
33		19 + 36	651.85	1.63	653.48		Pool
	21						
34		19 + 57	652.85	0.65	653.50		Pool
	40						
35		19 + 97	651.13	2.39	653.52		Pool
	62						
36		20 + 59	653.16	0.35	653.51		Bottom of riffle
	27						
37		20 + 86	654.24	0.25	654.49		Top of riffle/TR4
	131						
38		22 + 17	654.06	0.54	654.60		Pool
	52						
39		22 + 69	653.35	1.24	654.59		Pool
	52						
40		23 + 21	652.91	1.65	654.56		FHU TR5
	32						
41		23 + 53	652.77	1.79	654.56		Pool
	94						
42		24 + 47	654.11	0.43	654.54		Bottom of log jam
	5						

Appendix Table 2-A-3. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
43		24 + 52	654.53	0.58	655.11		Top of log jam/bottom of riffle
	20						
44		24 + 72	655.28	0.40	655.68		Top of riffle
	13						
45		24 + 85	655.30	0.40	655.70		Pool lower
	58						
46		25 + 43	654.86	0.85	655.71		Pool mid
	56						
47		25 + 99	655.24	0.47	655.71		Pool/riffle
	40						
48		26 + 39	655.80	0.46	656.26		Riffle/pool
	24						
49		26 + 63	655.94	0.35	676.29		Pool bottom
	24						
50		26 + 87	656.62	0.09	656.71		Head-barely breached

Appendix Table 2-A-4. Data used to develop the streambed (thalweg) profile of Upper Side Channel 11 (RM 136.2), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		1 + 75	675.68	2.35	678.03	SISA	Backwater
	0						
2		1 + 01	674.81	3.25	678.06	SISA	Backwater
	74						
3		0 + 21	674.73	3.35	678.08	SISA	Backwater
	80						
4		0 + 00	674.32	3.70	678.02	CO	Backwater
	21						
5		0 + 62	674.64	3.40	678.04	CO	Bottom of riffle
	62						
6		0 + 81	674.40	3.60	678.00	CO	Bottom of riffle
	19						
7		1 + 31	674.79	3.23	678.02	SICO	End backwater
	50						
8		1 + 54	675.60	2.40	678.00	SICO	End backwater
	23						
9		2 + 31	676.60	1.50	678.10	SICO	
	77						
10		3 + 75	676.05	2.00	678.05	SICO	
	144						
11		4 + 32	676.06	2.00	678.06	SICO	Bottom of riffle
	57						
12		4 + 85	677.05	1.00	678.05	SICO	Mid riffle
	53						
13		6 + 37	678.71	0.85	679.56	SICO	Top riffle
	152						
14		7 + 19	678.76	1.00	679.76	SOCO	Small riffle area
	82						
15		8 + 55	679.66	0.90	680.56	COBO	Riffle
	136						

Appendix Table 2-A-4. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		10 + 12	680.50	0.65	681.15	COBO	Top of riffle
	157						
17		11 + 43	680.08	1.30	681.38	COBO	Top of riffle
	131						
18		12 + 08	679.42	1.95	681.37	COBO	Top of pool
	65						
19		13 + 73	680.56	1.35	681.91	COBO	Mid riffle
	165						
20		14 + 30	681.73	1.18	682.92	COBO	Riffle
	57						
21		15 + 41	681.91	1.38	683.29	COBO	Riffle
	111						
22		16 + 84	682.55	1.32	683.87	COBO	Riffle
	143						
23		17 + 77	682.71	1.35	684.06	COBO	Riffle
	93						
24		19 + 24	682.22	1.50	683.72	COBO	Riffle
	147						
25		19 + 95	683.91	1.25	685.16	COBO	Riffle
	71						
26		20 + 80	684.45	1.11	685.56	COBO	Top of riffle
	85						
27		21 + 69	684.04	1.66	685.70	LGBO	Mid pool at head
	89						
28		22 + 32	684.31	1.42	685.73	SISA	
	63						

Appendix Table 2-A-5. Data used to develop the streambed (thalweg) profile of Side Channel 21 (RM 140.6), 1982.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		-51 + 68	731.05	0.40	731.45		Mouth
	46						
2		-51 + 22	730.95	0.45	731.40		Bar at mouth
	41						
3		-50 + 81	730.15	1.35	731.50		Bottom of riffle
	24						
4		-50 + 57	730.55	1.05	731.60		Riffle
	26						
5		-50 + 31	731.15	0.75	731.90		Top of riffle
	74						
6		-49 + 57	731.65	0.30	731.95		Pool
	200						
7		-47 + 57	730.25	1.70	731.95		Pool
	90						
8		-46 + 67	730.70	1.25	731.95		Top of pool
	2						
9		-46 + 65	731.25	0.70	731.95		Top of pool
	108						
10		-45 + 57	731.50	0.45	731.95		Top of pool
	61						
11		-44 + 96	731.50	0.60	732.10		Bottom of run
	58						
12		-44 + 38	731.65	0.60	732.25		Top of run
	17						
13		-44 + 21	732.40	0.20	732.60		Riffle
	11						
14		-44 + 10	732.10	0.55	732.65		Top of riffle
	28						
15		-43 + 82	731.30	1.35	732.65		Pool
	53						
16		-43 + 29	731.85	0.80	732.65		Top of pool
	88						
17		-42 + 41	732.05	0.65	732.70		Run
	126						

Appendix Table 2-A-5. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
18		-41 + 15	732.55	0.50	733.05		Run
	130						
19		-39 + 85	731.05	2.05	733.10		Pool
	146						
20		-38 + 39	731.45	1.65	733.10		Top of pool
	20						
21		-38 + 19	731.55	1.55	733.10		Top of pool
	31						
22		-37 + 88	732.75	0.35	733.10		Top of pool
	87						
23		-37 + 01	733.65	0.50	734.15		Riffle
	82						
24		-36 + 19	734.55	0.25	734.80		Top of riffle
	45						
25		-35 + 74	734.85	0.60	735.45		Top of riffle
	66						
26		-35 + 08	734.90	0.70	735.60		Pool
	80						
27		-34 + 28	735.20	0.40	735.60		Pool
	38						
28		-33 + 90	735.35	0.35	735.70		Top of pool
	37						
29		-33 + 53	735.90	0.40	736.30		Top of riffle
	62						
30		-32 + 91	735.40	0.95	736.35		Pool
	91						
31		-32 + 00	736.00	0.35	736.35		Pool
	87						
32		-31 + 13	736.10	0.70	736.80		Run
	39						
33		-30 + 74	736.10	0.80	736.90		Pool
	67						
34		-30 + 07	736.00	0.90	736.90		Pool
	57						

Appendix Table 2-A-5. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
35		-29 + 50	736.55	0.50	737.05		Top of pool
	9						
36		-29 + 41	736.85	0.45	737.30		Top of riffle
	53						
37		-28 + 88	737.05	0.40	737.45		Bottom of riffle
	47						
38		-28 + 41	737.10	0.65	737.75		Riffle
	85						
39		-27 + 56	737.50	0.35	737.85		Riffle
	48						
40		-27 + 08	737.50	0.55	738.05		Riffle
	42						
41		-26 + 66	737.80	0.45	738.25		
	33						
42		-26 + 33	737.35	0.95	738.30		Boulder run
	19						
43		-26 + 14	737.85	0.45	738.30		Boulder run
	22						
44		-25 + 92	737.35	0.10	738.45		Boulder run
	75						
45		-25 + 17	737.90	0.60	738.50		Top run
	63						
46		-24 + 54	738.10	0.45	738.55		Pool
	31						
47		-24 + 23	737.55	1.00	738.55		Pool
	101						
48		-23 + 22	738.05	0.55	738.60		Top of pool
	63						
49		-22 + 59	738.55	0.25	738.80		Bottom of riffle
	100						
50		-21 + 59	738.60	0.45	739.05		Riffle
	113						
51		-20 + 46	739.30	0.25	739.55		Riffle
	87						

Appendix Table 2-A-5. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
52		-19 + 59	739.45	0.55	740.00		Riffle
	95						
53		-18 + 64	740.20	0.30	740.50		Riffle
	108						
54		-17 + 56	740.85	0.50	741.35		Riffle
	88						
55		-16 + 68	741.60	0.50	742.10		Riffle
	96						
56		-15 + 72	742.10	0.55	742.75		Riffle
	82						
57		-14 + 90	742.25	0.50	742.75		Riffle
	70						
58		-14 + 20	742.00	0.85	742.85		Run
	90						
59		-13 + 30	742.55	0.30	742.85		Run
	128						
60		-12 + 02	742.15	0.75	742.90		Top of run
	80						
61		-11 + 22	742.20	0.80	743.00		Pool
	103						
62		-10 + 19	742.65	0.35	743.00		Pool
	163						
63		-8 + 56	742.70	0.30	743.00		Top of pool
	54						
64		-8 + 02	742.55	0.70	743.25		Run
	73						
65		-7 + 29	742.75	0.80	743.55		Run
	63						
66		-6 + 66	743.65	0.40	744.05		Run
	32						
67		-6 + 34	743.40	0.75	744.15		Run
	152						
68		-4 + 82	743.05	1.20	744.25		1982/TR-3
	97						

Appendix Table 2-A-5. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
69		-3 + 85	742.00	2.25	744.25		1982/TR-4
	141						
70		-2 + 44	743.65	0.68	744.35		1982/TR-5, from cross section survey data
	60						
71		-1 + 84	744.10	0.51	744.60		1982/TR-6, from cross section survey data
	89						
72		-0 + 95	743.25	1.58	744.80		1982/TR-7, from cross section survey data
	95						
Channel A-6							
1		-8 + 56	742.70	0.30	743.00		
	26						
2		-8 + 30	741.80	1.20	743.00		
	73						
3		-7 + 57	742.80	0.20	743.00		
	53						
4		-7 + 04	743.80	0.20	744.00		
	61						
5		-6 + 43	743.85	0.55	744.40		
	112						
6		-5 + 31	743.50	0.90	744.40		
	133						
7		-3 + 98	744.50	0.00	744.50		Dewatered
	179						
8		-2 + 19	747.21	0.00	747.21		Dewatered
	70						
9		-1 + 49	747.44	0.00	747.44		Dewatered

Appendix Table 2-A-6. Data used to develop the streambed (thalweg) profile of Whiskers Creek Side Slough (RM 101.2), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		0 + 00	361.87	1.06	362.93	LGRU	Mainstem/slough confluence
	236						
2		2 + 36	362.15	0.99	363.14	LGRU	Deep spot in run (near mouth at gage)
	209						
3		4 + 45	361.96	1.45	363.41	LGRU	Deep spot in run
	77						
4		5 + 22	363.06	0.52	363.58	LGRU	Mid-run
	95						
5		6 + 17	364.29	0.19	364.48	LGRU	Mid-run
	131						
6		7 + 48	364.63	0.40	365.03	LGRU	Riffle/pool
	73						
7		8 + 21	363.35	1.73	365.08	LGRU	Pool
	52						
8		8 + 73	364.36	0.74	365.10	LGRU	Pool/riffle
	35						
9		9 + 08	365.10	0.31	365.41	LGRU	Riffle/pool
	292						
10		12 + 00	363.20	2.25	365.45	LGRU	Below ice at creek mouth Pool lower 1/3
	152						
11		13 + 52	363.97	1.45	365.42	RUCO	Above ice, pool upper 1/3
	111						
12		14 + 63	365.02	0.42	365.44	RUCO	Pool/riffle
	20						
13		14 + 83	365.56	0.25	365.81	RUCO	Riffle/pool
	296						
14		17 + 79	362.73	3.00	365.73	RUCO	Pool frozen over - depth estimated - top of ice surveyed
	366						
15		21 + 45	365.47	0.32	365.79	RUCO	Pool/riffle
	106						

Appendix Table 2-A-6. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		22 + 51	366.38	0.20	366.58	RUCO	Riffle/pool
	213						
17		24 + 64	363.46	3.00	366.46	RUCO	Pool - frozen over - estimated depth - top of ice surveyed
	118						
18		25 + 82	366.33	0.20	366.53	RUCO	Forks converge - begin of pool
	295						
19		28 + 77	366.80	0.30	367.10	RUCO	Top of ice - depth estimated R&M cross section
	63						
20		29 + 40	366.97	0.00	366.97	RUCO	Low point at head dry

Appendix Table 2-A-7. Data used to develop the streambed (thalweg) profile of Slough 8A (RM 125.3), 1982.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		-3 + 74	558.60	1.05	559.65		Riffle
	74						
2		-3 + 00	559.40	0.35	559.75		Top of riffle
	75						
3		-2 + 25	558.95	0.85	559.80		Backwater
	75						
4		-1 + 50	558.40	1.40	559.80		Backwater
	50						
5		-1 + 00	557.85	2.05	559.90		Backwater
	63						
6		-0 + 37	559.40	0.50	559.90		Backwater
	37						
7		0 + 00	558.50	1.45	559.95		Mouth
	133						
8		1 + 33	556.95	3.00	559.95		Pool
	6						
9		1 + 39	559.30	0.70	560.00		Head of pool
	50						
10		1 + 89	559.95	0.20	560.15		Top of pool
	113						
11		3 + 02	560.60	0.35	560.95		Top of riffle
	107						
12		4 + 09	559.70	1.25	560.95		Pool
	74						
13		4 + 83	560.40	0.55	560.95		Pool
	114						
14		5 + 97	560.05	0.90	560.95		Pool
	151						
15		7 + 48	560.05	0.90	560.95		Pool
	112						
16		8 + 60	560.15	0.80	560.95		Pool
	53						
17		9 + 13	559.70	1.25	560.95		Pool
	144						

Appendix Table 2-A-7. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
18		10 + 57	560.55	0.40	560.95		Pool
	22						
19		10 + 79	560.75	0.20	560.95		Top of pool
	18						
20		10 + 97	561.15	0.20	561.35		Top of riffle
	37						
21		11 + 34	560.85	0.55	561.40		Run
	43						
22		11 + 77	561.05	0.45	561.50		Run
	43						
23		12 + 20	561.00	0.55	561.55		Run
	40						
24		12 + 60	561.50	0.20	561.70		Bottom of riffle
	20						
25		12 + 80	562.05	0.60	562.65		Bottom of pool
	72						
26		13 + 52	562.05	0.65	562.70		Pool
	24						
27		13 + 76	562.40	0.30	562.70		Pool
	7						
28		13 + 83	562.40	0.40	562.80		Run
	41						
29		14 + 24	562.15	0.70	562.85		Run
	15						
30		14 + 39	562.60	0.40	563.00		
	36						
31		14 + 75	562.80	0.35	563.15		
	47						
32		15 + 22	563.00	0.40	563.40		
	123						
33		16 + 45	563.50	0.20	563.70		
	244						
34		18 + 89	563.60	0.30	563.90		
	10						

Appendix Table 2-A-7. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
35		18 + 99	563.50	2.00	565.50		Top of dam
	156						
36		20 + 55	563.00	2.50	565.50		
	150						
37		22 + 05	559.50	4.00	565.50		Right bank
	269						
38		24 + 74	563.50	2.00	565.50		Pool
	132						
39		26 + 06	562.50	3.00	565.50		Pool
	208						
40		28 + 14	564.00	2.00	565.75		Water's edge
	111						
41		29 + 25	563.75	2.00	565.75		
	90						
42		30 + 15	564.55	1.23	565.78		
	132						
43		31 + 47	564.05	2.31	566.36		
	89						
44		32 + 36	561.25	5.13	566.35		
	66						
45		33 + 02	565.60	0.76	566.35		
	41						
46		33 + 43	565.70	0.79	566.45		
	103						
47		34 + 46	565.85	0.95	566.80		
	176						
48		36 + 22	566.15	1.29	567.45		
	113						
49		37 + 35	566.30	1.16	567.45		
	88						
50		38 + 23	565.45	1.98	567.45		
	50						
51		38 + 73	566.60	0.43	567.05		Bottom of riffle
	131						

Appendix Table 2-A-7. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
52		40 + 04	568.40	0.16	568.60		Top of riffle
	185						
53		41 + 89	567.80	0.82	568.60		Top of pool
	44						
54		42 + 33	568.35	0.56	568.90		Top of riffle
	140						
55		43 + 73	568.25	0.84	569.10		Top of pool
	45						
56		44 + 18	569.10	0.64	569.75		Top of riffle
	69						
57		44 + 87	567.80	1.95	569.75		Pool
	67						
58		45 + 54	569.15	0.60	569.75		Top of pool
	35						
59		45 + 89	569.15	0.64	569.80		Bottom of riffle
	71						
60		46 + 60	570.15	0.58	569.75		Top of riffle
	159						
61		48 + 19	570.05	0.79	570.80		Pool
	151						
62		49 + 70	569.60	1.27	570.85		Pool
	178						
63		51 + 48	570.55	0.32	570.85		Riffle
	116						
64		52 + 64	570.20	0.74	570.90		
	340						
65		56 + 04	567.90	3.00	567.95		Frozen, depth estimated
	331						
66		59 + 35	567.90	3.00	567.50		Frozen, depth estimated
	291						
67		62 + 26	570.40	0.50	570.90		
	178						
68		64 + 04	570.95	0.35	571.30		
	178						

Appendix Table 2-A-7. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
69		65 + 82	571.90	--	--		
	365						
70		69 + 47	571.25	0.97	572.25		
	217						
71		71 + 64	573.80	--	--		Dewatered
	290						
72		74 + 54	573.70	0.24	573.95		
	170						
73		76 + 24	573.15	--	--		Dewatered
	293						
74		79 + 17	575.35	--	--		Dewatered
	339						
75		82 + 56	576.45	--	--		Dewatered
	120						
76		83 + 76	575.05	--	--		Dewatered
	975						
77		93 + 51	576.15	--	--		Dewatered
	1012						
78		103 + 63	579.20	--	--		Dewatered
	300						
79		106 + 63	580.25	--	--		Dewatered

Appendix Table 2-A-8. Data used to develop the streambed (thalweg) profile of Slough 9 (RM 128.3), 1982.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		-8 + 76	588.10	1.11	589.20		--
	62						
2		-8 + 14	588.00	1.22	589.20		--
	65						
3		-7 + 49	588.40	0.83	589.25		--
	142						
4		-6 + 07	589.00	0.62	589.60		--
	53						
5		-5 + 54	588.90	0.88	589.80		--
	96						
6		-4 + 58	589.45	0.45	589.85		--
	82						
7		-3 + 77	589.60	0.34	589.95		--
	145						
8		-2 + 32	589.20	0.77	589.95		--
	206						
9		-0 + 26	588.05	1.96	589.95		--
	26						
10		0 + 00	588.30	1.67	589.95		Mouth, WSEL estimated
	274						
11		2 + 74	588.45	1.58	590.00		--
	245						
12		5 + 19	587.85	2.07	589.95		--
	7						
13		5 + 26	589.80	0.18	590.00		--
	114						
14		6 + 40	589.80	0.38	590.20		--
	98						
15		7 + 38	591.00	0.25	591.25		--
	143						
16		8 + 81	591.85	0.22	592.00		--
	146						

Appendix Table 2-A-8. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
17		10 + 27	591.70	0.42	592.10		--
	105						
18		11 + 32	591.20	0.93	592.15		--
	300						
19		14 + 32	591.50	0.67	592.15		--
	215						
20		16 + 47	591.40	0.90	592.30		1982/TR-1, WSEL estimated from cross section data.
	290						
21		19 + 37	591.80	0.70	592.50		1982/TR-2, WSEL estimated from cross section data.
	168						
22		21 + 05	591.80	0.80	592.60		1982/TR-3, WSEL estimated from cross section data.
	28						
23		21 + 33	592.40	0.30	592.70		1982/TR-4, WSEL estimated from cross section data.
	41						
24		21 + 74	592.10	0.90	593.0		1982/TR-5, WSEL estimated from cross section data.
	91						
25		22 + 65	592.00	1.30	593.30		1982/TR-6, WSEL estimated from cross section data.
	116						
26		23 + 81	592.40	0.90	593.30		1982/TR-7, WSEL estimated from cross section data.
	187						
27		25 + 68	590.80	2.60	593.40		1982/TR-8, WSEL estimated from cross section data.
	138						
28		27 + 06	590.00	3.40	593.40		1982/TR-9, WSEL estimated from cross section data.
	158						
29		28 + 64	589.80	3.70	593.50		1982/TR-10, WSEL estimated from cross section data.
	152						
30		30 + 16	591.85	1.25	593.10		--
	123						
31		31 + 39	592.75	0.40	593.15		--
	94						
32		32 + 33	593.65	0.48	594.15		--
	124						

Appendix Table 2-A-8. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
33		33 + 57	594.40	0.42	594.80		--
	173						
34		35 + 30	595.10	0.20	595.30		--
	294						
35		38 + 24	596.10	0.20	596.30		--
	290						
36		41 + 14	597.00	0.35	597.30		--
	184						
37		42 + 98	597.10	0.20	597.30		--
	202						
38		46 + 00	597.35	0.20	597.55		--
	183						
39		46 + 83	598.25	0.10	598.35		--
	145						
40		48 + 28	599.85	0.35	600.20		--
	295						
41		51 + 23	600.20	0.20	600.40		--
	241						
42		53 + 64	601.20	0.00	601.20		Dewatered
	177						
43		55 + 41	600.85	0.00	600.85		Dewatered
	168						
44		57 + 09	601.65	0.00	601.65		Dewatered
	248						
45		59 + 57	602.40	0.00	602.40		Dewatered
	145						
46		61 + 02	602.60	0.00	602.60		Dewatered
	149						
47		62 + 51	604.60	0.00	604.60		Head, dewatered

Appendix Table 2-A-9. Data used to develop the streambed (thalweg) profile of Side Slough 9A, 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		-2 + 40	639.72	0.42	640.14	COSA	
	63						
2		-1 + 77	639.49	0.70	640.19	COSA	
	52						
3		-1 + 25	639.51	0.75	640.26	COSA	
	71						
4		-0 + 54	639.77	0.60	640.37	COSA	
	54						
5		0 + 00	639.44	0.90	640.34	COSA	Mouth of Slough
	81						
6		0 + 81	640.04	0.45	640.49	COSA	
	67						
7		1 + 48	640.46	0.30	640.76	COSA	
	36						
8		1 + 84	639.52	1.30	640.82	COSA	
	36						
9		2 + 20	640.23	0.60	640.83	COSA	
	31						
10		2 + 51	640.35	0.60	640.95	COSA	
	60						
11		3 + 11	641.78	0.30	642.08	COSA	
	68						
12		3 + 79	641.36	0.80	642.16	COSA	
	27						
13		4 + 06	641.99	0.45	642.44	COSA	
	46						
14		4 + 52	642.35	0.50	642.85	COSA	
	29						
15		4 + 81	642.55	0.40	642.95	COSA	
	33						

Appendix Table 2-A-9. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		5 + 14	642.44	0.60	643.04	COSA	
	1						
17		5 + 15	642.77	0.35	643.12	COSA	
	22						
18		5 + 37	643.27	0.25	643.52	COSA	
	50						
19		5 + 87	643.46	0.20	643.66	COSA	
	40						
20		6 + 27	643.62	0.30	643.92	COSA	Mid-riffle/run
	60						
21		6 + 87	643.82	0.30	644.12		Pool/riffle
	133						
22		8 + 20	644.13	3.00	644.13		Estimated depth - deep pool WSEL surveyed
	50						
23		8 + 70	642.32	1.83	644.15		Riffle/pool
	53						
24		9 + 23	644.78	0.19	644.97		Begin riffle/across from beaver lodge
	135						
25		10 + 58	640.51	4.50	645.01		Estimated depth - deep pool WSEL surveyed
	66						
26		11 + 24	644.11	0.90	645.01		Shallow point
	153						
27		12 + 77	642.01	3.00	645.01		Estimated depth - deep pool WSEL surveyed
	55						
28		13 + 32	643.44	1.56	645.00		High point
	254						
29		15 + 86	643.42	1.62	645.04		Deep point/pool
	51						
30		16 + 37	644.49	0.53	645.02		Riffle/pool
	38						

Appendix Table 2-A-9. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
31		16 + 75	645.09	0.38	645.47		Pool/riffle
	108						
32		17 + 83	642.71	2.85	645.56		Deep point
	69						
33		18 + 52	644.98	0.58	645.56		Riffle pool
	49						
34		19 + 01	645.55	0.47	646.02		Bend in slough
	136						
35		20 + 37	646.84	0.48	647.32		Pool riffle
	159						
36		21 + 96	645.21	2.16	647.37		Deep point in pool
	113						
37		23 + 09	646.83	0.56	647.39		High point in pool
	61						
38		23 + 70	645.97	1.41	647.38		Deep point in pool
	118						
39		24 + 88	646.75	0.63	647.38		Riffle/pool
	15						
40		25 + 03	647.13	0.48	647.61		Pool/riffle
	22						
41		25 + 25	646.42	1.16	647.58		Deep point in pool
	35						
42		25 + 60	647.32	0.26	647.58		Riffle/pool
	70						
43		26 + 30	647.85	0.29	648.14		Pool/riffle
	320						
44		29 + 50	647.27	0.90	648.17		Deep point in pool
	129						
45		30 + 79	647.96	0.24	648.20		Riffle/pool
	179						
46		32 + 58	649.11	0.26	649.37		Slough branches from this point, High point, Head of slough

Appendix Table 2-A-10. Data used to develop the streambed (thalweg) profile of Slough 11 (RM 135.3), 1982.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		-7 + 09	662.80	1.70	664.50		Below mouth
	165						
2		-5 + 44	664.00	0.52	664.50		Below mouth
	300						
3		-2 + 44	665.30	0.50	665.80		Below mouth
	115						
4		-1 + 29	665.15	1.03	666.15		Below mouth
	129						
5		0 + 00	665.45	0.85	666.30		Mouth
	171						
6		1 + 71	666.00	0.37	666.35		Top of pool
	137						
7		3 + 08	667.90	0.49	668.40		Top of riffle
	212						
8		5 + 20	667.55	0.90	668.45		Top of pool, depth estimated
	72						
9		5 + 92	668.30	0.33	668.65		Top of riffle
	235						
10		8 + 27	668.25	0.45	668.70		Top of pool
	124						
11		9 + 51	668.95	0.55	669.50		Top of riffle
	157						
12		11 + 08	669.25	0.43	669.70		Top of pool
	94						
13		12 + 02	670.00	0.44	670.45		Top of riffle
	325						
14		15 + 27	669.80	0.91	670.70		At R&M well
	79						
15		16 + 06	670.50	0.21	670.70		Top of pool
	35						
16		16 + 41	670.75	0.30	671.05		Top of riffle
	218						
17		18 + 59	669.65	1.32	671.00		Pool
	139						

Appendix Table 2-A-10. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
18		19 + 98	671.05	0.27	671.30		Top of pool
	51						
19		20 + 49	673.15	0.24	673.35		Top of riffle
	117						
20		21 + 66	673.55	Ice	673.55		Pool
	300						
21		24 + 66	673.05	0.51	673.55		Top of pool
	56						
22		25 + 22	674.30	0.28	674.55		Top of riffle
	241						
23		27 + 63	674.40	0.25	674.65		Top of pool
	48						
24		28 + 11	675.15	0.25	675.40		Top of riffle
	300						
25		31 + 11	675.45	0.00	675.45		Pool, dewatered
	300						
26		34 + 11	675.35	0.00	675.35		Top of pool, dewatered
	302						
27		37 + 13	677.30	0.00	677.30		Dewatered
	128						
28		38 + 41	682.80	0.00	682.80		Channel, dewatered
	154						
29		39 + 95	679.75	0.00	679.75		Channel, dewatered
	100						
30		40 + 95	682.55	0.00	682.55		Mound, dewatered
	190						
31		42 + 85	680.70	0.00	680.70		Mound, dewatered
	211						
32		44 + 96	680.25	0.00	680.25		Bottom of pool, dewatered
	106						
33		46 + 02	680.40	0.00	680.40		Top of pool, dewatered
	68						

Appendix Table 2-A-10. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
34		46 + 70	682.80	0.00	682.80		Mound, dewatered
	177						
35		48 + 47	681.35	0.00	681.35		Bottom of pool, dewatered
	139						
36		49 + 86	681.35	0.00	681.35		Top of pool, dewatered
	123						
37		51 + 09	684.60	0.00	684.60		Head, dewatered

Appendix Table 2-A-11. Data used to develop the streambed profile (thalweg) of Side Slough 16/16B (RM 137.7), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		-0+ 84	694.33	2.53	696.86	RUSI	Mainstem
	84						
2		0 + 00	695.51	1.38	696.89	SI	High point end of sand spit
	168						
3		1 + 68	694.60	2.30	696.90	SICO	Low point in backwater
	45						
4		2 + 13	695.02	1.89	696.91	COSI	Low point in backwater
	88						
5		3 + 01	695.59	1.28	696.87	RUSI	Pool/backwater
	183						
6		4 + 84	695.80	1.12	696.92	SGLG	Low point in pool
	22						
7		5 + 06	696.71	0.23	696.94	SGLG	Run/pool
	24						
8		5 + 30	695.87	1.02	696.89	SGLG	Low point in run
	43						
9		5 + 73	696.26	0.75	697.01	sasg	Riffle/run
	118						
10		6 + 91	697.63	0.25	697.88	SGRU	Pool/riffle
	107						
11		7 + 98	695.93	2.07	698.00	SGSI	Low point in pool
	222						
12		10 + 20	697.88	0.15	698.03	RUCO	Mainstem LWE
	26						
13		10 + 46	698.34	0.00	698.34	LGCO	High point, dewatered
	42						
14		10 + 88	696.44	1.55	697.99	SACO	Low point in pool
	21						
15		11 + 09	697.59	0.40	697.99	SGRU	Riffle/pool mouth 16B Head 16
	27						

Appendix Table 2-A-11. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		11 + 36	697.89	0.25	698.14	SGLG	Pool/riffle
	43						
17		11 + 79	696.77	1.38	698.15	SISG	Staff gage 138.0W1
	42						
18		12 + 21	696.74	1.42	698.16	COSI	Low point in pool
	78						
19		12 + 99	696.74	1.41	698.15	RULG	Low point in pool
	21						
20		13 + 20	697.62	0.55	698.17	SALG	High point in pool
	21						
21		13 + 41	696.64	1.52	698.16	SASG	Low point in pool
	12						
22		13 + 53	697.76	0.42	698.18	SALG	Run/pool
	20						
23		13 + 73	697.87	0.32	698.19	SA	High point in run
	23						
24		13 + 96	697.93	0.30	698.23	SGLG	Riffle/run
	30						
25		14 + 26	698.81	0.10	698.91	SGLG	Pool/riffle
	118						
26		15 + 44	697.75	1.18	698.93	COLG	Low point in pool
	41						
27		15 + 85	698.46	0.45	698.91	COLG	Run/Pool
	52						
28		16 + 37	698.49	0.43	698.92	RUSG	Riffle/run
	91						
29		17 + 28	699.91	0.10	700.01	SGRU	Run/riffle
	16						
30		17 + 44	699.51	0.53	700.04	RULG	Low point in run
	51						

Appendix Table 2-A-11. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
31		17 + 95	699.72	0.31	700.03	LGCO	Pool/run
	32						
32		18 + 27	699.31	0.74	700.05	LGSG	Staff gage 138.0 S5B
	13						
33		18 + 40	699.18	0.87	700.05	SARU	Low point in poool
	36						
34		18 + 76	699.73	0.30	700.03	LGSG	Run/pool
	47						
35		19 + 23	699.79	0.26	700.05	RUSG	Riffle/run
	19						
36		19 + 42	700.03	0.27	700.30	RUSH	Run/riffle
	132						
37		20 + 74	700.30	0.28	700.58	RUCO	Riffle/run
	33						
38		21 + 07	700.51	0.31	700.82	CORU	Run/riffle
	87						
39		21 + 94	700.32	0.54	700.86	RUCO	Low point in run
	15						
40		22 + 09	700.58	0.29	700.87	RUCO	Riffle/run
	138						
41		23 + 47	701.38	0.15	701.53	RULG	Run/riffle
	30						
42		23 + 77	700.84	0.68	701.52	LGSG	Low point in run
	20						
43		23 + 97	701.31	0.21	701.52	LGSG	Riffle/run
	71						
44		24 + 68	702.60	0.01	702.61	RUCO	Run/riffle
	34						
45		25 + 02	702.07	0.54	702.61	RULG	Low point in run
	30						

Appendix Table 2-A-11. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
46		25 + 32	702.19	0.42	702.61	RULG	Pool/run
	81						
47		26 + 13	701.63	0.94	702.57	LGRU	Low point in pool
	55						
48		26 + 68	702.47	0.10	702.57	LGRU	Riffle/pool
	87						
49		27 + 55	703.23	0.01	703.24	LGRU	High point
	26						
50		27 + 81	702.93	0.28	703.21	LGSG	Low point in small pool
	29						
51		28 + 10	703.26	0.00	703.26	SGRU	High point, dewatered
	12						
52		28 + 22	702.86	0.46	703.32	SGRU	Low point in small pool
	26						
53		28 + 48	703.31	0.00	703.31	SGLG	High point, dewatered
	33						
54		28 + 81	702.70	0.38	703.08	SGLG	Low point in small pool
	22						
55		29 + 03	703.18	0.00	703.18	LGRU	High point, dewatered
	58						
56		29 + 61	703.62	0.00	703.62	CORU	High point, dewatered
	44						
57		30 + 05	702.57	0.62	703.19	CORU	Mainstem

Appendix Table 2-A-12. Data used to develop the streambed (thalweg) profile of Side Slough 20 (RM 140.1), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		0 + 00	722.33	2.00	724.33	CORU	Mainstem
	17						
2		0 + 17	722.79	1.77	724.56	SI	Mouth high point
	13						
3		0 + 30	722.62	1.95	724.57	SI	Low point in backwater
	41						
4		0 + 71	723.37	1.22	724.59	SI	High point in run
	27						
5		0 + 98	723.15	1.46	724.61	SIRU	Low point in run
	30						
6		1 + 28	723.51	1.10	724.61	RULG	High point in run
	20						
7		1 + 48	723.30	1.33	724.63	LGSI	Low point in run
	31						
8		1 + 79	723.54	1.08	724.62	RUSI	Staff gage 140.1 W4C
	59						
9		2 + 38	723.55	1.07	724.62	LGRU	Low point in run
	46						
10		2 + 84	724.11	0.54	724.65	LGSG	Riffle/run
	66						
11		3 + 50	724.57	0.39	724.96	LGRU	Mid-riffle
	33						
12		3 + 83	724.50	0.67	725.17	COLG	Run/riffle
	47						
13		4 + 30	724.10	1.09	725.19	RULG	Low point in run
	30						
14		4 + 60	724.33	0.85	725.18	LGSA	Riffle/run
	110						
15		5 + 70	724.84	0.39	725.23	RUSG	Mid-riffle
	79						

Appendix Table 2-A-12. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		6 + 49	724.52	0.79	725.31	CORU	Run/riffle
	103						
17		7 + 52	724.46	0.90	725.36	RULG	Pool/run
	14						
18		7 + 66	723.89	1.48	725.37	RUBO	Low point in pool
	69						
19		8 + 35	724.94	0.43	725.37	SGLG	Riffle/pool
	50						
20		8 + 85	724.61	0.87	725.48	RULG	Steel/shallow riffle
	29						
21		9 + 14	726.13	0.30	726.43	LGCO	High point n riffle
	15						
22		9 + 29	725.99	0.61	726.60	LGRU	Run/riffle
	225						
23		11 + 54	725.60	1.13	726.73	LGSG	Staff gage 140.1 S5B
	12						
24		11 + 66	725.89	0.83	726.72	LGSG	Riffle/run
	68						
25		12 + 34	726.19	0.86	727.05	LGRU	Low point in riffle
	44						
26		12 + 78	726.79	0.48	727.27	SGLG	Run/riffle
	99						
27		13 + 77	726.56	0.74	727.30	LGRU	Low point in run
	24						
28		14 + 01	726.62	0.69	727.31	LGRU	Riffle/run
	36						
29		14 + 37	727.20	0.40	727.60	RUCI	Pool/riffle
	64						
30		15 + 01	725.22	2.38	727.60	SIRU	Waterfall creek enters
	57						
31		15 + 58	724.16	3.45	727.61	SI	Low point in pool
	169						

Appendix Table 2-A-12. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
32		17 + 27	726.15	1.46	727.61	SICO	High point in pool
	107						
33		18 + 34	725.69	1.92	727.61	SICO	Low point in pool
	105						
34		19 + 39	725.81	1.80	727.61	SICO	Low point in pool
	94						
35		20 + 33	725.18	2.45	727.63	RUCO	Riffle/pool
	25						
36		20 + 58	726.76	0.27	728.03	LGRU	Run/riffle
	176						
37		22 + 34	728.10	0.06	728.26	SALG	High point in run
	123						
38		23 + 57	727.90	0.45	728.35	LGRU	Low point in run
	39						
39		23 + 96	728.21	0.17	728.38	LGCO	High point in run
	22						
40		24 + 18	727.87	0.57	728.44	LGCO	Low point in run
	25						
41		24 + 43	728.09	0.39	728.48	RULG	Riffle/run
	21						
42		24 + 64	728.68	0.29	728.97	RULG	Run/riffle
	55						
43		25 + 19	728.47	0.59	729.06	CORU	Low point in run
	108						
44		26 + 27	728.96	0.42	729.38	COLG	Pool/run
	81						
45		27 + 08	728.50	0.91	729.41	LGCO	Low point in pool
	21						
46		27 + 29	729.16	0.26	729.42	SGLG	Riffle/pool
	10						
47		27 + 39	729.69	0.19	729.88	LGRU	Pool/riffle
	17						

Appendix Table 2-A-12. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
48		27 + 56	729.23	0.65	729.88	COLG	Tributary enters
	51						
49		28 + 97	727.79	2.10	729.89	RULG	Low point in pool
	6						
50		28 + 13	729.01	0.90	729.91	RULG	High point in pool
	14						
51		28 + 27	728.52	1.38	729.90	RULG	Low point in pool
	33						
52		28 + 60	729.85	0.08	729.93	RULG	Head of pool
	25						
53		28 + 85	729.32	0.74	730.06	RULG	Small pool in riffle
	24						
54		29 + 09	730.03	0.04	730.07	LGSG	High point
	14						
55		29 + 23	729.89	0.22	730.11	LGSG	Small pool in riffle
	60						
56		29 + 83	730.27	0.00	730.27	CORU	Pool/riffle, dewatered
	36						
57		30 + 19	729.52	0.77	730.29	COSI	Low point in pool
	31						
58		30 + 50	730.15	0.15	730.30	RULG	Head of slough Head of pool
	30						
59		30 + 80	730.39	0.00	730.39	RUCO	High point, dewatered
	91						
60		31 + 71	729.75	0.54	730.29	CORU	Mainstem

Appendix Table 2-A-13. Data used to develop the streambed (thalweg) profile of Side Slough 21 (RM 141.8), 1982.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		0 + 00	743.15	--	--		1981/TR-13
	82						
2		0 + 82	743.45	--	--		1981/TR-12
	118						
3		2 + 00	743.85	--	--		1981/TR-11
	126						
4		3 + 26	744.10	--	--		1981/TR-10
	314						
5		6 + 40	744.80	--	--		1981/TR-9
	204						
6		8 + 44	745.55	--	--		1981/TR-8
	214						
7		10 + 58	746.30	--	--		1981/TR-7
	139						
8		11 + 97	747.06	--	--		1981/TR-6, point between left and right forks, from this point thalweg is measured up left fork.
	106						
9		13 + 03	747.75	--	--		1981/TR-5
	206						
10		15 + 09	749.65	--	--		1981/TR-4
	212						
11		17 + 21	748.30	--	--		1981/TR-3
	440						
12		21 + 61	752.10	--	--		1981/TR-2
	297						
13		24 + 58	753.80	--	--		1981/TR-1

Appendix Table 2-A-13. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
Right Fork							
1		11 + 97	747.06	0.3	747.36		Depth estimated
	50						
2		12 + 47	747.04	0.3	747.34		Depth estimated
	124						
3		13 + 71	747.18	0.3	747.48		Depth estimated
	63						
4		14 + 34	748.74				Riffle
	126						
5		15 + 60	749.48				Pool
	152						
6		17 + 12	748.84				Pool
	110						
7		18 + 22	749.98				Dewatered
	186						
8		20 + 08	750.84				Dewatered
	176						
9		21 + 84	752.78				Dewatered
	224						
10		24 + 08	753.26				Dewatered
	194						
11		26 + 02	754.06				Dewatered
	247						
12		28 + 49	755.54				Dewatered

Appendix Table 2-A-14. Data used to develop the streambed (thalweg) profile of Side Slough 22 (RM 144.3), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		-0 + 40	777.79	1.4	779.19	CO	Mainstem
	40						
2		0 + 00	778.91	0.30	779.21	BOCO	Riffle/backwater
	141						
3		1 + 41	779.57	0.65	780.22	COBO	Run/riffle
	162						
4		3 + 03	779.52	0.77	780.29	COBO	Pool/run
	346						
5		6 + 49	776.25	4.08	780.33	SI	Low point in pool
	116						
6		7 + 65	777.74	2.57	780.31	SICO	High point in pool
	16						
7		7 + 81	777.56	2.75	780.31	SI	Low point in pool
	40						
8		8 + 21	778.88	1.40	780.28	SI	Mid-point
	156						
9		9 + 77	779.24	1.06	780.30	SICO	Low point in pool
	41						
10		10 + 18	779.95	0.34	780.29	SI	Run/pool
	55						
11		10 + 73	779.75	0.60	780.35	COSI	Riffle/run
	13						
12		10 + 86	780.06	0.35	780.41	COBO	Staff gage 144.3 S4C
	13						
13		10 + 99	780.11	0.39	780.50	COBO	Pool/riffle
	251						
14		13 + 50	777.29	3.23	780.52	SICO	Low point in pool
	21						
15		13 + 71	778.12	2.41	780.53	SACO	Channels converge
	34						

Appendix Table 2-A-14. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		14 + 05	780.32	0.20	780.52	SALG	Riffle/pool
	40						
17		14 + 45	780.64	0.27	780.91	SGRU	Gradient change
	88						
18		15 + 33	782.33	0.12	782.45	BOLG	Bend
	95						
19		16 + 28	782.49	0.33	782.82	COLG	Riffle divides
	254						
20		18 + 82	782.42	0.66	783.08	COBO	Pool/riffle
	143						
21		20 + 25	781.25	1.85	783.10	RUCO	Low point in pool
	7						
22		20 + 32	781.73	1.37	783.10	COBO	
	34						
23		20 + 66	782.62	0.48	783.10	CORU	Riffle/pool
	9						
24		20 + 75	782.73	0.43	783.16	CORU	Staff gage
	107						
25		21 + 82	783.41	0.30	783.71	RUBO	Spring fed fork of slough enters
	40						
26		22 + 22	784.66	0.00	784.66	BORU	High point, dewatered
	3						
27		22 + 35	784.28	0.00	784.28	BORU	Low point, dewatered
	10						
28		22 + 35	784.47	0.00	784.47	CORU	Bend, dewatered
	52						
29		22 + 87	784.55	0.00	784.55	CORU	Low point, dewatered
	63						
30		23 + 50	786.02	0.00	786.02	CORU	High point, dewatered
	55						

Appendix Table 2-A-14. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
31		24 + 05	785.84	0.00	785.84	CORU	High point, dewatered
	29						
32		24 + 34	785.66	0.00	785.67	BORU	Low point in pool, dewatered
	43						
33		24 + 77	787.17	0.00	787.17	CORU	Bend, dewatered
	109						
34		25 + 86	787.91	0.00	787.91	CORU	High point, dewatered
	121						
35		27 + 70	786.06	0.87	786.93	COBO	Low point in pool
	19						
36		27 + 26	787.00	0.00	787.00	COBO	High point, dewatered
	29						
37		27 + 55	786.45	0.42	786.87	SIBO	Low point in pool
	30						
38		27 + 85	787.17	0.00	787.17	SICO	High point, dewatered
	22						
39		28 + 07	785.96	0.95	786.91	SIBO	Low point in pool
	32						
40		28 + 39	787.45	0.00	787.45	CORU	High point
	32						
41		28 + 71	787.00	0.00	787.00	SA	Mainstem LWE
	9						
42		28 + 80	786.08	0.96	787.04	COSA	Mainstem

Appendix Table 2-A-15. Data used to develop the streambed (thalweg) profile of Upland Slough 6A (RM 112.3), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		0 + 00	452.75	3.05	455.80	SI	Mouth
	34						
2		0 + 34	453.09	2.84	455.93	SI	Transect at staff gages
	109						
3		1 + 43	453.45	2.47	455.92	SI	RJ-TR1
	256						
4		3 + 99	453.97	2.00	455.97	SI	RJ-TR2
	120						
5		5 + 19	453.35	2.50	455.85	SI	RJ-TR3
	99						
6		6 + 18	452.62	3.58	456.20	SI	RJ-TR4
	80						
7		6 + 98	452.37	3.44	455.81	SI	RJ-TR5
	103						
8		8 + 01	451.27	4.72	455.99	SI	RJ-TR6
	123						
9		9 + 24	451.88	4.02	455.90	SI	RJ-TR7
	179						
10		11 + 03	450.76	5.14	455.90	SI	RJ-TR8
	105						
11		12 + 08	454.13	1.86	455.99	SI	RJ-TR9
	95						
12		13 + 03	456.07	0.39	456.45	SI	Left fork bottom of dam
	7						
13		13 + 10	458.64	0.00	458.64	LOGS	Left fork - top of dam

Appendix Table 2-A-15. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
Right Channel							
11A		12 + 08	454.13	1.86	455.99	SI	RJ-TR9
	17						
12A		12 + 25	454.36	1.53	455.89	SI	Mouth of right fork
	17						
13A		12 + 42	455.25	0.74	455.99	LGSG	Top of gravel bar downstream of dam
	18						
14A		12 + 60	454.64	1.50	456.10	SI	Right fork - bottom of dam
	7						
15A		12 + 67	458.72	0.00	458.72	LOGS	Right fork - top of dam

Appendix Table 2-A-16. Data used to develop the streambed (thalweg) profile of Upland Slough 10 - Northwest (left) Channel (RM 133.8), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		3 + 79	647.67	2.18	649.85	CO	Pool - backwater, sidechannel junction
	12						
2		3 + 91	646.98	2.83	649.81	CO	Pool/backwater/deep hole
	26						
3		4 + 17	649.08	0.78	649.86	CO	Bottom of run/backwater
	71						
4		4 + 88	648.73	1.20	649.93	CO	Top of run/backwater
	55						
5		5 + 43	648.42	1.50	649.92	CO	Pool/backwater
	48						
6		5 + 91	647.97	1.96	649.93	SISA	Pool/backwater
	45						
7		6 + 36	648.15	1.77	649.92	SISA	Pool/backwater
	70						
8		7 + 06	648.80	1.10	649.90	SISA	Pool/backwater
	36						
9		7 + 42	648.25	1.68	649.93	SISA	Pool/backwater
	54						
10		7 + 96	647.74	2.20	649.94	SISA	Pool/backwater end of log right fork of Slough 10 starts here
	18						
11		8 + 24	647.54	2.48	650.02	SISA	Pool
	36						
12		8 + 50	647.75	2.27	650.02	SISA	Deephole - pool
	19						
13		8 + 69	649.00	1.02	650.02	SISA	Pool
	41						
14		9 + 10	648.64	1.39	650.03	SISA	Pool
	20						
15		9 + 30	648.89	1.14	650.03	SARU	Pool
	55						

Appendix Table 2-A-16. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		9 + 85	648.64	1.38	650.02	SABO	Pool
	48						
17		10 + 33	648.85	1.17	650.02	SABO	Pool
	94						
18		11 + 27	647.72	2.30	650.02	SABO	Pool
	43						
19		11 + 70	648.15	1.86	650.01	SACO	Pool
	3						
20		11 + 73	647.95	2.06	650.01	SACO	Pool
	37						
21		12 + 10	648.31	1.71	650.02	SACO	Pool
	37						
22		12 + 47	648.46	1.57	650.03	SACO	Pool
	49						
23		12 + 96	647.78	2.22	650.00	SI	Pool
	50						
24		13 + 46	648.01	2.00	650.00	SI	Pool
	61						
25		14 + 07	648.07	1.93	650.00	SICO	Pool
	64						
26		14 + 71	648.20	1.80	650.00	SILG	Pool
	20						
27		14 + 91	647.87	2.13	650.00	SILG	Pool (mainstem backwater from this point to the mouth
	80						
28		15 + 71	649.00	1.07	650.07	BOCO	Bottom riffle
	66						
29		16 + 37	649.65	1.16	650.81	SICO	End of pool/top of riffle
	81						
30		17 + 18	649.24	1.58	650.82	SICO	Mid pool
	71						

Appendix Table 2-A-16. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
31		17 + 89	649.75	1.08	650.83	COBO	Bottom of riffle/top of pool
	6						
32		17 + 95	650.39	0.65	651.04	COBO	End of pool/top of riffle
	52						
33		18 + 47	649.33	1.72	651.05	SICO	Pool
	32						
34		18 + 79	650.61	0.46	651.07	COLG	Bottom riffle
	32						
35		19 + 11	650.86	0.56	651.42	COLG	R&M Q Station

Appendix Table 2-A-17. Data used to develop the streambed (thalweg) profile of Upland Slough 10- Northeast (Right) Channel (RM 133.8), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		7 + 96	647.74	2.20	649.94	SISA	Pool/backwater, end of log
	8						
2		8 + 04	648.22	1.72	649.94	SI	
	18						
3		8 + 22	648.58	1.36	649.94	SIBO	
	24						
4		8 + 46	648.74	1.20	649.94	SIBO	
	49						
5		8 + 95	648.73	1.20	694.93	SIBO	
	20						
6		9 + 15	648.66	1.27	649.93	SIBO	Numerous decaying logs
	15						
7		9 + 30	648.89	1.04	649.93	SIBO	
	13						
8		9 + 43	649.05	0.88	649.93	SIBO	
	21						
9		9 + 64	649.16	0.89	649.94	SIBO	
	36						
10		10 + 00	648.75	0.78	649.94	SIBO	
	10						
11		10 + 10	648.91	1.19	649.94	SIBO	
	21						
12		10 + 31	649.14	1.04	649.95	SIBO	
	24						
13		10 + 55	649.14	0.82	649.96	SIBO	
	19						
14		10 + 74	649.38	0.58	649.96	SIBO	
	22						
15		10 + 96	649.34	0.64	649.98	SIBO	
	22						

Appendix Table 2-A-17. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		11 + 18	649.79	0.38	650.17	SIBO	
	23						
17		11 + 41	649.79	0.42	650.21	SIBO	
	18						
18		11 + 59	649.43	0.80	650.23	SIBO	
	14						
19		11 + 73	649.84	0.39	650.23	SIBO	
	11						
20		11 + 84	649.61	0.66	650.27	SIBO	
	30						
21		12 + 14	649.60	0.72	650.32	SIBO	
	30						
22		12 + 44	649.88	0.55	650.43	SIBO	
	17						
23		12 + 61	650.00	0.46	650.46	SIBO	30 fry in pool near log across slough
	24						
24		12 + 85	650.00	0.53	650.53	SIBO	
	12						
25		12 + 97	650.27	0.35	650.62	SIBO	
	42						
26		13 + 39	650.35	0.47	650.82	SIBO	
	42						
27		13 + 81	650.86	0.22	651.08	SIBO	
	34						
28		14 + 15	650.96	0.24	651.20	SIBO	
	16						
29		14 + 31	650.91	0.30	651.21	SIBO	
	23						
30		14 + 54	650.53	0.72	651.25	SIBO	
	27						

Appendix Table 2-A-17. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
31		14 + 81	650.44	0.82	651.26	SIBO	
	28						
32		15 + 09	650.37	0.89	651.26	SIBO	
	23						
33		15 + 32	650.66	0.64	651.30	SIBO	
	24						
34		15 + 56	650.49	0.85	651.34	SIBO	
	26						
35		15 + 82	650.45	0.89	651.34	SIBO	
	22						
36		16 + 04	650.58	0.75	651.33	SIBO	
	28						
37		16 + 32	650.23	1.10	651.33	SIBO	
	25						
38		16 + 57	650.87	0.48	651.35	SIBO	
	14						
39		16 + 71	651.02	0.33	651.35	SIBO	
	23						
40		16 + 94	650.82	0.56	651.38	SIBO	Bank seepage - bear kill chum salmon
	19						
41		17 + 13	650.48	0.90	651.38	SIBO	
	18						
42		17 + 31	650.08	1.32	651.40	SIBO	
	14						
43		17 + 45	650.71	0.70	651.41	SIBO	
	18						
44		17 + 63	649.99	1.41	651.40	SIBO	
	23						
45		17 + 86	650.60	0.80	651.40	SIBO	
	15						

Appendix Table 2-A-17. (Continued)

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
46		18 + 01	650.99	0.40	651.39	SIBO	
	12						
47		18 + 13	650.77	0.60	651.37	SIBO	
	12						
48		18 + 25	651.99			SIBO	Elevation of nail placed on log as TBM

Appendix Table 2-A-18. Data used to develop the streambed (thalweg) profile of Upland Slough 19 (RM 140.0), 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		0 + 00	718.79	0.39	719.18	SISA	Mouth of slough
	79						
2		0 + 79	718.77	0.46	719.23	SISA	
	100						
3		1 + 79	718.58	0.68	719.26	SISA	
	105						
4		2 + 84	718.81	0.71	719.52	SISA	
	127						
5		4 + 11	719.58	0.57	720.15	LGRU	
	216						
6		6 + 27	720.32	0.51	720.83	LGRU	
	103						
7		7 + 30	721.15	0.12	721.27	COBO	
	141						
8		8 + 71	722.01	0.00	722.01	COBO	Dewatered
	61						
9		9 + 32	721.88	0.14	722.02	COBO	
	55						
10		9 + 87	721.95	0.03	721.98	COBO	

Appendix 2-B

LIST OF APPENDIX B TABLES

LIST OF APPENDIX B TABLES (Continued)

LIST OF APPENDIX B TABLES (Continued)

LIST OF APPENDIX B TABLES (Continued)

LIST OF APPENDIX B TABLES (Continued)

Appendix Table 2-B-1. Cross sectional elevations of Mainstem 2 Side Channel - mouth, staff gage 114.4W6. Surveyed by ADF&G on September 22, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	483.86	LBHP 114.46LB ADF&G
0.0	483.49	GROUND BY LBHP
4.6	482.83	
10.9	480.89	TOP OF LEFT BANK
13.6	478.79	BOTTOM OF LEFT BANK
33.6	477.20	
61.6	476.69	
88.6	475.73	
108.6	475.31	
135.6	474.98	LEW
172.1	474.54	
198.6	473.91	
224.6	473.23	
244.6	472.73	
267.6	472.47	
293.6	472.66	
311.6	472.58	
316.6	472.37	
333.1	471.73	
338.6	473.00	
351.6	474.30	
356.3	474.97	REW
370.6	475.58	
388.6	475.16	
407.3	475.92	BOTTOM OF LEFT BANK
409.1	477.91	TOP OF RIGHT BANK
417.2	479.99	
424.4	484.19	TOP OF RIGHT BANK
441.2	485.27	GROUND BY RBHP
441.2	485.47	RBHP ADF&G ALCAP 114.4W6RB

Appendix Table 2-B-2. Cross sectional elevations of Mainstem 2 Side Channel - lower backwater, staff gage 114.4S9. Surveyed by ADF&G on September 22, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	483.84	LBHP 114.4S9LB ALCAP ADF&G
0.0	483.50	GROUND BY LBHP
2.5	483.49	TOP OF LEFT BANK
6.5	481.93	MID BANK
11.6	478.42	BOTTOM OF BANK
26.0	476.78	
54.5	475.61	
78.5	475.65	
122.5	475.65	
146.6	475.15	LEW
165.5	474.25	
183.5	473.38	
199.5	472.76	
213.5	472.88	
237.5	472.47	
250.5	472.52	
267.5	473.00	
288.5	473.97	
298.5	474.18	
319.5	474.58	
328.1	475.05	REW
342.5	476.16	
362.5	477.60	
376.5	479.91	
382.5	480.60	BOTTOM OF RIGHT BANK
387.1	482.96	MID-BANK
392.3	485.23	TOP OF RIGHT BANK
398.0	486.10	GROUND BY RBHP
398.0	486.48	RBHP ADF&G ALCAP 114.4S9RB

Appendix Table 2-B-3. Cross sectional elevations of Mainstem 2 Side Channel - upper backwater, staff gage 114.4S7. Surveyed by ADF&G on September 22, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	484.93	LBHP 114.4S7LB ADF&G ALCAP
0.0	484.46	GROUND BY LBHP
4.5	484.41	TOP OF LEFT BANK
11.8	480.05	BOTTOM OF LEFT BANK
31.0	477.84	
47.0	476.36	
65.0	475.91	
79.2	475.27	LEW
111.0	474.20	
128.5	473.60	
142.8	473.33	
152.6	473.55	
163.6	474.57	
180.0	474.58	
206.0	474.10	
227.8	474.40	
243.2	475.23	REW
271.7	475.64	
297.0	476.69	
322.8	476.53	
350.0	476.22	
372.4	476.92	BOTTOM OF RIGHT BANK
379.0	479.26	VEGETATION
395.0	480.10	VEGETATION
404.2	484.07	TOP OF RIGHT BANK
411.4	483.93	GROUND BY RIGHT BANK
411.4	484.66	114.4S7RB ADF&G REBAR

Appendix Table 2-B-4. Cross sectional elevations of Mainstem 2 Side Channel - Northwest channel Q site, staff gage 114.4S5. Surveyed by ADF&G on August 6, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	489.37	LBHP ADF&G ALCAP 114.4S5LB
0.0	488.96	GROUND BY LBHP
13.3	489.06	TOP OF LEFT BANK
19.0	483.64	BOTTOM OF LEFT BANK
26.5	483.05	
35.0	483.40	
59.0	484.11	
73.4	483.45	
90.0	483.40	
98.0	483.89	
107.0	483.59	
129.0	483.72	
130.5	482.34	
144.0	481.23	
153.0	483.10	
164.2	483.32	
169.8	482.29	
181.0	482.46	
192.0	481.52	LEW
200.0	480.96	
217.0	480.20	
246.0	479.45	
265.0	478.33	
282.0	478.67	
324.0	479.14	
376.0	481.59	REW
379.0	482.21	BOTTOM OF RIGHT BANK
385.0	487.27	TOP OF RIGHT BANK
395.0	487.62	GROUND BY RBHP
395.0	487.97	RBHP ADF&G ALCAP 114.4S5RB

Appendix Table 2-B-5. Cross sectional elevations of Mainstem 2 - Northwest channel head, staff gage 114.4H3. Surveyed by ADF&G on September 24, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	487.68	LBHP ADF&G ALCAP 114.4H3LB
0.0	487.20	GROUND BY LBHP
13.7	487.23	TOP OF LEFT BANK
21.5	486.35	
24.1	484.41	BOTTOM OF LEFT BANK
37.3	484.35	
48.0	485.43	
76.0	484.47	
102.4	485.09	
134.0	485.15	
177.9	483.37	
184.9	484.03	
227.8	483.59	
254.0	483.50	
296.8	483.77	
339.0	483.83	
392.0	483.58	
436.0	483.24	
493.0	482.73	
541.7	482.65	
595.6	482.94	
649.0	482.74	
678.0	482.39	LWE
714.0	482.04	
767.0	481.92	

Appendix Table 2-B-5. continued.

STATION	ELEVATION	DESCRIPTION
792.0	481.18	
830.0	481.00	
870.0	480.96	
903.0	481.95	
937.0	482.59	RWE
979.0	482.38	
1017.0	484.42	
1059.0	483.09	
1083.0	484.14	BOTTOM OF RIGHT BANK
1093.0	485.79	MID RIGHT BANK
1105.0	487.24	TOP OF RIGHT BANK
1118.0	487.52	GROUND BY RBHP
1118.0	487.98	RBHP ADF&G ALCAP 114.4H3RB

Appendix Table 2-B-6. Cross sectional elevations of Mainstem 2 Side Channel - Northeast channel Q site, at staff gage 114.4S8. Surveyed by ADF&G on July 4, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	488.73	TOP OF LEFT BANK
10.0	484.27	BOTTOM OF LEFT BANK
24.0	483.91	
48.0	481.92	
50.0	480.41	LEW
60.0	478.94	
72.0	479.12	
82.0	478.98	
93.0	478.71	
101.0	478.86	
104.0	479.11	
125.0	479.52	
135.0	480.54	REW
143.0	480.75	
148.0	483.54	
158.0	485.24	
168.0	485.31	BOTTOM OF RIGHT BANK
172.0	488.98	TOP OF RIGHT BANK

Appendix Table 2-B-7. Cross sectional elevations of Mainstem 2 Side Channel - Northeast channel head, staff gage 114.4H1. Surveyed by ADF&G on September 23, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	490.54	LBHP 114.4H1LB
0.0	490.17	GROUND BY LBHP
15.6	489.85	TOP OF LEFT BANK
21.6	487.48	MID BANK
26.6	485.57	
43.7	485.90	
80.0	486.11	
118.0	485.93	
170.0	485.46	
227.0	485.92	
274.0	485.40	
299.0	485.68	
335.0	485.41	
370.0	484.64	
392.0	484.85	
412.6	485.74	
428.0	486.26	
443.5	487.58	BOTTOM OF RIGHT BANK
455.0	491.29	MID-BANK
471.0	499.43	TOP OF RIGHT BANK
477.5	498.69	GROUND BY RBHP
	499.07	RBHP 114.4H1RB

Appendix Table 2-B-8. Cross sectional elevations of Side Channel 10 - mouth, staff gage 133.8W5. Surveyed by ADF&G on July 17, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	650.90	CLIFF
6.5	650.81	LEW
24.0	646.08	
31.0	645.41	
55.0	646.44	
108.0	650.82	REW
148.0	654.46	TOP OF BANK
205.0	655.14	GB
205.0	655.28	RBHP ALCAP ADF&G 133.8WRB 83

Appendix Table 2-B-9. Cross sectional elevations of Side Channel 10 - head, staff gage 133.8H4. Surveyed by ADF&G on September 11, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	661.29	LBHP ALCAP ADF&G 134.3HLB83
0.0	660.93	GB
3.0	660.20	TOP LEFT BANK
5.0	658.14	BOTTOM OF BANK
23.0	658.11	
81.0	657.14	
96.0	656.65	
120.0	656.33	
135.0	656.25	
152.0	657.46	
178.0	657.67	
206.0	657.21	
227.0	656.23	
260.0	657.06	
270.0	656.37	
285.0	656.20	
300.0	656.98	
310.0	657.03	
320.0	657.54	
330.0	658.79	
350.0	659.02	
360.0	659.61	TOP OF RIGHT BANK
366.0	659.64	GB
366.0	660.73	RBHP ALCAP ADF&G 134.3HRB83

Appendix Table 2-B-10. Cross sectional elevations of Upper Side Channel 11 - mouth, staff gage 136.2W3. Surveyed by ADF&G on July 20, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	682.31	LBHP ALCAP ADF&G 136.2WLB 83
0.0	682.01	GROUND AT ALCAP
51.0	680.53	EDGE OF VEGETATION
73.5	677.90	LEW
92.0	674.58	THALWEG
119.0	676.88	
130.0	676.72	
149.0	676.58	
166.0	676.99	
185.0	676.05	
188.0	675.69	BOTTOM OF RB
196.0	677.95	RWE
208.0	684.35	TOP BANK VEGETATION
214.5	684.68	GROUND AT ALCAP
214.5	685.00	RBHP ALCAP ADF&G 136.2WRB 83

Appendix Table 2-B-11 Cross sectional elevations of Upper Side Channel 11 - head, staff gage 136.2H2. Surveyed by ADF&G on July 18, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	691.28	LBHP ALCAP ADF&G 136.5HLB 83
0.0	691.04	GROUND BY ALCAP
2.0	691.25	VEGETATION TOP OF BANK
5.5	686.23	BOTTOM OF LEFT BANK
60.5	685.12	
125.5	685.80	
198.5	685.62	
361.5	685.97	
455.5	686.88	
582.5	686.74	
635.5	686.68	
822.5	686.83	SPARSE VEGETATION
896.5	686.07	REW
935.5	685.05	BOTTOM
975.5	684.50	THALWEG
991.5	685.91	LEW
1017.5	685.96	BOTTOM
1037.5	687.66	EDGE OF VEGETATION
1051.9	691.09	TOP OF BANK
1051.9	691.38	RBHP ALCAP ADF&G 136.5HRB 83

Appendix Table 2-B-12. Cross sectional elevations of Side Channel 21 - mouth, staff gage 140.6W1. Surveyed by ADF&G on September 12, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	736.13	LBHP ALCAP ADF&G 140.6W1LB
0.0	735.71	GROUND BY ALCAP
15.0	734.48	MID-BANK
19.0	735.23	
41.0	733.03	EDGE OF VEGETATION
47.0	731.63	BOTTOM OF BANK
53.0	731.53	
63.0	731.87	
105.0	731.53	
131.0	730.66	
156.0	729.99	LWE
165.0	729.59	
180.0	729.76	
203.0	729.79	
218.0	729.44	
241.0	729.22	
293.0	729.39	
310.0	729.38	
346.0	729.79	RWE
387.0	730.62	
402.0	732.19	BOTTOM OF RIGHT BANK
415.0	735.17	MID-BANK
421.0	735.74	TOP OF RIGHT BANK
436.0	738.00	GROUND BY ALCAP
436.0	738.41	RBHP ALCAP 140.6W1RB

Appendix Table 2-B-13. Cross sectional elevations of Side Channel 21 - lower Q site, staff gage 140.6S4. Surveyed by ADF&G on September 12, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	742.26	LBHP ADF&G ALCAP 140.6S4LB
0.0	741.99	GROUND BY ALCAP
16.0	740.01	MID-BANK
26.0	739.10	BOTTOM OF LEFT BANK
39.0	737.32	
68.0	736.17	LEW
87.0	735.62	
117.0	734.89	
144.0	735.99	
172.0	736.19	
197.0	735.77	
229.0	736.44	REW
260.0	737.31	
277.0	737.33	
289.0	737.80	EDGE OF VEGETATION
293.0	741.43	MID-BANK
294.0	745.18	GROUND BY ALCAP
294.0	745.91	RBHP ADF&G ALCAP 140.6S4RB

Appendix Table 2-B-14. Cross sectional elevations of Side Channel 21 - mid - channel, staff gage 140.6S2. Surveyed by ADF&G on September 13, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	747.48	LBHP ALCAP 140.652LB
0.0	747.82	GROUND BY ALCAP
15.0	746.27	TOP OF LEFT BANK EDGE OF VEGETATION
21.0	744.02	BOTTOM OF BANK
30.0	742.97	
44.0	744.03	
81.0	744.53	
114.0	743.78	
170.0	742.98	LEW
174.0	742.59	
190.0	742.19	
195.0	742.59	
209.0	742.05	
223.0	742.27	
231.0	741.59	
251.0	742.09	
286.0	742.19	
302.0	742.83	REW
340.0	744.29	BOTTOM OF RIGHT BANK
350.0	752.72	GROUND BY ALCAP
350.0	753.45	RBHP ALCAP 140.6S2RB

Appendix Table 2-B-15. Cross sectional elevations of Side Channel 21 - A5 head, staff gage 140.6S3. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	751.27	LBHP R&M ALCAP 141.7A5RB
8.0	751.03	TOP OF LEFT BANK
12.0	746.20	
21.0	745.80	
32.0	744.10	
40.0	744.00	
44.0	743.80	
56.0	743.10	
68.0	743.90	
88.0	744.20	
116.0	746.23	
119.0	746.75	BOTTOM OF RIGHT BANK
124.0	750.10	TOP OF RIGHT BANK
144.0	750.18	RBHP R&M ALCAP 141.7A5LB

Appendix Table 2-B-16. Cross sectional elevations of Side Channel 21 - upper Q site, staff gage 140.6S7. Surveyed by ADF&G on September 13, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	751.78	LBHP ALCAP 140.6S7LB
0.0	751.48	GROUND BY ALCAP
26.0	751.33	TOP OF LEFT BANK
37.0	749.03	BOTTOM OF LEFT BANK
67.0	746.27	
93.0	744.29	LEW
113.0	743.26	
143.0	744.42	REW
177.0	745.37	
219.0	747.09	
250.0	746.91	
260.0	744.75	
270.0	744.19	LEW
299.0	743.23	
305.0	743.55	
320.0	743.43	
324.0	744.23	REW
334.0	745.32	BOTTOM OF RIGHT BANK
342.0	749.01	TOP OF RIGHT BANK
347.0	749.85	GROUND BY RBHP
347.0	750.49	RBHP ALCAP 140.6S7RB

Appendix Table 2-B-17. Cross sectional elevations of Side Channel 21 - A6 head, staff gage 140.6H5. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	753.04	LBHP R&M ALCAP 141.8A6RB
18.0	752.15	TOP OF LEFT BANK
27.0	746.55	BOTTOM OF LEFT BANK
48.0	745.15	
60.0	746.35	
66.0	746.85	
78.0	746.35	LEW
84.0	746.55	REW
116.0	747.85	BREAK
138.0	747.35	TOP OF LOW BANK
158.0	744.95	
169.0	746.65	
197.0	744.95	
218.0	747.15	BOTTOM OF BANK
285.0	749.05	
299.0	747.95	
341.0	749.15	
390.0	749.05	
438.0	749.25	
482.0	748.95	
526.0	748.65	
556.0	748.45	LEW
574.0	748.35	
59500	748.25	
617.0	748.15	
636.0	748.05	
660.0	748.35	
679.0	748.45	BOTTOM OF RIGHT BANK
695.0	748.75	REW
706.0	752.65	TOP OF RIGHT BANK
717.0	753.45	RBHP R&M ALCAP 141.8A6LB

Appendix Table 2-B-18. Cross sectional elevations of Whiskers Creek Side Slough - mouth, staff gage 101.2W1. Surveyed by ADF&G on September 11, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	370.02	LBHP R&M ALCAP 101.2W1RB
0.0	369.90	GROUND BY HEADPIN
9.0	368.44	TOP OF LEFT BANK
14.0	366.36	MID BANK
20.0	365.33	EDGE OF VEGETATION
24.2	363.43	LEW
38.0	362.49	
50.0	362.14	
60.0	362.44	
70.0	362.09	
80.0	362.41	
85.0	362.56	
90.0	362.42	
96.0	362.24	
105.0	362.25	
111.0	362.61	
114.4	363.45	REW
119.2	365.89	EDGE OF VEGETATION
126.5	366.57	MID BANK
133.0	370.22	GROUND BY HEADPIN
133.0	370.41	RBHP R&M ALCAP 101.2W1LB

Appendix Table 2-B-19. Cross sectional elevations of Whiskers Creek Side Slough - Q site, staff gage 101.2S3. Surveyed by ADF&G on July 3, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	373.21	HIGH BANK
2.0	371.68	TOE
09.0	369.08	
16.0	367.42	
19.0	366.19	LEW
31.0	364.63	
38.0	364.21	THALWEG
44.0	364.25	
50.0	364.37	
55.0	364.55	
66.0	365.33	
76.0	366.11	REW
84.0	368.03	
95.0	368.16	EDGE OF VEGETATION
105.0	370.38	RBHP R&M ALCAP 101.4S3LB
125.0	370.93	HIGH BANK

Appendix Table 2-B-20. Cross sectional elevations of Whiskers Creek Side Slough - head, staff gage 101.2H5. Surveyed by ADF&G on July 3, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	374.15	GROUND BY HEADPIN
9.0	373.30	MIDBANK
18.0	370.04	TOE
27.0	369.33	
30.0	368.42	
42.0	367.42	LEW
48.0	366.48	
64.0	368.39	REW
74.0	369.98	
80.0	369.42	
85.0	368.16	LEW
91.0	367.62	
98.0	367.81	
108.0	367.46	
119.0	367.33	
128.0	367.44	
142.0	368.25	REW
147.0	368.27	TOE
152.0	374.14	HIGH BANK

Appendix Table 2-B-21. Cross sectional elevations of Side Slough 8 - below mouth, staff gage 113.6W8. Surveyed by ADF&G on September 12, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	471.23	LBHP ADF&G REBAR
0.0	470.79	GROUND BY LBHP
5.3	470.49	TOP OF LEFT BANK
10.8	466.70	BOTTOM OF LEFT BANK. LEW
12.2	465.83	CHANNEL BOTTOM
16.7	466.01	
19.7	466.29	
22.7	466.31	
25.9	466.71	REW
32.7	467.00	
44.7	467.36	
49.7	467.75	
55.2	467.28	
66.7	466.96	
71.7	467.42	BOTTOM OF RIGHT BANK
78.7	469.09	TOP OF RIGHT BANK
93.0	469.85	GROUND BY RBHP
93.0	470.33	RBHP ADF&G REBAR

Appendix Table 2-B-22. Cross sectional elevations of Side Slough 8 - mouth, staff gage 113.6W8. Surveyed by ADF&G on July 5, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	471.11	LEFT HIGH BANK
7.0	470.81	
11.0	468.96	LEW
15.0	466.37	
19.0	465.85	
25.0	467.58	
34.0	468.42	
41.0	468.93	REW
51.0	469.63	
74.4	470.19	
100.0	470.26	EDGE OF VEGETATION
112.0	470.84	

Appendix Table 2-B-23. Cross sectional elevations of Side Slough 8 - Q site, staff gage 113.6S2. Surveyed by ADF&G on July 5, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	470.97	EDGE OF VEGETATION
13.0	470.78	
26.0	470.76	TOP OF BANK
30.0	468.94	LEW
31.0	468.06	BOTTOM OF BANK
36.0	467.40	
43.0	467.36	MIDSTREAM
52.0	467.46	BOTTOM OF BANK
57.0	467.74	
61.0	468.92	REW
64.0	470.25	TOP OF RIGHT BANK
72.0	470.76	
77.0	471.02	EDGE OF VEGETATION

Appendix Table 2-B-24. Cross sectional elevations of Side Slough 8 - head, staff gage 113.6H4. Surveyed by ADF&G on July 5, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	476.23	LBHP R&M ALCAP 114.1H1 RB
0.0	476.57	GROUND BY ALCAP
15.0	475.76	HIGH BANK
22.0	475.10	
36.0	475.90	
55.0	476.08	
71.0	475.73	
82.0	475.95	
95.0	475.56	
101.0	475.73	
108.0	476.13	
110.0	475.13	
122.0	475.97	
140.0	475.47	
151.0	475.00	
153.0	474.41	
160.0	474.92	
178.0	474.53	
196.0	474.12	
205.0	474.05	
208.0	472.96	
216.0	472.53	
229.0	481.34	THALWEG
235.0	481.73	HIGH BANK
237.0	481.85	RBHP R&M ALCAP 114.1H1LB

Appendix Table 2-B-25. Cross sectional elevations of Side Slough 8A - mouth, staff gage 125.3W5. Surveyed by ADF&G on October 19, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	566.01	LBHP R&M ALCAP 125.2W1RB
0.0	565.82	GROUND BY LBHP ALCAP
8.0	563.99	MID LEFT BANK
14.0	563.25	
16.0	562.49	BOTTOM OF LEFT BANK
30.0	561.34	LEW
52.0	560.68	
61.0	560.69	
81.0	560.11	
106.0	559.67	
113.0	559.12	
118.0	559.25	
137.0	558.93	
156.0	558.62	
165.0	558.93	
170.0	559.26	
175.0	560.61	
177.0	561.36	REW
178.0	562.22	BOTTOM OF RIGHT BANK
179.0	566.21	MID-BANK
184.0	567.57	TOP OF RIGHT BANK
189.0	568.37	GROUND BY RBHP
189.0	568.54	RBHP R&M ALCAP 125.2W1LB

Appendix Table 2-B-26. Cross sectional elevations of Side Slough 8A - upper backwater, staff gage 125.3S6. Surveyed by ADF&G on July 18, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	570.07	LBHP ADF&G ALCAP 125.3S6LB
0.0	569.82	GROUND BY ALCAP
3.0	569.73	TOP OF LEFT BANK
13.0	564.95	MID-BANK
28.0	564.73	EDGE OF VEGETATION
32.0	563.77	
33.0	563.33	
40.0	562.93	LWE
62.0	561.05	
94.0	561.52	
132.0	562.29	
155.0	561.49	
170.0	562.88	RWE
171.0	563.86	BOTTOM OF RIGHT BANK
187.0	564.75	MID-BANK
197.0	566.77	TOP OF RIGHT BANK
206.0	567.53	GROUND BY RB ALCAP
206.0	567.95	RBHP ADF&G ALCAP 125.3S6RB

Appendix Table 2-B-27. Cross sectional elevations of Side Slough 8A - lower Q site, staff gage 125.3S4. Surveyed by ADF&G on July 18, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	567.97	LBHP ADF&G ALCAP 125.3S4LB
0.0	567.44	GROUND BY ALCAP
10.0	566.12	TOP OF LEFT BANK
12.0	564.20	BOTTOM OF LEFT BANK
19.0	564.50	DRY STREAM BED
23.0	564.26	BOTTOM OF RIGHT BANK
26.0	565.71	HIGH BANK
38.0	565.72	MID-GRAVEL BAR
50.0	564.84	HIGH BANK
52.0	563.51	BOTTOM OF LEFT BANK
54.0	562.99	
68.0	563.25	
85.0	563.53	RWE
87.0	563.88	BOTTOM OF RIGHT BANK
101.0	565.98	TOP OF RIGHT BANK
126.0	566.41	MID-ISLAND
167.0	565.93	TOP OF LEFT BANK
171.0	564.55	MID-BANK
175.0	564.02	BOTTOM OF LEFT BANK
177.0	563.61	LWE
185.0	562.91	
199.0	563.55	RWE
215.0	565.45	EDGE OF VEGETATION
226.0	565.26	MID-BANK
235.0	568.38	TOP OF BANK
239.0	568.89	GROUND BY ALCAP
239.0	569.28	RBHP 125.3S4 ADF&G ALCAP

Appendix Table 2-B-28. Cross sectional elevations of Side Slough 8A - northwest channel Q site, staff gage 125.3S3. Surveyed by ADF&G on July 18, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	573.32	LBHP ADF&G ALCAP 125.3S3LB
0.0	572.90	GROUND BY ALCAP
9.0	573.06	TOP OF LEFT BANK
16.0	570.13	MID BANK
22.0	568.48	BOTTOM OF BANK
25.0	566.61	
29.0	566.15	LWE
35.0	565.81	
44.0	565.70	
64.0	566.03	RWE
69.0	566.34	EDGE OF VEGETATION
71.0	567.19	BOTTOM OF BANK
82.0	568.61	MID-BANK
95.0	570.70	TOP OF BANK
122.0	571.47	GROUND BY ALCAP
122.0	572.08	RBHP ADF&G ALCAP 125.3SLB

Appendix Table 2-B-29. Cross sectional elevations of Side Slough 8A - Northwest channel head, staff gage 125.3H2. Surveyed by ADF&G on May 15, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	577.11	LBHP R&M ALCAP 126.1H4RB
0.0	575.46	EDGE OF VEGETATION
66.0	574.29	
100.0	574.23	
135.0	573.55	
172.0	573.18	
232.0	573.11	
260.0	573.92	EDGE OF VEGETATION
279.0	582.40	RBHP REBAR

Appendix Table 2-B-30. Cross sectional elevations of Side Slough 8A - Northeast channel head, staff gage 125.3H7. Surveyed by ADF&G on August 4, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	583.87	LBHP ADF&G REBAR
0.0	583.52	GROUND BY LBHP
16.5	583.48	TOP OF LEFT BANK
20.0	580.33	MID-BANK
24.0	579.30	BOTTOM OF BANK
36.0	578.98	
50.0	578.99	
54.0	580.33	
56.0	579.75	
60.0	578.51	
62.5	577.80	
67.0	579.28	
75.5	579.46	
86.0	579.64	
97.0	579.59	
103.0	578.97	
108.0	578.05	
119.0	578.33	
126.0	577.37	
132.0	577.98	
140.0	577.95	
151.0	577.18	
168.0	577.39	
180.0	577.06	
187.0	577.12	
200.0	577.13	
209.0	577.31	
225.0	577.19	
234.0	577.60	
247.8	578.39	
260.0	579.33	
271.0	579.10	
294.5	579.96	GROUND BY RBHP
294.5	580.28	RBHP ADF&G REBAR

Appendix Table 2-B-31. Cross sectional elevations of Side Slough 9 - mouth, staff gage 128.3W3. Surveyed by ADF&G on September 14, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	592.59	LBHP ADF&G REBAR
0.0	591.38	GROUND BY LBHP
3.0	591.36	TOP OF SAND BAR
4.7	590.68	
6.3	589.96	LEW
10.0	589.62	
17.0	589.84	
31.0	589.82	
41.0	589.63	
49.0	589.44	
59.0	589.76	
64.7	590.01	REW
74.0	591.96	
78.4	592.71	BOTTOM OF RIGHT BANK
78.8	595.29	TOP OF RIGHT BANK
93.0	596.03	GROUND BY RBHP
93.0	596.44	RBHP ADF&G ALCAP 128.3W3RB

Appendix Table 2-B-32. Cross sectional elevations of Side Slough 9 - Q site, staff gage 128.3S1. Surveyed by ADF&G on August 3, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	600.15	ADF&G REBAR LBHP
0.0	599.45	GROUND BY LBHP
5.0	597.49	MID-BANK
8.0	596.30	
11.5	593.72	BOTTOM OF LEFT BANK
21.0	593.70	
41.0	594.08	
76.0	593.73	
97.8	593.59	LWE
110.0	592.93	
130.0	592.57	
148.0	592.48	
155.7	593.59	RWE
166.4	595.35	EDGE OF VEGETATION
168.3	597.03	MID-BANK
171.0	598.18	TOP OF RIGHT BANK
192.3	599.67	GROUND BY RBHP
192.3	600.20	ADF&G REBAR RBHP

Appendix Table 2-B-33. Cross sectional elevations of Side Slough 9 - head, staff gage 128.3H2. Surveyed by ADF&G on August 23, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	604.97	ADF&G REBAR LBHP
0.0	604.50	GROUND BY LBHP
15.0	604.77	
25.0	604.45	LWE
31.0	603.99	
36.0	603.94	
46.0	604.11	
61.0	603.86	
68.0	603.68	
78.0	604.01	
94.0	603.91	
108.0	604.17	
122.0	604.09	
134.0	604.22	
138.0	604.00	
152.0	604.69	
169.0	604.38	
175.0	604.63	RWE
194.0	604.93	
210.0	604.63	
220.0	604.28	
250.0	605.38	
259.0	605.59	
272.0	605.20	
289.0	605.51	
311.0	605.50	
336.0	605.10	
360.0	604.35	
370.0	602.69	LWE
385.0	610.84	
391.0	602.67	RWE
409.0	604.00	BOTTOM OF RIGHT BANK
412.0	607.90	TOP OF RIGHT BANK. EDGE OF VEGETATION
416.0	608.19	GROUND BY RBHP
416.0	608.68	ADF&G REBAR RBHP

Appendix Table 2-B-34. Cross sectional elevations of Side Slough 11 - mouth, staff gage 135.3W1. Surveyed by ADF&G on October 19, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	672.77	LBHP ALCAP R&M 135.5W1LB
0.0	672.57	GB
3.0	670.96	TOP OF LEFT BANK. EDGE VEGETATION
16.5	670.42	
41.0	669.14	MIDDLE BANK
64.4	668.15	
83.4	667.45	
107.6	667.64	
114.8	667.38	
120.0	666.60	BOTTOM OF LOW BANK
126.5	666.30	LWE
133.2	665.81	
137.0	665.61	
144.0	665.83	
148.4	665.45	
154.0	665.75	
155.7	666.31	RWE
162.2	666.88	BOTTOM OF LOW BANK
173.5	667.78	MIDDLE BANK
184.6	669.24	BANK
186.6	671.97	BANK
186.6	674.00	

Appendix Table 2-B-35. Cross sectional elevations of Side Slough 11 - Q site, staff gage 135.3S6. Surveyed by ADF&G on June 29, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	674.36	LBHP ALCAP R&M 135.7S2RB
0.0	674.06	GB
11.5	673.69	
23.5	674.19	
43.6	673.04	
72.0	672.19	
98.0	671.53	
107.6	670.74	LEW
118.7	670.71	
125.6	669.77	THALWEG
129.9	669.83	
147.3	670.78	REW
162.6	674.27	MIDDLE OF HIGH BANK

Appendix Table 2-B-36. Cross sectional elevations of Side Slough 11 - head, staff gage 135.3H3. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	688.67	LBHP ALCAP R&M LRX44
13.0	688.10	TOP BANK
21.0	685.30	BOTTOM OF BANK
31.0	684.80	
40.0	684.90	
53.0	685.10	
65.0	684.90	
79.0	684.70	
90.0	684.90	
98.0	684.00	
108.0	684.20	
116.0	685.50	
129.0	685.40	
140.0	685.60	
154.0	685.70	
168.0	685.60	
182.0	685.10	
197.0	685.80	
213.0	686.60	
229.0	687.30	
246.0	687.70	
263.0	688.30	
280.0	688.80	
292.0	689.00	TOP OF BANK
299.0	689.70	GB
307.0	689.36	RBHP ALCAP 136.5H4LB

Appendix Table 2-B-37. Cross sectional elevations of Side Slough 16B - Q site, staff gage 138.0S5. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	706.50	LBHP R&M ALCAP 138.0S3RB
7.0	704.87	
10.0	703.27	
32.0	700.98	
39.0	699.97	
46.0	699.77	
53.0	699.67	
61.0	699.87	
67.0	699.67	
78.0	705.37	
84.0	705.62	RBHP R&M ALCAP 138.0S3LB

Appendix Table 2-B-38. Cross sectional elevations of Side Slough 16B - head, staff gage 138.0H3. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	708.22	LBHP ADF&G REBAR RB
5.0	707.00	
7.0	704.14	
21.0	703.64	
29.0	703.40	
41.0	703.10	
53.0	703.10	
66.0	703.00	
80.0	703.30	
94.0	703.48	
107.0	703.70	
126.0	703.70	
149.0	704.10	
173.0	704.70	
187.0	704.60	
195.0	708.86	RBHP ADF&G ALCAP LB

Appendix Table 2-B-39. Cross sectional elevations of Side Slough 20 - mouth, staff gage 140.1W4. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	733.76	LBHP R&M ALCAP LRX-53 LB
11.0	732.58	
22.0	732.38	
27.0	731.58	TOP BANK
30.0	729.48	BOTTOM OF LEFT BANK
38.0	727.88	
54.0	726.98	
75.0	727.08	
78.0	725.63	
89.0	725.48	
109.0	724.98	
114.0	724.42	
121.0	722.92	
128.0	723.12	
136.0	723.62	
142.0	724.02	
148.0	724.32	
154.0	724.72	
161.0	724.82	
168.0	724.92	
176.0	725.02	
189.0	725.51	
201.0	727.22	
209.0	728.14	RBHP R&M ALCAP 140.1W1 RB

Appendix Table 2-B-40. Cross sectional elevations of Side Slough 20 - Q site, staff gage 140.1S5. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	732.20	RBHP R&M ALCAP 140.2S2LB
4.0	731.70	TOP BANK
9.0	727.48	
13.0	726.40	
18.0	726.00	
22.0	726.00	
27.0	726.10	
31.0	726.10	
36.0	726.50	
41.0	726.50	
46.0	726.60	
51.0	726.80	
57.0	726.90	
61.0	727.10	
66.0	727.20	
70.0	727.48	
74.0	728.40	
79.0	729.66	LBHP R&M ALCAP 140.2S2RB

Appendix Table 2-B-41. Cross sectional elevations of Side Slough 20 - head, staff gage 140.1H3. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	734.25	RBHP R&M ALCAP 140.6H3LB
15.0	733.90	
32.0	733.10	
47.0	732.80	
59.0	732.40	
71.0	732.10	
79.0	731.73	
84.0	731.50	
93.0	731.30	
102.0	731.10	
110.0	731.00	
117.0	730.60	
123.0	730.50	
129.0	730.50	BOTTOM
134.0	731.71	
141.0	737.33	LBHP R&M ALCAP 140.6H3RB

Appendix Table 2-B-42. Cross sectional elevations of Side Slough 21 - mouth, staff gage 142.0W5. Surveyed by ADF&G on May 17, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	751.49	LBHP REBAR ADF&G 1981 LBHP8
9.0	744.21	BOTTOM OF LEFT BANK
32.0	743.55	
54.0	742.82	
85.0	742.62	
99.0	744.36	
120.0	744.47	
130.0	750.97	RBHP REBAR ADF&G 1981 RBHP8

Appendix Table 2-B-43. Cross sectional elevations of Side Slough 21 - Q site, staff gage 142.0S6. Surveyed by ADF&G on May 17, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	751.21	LBHP ALCAP 141.9S8RB
19.0	745.89	BOTTOM OF BANK
42.0	746.18	
86.0	744.92	LEW
90.7	744.31	
109.0	744.88	REW BOTTOM OF RIGHT BANK
116.3	751.61	TOP OF RIGHT BANK

Appendix Table 2-B-44. Cross sectional elevations of Side Slough 21 - Northwest head, staff gage 142.0H3. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	759.26	LBHP R&M LRX-56
0.0	758.34	GROUND BY LRX-56
26.0	755.34	
39.0	754.74	
55.0	754.94	
63.0	756.61	
74.0	754.84	
106.0	755.34	
136.0	754.64	
158.0	756.21	
161.0	754.84	
198.0	755.44	

Appendix Table 2-B-45. Cross sectional elevations of Side Slough 21 - Northwest head, staff gage 142.0H1. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
795.0	757.01	
831.0	756.81	
867.0	757.01	
893.0	756.71	
928.0	755.67	
929.0	755.61	
952.0	757.11	
957.0	756.68	BOTTOM OF RIGHT BANK
977.0	761.38	TOP OF RIGHT BANK

Appendix Table 2-B-46. Cross sectional elevations of Side Slough 22 - mouth, staff gage 144.3W3. Surveyed by ADF&G on September 15, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	787.62	LBHP ADF&G REBAR
0.0	787.23	GROUND BY ALCAP
13.0	781.77	BOTTOM OF LEFT BANK
50.0	780.76	
66.0	780.37	LEW
71.0	780.01	
92.0	779.77	
115.0	779.74	
132.0	780.34	
168.0	780.35	REW
190.0	781.03	
228.0	781.61	
266.0	781.68	
300.0	781.77	
331.0	781.61	
379.0	781.63	
405.0	781.72	
410.0	783.85	
443.0	783.86	EDGE OF VEGETATION
498.0	784.27	
513.0	782.73	
523.0	782.82	
525.0	783.92	
530.0	784.07	
560.0	782.37	
575.0	782.78	BOTTOM OF RIGHT BANK
576.0	782.75	GROUND BY RBHP
576.0	784.11	RBHP ADF&G REBAR

Appendix Table 2-B-47. Cross sectional elevations of Side Slough 22 - mid-slough, staff gage 144.3S4. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	785.16	LBHP R&M ALCAP 144.4S2RB
10.0	784.19	
23.0	784.35	TOP OF LEFT BANK
33.0	780.78	
38.0	779.57	BOTTOM
43.0	779.22	
50.0	778.89	BOTTOM
55.0	777.66	
65.0	778.52	BOTTOM
82.0	780.94	
96.0	784.72	
100.0	787.25	TOP OF RIGHT BANK
110.0	787.56	RBHP ADF&G 144.3S4A

Appendix Table 2-B-48. Cross sectional elevations of Side Slough 22 - Q site, staff gage 144.3S6. Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	789.54	LBHP ALCAP 144.6S3RB
3.0	788.57	TOP LEFT BANK
5.0	785.88	TOE. BOTTOM OF LEFT BANK
17.0	783.72	
21.0	783.43	
25.0	783.24	
30.0	783.21	
35.0	783.21	
40.0	782.86	
45.0	782.90	
53.0	783.74	
71.0	785.29	
82.0	788.89	
110.0	789.54	RBHP ADF&G REBAR 3 LB

Appendix Table 2-B-49. Cross sectional elevations of Side Slough 22 - head, staff gage 144.3H2. Surveyed by ADF&G on September 15, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	790.07	LBHP REBAR ADF&G
0.0	791.19	GROUND BY LBHP
13.0	790.58	EDGE OF VEGETATION
19.0	789.78	
33.0	788.72	
54.0	788.96	
76.0	788.02	
90.0	787.79	
105.0	786.78	
115.0	786.35	
127.0	787.16	
135.0	788.87	
152.0	789.55	
159.0	789.25	
169.0	787.85	
184.0	788.97	
191.0	787.54	
203.0	788.68	EDGE OF VEGETATION
218.0	790.21	
232.0	791.45	BOTTOM OF RIGHT BANK
237.0	793.53	TOP OF RIGHT BANK
263.0	793.39	GROUND BY RBHP
265.0	795.00	RBHP SPIKE IN COTTONWOOOD

Appendix Table 2-B-50. Cross sectional elevations of Upland Slough 6A - mouth, staff gage 112.3W1. Surveyed by ADF&G on July 5, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	467.29	LEFT BANK
10.0	467.51	
16.0	466.50	
21.0	459.61	
27.0	457.51	TOE
42.0	457.23	
56.0	457.35	LEW
69.0	456.77	
71.0	455.96	
83.0	452.16	
88.0	452.54	
94.0	453.42	
102.0	456.28	
112.0	457.28	REW
120.0	458.64	RIGHT HIGH BANK

Appendix Table 2-B-51. Cross sectional elevations of Upland Slough 6A - backwater, staff gage 112.3S3. Surveyed by ADF&G on September 12, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	460.16	LBHP ALCAP 112.3S3LB
0.0	459.66	GROUND BY ALCAP
10.6	458.30	TOP OF LEFT BANK
16.6	455.65	BOTTOM OF LEFT BANK AND LEW
17.6	455.29	
19.6	454.62	
24.6	454.68	
28.6	455.09	
30.6	453.84	
32.6	453.71	
36.6	453.56	
38.6	453.93	
39.6	454.42	
42.3	455.65	REW
45.0	455.82	BOTTOM OF LEFT BANK
45.3	457.55	TOP OF RIGHT BANK
52.2	458.19	GROUND BY RBHP
52.2	458.88	RBHP ADF&G REBAR

Appendix Table 2-B-52. Cross sectional elevations of Upland Slough 19 - access, staff gage 140.0W1. Surveyed by ADF&G on September 14, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	719.57	MAINSTEM REW
20.0	720.37	GRAVEL BAR
27.0	719.94	GRAVEL BAR
56.0	719.72	GRAVEL BAR
59.0	720.36	SAND BAR
88.0	719.95	SAND BAR
98.0	718.61	LEW
100.0	718.03	THALWEG
103.0	718.64	REW
109.0	720.25	
111.0	721.00	BOTTOM OF BANK EDGE OF VEGETATION
117.0	724.52	GROUND BY ALCAP
117.0	724.71	RBHP ALCAP ADF&G 140.0W1RB

Appendix Table 2-B-53. Cross sectional elevations of Upland Slough 19 - below mouth, staff gage 140.0S3. Surveyed by ADF&G on September 14, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	719.97	MAINSTEM LEW
15.0	720.55	
28.0	720.31	
38.0	719.96	
48.0	720.42	
75.0	720.09	
81.0	719.75	
95.0	719.85	
105.0	720.02	
120.0	719.11	LEW
135.0	717.01	
142.0	716.80	THALWEG
150.0	718.16	
156.0	717.74	
165.0	719.03	
168.0	719.38	BOTTOM OF BANK
169.0	722.32	TOP OF BANK EDGE OF VEGETATION
176.0	722.87	GROUND BY ALCAP
176.0	723.23	RBHP ALCAP ADF&G 140.0S3RB 83

Appendix Table 2-B-54. Cross sectional elevations of Upland Slough 19 - Q site, staff gage 140.0S4. Surveyed by ADF&G on September 14, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	724.52	LBHP ALCAP ADF&G 140.0S4LB 83
0.0	724.25	GROUND BY ALCAP
6.0	721.84	MIDDLE BANK
10.0	720.81	BOTTOM OF BANK
11.0	720.02	LEW
16.0	719.68	THALWEG
18.0	719.65	
21.0	720.02	REW
30.0	720.35	
33.0	721.86	TOP OF BERM VEGETATION
36.0	720.01	LEW
38.0	719.45	BOTTOM OF POOL
42.0	719.99	REW
44.0	721.61	TOP OF BANK EDGE OF VEGETATION
52.0	722.43	MIDDLE OF BANK
71.0	724.94	GROUNG BY ALCAP
71.0	725.22	RBHP ALCAP ADF&G 140.0S4RB 83

Appendix Table 2-B-55. Cross sectional elevations of 4th of July Creek - Q site, staff gage 131.1T1. Surveyed by ADF&G on July 3, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	627.69	LBHP R&M ALCAP 131.1T3LB
0.0	627.47	GROUND BY ALCAP
3.0	626.46	TOP OF LEFT BANK
4.5	624.79	LWE
7.0	623.93	
10.0	622.39	
13.0	624.09	
16.0	623.27	
19.0	623.30	
22.0	623.41	
25.5	624.41	
25.5	624.77	RWE
27.0	627.06	TOP OF RIGHT BANK
31.0	627.98	GROUND BY ALCAP
31.0	628.54	RBHP R&M REBAR

Appendix Table 2-B-56. Cross sectional elevations of Gold Creek - Q site, staff gage 136.8T1. Surveyed by ADF&G on May 16, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	699.81	RBHP R&M ALCAP GOLD CREEK 136.8T2RB 1982
11.0	700.69	TOP BANK
20.0	695.82	LEW
28.0	695.09	BOTTOM
32.0	694.99	
41.0	695.71	
54.0	698.16	TOP OF BANK
61.0	698.87	LBHP R&M ALCAP GOLD CREEK 136.8T2LB

Appendix Table 2-B-57. Cross sectional elevations of Indian River - Q site, staff gage 138.6T2. Developed from ADF&G 1983 streamflow data.

STATION	ELEVATION	DESCRIPTION
0.0	847.49	LEW
0.4	847.49	
0.6	846.99	
1.6	846.59	
1.6	847.28	
2.4	846.69	
5.1	846.48	
5.8	846.49	
6.1	846.73	
8.9	845.84	
10.0	846.39	
10.1	846.48	
11.9	845.79	
14.1	846.28	
14.2	846.09	
14.9	845.67	
18.0	845.99	
20.9	845.49	
22.1	845.86	
23.9	845.39	
26.1	845.83	
26.4	845.89	
27.9	845.09	
30.1	845.68	
30.6	845.79	
33.9	845.49	
34.1	845.33	
34.8	845.99	
36.9	846.19	
38.1	846.08	
41.9	846.29	
43.2	846.29	
46.1	846.46	
46.9	846.31	
47.4	846.19	

Appendix Table 2-B-57. continued.

STATION	ELEVATION	DESCRIPTION
51.6	846.29	
51.9	846.19	
55.6	846.38	
55.8	846.19	
56.5	846.29	
59.6	846.28	
60.0	846.19	
61.9	845.61	
63.6	845.78	
64.2	845.99	
66.9	845.09	
70.0	846.18	
71.9	845.49	
72.2	846.09	
75.0	845.99	
75.6	846.99	
79.6	846.93	
80.2	846.69	
81.6	847.28	
81.9	847.27	
82.9	847.49	
83.2	847.49	REW

Appendix Table 2-B-58. Cross sectional elevations of Portage Creek - Q site, staff gage 148.8T1. Developed from ADF&G 1983 streamflow data.

STATION	ELEVATION	DESCRIPTION
0.0	841.33	LEW
1.8	840.94	
5.0	839.54	
8.0	838.83	
10.0	838.54	
13.0	838.73	
15.0	838.44	
18.0	838.73	
20.0	838.74	
23.0	838.53	
25.0	838.44	
28.0	838.53	
30.0	838.44	
33.0	838.53	
35.0	838.14	
38.0	838.33	
40.0	838.14	
43.0	838.33	
44.0	838.14	
48.0	838.14	
52.0	838.14	
53.0	838.03	
56.0	837.94	
58.0	838.53	
60.0	838.34	

Appendix Table 2-B-58. continued.

STATION	ELEVATION	DESCRIPTION
63.0	837.93	
64.0	837.64	
68.0	837.79	
72.0	837.74	
73.0	838.13	
76.0	837.84	
78.0	837.33	
80.0	837.74	
83.0	836.83	
84.0	837.74	
88.0	837.34	
92.0	838.74	
95.0	841.33	REW