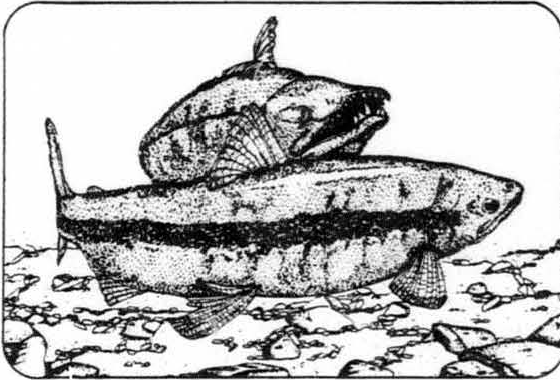
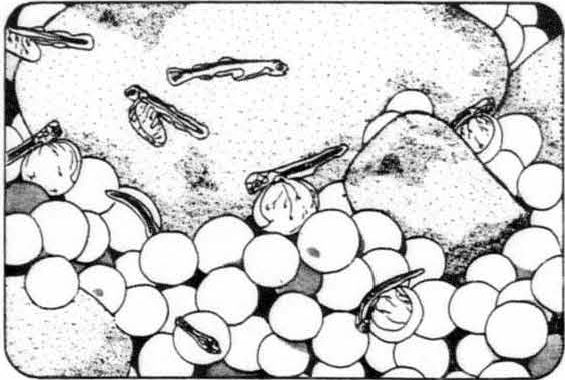
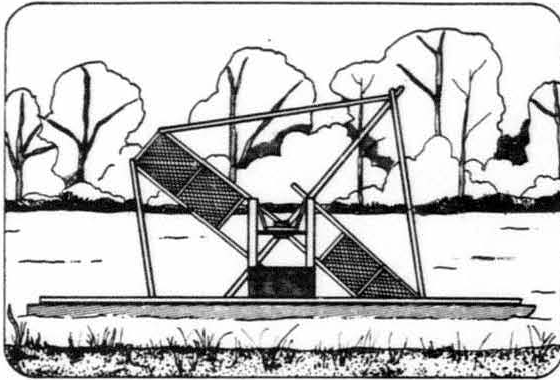




ALASKA DEPARTMENT OF FISH AND GAME
SUSITNA HYDRO AQUATIC STUDIES

REPORT NO. 3 Part I, Chapter 2
AQUATIC HABITAT AND INSTREAM FLOW
INVESTIGATIONS (MAY-OCTOBER 1983)



ADFG/SU HYDRO
PROVISIONAL DATA
DATE MAY 06 1984

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

ADFG/SU HYDRO
PROVISIONAL DATA
DATE _____
MAY 08 1984

ALASKA DEPARTMENT OF FISH AND GAME
SUSITNA HYDRO AQUATIC STUDIES

REPORT NO. 3 Part I, Chapter 2
AQUATIC HABITAT AND INSTREAM FLOW
INVESTIGATIONS (MAY-OCTOBER 1983)

Edited by:

Christopher C. Estes
and
Douglas S. Vincent-Lang

Prepared for:

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

FORWARD

Part I, "Basin-wide Hydrologic and Water Quality Investigations", is a compilation of the physical and chemical data collected by the ADF&G Su Hydro Aquatic Studies team during the FY 84 open water field season (May-October, 1983). In certain cases, the 1983 data bases have been combined with the ADF&G 1981 and 1982 data bases, along with other data bases from other subcontractors (R&M Consultants and AEIDC) in order to present a most up to complete listing of currently available data. These data are arranged by data type for ease of use by user agencies.

Part I is divided into five chapters:

- | | |
|-----------|---|
| Chapter 1 | Stage/discharge investigations of the Susitna River basin. |
| Chapter 2 | Channel geometry investigations of the Susitna River basin. |
| Chapter 3 | Continuous water temperature investigations of the Susitna River basin. |
| Chapter 4 | Water quality investigations of the Susitna River basin. |
| Chapter 5 | Dissolved gas concentration investigations of the Susitna River basin. |

GLOSSARY FOR PART I OF REPORT # 3

Backwater Area - A body or accumulation of water with little or no velocity resulting from a hydraulic (e.g. mainstem discharge) or physical (e.g. beaver dam) barrier which occurs at the mouth of or within a side channel or slough.

Berm - The ledge or shelf at the head of a side slough or side channel that separates the side slough or channel from the mainstem Susitna River or other side channels.

Breaching - Any of the three conditions of overtopping of the head of a side channel or side slough (see also initial, intermediate, and controlling breaching discharges).

Controlling Breaching Discharge - The breaching condition in which mainstem discharges at Gold Creek are equal to or greater than the mainstem discharge required to directly govern the hydraulic characteristics within a side slough or side channel. This condition can be denoted as equalling the segment of the flow rating curve beginning with the point of inflection and beyond.

Cross Section Profile - A profile describing the cross sectional geometry of a channel.

Datapod - An instrument used to continuously measure and record various environmental variables e.g. air or water temperature, stage, and dissolved gas concentration (refer to Chapters 1, 2 and 5).

Discharge - Water volume passing a fixed location at a specific point in time. The term specifically refers to the moving water in the mainstem habitat.

DSM - Data Storage Module used in the datapod system to store data (refer to Chapters 1 and 2).

Flow - Water volume passing a specific location at a specific point in time. The term specifically refers to moving water in side channel, side slough, upland slough, tributary mouth, and tributary habitats.

Gaging Station - A station at a site which has been established for monitoring stage, flow and/or discharge.

Gradient - Rate of change in vertical elevation per unit horizontal distance.

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

Inflection Point - The point on a rating curve at which the line describing the data changes slope.

Initial Breaching Discharge - The mainstem discharge at Gold Creek which represents the initial point when mainstem water begins to enter the upstream head (berm) of a side slough or channel.

Intermediate Breaching Discharge - The range of mainstem discharges at Gold Creek representative of the conditions between the Initial and Controlling Breaching Discharges. This range occurs from immediately after mainstem surface water begins to overlap the upstream head (berm) of a side slough or side channel up to the point when the mainstem discharge begins to govern the hydraulic characteristics of the site.

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 discharge per 24 hour period for a gaging station. All USGS discharge data are in this format.

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

Mouth - The downstream confluence of one or more water bodies with another water body.

Overtopping - See breaching.

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

Pool - A portion of a water course that is relatively deep and slow-moving in comparison to the rest of the water course.

Project Datum - A series of elevations tied to sea level that are used by project personnel to tie relative data bases together.

Rating Curve - A curve that is constructed from data representing two dependent variables (e.g. stage, flow or discharge data) that describes the relationship between the two variables at a site.

Riffle - A portion of a water course that is relatively shallow and fast-running in comparison to the rest of the water course.

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.

Staff Gage - A device used to instantaneously monitor stage at a site.

Stage - A measure of water depth which can be converted to water, surface elevation when surveyed to a benchmark at a site. It can be converted to true water surface elevation if it is tied into project datum.

Thalweg Profile - A longitudinal profile that describes the streambed elevation of the deepest portion or middle of mainstem, tributary, slough or other riverine habitats.

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.

Turbid - The condition of water quality at a site when water clarity is decreased by inorganic and/or organic suspended materials. Turbidity levels often exceed 50 NTU's.

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.

Water Surface Elevation - The elevation of the water surface.

WSEL - See water surface elevation.

Channel Geometry Investigations
of the Susitna River Basin

1984 Report No. 3, Chapter 2

by: Tim Quane, Isaac Queral, Don Seagren, and Tommy Withrow

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

ABSTRACT

(To be prepared)

TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT	i
TABLE OF CONTENTS.....	ii
LIST OF FIGURES.....	vii
LIST OF TABLES.....	v
1.0 INTRODUCTION & OBJECTIVES.....	1
1.1 Introduction.....	1
1.2 Objectives.....	1
1.2.1 Thalweg Profile Study.....	2
1.2.2 Cross Section Surveys.....	2
2.0 METHODS.....	3
2.1 Site Selection.....	3
2.1.1 Thalweg Surveys.....	3
2.1.2 Cross Section Profile Study.....	3
2.2 Field Data Collection.....	7
2.2.1 Thalweg Field Data Collection Procedures.....	7
2.2.2 Cross Section Field Data Collection Procedures..	7
2.3 Analytical Approach.....	8
2.3.1 Thalweg Study.....	8
2.3.2 Cross Section Study.....	9
3.0 RESULTS.....	10
3.1 Mainstem Habitats.....	10
3.2 Side Channel Habitats.....	10
3.2.1 Mainstem 2 Side Channel (RM 114.4).....	10
3.2.1.1 Site Description.....	10
3.2.1.2 Thalweg Profile.....	12

3.2.1.3	Cross Section Profiles.....	14
3.2.2	Slough 10 Complex (RM 133.8).....	14
3.2.2.1	Site Description.....	14
3.2.2.2	Thalweg Profile.....	18
3.2.2.3	Cross Section Profiles.....	18
3.2.3	Lower Side Channel 11 (RM 135.3).....	22
3.2.3.1	Site Description.....	22
3.2.3.2	Thalweg Profile.....	22
3.2.3.3	Cross Section Profiles.....	22
3.2.4	Upper Side Channel 11 (RM 136.2).....	24
3.2.4.1	Site Description.....	24
3.2.4.2	Thalweg Profile.....	24
3.2.4.3	Cross Section Profiles.....	26
3.2.5	Slough 21 Complex.....	29
3.2.5.1	Site Description.....	29
3.2.5.2	Thalweg Profile.....	29
3.2.5.3	Cross Section Profiles.....	31
3.3	Side Slough Habitats.....	31
3.3.1	Whiskers Side Slough	34
3.3.1.1	Site Description.....	34
3.3.1.2	Thalweg Profile.....	34
3.3.1.3	Cross Section Profiles.....	36
3.3.2	Side Slough 8.....	36
3.3.2.1	Site Description.....	36
3.3.2.2	Thalweg Profile.....	36
3.3.2.3	Cross Section Profiles.....	39
3.3.3	Side Slough 8A.....	39

3.3.3.1	Site Description.....	39
3.3.3.2	Thalweg Profile.....	42
3.3.3.3	Cross Section Profiles.....	42
3.3.4	Side Slough 9.....	44
3.3.4.1	Site Description.....	44
3.3.4.2	Thalweg Profile.....	48
3.3.4.3	Cross Section Profiles.....	48
3.3.5	Side Slough 9A (RM 133.2).....	52
3.3.5.1	Site Description.....	52
3.3.5.2	Thalweg Profile.....	52
3.3.5.3	Cross Section Profiles.....	54
3.3.6	Side Slough 11 (RM 135.7).....	54
3.3.6.1	Site Description.....	54
3.3.6.2	Thalweg Profile.....	55
3.3.6.3	Cross Section Profiles.....	55
3.3.7	Side Slough 16/16B Complex (RM 138.0).....	59
3.3.7.1	Site Description.....	59
3.3.7.2	Thalweg Profile.....	59
3.3.7.3	Cross Section Profiles.....	61
3.3.8	Side Slough 20 (RM 140.2).....	61
3.3.8.1	Site Description.....	61
3.3.8.2	Thalweg Profile.....	64
3.3.8.3	Cross Section Profiles.....	64
3.3.9	Side Slough 21 (RM 141.8).....	68
3.3.9.1	Site Description.....	68
3.3.9.2	Thalweg Profile.....	68
3.3.9.3	Cross Section Profiles.....	70

3.3.10	Side Slough 22 (RM 144.2).....	73
3.3.10.1	Site Description.....	73
3.3.10.2	Thalweg Profile.....	73
3.3.10.3	Cross Section Profiles.....	75
3.4	Upland Slough Habitats	75
3.4.1	Upland Slough 6A (RM 1).....	78
3.4.1.1	Site Description.....	78
3.4.1.2	Thalweg Description.....	78
3.4.1.3	Cross Section Profiles.....	80
3.4.2	Upland Slough 10.....	82
3.4.2.1	Site Description.....	82
3.4.2.2	Thalweg Description.....	82
3.4.2.3	Cross Section Profiles.....	82
3.4.3	Upland Slough 19.....	83
3.4.3.1	Site Description.....	83
3.4.3.2	Thalweg Description.....	83
3.4.3.3	Cross Section Profiles.....	85
3.5	Tributary Habitats	85
3.5.1	Fourth of July Creek (RM 131.1).....	87
3.5.1.1	Site Description.....	87
3.5.1.2	Cross Section Profile.....	87
3.5.2	Gold Creek (RM 136.8).....	87
3.5.2.1	Site Description.....	87
3.5.2.2	Cross Section Profile.....	89
3.5.3	Indian River (RM 138.6).....	89
3.5.3.1	Site Description.....	89
3.5.3.2	Cross Section Profile.....	89

3.5.4	Portage Creek (RM 148.9).....	92
3.5.4.1	Site Description.....	92
3.5.4.2	Cross Section Profile.....	92
4.0	DISCUSSION	94
5.0	CONTRIBUTORS	97
6.0	ACKNOWLEDGEMENTS	98
7.0	LITERATURE CITED	99
8.0	APPENDICES	100

LIST OF FIGURES

<u>Figure No.</u>		<u>Page</u>
2-1	Locations at which channel geometry data were collected during the 1983 open water field season.....	5
2-2	Thalweg profile of the Talkeetna to Devil Canyon reach of the Susitna River showing locations of selected study sites.....	11
2-3	Streambed (thalweg) profile of Mainstem II Side Channel (RM 114.4).....	13
2-4	Cross section profiles developed for staff gage sites within Mainstem II Side Channel.....	14
2-5	Streambed (thalweg) profile of Slough 10 Complex (RM 133.8).....	19
2-6	Cross section profiles developed for staff gage sites within Side Channel 10.....	21
2-7	Streambed (thalweg) profile Upper Side Channel 11 (RM 136.2).....	25
2-8	Cross section profiles developed for staff gage sites within Upper Side Channel 11.....	28
2-9	Streambed (thalweg) profile of Slough 21 Complex (RM 140.6).....	30
2-10	Cross section profiles developed for staff gage sites within Side Channel 21.....	33
2-11	Thalweg profile of Whiskers Creek Side Slough (RM 101.2).....	35
2-12	Cross section profiles developed for staff gage sites within Whiskers Creek Side Slough.....	38
2-13	Cross section profiles developed for staff gage locations within Side Slough 8 (RM 133.6).....	41
2-14	Streambed (thalweg) profile of Side Slough 8A (RM 126.2).....	43
2-15	Cross section profiles developed for staff gage locations within Side Slough 8A.....	46
2-16	Streambed (thalweg) profile of Side Slough 9 (RM 128.3).....	49

<u>Figure No.</u>		<u>Page</u>
2-17	Cross section profiles developed for staff gage locations within Side Slough 9.....	50
2-18	Streambed (thalweg) profile of Side Slough 11 (RM 133.2).....	53
2-19	Streambed (thalweg) profile of Side Slough 11 (RM 135.7).....	56
2-20	Cross section profile developed for staff gage sites within Side Slough 11.....	57
2-21	Streambed (thalweg) profile of Side Slough 16/16B Complex (RM 138.0).....	60
2-22	Cross section profiles developed for staff gage locations within Side Slough 16B.....	62
2-23	Streambed (thalweg) profile of Side Slough 20 (RM 140.2).....	65
2-24	Cross section profiles developed for staff gage locations within Side Slough 20.....	66
2-25	Streambed (thalweg) profile of Slough 21 Complex (RM 140.6).....	69
2-26	Cross section profiles developed for staff gage sites within Side Slough 21 (RM 141.8).....	71
2-27	Streambed (thalweg) profile of Side Slough 22 (RM 144.2).....	74
2-28	Cross section profiles developed for staff gage locations within Side Slough 22.....	76
2-29	Streambed (thalweg) profile of Upland Slough 6A (RM 112.3).....	79
2-30	Cross section profiles developed for staff gage sites within Upland Slough 6A.....	81
2-31	Streambed (thalweg) profile of Upland Slough 19 (RM 140.0).....	84
2-32	Cross section profiles developed for staff gage sites within Upland Slough 19.....	86
2-33	Cross section profile developed for the staff gage site within Fourth of July Creek (RM 131.1).....	88

<u>Figure No.</u>	<u>Page</u>
2-34	Cross section profile developed for the staff gage site within Gold Creek (RM 136.8)..... 90
2-35	Cross section profile developed for the staff gage site within Indian River (RM 138.6)..... 91
2-36	Cross section profile developed for the staff gage site within Portage Creek (RM 148.9)..... 93

LIST OF TABLES

<u>Table No.</u>		<u>Page</u>
2-1	Slough (upland and side) and side channel site which thalweg and cross section data were collected during 1983.....	4
2-2	Sites within the Mainstem 2 Side Channel for which cross section profiles were constructed.....	15
2-3	Sites within Side Channel 10 for which cross sections were constructed.....	20
2-4	Sites within Lower Side Channel 11 for which cross sections were constructed.....	23
2-5	Sites within Upper Side Channel 11 for which cross sections were constructed.....	27
2-6	Sites within Side Channel 21 for which cross sections were constructed.....	32
2-7	Sites within Whiskers Side Slough for which cross sections were constructed.....	37
2-8	Sites within Side Slough 8 for which cross sections were constructed.....	40
2-9	Sites within Side Slough 8A for which cross sections were constructed.....	45
2-10	Sites within Side Slough 9 for which cross sections were constructed.....	51
2-11	Sites within Side Slough 11 for which cross sections were constructed.....	58
2-12	Sites within Side Slough 16B for which cross sections were constructed.....	63
2-13	Sites within Side Slough 20 for which cross sections were constructed.....	67
2-14	Sites within Side Slough 21 for which cross sections were constructed.....	72
2-15	Sites within Side Slough 22 for which cross sections were constructed.....	77
2-16	Sites within Upland Slough 6A for which cross sections were constructed.....	80
2-17	Sites within Upland Slough 19 for which cross sections were constructed.....	85

1.0 INTRODUCTION AND OBJECTIVES

1.1 Introduction

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 studies. The primary emphasis of these studies has been placed on defining the hydraulic conditions present within selected side slough habitats in the Talkeetna to Devil Canyon reach of the Susitna River and determining how these hydraulic conditions influence fish habitat availability and utilization within these habitats. Results of these investigations (ADF&G 1981, 1982) have been used to determine the mainstem flows required to breach the heads of selected side sloughs, access conditions present at the mouths and passage conditions within selected side sloughs as a function of mainstem flow, and spawning habitat availability and utilization within selected side sloughs.

1.2 Objectives

The FY84 open water field season (May 1 - October 15, 1983) channel geometry field data collection program was designed to expand the collection of channel geometry data to an increased number of sites and habitats than were evaluated during 1982. The program was divided into two segments: thalweg profile and cross section profile studies.

1.2.1 Thalweg Profile Study

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

1. Evaluate the influence that mainstem discharge has on access into and passage within selected upland and side slough, side channel, and tributary mouth habitats; and,
2. Illustrate the influence that mainstem discharge has on the water surface elevation and formation of backwater within selected upland and side slough, side channel, and tributary mouth habitats.

1.2.2 Cross Section Profile Studies

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

1. Evaluate the influence of mainstem discharge on specific access and passage conditions that exist at specific locations within selected side slough and side channel habitats; and,
2. Assist in determining the mainstem flows required to breach the head portions of selected side slough and side channel habitats.

2.0 METHODS

2.1 Site Selection

2.1.1 Thalweg Surveys

Locations at which thalweg data were collected during the 1983 open water field season are presented in Table 2-1, Figure 2-1. Sites were selected, based on consultations with project biologists and the project engineer to meet the outlined objectives, which were to:

1. Evaluate the influence that mainstem discharge has on access conditions into and passage conditions within selected upland and side slough, side channel, and tributary mouth habitats; and,
2. Illustrate the influence that mainstem discharge has on the water surface elevation and formation of backwater in selected upland and side slough, side channel, and tributary mouth habitats.

2.1.2 Cross Section Surveys

Locations at which cross section data were collected during the 1983 open water field season are presented in Table 2-1, Figure 2-1. Sites were selected based on consultations with project biologists and the

Table 2-1. Slough (upland and side), and side channel sites which thalweg and cross section data were collected during 1983.

<u>Site</u>	<u>River Mile</u>
<u>Sloughs</u>	
Whiskers Creek Slough	101.2
6A	112.3
8A	125.3
9	128.3
9A	133.2
10	133.8
11	135.3
16	137.7
16B	137.9
19	139.8
20	140.1
21	141.8
22	144.2
<u>Side Channels</u>	
Mainstem II Side Channel	114.5
Side Channel 10	133.8
Upper Side Channel 11	136.0
Side Channel 21	140.7

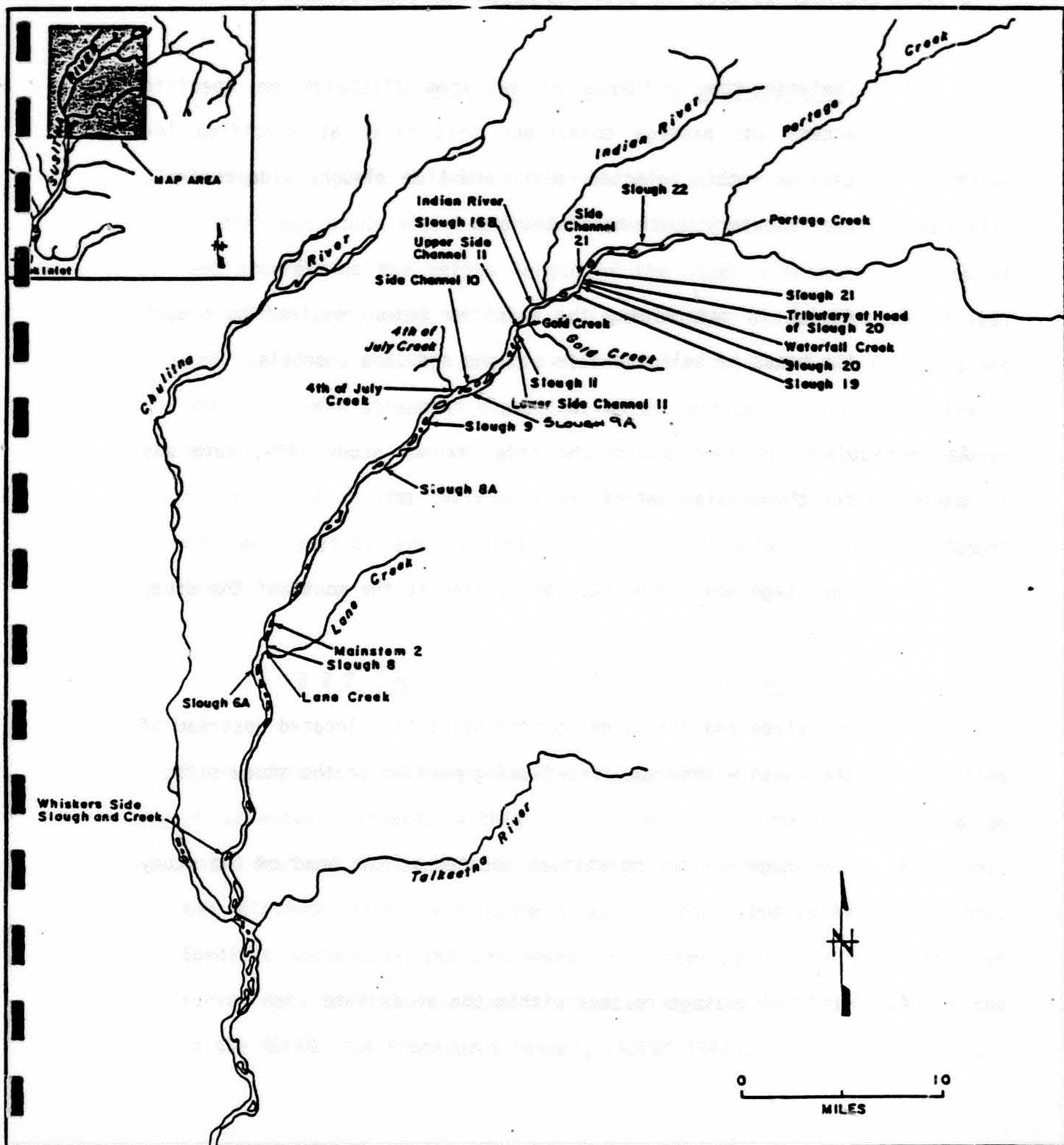


Figure 2-1 Locations at which channel geometry data were collected during the 1983 open water field season.

project engineer to meet the outlined objectives, which were to:

1. Evaluate the influence of mainstem discharge on specific access and passage conditions that exist at specified locations within selected upland and side slough, side channel, and tributary mouth habitats; and
2. Assist in determining the mainstem flows required to breach the heads of selected side sloughs and side channels.

At each upland and side slough and side channel study site, data was collected for the development of cross-sections at:

1. the stage monitoring station located at the mouth of the study site;
2. the stage and discharge monitoring station located upstream of the mouth within the free-flowing portion of the study site;
3. the stage monitoring station located at the head of the study site; and
4. critical passage reaches within the study site.

2.2 Field Data Collection

2.2.1 Thalweg Field Data Collection Procedures

Survey data were collected for the development of thalweg profiles within each study site beginning at the mouth or head of the study site and progressing the entire length of the study site noting points of significant morphological features (such as tops and bottoms of riffles, and pools) as thalweg points. Information collected at each thalweg point included streambed elevation, water surface elevation, substrate, and distance from last thalweg point. Specific techniques and procedure incorporated in the collection of survey data for the development of thalweg profiles are presented in the FY84 ADF&G Procedures Manual (ADF&G 1984).

2.2.2 Cross Section Field Data Collection Procedures

Survey data were collected for the development of cross section profiles at selected transects within study sites. Information collected on cross sections included streambed elevations, water surface elevations, and distance from bank headpin at selected cross section points. Specific techniques and procedures incorporated in the collection of survey data for the development of cross section profiles are presented in the ADF&G FY84 Procedures Manual, (ADF&G 1984).

2.3 Analytical Approach

2.3.1 Thalweg Studies

Thalweg survey data consists of a series of elevations representing the deepest part of a stream channel (with the water surface elevation determined for each thalweg point) transversing the entire length of the study site, and distance measurements from the starting point to each elevation obtained from beginning to end. Thalweg survey data are plotted as thalweg elevation on the y axis and the distance measurement on the x axis. Water surface elevations obtained at each thalweg point are also graphed on the y axis. The water surface elevations plotted on the thalweg profile cover the full range of water surface elevations occurring in the study area for 1983. These thalweg profiles are used to delineate any potential access problems in the study site as determined by the depth of water at various mainstem discharges. This analysis, however, does not account for the potential influence of base flow conditions (i.e. groundwater, surface water runoff) occurring within the study site or the indirect relationship between mainstem discharge and base flow conditions occurring in the study site during an unbreached condition. At present, the analysis of local base flow conditions in the study site and corresponding mainstem discharge levels and these influences on the thalweg analysis is based on the professional judgement of project biologists and our consulting hydraulic engineer.

A reach gradient is determined from the survey data by dividing the difference in the elevation between the head and mouth by the length of

the thalweg survey. If the gradient for the thalweg profile changes dramatically the thalweg profile is divided into reach gradients which are determined for a selected series of thalweg points. Substrate types for the side channel are also super-imposed beneath the thalweg profile to illustrate the general substrate available.

2.3.2 Cross Section Studies

Cross section survey data consists of a series of elevations perpendicular to the stream channel, beginning from the left bank looking upstream and concluding on the right bank with every major change in topography included. These data were plotted with elevation as the y axis and distance from left bank headpin as the x axis to illustrate the cross section profile of the stream at a specific location. Superimposed on the cross section profile are a series of water surface elevations plotted parallel to the x axis representing the range of water surface elevations observed during the FY84 open water field season. For cross sections located at the head of a side slough or side channel, a point of zero flow (PZF, the elevation at which mainstem flow just breaches the head portion of the study site) was also determined.

3.0 RESULTS

Survey data for the development of thalweg and cross section profiles were obtained within selected side channel, side slough, upland slough, and tributary habitats in the Talkeetna to Devil Canyon reach of the Susitna River. These data are presented below by habitat type.

3.1 Mainstem Habitats

Lower river cross section data collected by R&M Consultants (R&M, 1982) were used to construct a thalweg profile for the Susitna River from Talkeetna to Devil Canyon (Figure 2-2). Superimposed on this thalweg profile are the locations of the major side channels, side and upland sloughs, and tributaries located in this reach of the river.

3.2 Side Channel Habitats

Survey data were obtained within two side channels for the development of thalweg profiles and five side channels for the development of cross section profiles in the Talkeetna to Devil Canyon reach of the Susitna River. These data are presented below by site.

3.2.1 Mainstem II Side Channel (RM 114.4)

3.2.1.1 Site Description

Mainstem II Side Channel (Figure 2-1) is located on the east bank of the Susitna River at RM 114.4. It is approximately one mile in length and

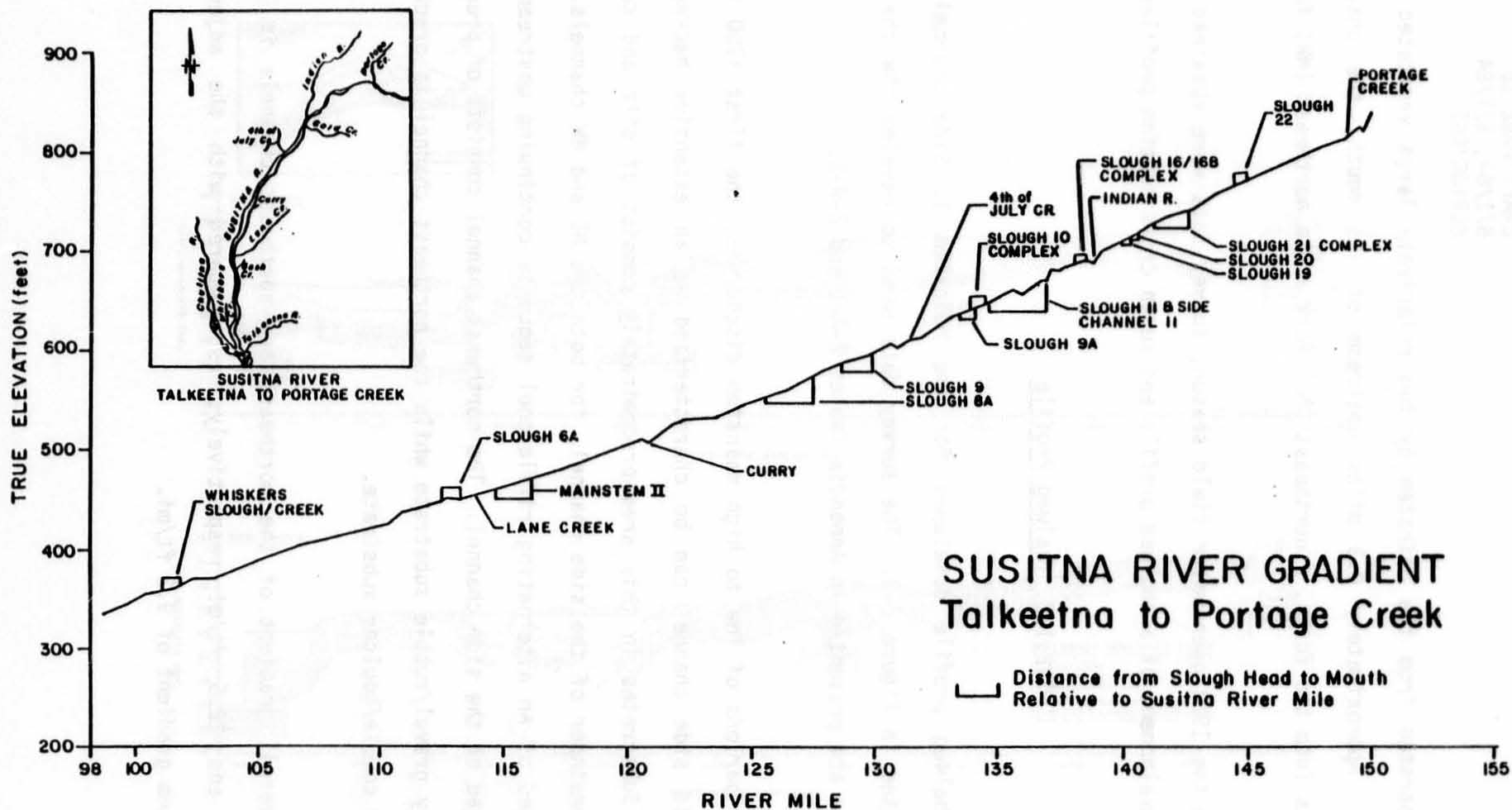


Figure 2-2 Thalweg profile of the Talkeetna to Devil Canyon reach of the Susitna River showing locations of selected study sites.

is separated from the mainstem by two relatively large vegetated islands. Approximately 0.3 miles upstream of the mouth, the channel divides into two forks, a northeast (NE) fork and a northwest (NW) fork.

During the 1983 open water field season, survey data were obtained for the development of a thalweg profile and seven cross section profiles.

3.2.1.2 Thalweg Profile

The thalweg profile developed for the Mainstem II Side Channel is presented in Figure 2-3. The survey data used to develop the thalweg profile are presented in Appendix Tables 2-A-1 and 2-A-2.

During periods of low to high mainstem discharges, the first 1200 feet of this side channel can be characterized as an extensive backwater area. Substrates in this area predominately consist of silt and sand. The remainder of the side channel, for both the NE and NW channels, is composed of an alternating riffle/pool sequence continuing upstream to the head of the side channel. The northwest channel consists of predominately gravel/rubble substrate while the northeast channel is predominately cobble/boulder substrate.

The overall gradient of the northwest and northeast channels is 10.7 ft/mi and 12.5 ft/mi respectively, as compared with the adjacent mainstem gradient of 9.2 ft/mi.

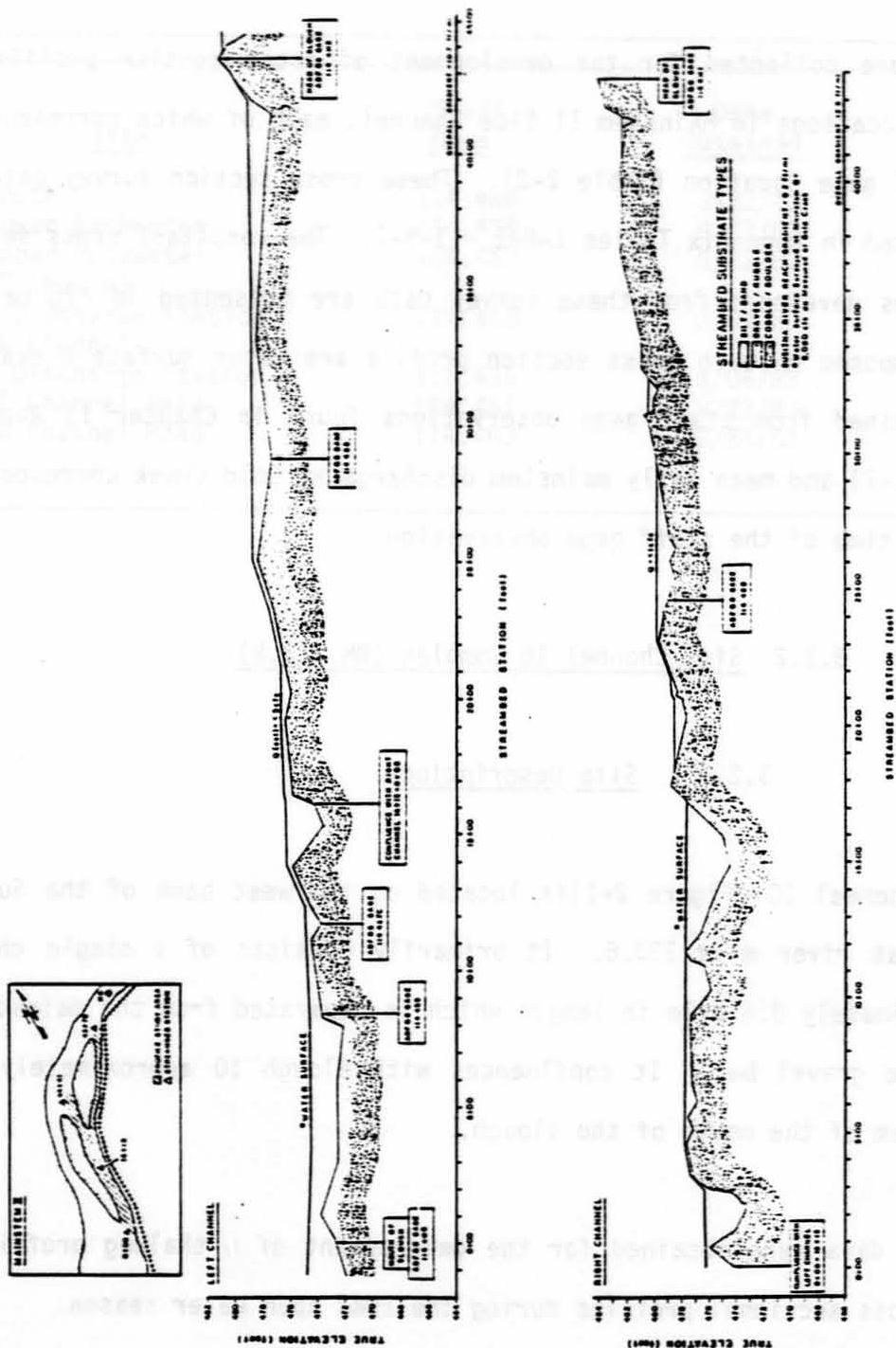


Figure 2-3 Streambed (thalweg) profile of Mainstem 2 Side Channel.

3.2.1.3 Cross Section Profiles

Data were collected for the development of cross section profiles at seven locations in Mainstem II Side Channel, each of which correspond to a staff gage location (Table 2-2). These cross section survey data are presented in Appendix Tables 1-B-1 - 1-B-7. The resultant cross section profiles developed from these survey data are presented in Figure 2-4. Superimposed on each cross section profile are water surface elevations (determined from staff gage observations found in Chapter 1; Appendix Table 1-7) and mean daily mainstem discharge at Gold Creek corresponding to the time of the staff gage observation.

3.2.2 Side Channel 10 Complex (RM 133.8)

3.2.2.1 Site Description

Side Channel 10 (Figure 2-1) is located on the west bank of the Susitna River at river mile 133.8. It primarily consists of a single channel approximately 0.4 mile in length which is separated from the mainstem by a large gravel bar. It confluences with Slough 10 approximately 100' upstream of the mouth of the slough.

Survey data were obtained for the development of a thalweg profile and six cross sectional profiles during the 1983 open water season.

Table 2-2. Sites within the Mainstem II Side Channel for which cross section profiles were constructed.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
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

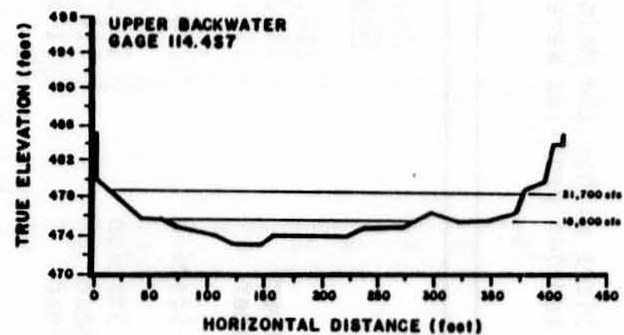
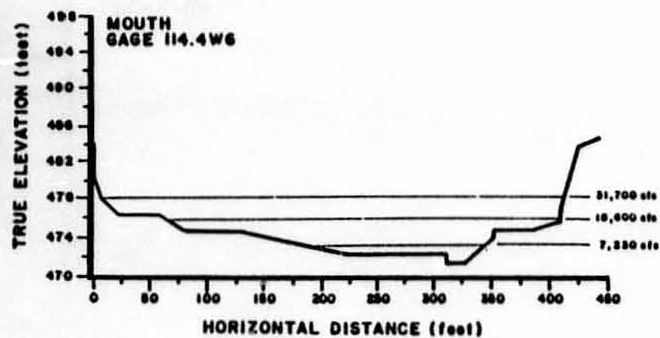
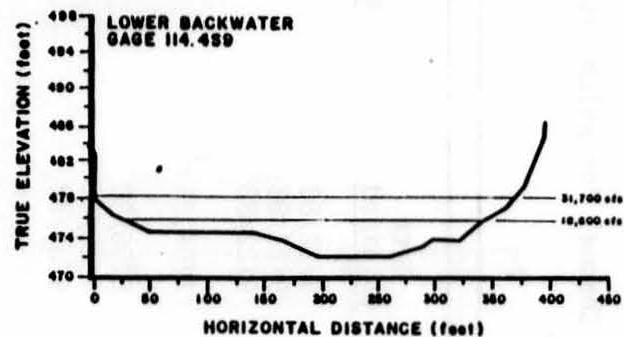
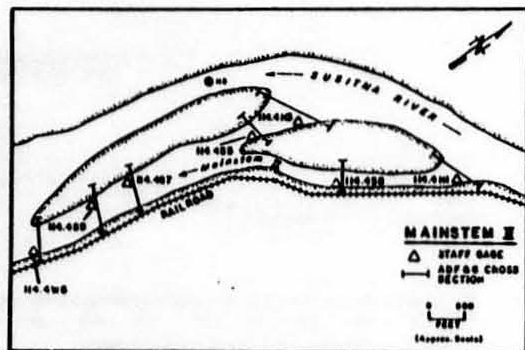


Figure 2-4 Cross section profiles developed for staff gage sites within Mainstem 2 Side Channel.

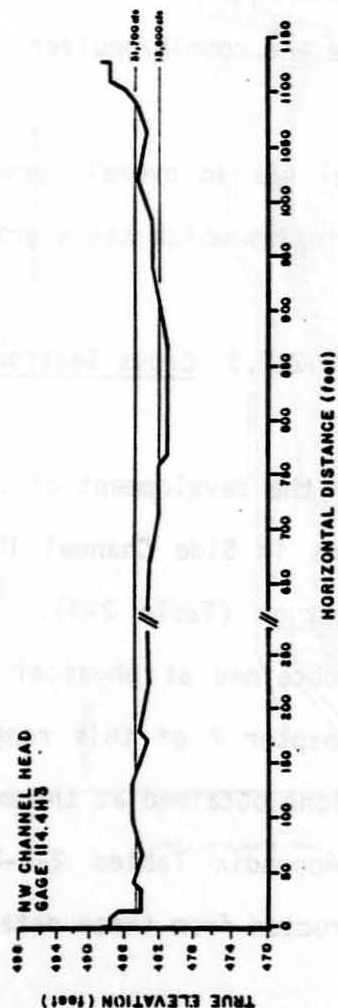
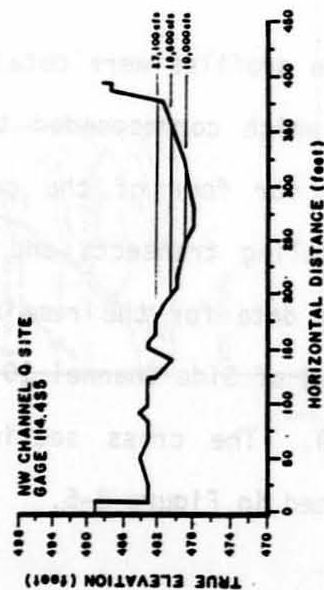
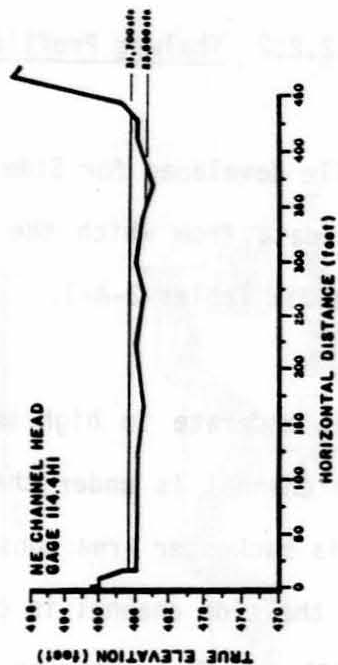
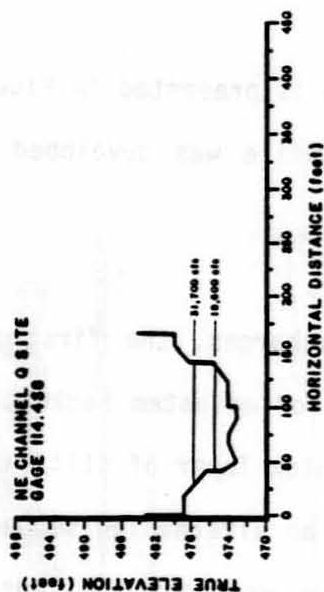


Figure 2-4. Continued

3.2.2.2 Thalweg Profile

The thalweg profile developed for Side Channel 10 is presented in Figure 2-5. The survey data from which the thalweg profile was developed is presented in Appendix Tables 2-A-3.

During periods of moderate to high mainstem discharges, the first 900 feet of the side channel is under the influence of mainstem backwater. Substrates in this backwater area consist of a thick layer of silt/sand. The remainder of the side channel is composed of an alternating sequence of pools and riffles. The substrate in this area was found to consist of gravel/rubble and cobble/boulder.

The side channel has an overall gradient of 20.5 ft/mi as compared to the adjacent mainstem which has a gradient of 8.9 ft/mi.

3.2.2.3 Cross Section Profiles

Survey data for the development of cross section profiles were obtained at six locations in Side Channel 10, each of which corresponded to a staff gage location (Table 2-3). Survey data for four of the cross sections were obtained at physical habitat modeling transects and are presented in Chapter 7 of this report. Survey data for the remaining two cross sections obtained at the mouth and head of Side Channel 10 are presented in Appendix Tables 2-B-8 and 2-B-9. The cross sectional profiles constructed from these data are presented in Figure 2-6.

Table 2-3. Sites within Side Channel 10 for which cross sections were constructed.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
Mouth	133.8W5	7/17/83	ADF&G
ADF&G Model Transect 1	133.8S1	1983 ¹	ADF&G
ADF&G Model Transect 2	133.8S2	1983 ¹	ADF&G
ADF&G Model Transect 3	133.8S6	1983 ¹	ADF&G
ADF&G Model Transect 4	133.8S3	1983 ¹	ADF&G
Head	133.8H4	9/11/83	ADF&G

¹ These cross sections are presented in Chapter 7.

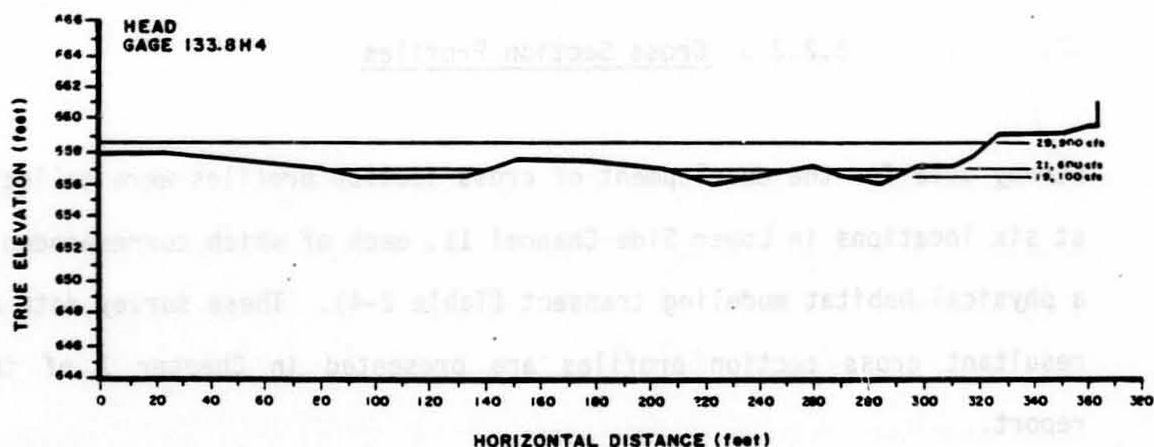
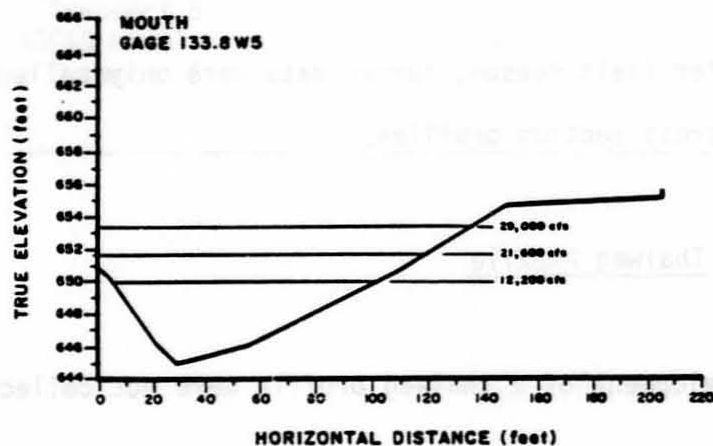
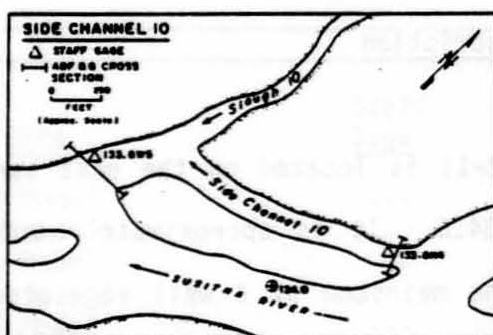


Figure 2-6 Cross section profiles developed for staff gage sites within Side Channel 10.

3.2.3 Lower Side Channel 11 (RM 135.3)

3.2.3.1 Site Description

Lower Side Channel 11 (Figure 2-1) is located on the east bank of the Susitna River at river mile 134.6. It is approximately 0.7 mile in length and is separated from the mainstem by a well vegetated island. Just upstream of the confluence with Slough 11, the channel divides into two forks.

During the 1983 open water field season, survey data were only collected for the development of cross section profiles.

3.2.3.2 Thalweg Profile

Survey data for the development of a thalweg profile were not collected in this side channel.

3.2.3.3 Cross Section Profiles

Survey data for the development of cross section profiles were collected at six locations in Lower Side Channel 11, each of which corresponded to a physical habitat modeling transect (Table 2-4). These survey data and resultant cross section profiles are presented in Chapter 7 of this report.

Table 2-4. Sites within Lower Side Channel 11 for which cross sections were constructed.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
ADF&G Model Transect 1	---	1983	ADF&G
ADF&G Model Transect 2	---	1983	ADF&G
ADF&G Model Transect 3	---	1983	ADF&G
ADF&G Model Transect 4	---	1983	ADF&G
ADF&G Model Transect 5	---	1983	ADF&G
ADF&G Model Transect 6	---	1983	ADF&G

3.2.4 Upper Side Channel 11 (RM 136.2)

3.2.4.1 Site Description

Upper Side Channel 11 (Figure 2-1) is located on the east bank of the Susitna River at RM 136.2. It consists of a single channel approximately 0.4 miles in length which is separated from the mainstem by a well vegetated island. The head of Slough 11 conflues with this side channel approximately 800 feet downstream of the head of the side channel.

During the 1983 open water field season, survey data were obtained for the development of a thalweg profile and six cross sectional profiles.

3.2.4.2 Thalweg Profile

The thalweg profile for Upper Side Channel 11 is presented in Figure 2-7. The survey data used to construct this thalweg profile are presented in Appendix Table 2-A-4.

During periods of low to high mainstem discharges, a substantial area of backwater occurs at the mouth of this side channel. Substrates in this area predominately consist of silt and sand. Above this area of backwater, a riffle/pool sequence occurs extending to the head. Cobble/boulder substrates predominate in this area with silt/sand deposits occurring in the pools.

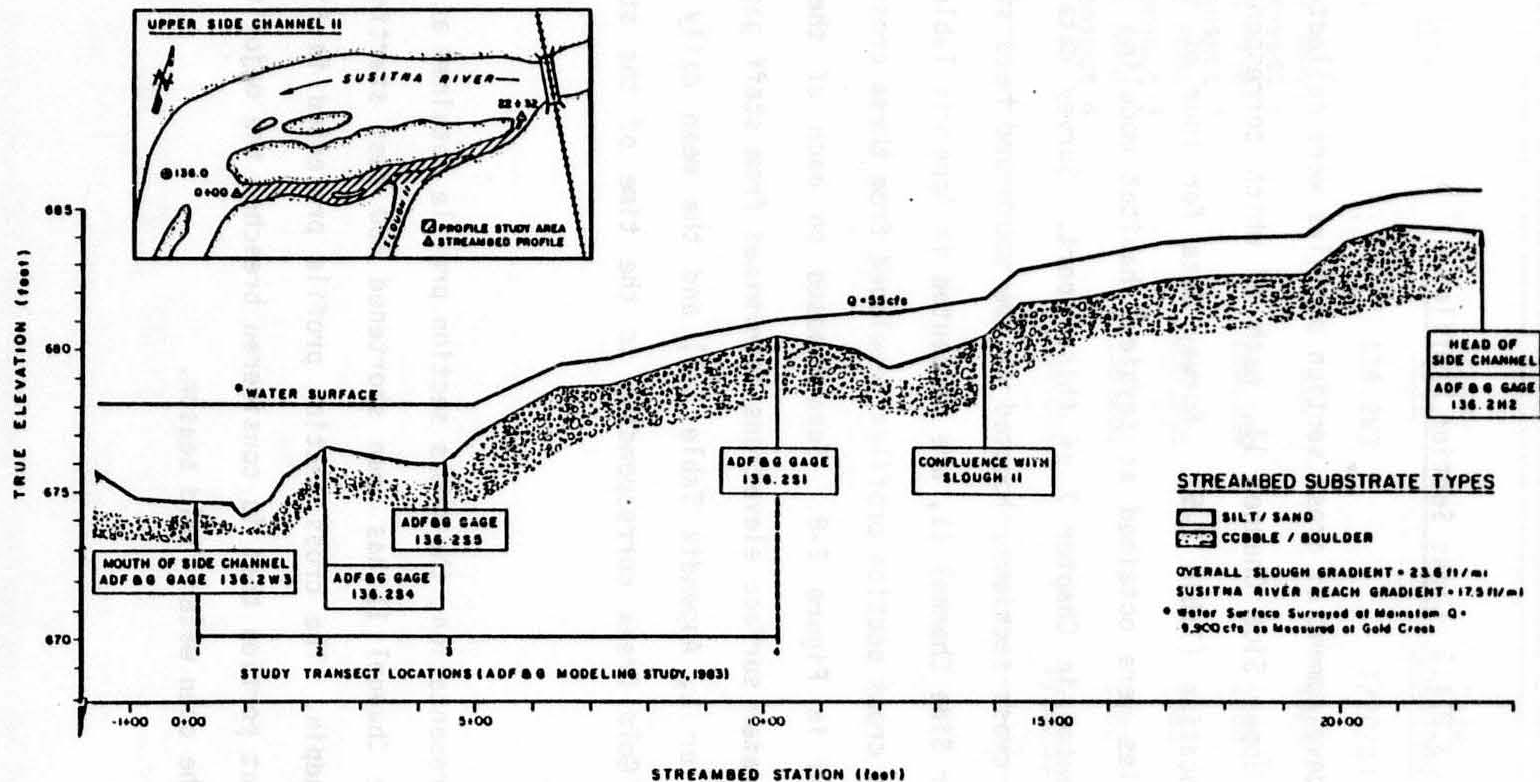


Figure 2-7 Streambed (thalweg) profile Upper Side Channel 11 (RM 136.2).

The overall gradient of this side channel is 23.6 ft/mi compared to the adjacent mainstem which has a gradient of 17.5 ft/mi.

3.2.4.3 Cross Section Profiles

Data for the development of cross section profiles were collected at six locations in Upper Side Channel 11, each of which corresponded to a staff gage location (Table 2-5). Survey data for four of the cross section profiles were obtained at physical habitat modeling transects and are presented in Chapter 7 of this report. Survey data for the remaining two cross sections, located at the mouth and head staff gage sites of Upper Side Channel 11, are presented in Appendix Tables 2-B-10 - 2-B-12. The cross section profiles developed from these cross section data presented in Figure 2-8. Superimposed on each of these cross sections are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-7) and the mean daily mainstem discharge at Gold Creek corresponding to the time of the staff gage observations.

For ease of presentation, the cross section profile obtained at the head of Upper Side Channel 11 has been shortened 880 feet starting at the left bank headpin. The cross section profile presented in Figure 2-8 represents that portion that is considered breached the majority of the time during the open water field season.

Table 2-5. Sites within Upper Side Channel 11 for which cross sections were developed.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
Mouth	136.2W3	7/20/83	ADF&G
ADF&G Model Transect 1	---	1983	ADF&G
ADF&G Model Transect 2	136.2S4	1983	ADF&G
ADF&G Model Transect 3	136.2S5	1983	ADF&G
ADF&G Model Transect 4	136.2S1	1983	ADF&G
Head	136.2H2	7/18/83	ADF&G

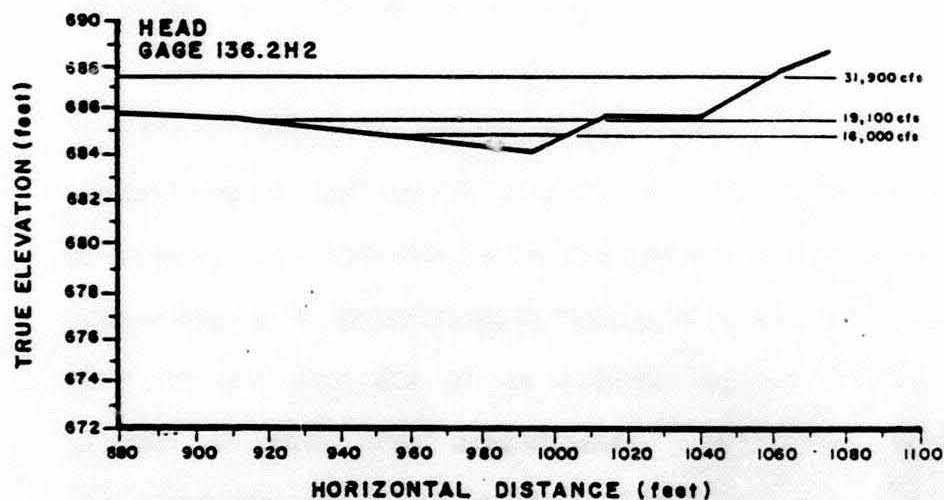
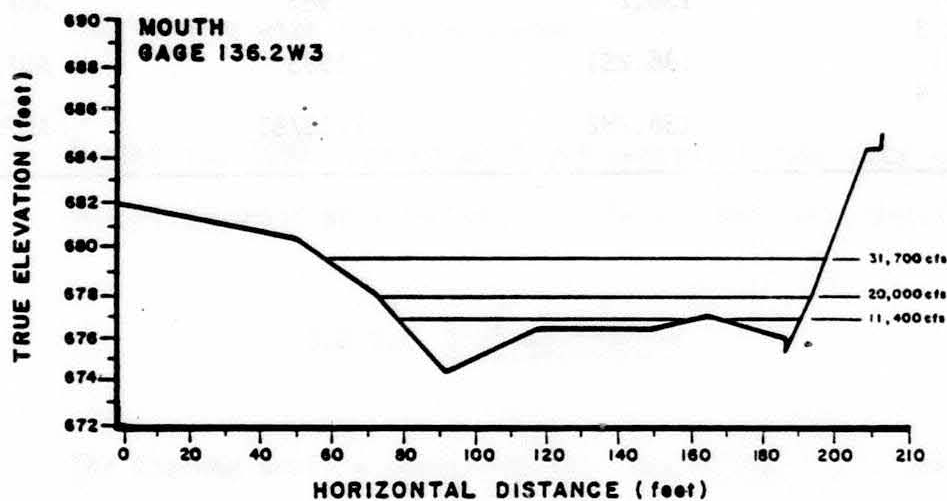
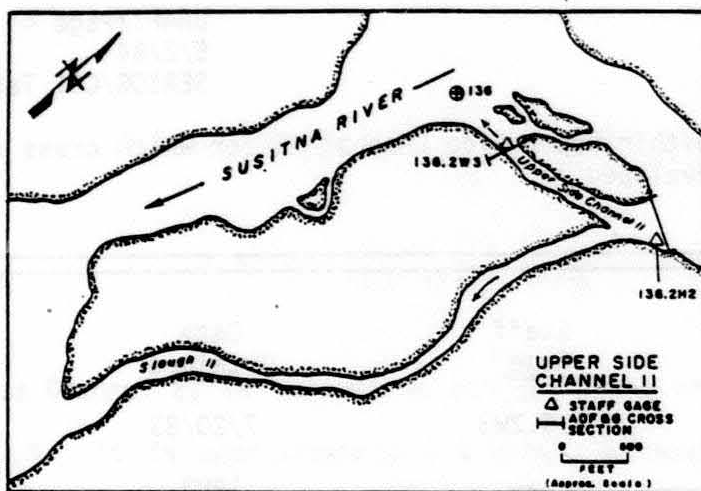


Figure 2-8 Cross section profiles developed for staff gage sites within Upper Side Channel II.

3.2.5 Side Channel 21 (RM 140.6)

3.2.5.1 Site Description

Side Channel 21 is located on the east bank of the Susitna River at RM 140.6. It is approximately 0.9 miles in length and is separated from the mainstem by a series of well vegetated islands and gravel bars. Approximately 800 feet from the head of the side channel, Side Slough 21 confluences with the side channel.

During the 1983 open water field season, survey data were obtained for the development of a thalweg profile and ten cross sectional profiles.

3.2.5.2 Thalweg Profile

The thalweg profile developed for Side Channel 21 is presented in Figure 2-9. The survey data used in the development of the thalweg profile are presented in ADF&G 1983e, Appendix E.

An area of backwater was observed to occur at the mouth of this side channel during periods of moderate to high mainstem discharges. Substrates in this backwater area predominately consisted of silt and sand intermixed with gravel/cobble/rubble. Above the backwater area, the side channel consists of an alternating pool/riffle sequence. Substrates in this area predominately consist of rubble/boulder with silt/sand deposits found in the pools.

The overall gradient for Side Channel 21 is 16.1 ft/mi, compared with the gradient of the adjacent mainstem of 16.7 ft/mi.

3.2.5.3 Cross Section Profiles

Survey data for the development of cross sectional profiles were obtained at ten locations in Side Channel 21, five of which corresponded to staff gage locations (Table 2-6). Survey data for the other five cross section profiles were obtained at physical habitat modeling transects and are presented in Chapter 7 of this report. The survey data for the five cross sections included in this report are presented in Appendix Tables 2-B-13 - 2-B-18. The cross sectional profiles developed from this survey data are presented in Figure 2-10.

The cross sectional profile for Channel A6 was shortened 100 ft for ease of presentation. Superimposed on each of these cross sectional profiles are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-A-7) and mean, daily mainstem discharge at Gold Creek corresponding to the time of the staff gage observations.

3.3 Side Slough Habitats

Survey data for the development of thalweg and cross sectional profiles were obtained at ten side slough sites located in the Talkeetna to Devil Canyon reach of the Susitna River (Figure 2-1). These data are presented below by site.

Table 2-6. Sites within Side Channel 21 for which cross sections were constructed.

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

¹ These cross sections are presented in Chapter 7.

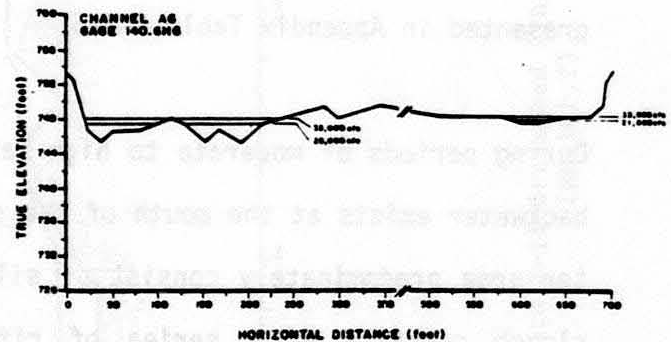
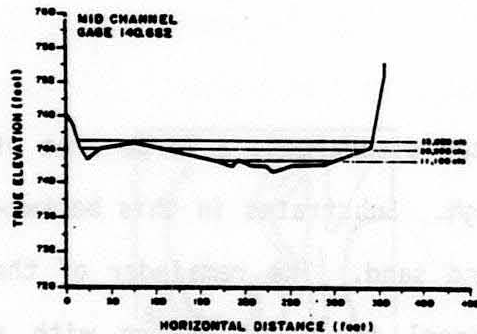
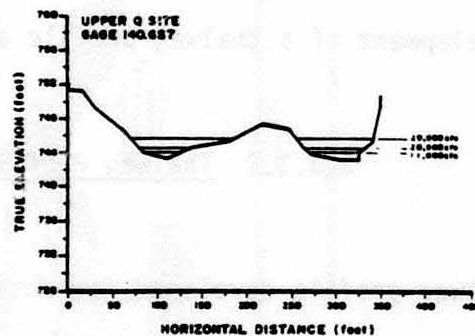
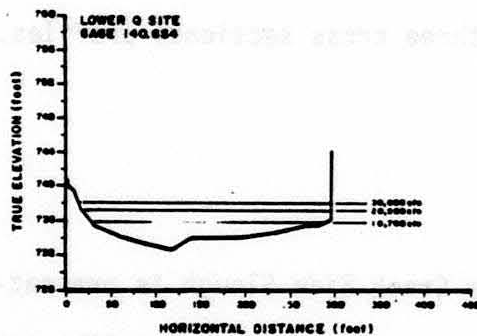
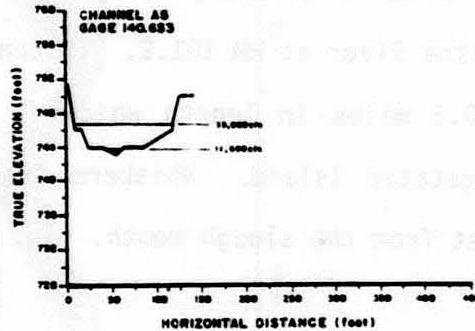
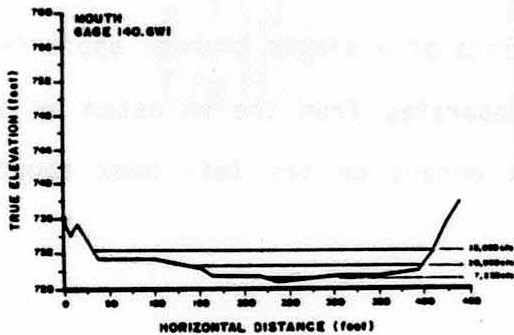
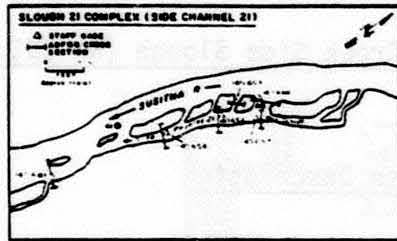


Figure 2-10 Cross section profiles developed for staff gage sites within Side Channel 21.

3.3.1 Whiskers Creek Side Slough (RM 101.2)

3.3.1.1 Site Description

Whiskers Creek Side Slough (Figure 2-1) is located on the west bank of the Susitna River at RM 101.2. It consists of a single channel approximately 0.6 miles in length which is separated from the mainstem by a well vegetated island. Whiskers Creek enters on its left bank about 1200 feet from the slough mouth.

During the 1983 open water field season, survey data were obtained for the development of a thalweg profile and three cross sectional profiles.

3.3.1.2 Thalweg Profile

The thalweg profile developed for Whiskers Creek Side Slough is presented in Figure 2-11. The survey data used to construct this profile are presented in Appendix Table 2-A-5.

During periods of moderate to high mainstem discharges, a large area of backwater exists at the mouth of the slough. Substrates in this backwater area predominately consist of silt and sand. The remainder of the slough consists of a series of riffle/pool sequences ending with a shallow pool at the head. Substrates in this area consists predominately of gravel/rubble with silt/sand occurring in pools.

The overall gradient of the slough is 9.2 ft/mi, compared with the adjacent mainstem Susitna River gradient of 5.5 ft/mi.



Figure 2-11. Streambed (Thalweg) profile of Whiskers Creek Side Slough (RM 101.2).

3.3.1.3 Cross Section Profiles

Survey data for the development of cross section profiles were collected at three locations in Whiskers Creek Side Slough, each of which corresponded to a staff gage location (Table 2-7). The survey data for these cross sections are presented in Appendix Tables 2-B-19 - 2-B-21. The cross section profiles developed from these survey data are presented in Figure 2-12. Superimposed on each of these cross sections are water surface elevations determined from staff gage observations (Chapter 1 Appendix Table 1-7) and the mean daily mainstem discharge at Gold Creek corresponding to the time of the staff gage observations.

3.3.2 Side Slough 8 (RM 133.6)

3.3.2.1 Site Description

Side Slough 8, also known as Lane Creek Slough, is located on the east bank of the Susitna River at RM 133.6. This slough is approximately 0.4 miles long and is separated from the mainstem by a vegetated island.

During the 1983 open water field season, survey data were only obtained for the development of four cross sectional profiles.

3.3.2.2 Thalweg Profile

Survey data for the development of a thalweg profile were not obtained in Side Slough 8.

Table 2-7. Sites within Whiskers Creek Side Slough for which cross sections were constructed.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
Mouth	101.2W1	9/11/83	ADF&G
Discharge Station	101.2S3	7/03/83	ADF&G
Head	101.6H5	7/03/83	ADF&G



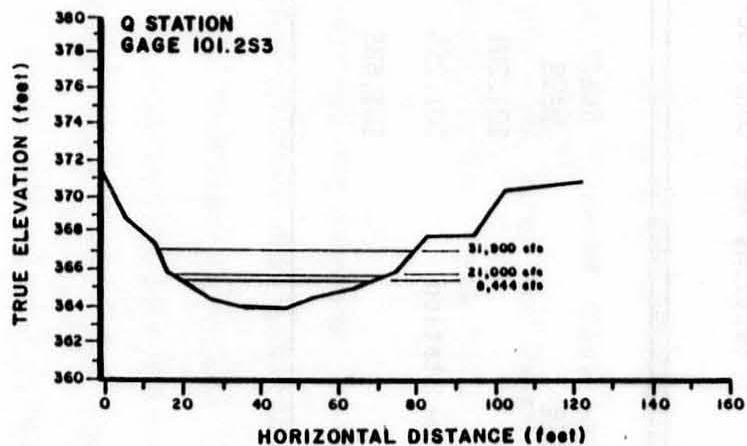
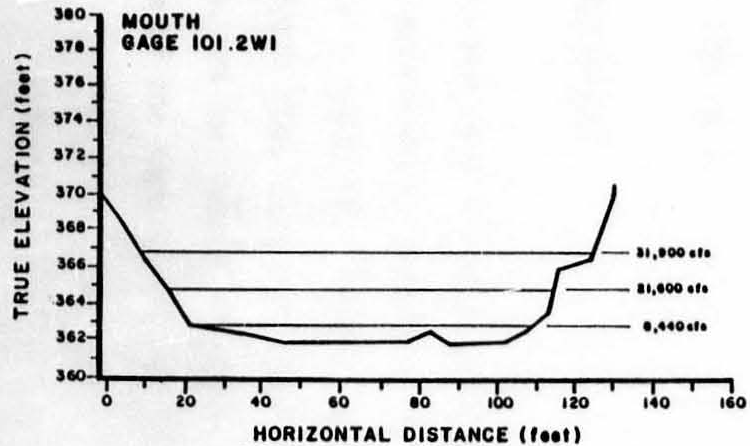
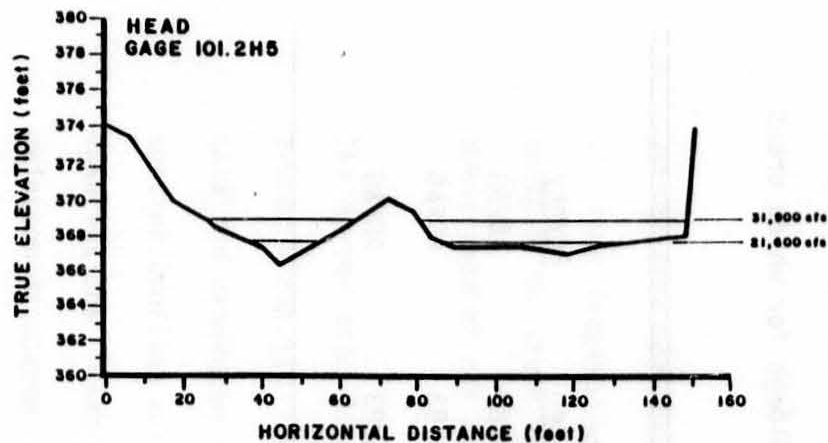
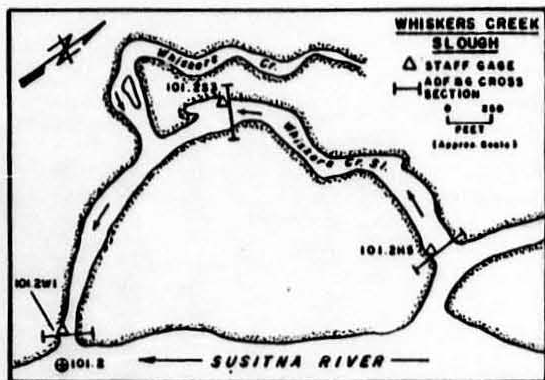


Figure 2-12 Cross section profiles developed for staff gage sites within Whisker Creek Side Slough.

3.3.2.2 Cross Section Profile

Survey data for the development of cross section profiles were collected at four locations in Side Slough 8. Three of these locations corresponded to staff gage locations. The other was located immediately downstream of the mouth staff gage location (Table 2-8).

The survey data for the cross sections are presented in Appendix Tables 2-B-22 - 2-B-25. The cross section profiles developed from these survey data are presented in Figure 2-13. Superimposed on each of these cross section profiles are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-A-7) and the mean daily mainstem discharge (cfs) at Gold Creek corresponding to the time of the staff gage observations.

3.3.3 Side Slough 8A (RM 126.2)

3.3.3.1 Site Description

Side Slough 8A is located on the east bank of the Susitna River at river mile 125.3 (Figure 2-1). It is approximately two miles in length and is separated from the mainstem by a vegetated island. The main slough channel forks approximately 2,500 feet from the slough mouth. Two beaver dams exist in the slough, one just downstream of the fork in the slough, with the other upstream of the fork in the east channel of the slough.

Table 2-8. Sites within Slough 8 Side Slough for which cross sections were obtained.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
Below Mouth	No Gage	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

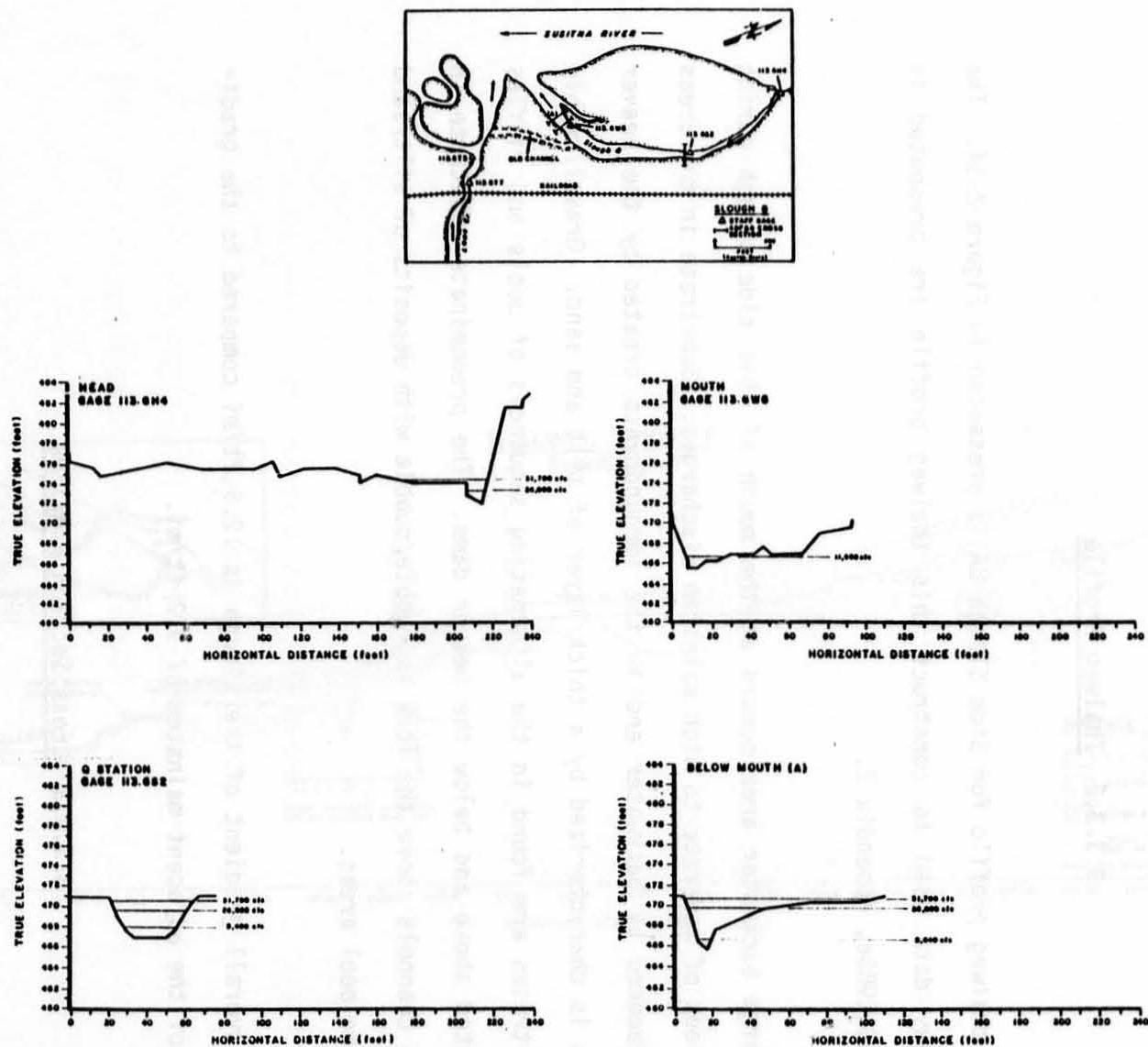


Figure 2-13 Cross section profiles developed for staff gage sites within Side Slough 8 (RM 126.2).

Survey data for the development of a thalweg profile was obtained in 1982. Survey data for the development of 17 cross sectional profiles were obtained in 1983.

3.3.3.2 Thalweg Profile

The thalweg profile for Side Slough 8A is presented in Figure 2-14. The survey data used to construct this thalweg profile are presented in ADF&G 1983e, Appendix E.

A large backwater area occurs at the mouth of this side slough during periods of moderate to high mainstem discharges. Substrate in the areas influenced by backwater and in the impoundments created by the beaver dams is characterized by a thick layer of silt and sand. Gravel/rubble substrates are found in the alternating sequences of pools and riffles located above and below the beaver dams. The predominate substrate in both channels above the fork is rubble/cobble with deposits of silt/sand in the pool areas.

The overall gradient of the slough is 12.5 ft/mi compared to the gradient of the adjacent mainstem of 9.2 ft/mi.

3.3.3.3 Cross Section Profiles

Survey data for the development of cross section profiles were collected at seventeen locations in Side Slough 8A of which six were obtained at staff gage locations and eleven at physical habitat modeling transects (Table 2-9). Survey data for the eleven cross sections obtained at

Figure 2-14 Streambed (thalweg) profile of Side Slough 8A (RM 126.2).

physical modeling transects are presented in Chapter 7 of this report. The survey data used to construct the cross section profiles at the remaining six locations are presented in Appendix Tables 2-B-26 - 2-B-31. The cross sections developed from these survey data are presented in Figure 2-15. Superimposed on each of these six cross section profiles are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-A-7) and mean, daily mainstem discharge (cfs) at Gold Creek corresponding to the time of the staff gage observation.

A cross section was obtained at the NE channel head gage site (125.3H7) but due to an absence of observed water surface elevations no water surface elevations were superimposed of this cross sectional plot.

3.3.4 Side Slough 9 (RM 128.3)

3.3.4.1 Site Description

Side Slough 9 is located on the east bank of the Susitna River at RM 128.3 (Figure 2-1). This slough is approximately 1.2 miles in length and is separated from the mainstem by a large vegetated island. Two small tributaries enter the slough from the east bank approximately 500 and 3,000 feet upstream from the slough mouth.

Survey data for the development of a thalweg profile were obtained during the 1982 open water field season. Survey data for the development of ten cross sectional profiles were obtained in 1983.

Table 2-9. Sites within Side Slough 8A for which cross sections were obtained.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
Mouth	125.3W5	10/19/83	ADF&G
Upper Backwater	125.3S6	7/18/83	ADF&G
Lower Slough 8A	125.3S4	7/18/83	ADF&G
Discharge Station			
NW Channel ¹ Site	125.3S3	7/18/83	ADF&G
ADF&G Model ¹	N/A	1983	ADF&G
Transect 1			
ADF&G Model ¹	N/A	1983	ADF&G
Transect 2			
ADF&G Model ¹	N/A	1983	ADF&G
Transect 3			
ADF&G Model ¹	N/A	1983	ADF&G
Transect 4			
ADF&G Model ¹	N/A	1983	ADF&G
Transect 5			
ADF&G Model ¹	N/A	1983	ADF&G
Transect 6			
ADF&G Model ¹	N/A	1983	ADF&G
Transect 7			
ADF&G Model ¹	N/A	1983	ADF&G
Transect 8			
ADF&G Model ¹	N/A	1983	ADF&G
Transect 9			
ADF&G Model ¹	N/A	1983	ADF&G
Transect 10			
ADF&G Model ¹	N/A	1983	ADF&G
Transect 11			
NE Channel Head	125.3H7	8/4/83	ADF&G
NW Channel Head	125.3S3	7/18/83	ADF&G

¹ These cross sections are presented in Chapter 7.

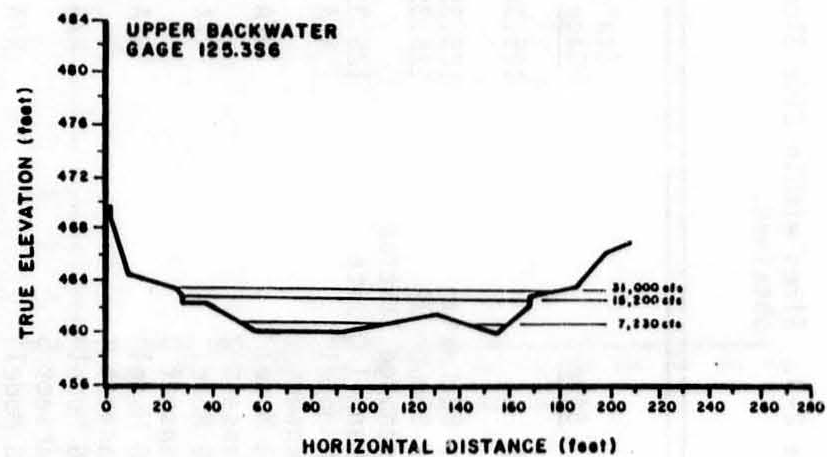
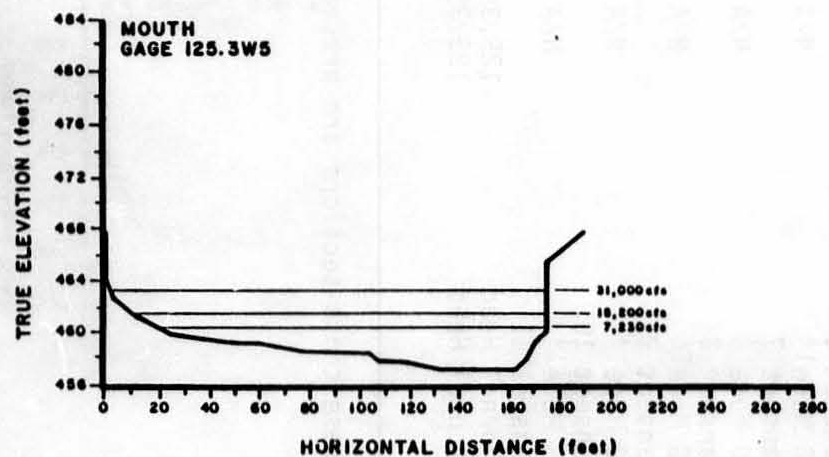
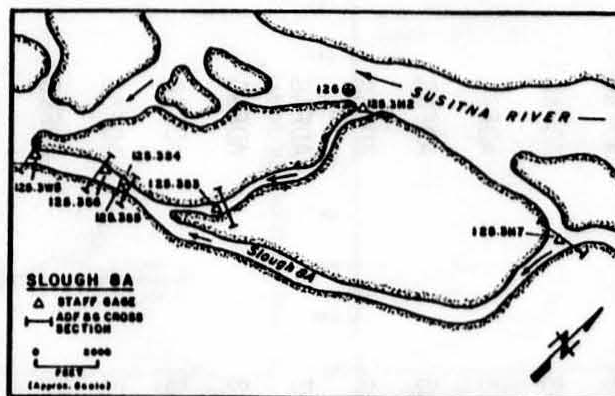


Figure 2-15 Cross section profiles developed for staff gage sites within Side Slough 8A.

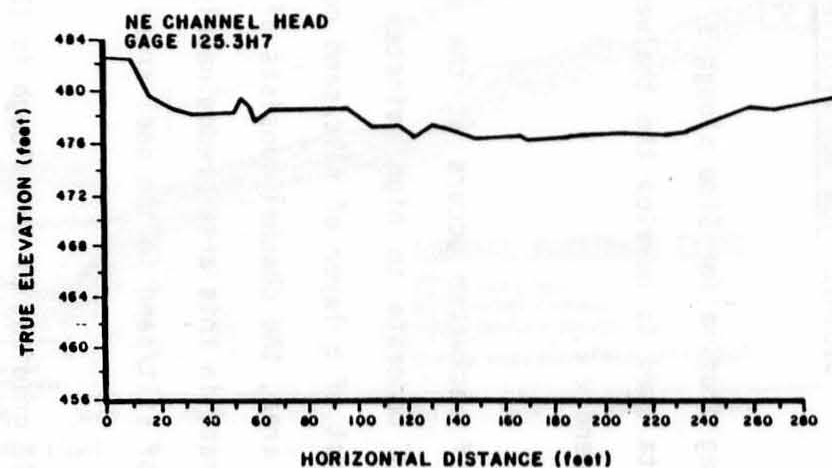
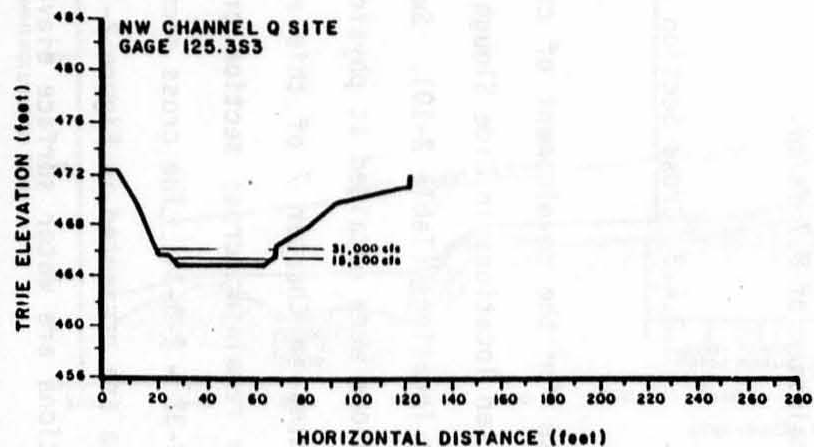
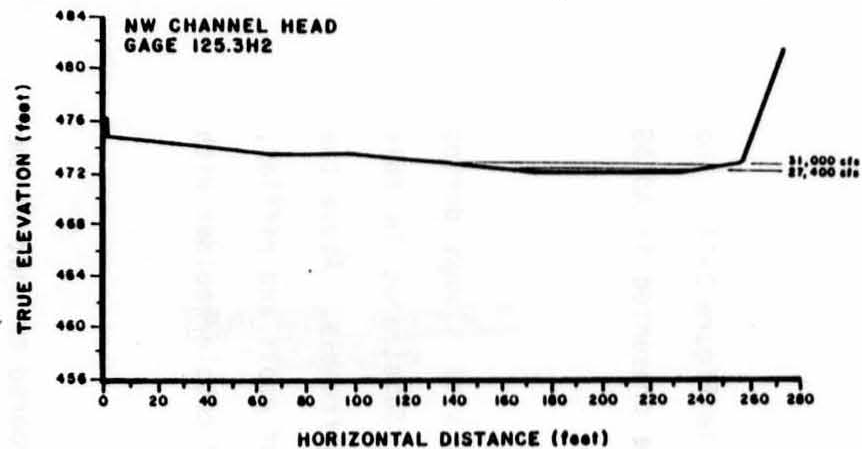
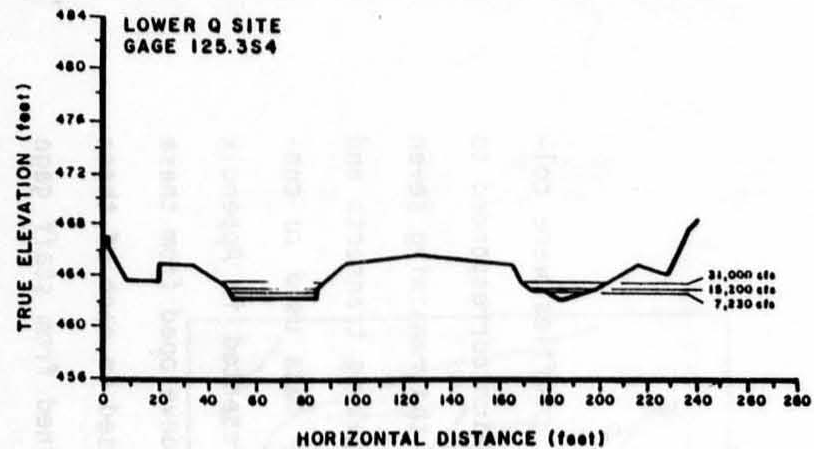


Figure 2-15. Continued

3.3.4.2 Thalweg Profile

The thalweg profile for Side Slough 9 is presented in Figure 2-16. The survey data used to develop the thalweg profile are presented in ADF&G 1983e, Appendix E.

An area of backwater occurs at the mouth of the side slough during periods of moderate to high mainstem discharges. Substrates in this area consist of a layer of silt/sand covering gravel/rubble. Above the backwater area, the channel consists of a sequence of pools and riffles. The substrate in this area predominately consists of cobble/boulder with deposits of silt/sand in the pool areas.

The overall gradient of the slough is 13.8 ft/mi compared to that of the adjacent mainstem of 8.7 ft/mi.

3.3.4.3 Cross Section Profiles

Survey data for the development of cross sectional profiles were collected at ten locations in Side Slough 9, three of which corresponded to staff gage locations (Table 2-10). Survey data for the remaining seven cross sections were obtained at physical habitat modeling transects and are presented in Chapter 7 of this report. Survey data used to construct the remaining cross section profiles are presented in Appendix Tables 2-B-32 - 2-B-34. The cross section profiles developed from these survey data are presented in Figure 2-17. Superimposed on each of these cross sections are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-7) and mean daily mainstem

b7

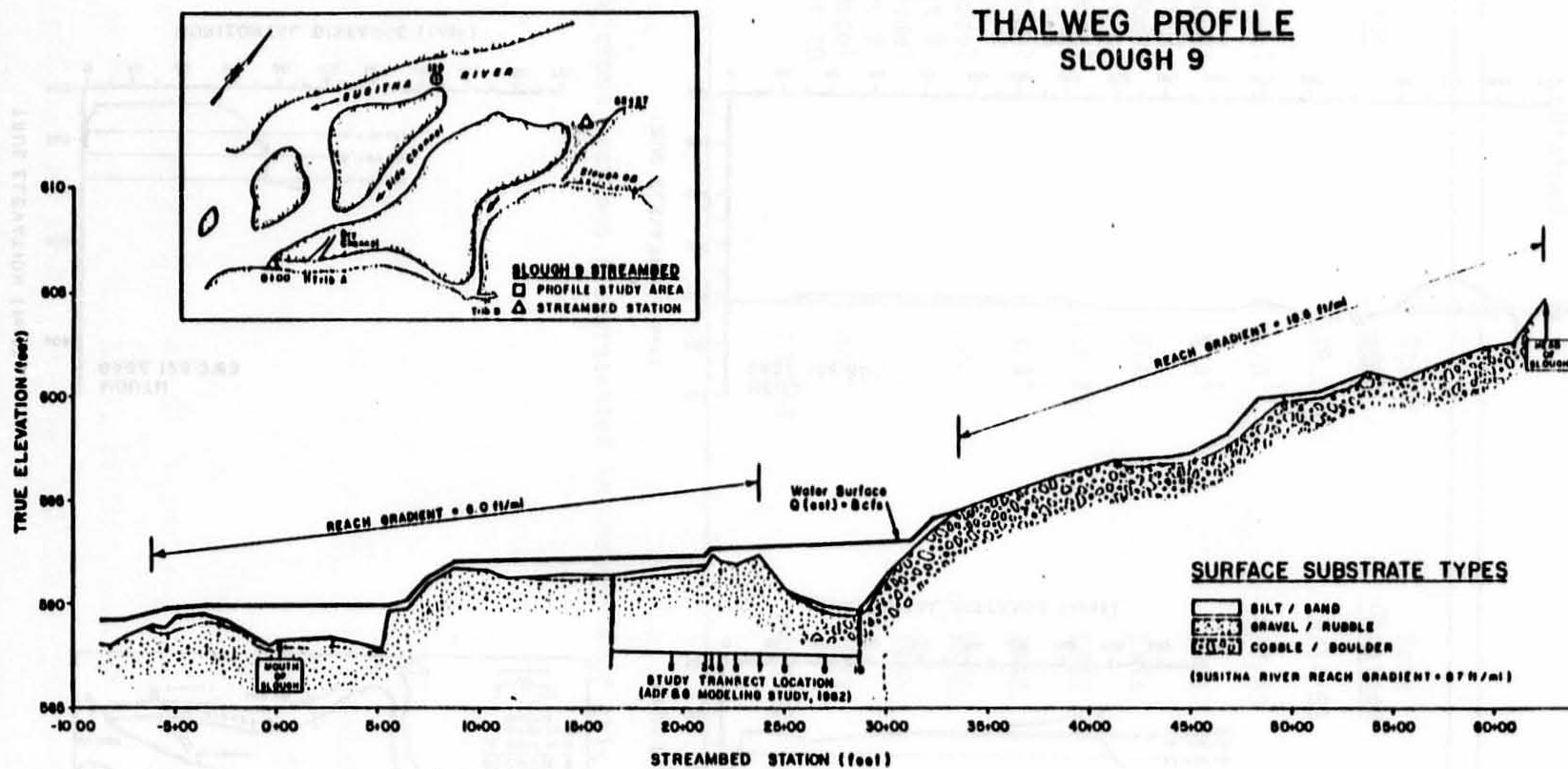


Figure 2-16 Streambed (thalweg) profile of Side Slough 9 (RM 128.3).

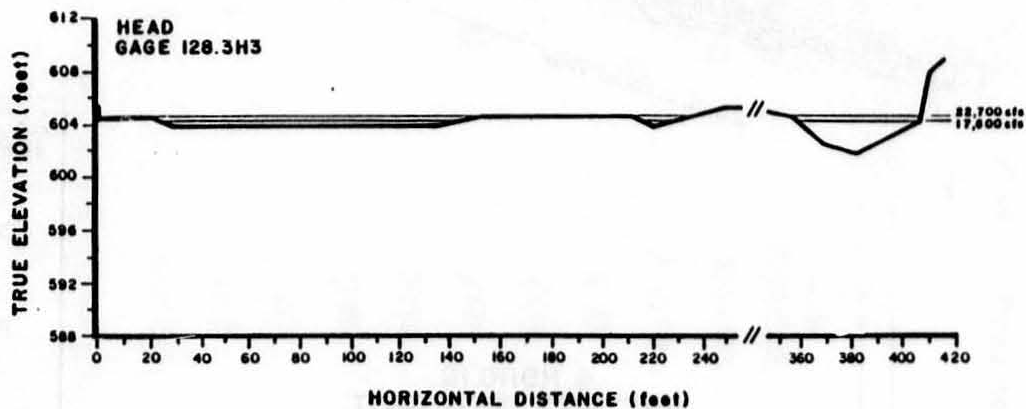
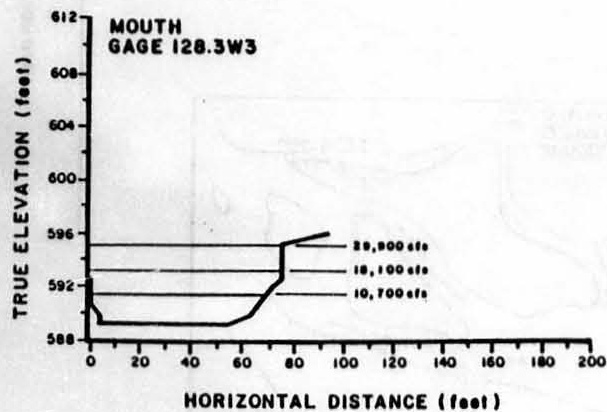
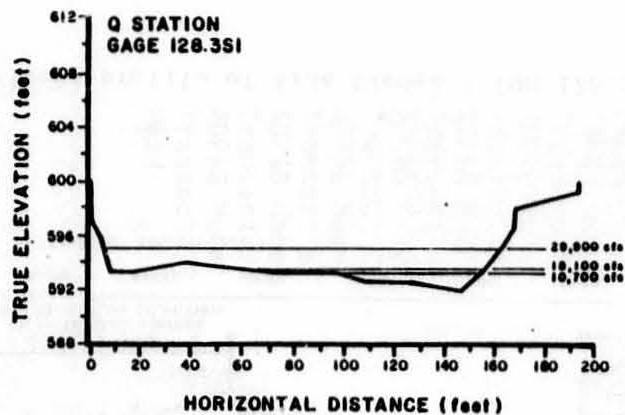
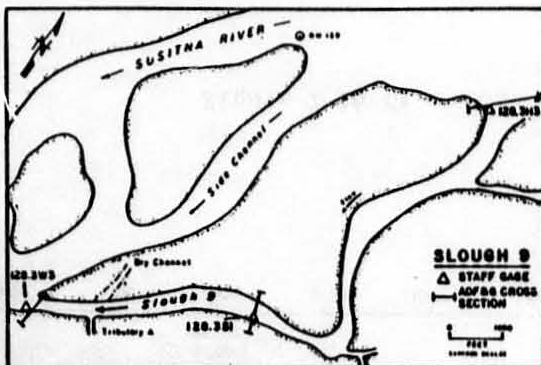


Figure 2-17 Cross section profiles developed for staff gage sites within Side Slough 9.

Table 2-10. Sites within Side Slough 9 for which cross sections were obtained.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
Mouth	128.3W3	9/14/83	ADF&G
ADF&G Model Transect 1	N/A ¹	8/3/83	ADF&G
ADF&G Model Transect 2	N/A ¹	1983	ADF&G
ADF&G Model Transect 4	N/A ¹	1983	ADF&G
ADF&G Model Transect 6	128.3S1	1983	ADF&G
ADF&G Model Transect 7	N/A ¹	1983	ADF&G
ADF&G Model Transect 8	N/A ¹	1983	ADF&G
ADF&G Model Transect 9	N/A ¹	1983	ADF&G
ADF&G Model Transect 10	N/A ¹	1983	ADF&G
Head	128.3H3	8/23/83	ADF&G

¹ These cross sections are presented in Chapter 7 of this report.

discharge at Gold Creek corresponding to the time of the staff gage observation.

For ease of presentation, the cross section of the head was shortened 30 feet, with a range in elevation of 0.41 feet.

3.3.5 Side Slough 9A (RM 133.2)

3.3.5.1 Site Description

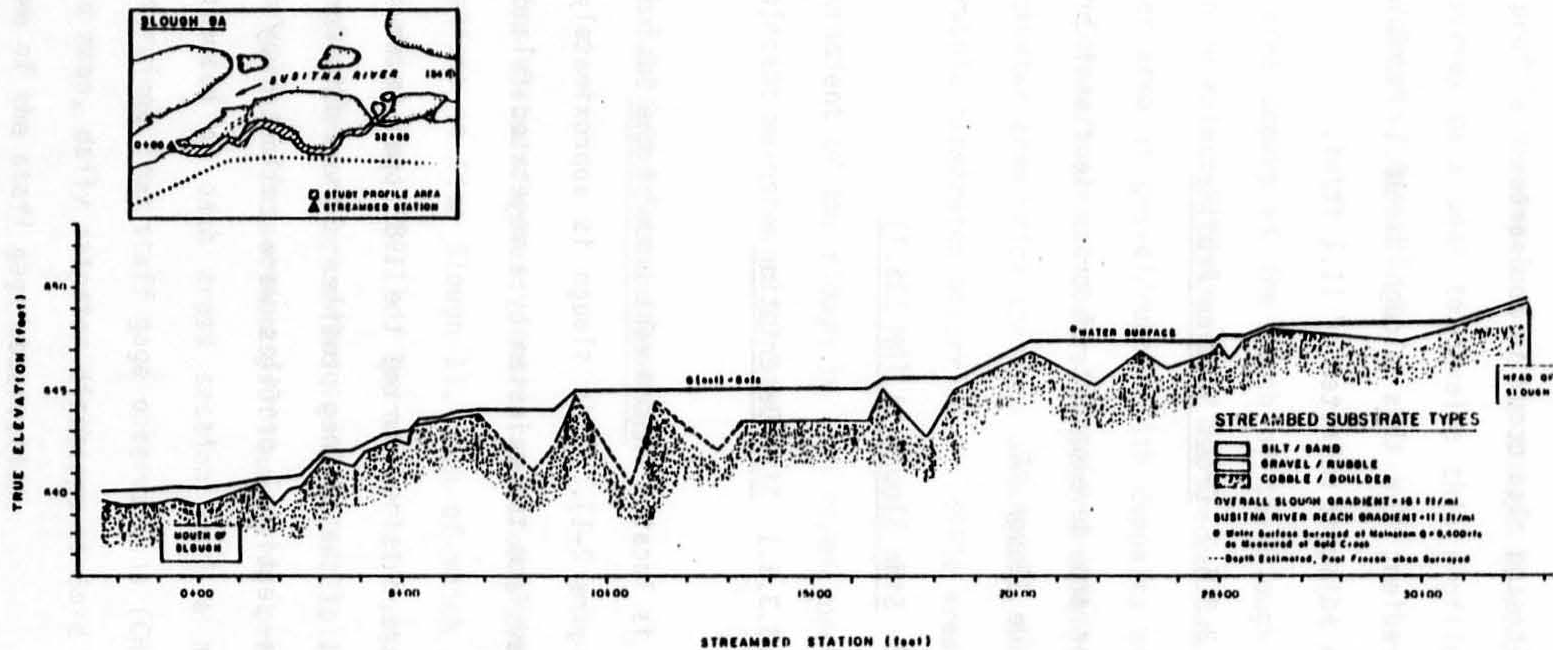
Side Slough 9A is located on the east bank of the Susitna River at river mile 133.2 (Figure 2-1). It is separated from the mainstem by a large vegetated island.

Survey data for the development of the thalweg profile was obtained during the 1983 open water field season. No survey data were obtained for the development of cross sectional profiles in Side Slough 9A.

3.3.5.2 Thalweg Profile

The thalweg profile for Side Slough 9A is presented in Figure 2-18. The survey data used to develop the thalweg profile is presented in Appendix Table 2-A-6.

An area of backwater occurs at the mouth of this side slough during periods of low to high mainstem discharges. Substrates in this area predominately consist of silt and sand. Above the backwater area, the slough is characterized by a series of pools and riffles. Although



cobble/boulder is the predominate substrate type in this area of this slough, gravel/rubble substrate types are found in the riffle areas. Deposits of silt/sand also occur in pool areas.

The overall gradient for this slough is 16.1 ft/mi compared to the gradient in the adjacent mainstem of 11.1 ft/mi.

3.3.5.3 Cross Section Profile

Survey data for the development of cross sectional profiles were not obtained for Side Slough 9A.

3.3.6 Side Slough 11 (RM 135.7)

3.3.6.1 Site Description

Side Slough 11 is located on the east bank of the Susitna River at river mile 135.7 (Figure 2-1). This slough is approximately 0.9 miles long and is separated from the mainstem by a vegetated island.

Survey data were obtained during the 1982 open water field season for the development of the thalweg profile. Survey data for the development of three cross sectional profiles were collected by R&M in 1982 and ADF&G in 1983.

3.3.6.2 Thalweg Profile

The thalweg profile developed for Side Slough 11 is presented in Figure 2-19. The survey data used to develop this profile are presented in ADF&G 1983, Volume 4, Appendix E.

A backwater area occurs at the mouth of the slough during periods of moderate to high mainstem discharge. The predominate substrate type in this backwater area is gravel/rubble with deposits of silt/sand in the pool areas. Cobble/boulder substrate types predominate in the section above the backwater area which consists of a series of pools and riffles with gravel/rubble substrates occurring in riffle areas.

The overall gradient of the slough is 19.8 ft/mi compared to the gradient in the adjacent mainstem of 10.3 ft/mi.

3.3.6.3 Cross Section Profiles

Survey data for the development of cross section profiles were obtained at three locations in Side Slough 11, each of which corresponded to a staff gage location (Table 2-11). The survey data used to construct the cross section profiles are presented in Appendix Tables 2-B-35 - 2-B-37 with the resultant cross section profiles being presented in Figure 2-20. Superimposed on each cross section profile are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-7) and mean, daily mainstem discharge at Gold Creek corresponding to the time of the staff gage observation.

95

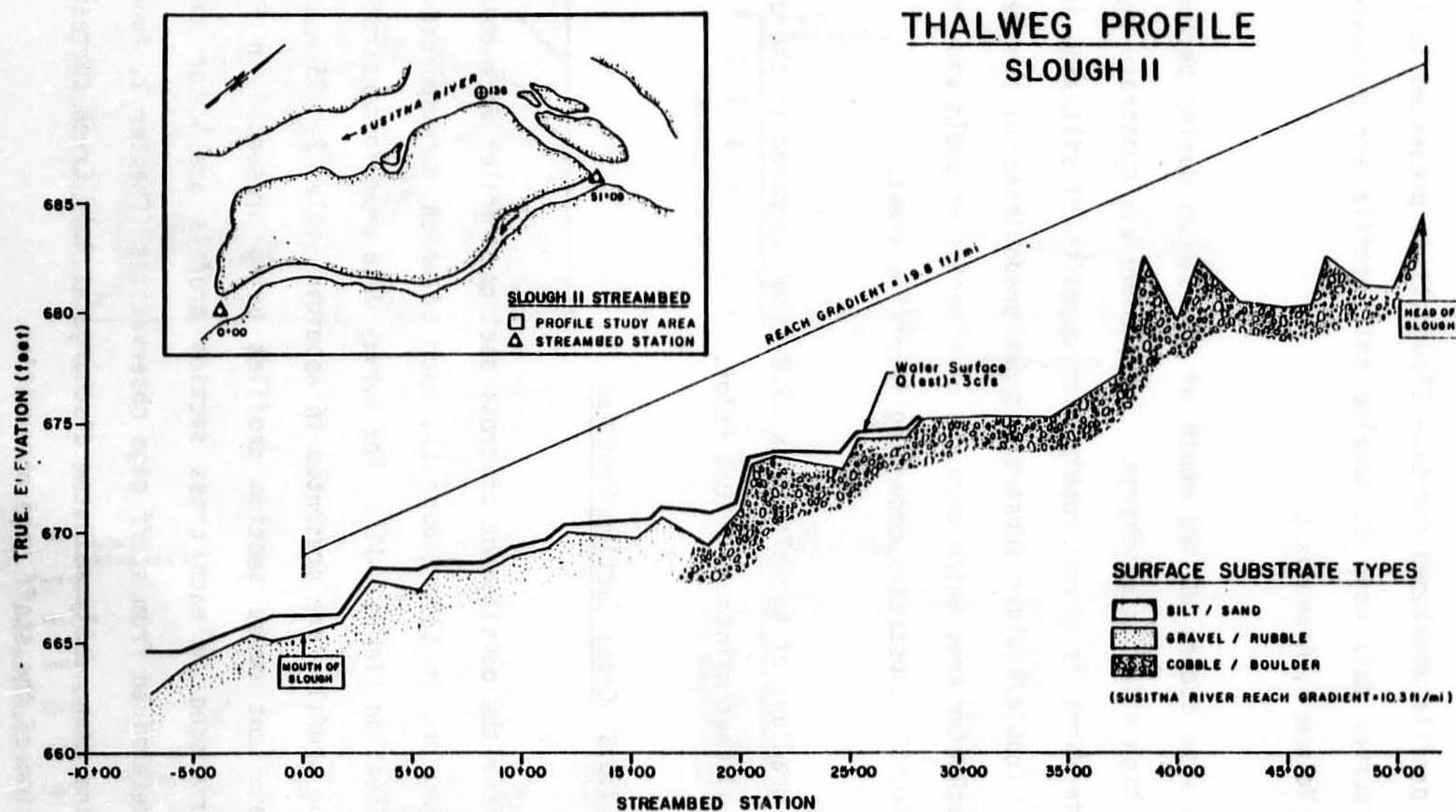


Figure 2-19 Streambed (thalweg) profile of Side Slough 11 (RM 135.7).

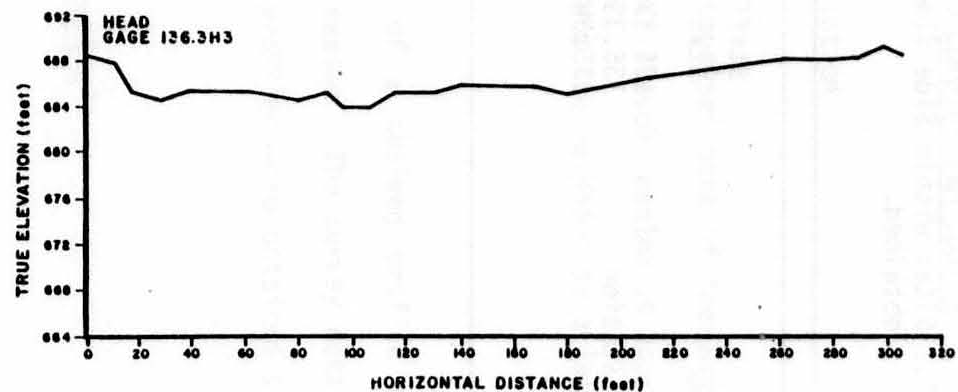
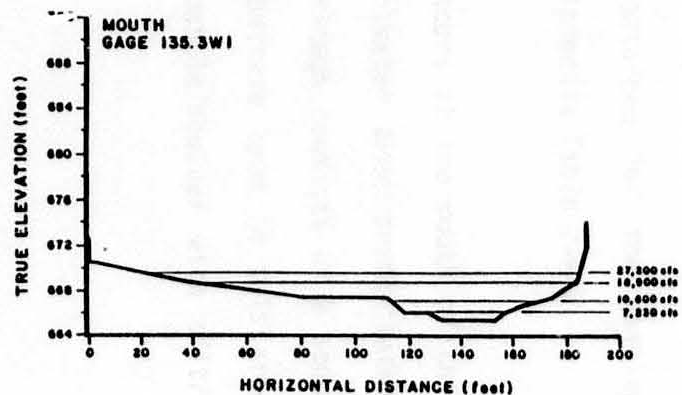
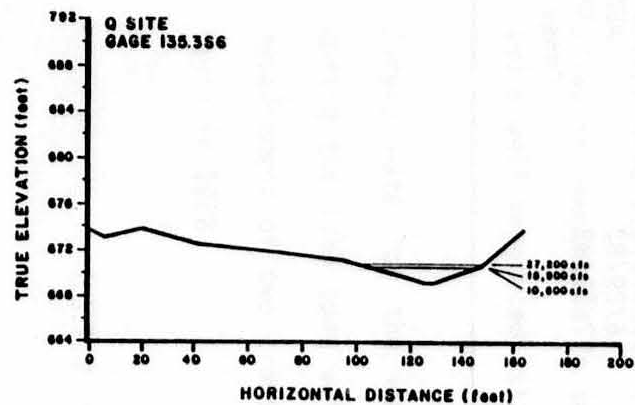
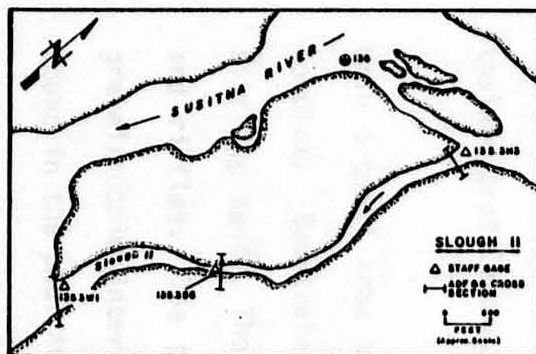


Figure 2-20 Cross section profiles developed for staff gage sites within Side Slough II.

Table 2-11. Sites within Side Slough 11 for which cross sections were obtained.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
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

3.3.7 Side Slough 16/16B Complex (RM 138.0)

3.3.7.1 Site Description

Side Slough 16/16B is located on the west bank of the Susitna River at river mile 138.0 (Figure 2-1). This slough complex is approximately 0.6 miles in length and is separated from the mainstem by a large gravel bar and a well vegetated island.

Survey data for the development of a thalweg profile were obtained during the 1983 open water field season. The survey data used for the development of two cross section profiles were obtained by R&M Consultants in 1982.

3.3.7.2 Thalweg Profile

The thalweg profile for the Side Slough 16/16B Complex is presented in Figure 2-21. The survey data obtained for the development of the thalweg profile are presented in Appendix Table 2-A-9.

Only a small area of backwater occurs at the mouth of this side slough complex. Substrates in this backwater area predominately consist of silt and sand. The rest of the slough consists of a sequence of pools and riffles. The predominate substrate type in this area consists of gravel/rubble interspersed with cobble/boulder with silt/sand deposits found in the pool areas.

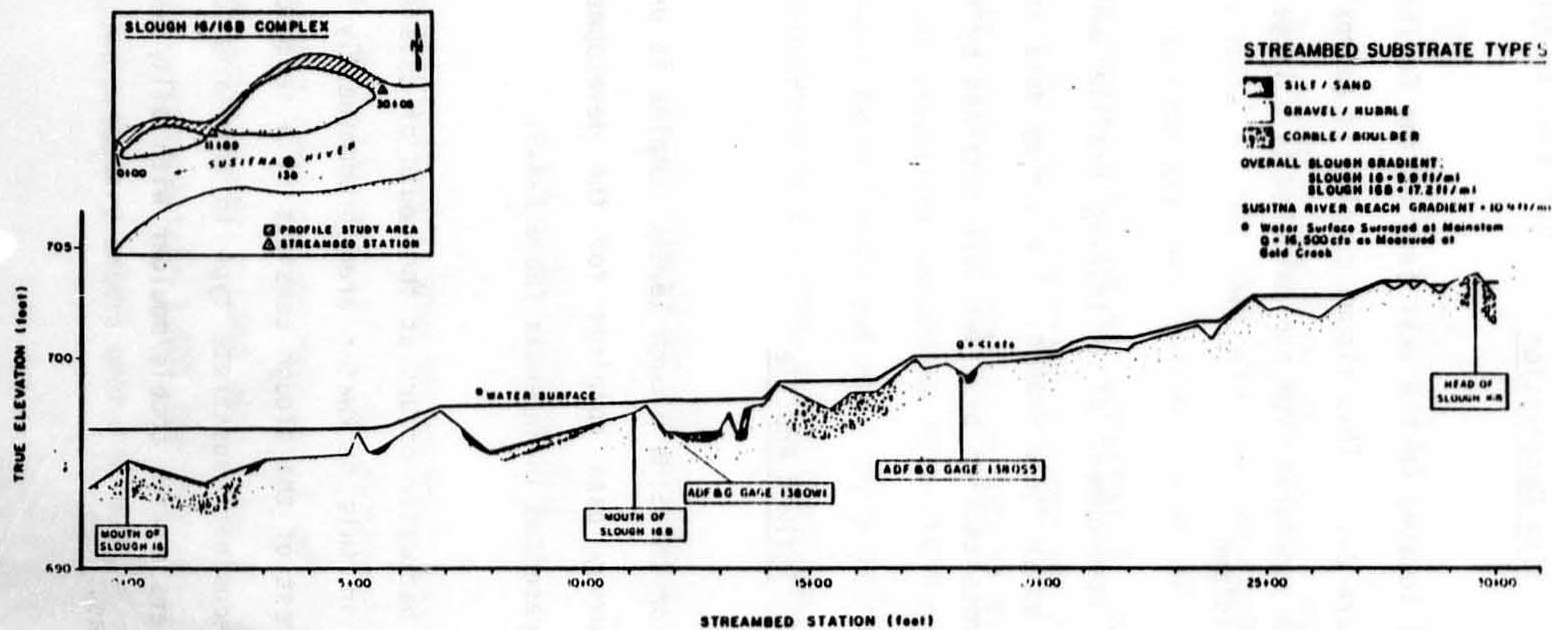


Figure 2-21 Streambed (thalweg) profile of Side Slough 16/16B Complex (RM 138.0).

The overall gradients of Slough 16 and Slough 16B are 9.9 and 17.2 ft/mi, respectively. The gradient of the mainstem adjacent to these sloughs is 10.9 ft/mi.

3.3.7.3 Cross Section Profiles

Data for the development of cross section profiles were collected by R&M Consultants in 1982 (R&M 1982) at two staff gages located at the head and discharge stations in Side Slough 16B (Table 1-12). The resultant cross section profiles are presented in Figure 2-22. The survey data used to develop these cross sections are presented in Appendix Tables 2-B-38 - 2-B-39. Superimposed on each of these cross sections are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-A-7) and mean, daily mainstem discharge at Gold Creek corresponding to the time of the staff gage observation.

3.3.8 Side Slough 20 (RM 140.2)

3.3.8.1 Site Description

Side Slough 20 is located on the east bank of the Susitna River at river mile 140.2 (Figure 2-1). It is approximately 0.5 miles in length and is separated from the mainstem by a well vegetated island. Two small tributaries enter on the east bank of this slough; Waterfall Creek enters approximately 1,500 feet upstream from the mouth and a small unnamed tributary enters near the head of the slough.

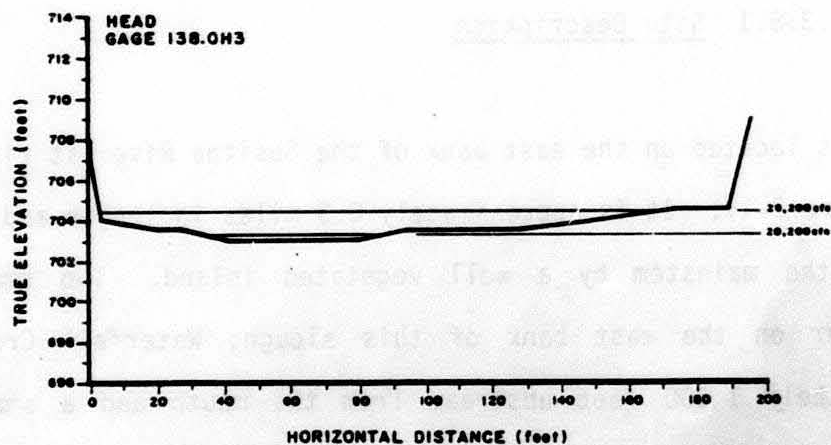
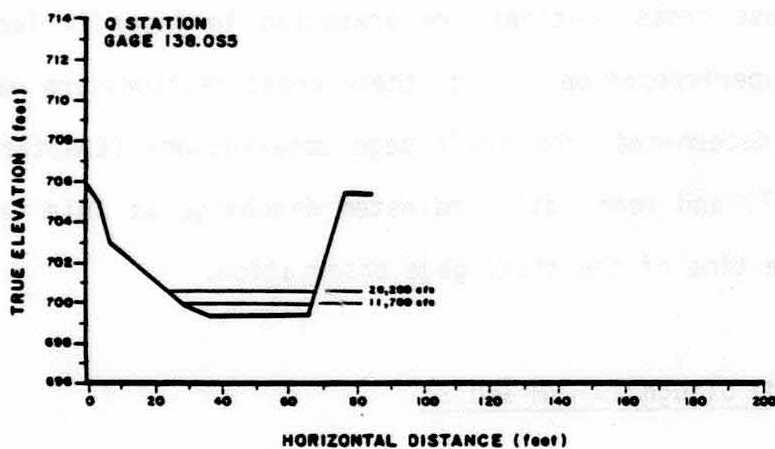
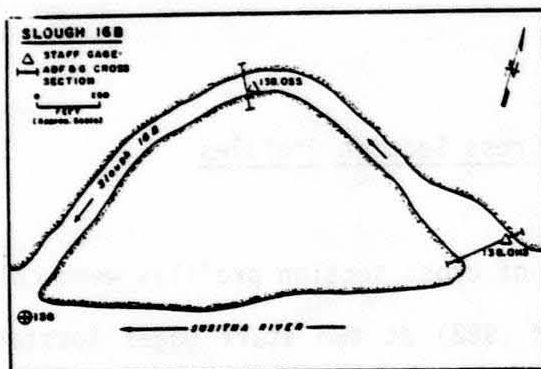


Figure 2-22 Cross section profiles developed for staff gage sites within Side Slough 16B.

Table 2-12. Sites within Side Slough 16B for which cross sections were constructed.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
Mouth	138.0W1	Cross Section Not Available	
Discharge Station	138.0S5	7/24/82	R&M Consultants
Head	138.0H3	7/22/82	R&M Consultants

Survey data were obtained during the 1983 open water field season for the development of a thalweg profile. Survey data for the development of three cross section profiles were obtained by R&M Consultants in 1982.

3.3.8.2 Thalweg Profile

The thalweg profile developed for Side Slough 20 is presented in Figure 2-23. The survey data used in the construction of this thalweg profile are presented in Appendix Table 2-A-10.

An area of backwater occurs at the mouth of the slough during periods of moderate to high mainstem discharges. The predominate substrate type present in this backwater area is silt/sand. Above the backwater area, the channel is characterized by a sequence of pools and riffles. Substrates in this reach consist of gravel/rubble with areas of cobble/boulder at the head and silt/sand in the pools.

The overall gradient of the slough is 13.5 ft/mi which is similar to that of the adjacent mainstem (13.4 ft/mi).

3.3.8.3 Cross Section Profile

Data for the development of cross sectional profiles were obtained by R&M Consultants at three locations in Side Slough 20 in 1982 all of which corresponded to staff gage locations (Table 2-13). These resultant cross section profiles are presented in Figures 2-24. The survey data used to develop these cross section profiles are presented in

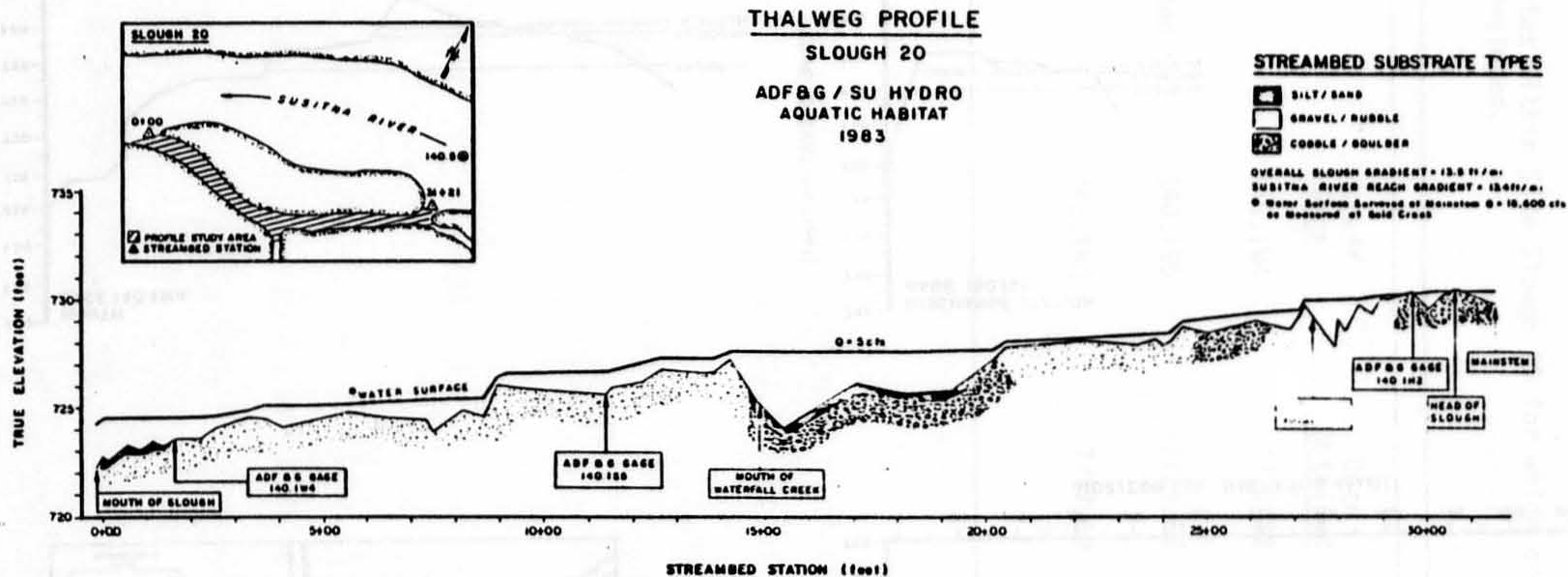


Figure 2-23 Streambed (thalweg) profile of Side Slough 20 (RM 140.2).

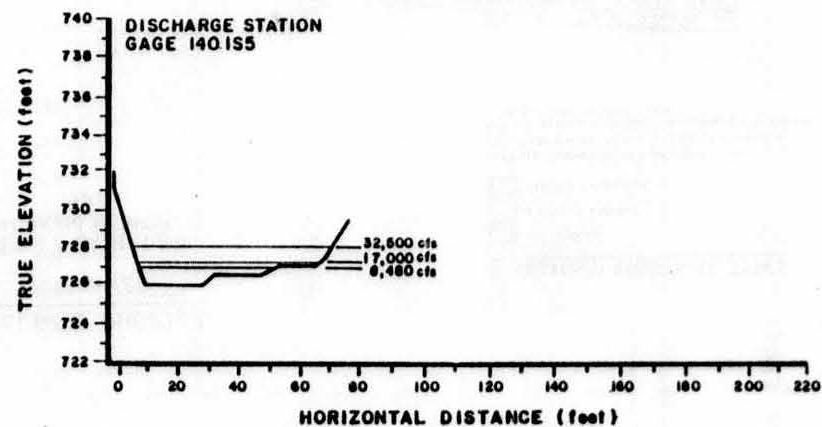
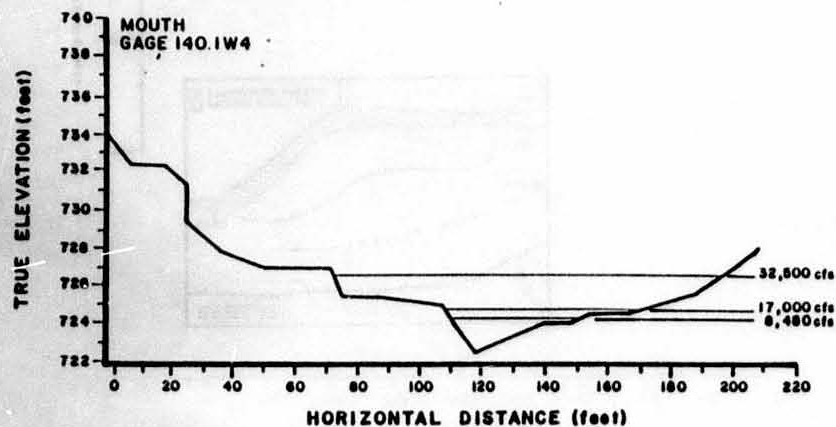
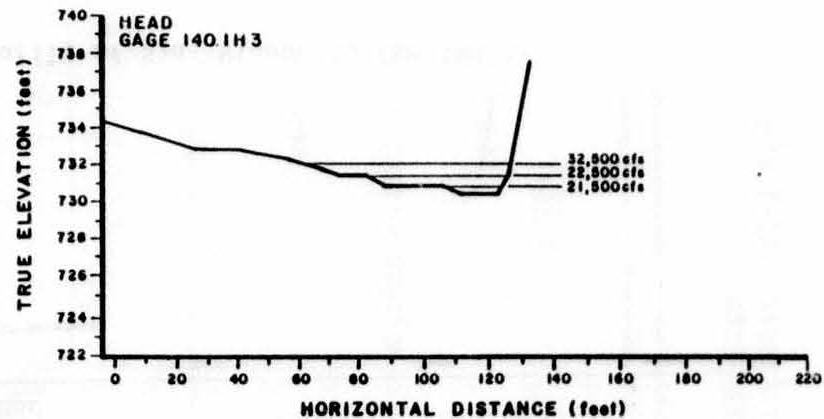
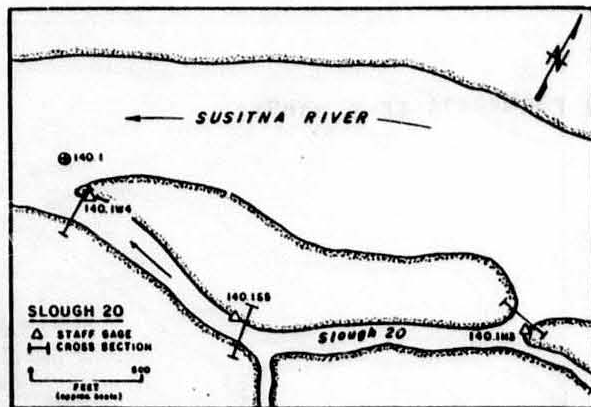


Figure 2-24 Cross section profiles developed for staff gage sites within Side Slough 20.

Table 2-13. Sites within Side Slough 20 for which cross sections were developed.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
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

Appendix Table 2-B-40 - 2-B-42. Superimposed on each cross section profile are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-A-7) and mean, daily mainstem discharge at Gold Creek corresponding to the time of the staff gage observations.

3.3.9 Side Slough 21 (RM 141.8)

3.3.9.1 Site Description

Side Slough 21 is located on the east bank at the Susitna River at river mile 141.8 (Figure 2-1). This slough is approximately 0.5 miles in length and is separated from the mainstem by a large vegetated island. The channel divides about 1,500 feet from the mouth into two forks.

Survey data were obtained during the 1983 open water field season for the development of a thalweg profile and eight cross sectional profiles.

3.3.9.2 Thalweg Profile

The thalweg profile developed for Side Slough 21 is presented in Figure 2-25. The supporting survey data are presented as part of the Side Channel 21 thalweg profile (see Section 3.2.5).

Mainstem discharge through the upper portion of Overflow Channel A6 creates a backwater area in the immediate vicinity of the mouth of Side Slough 21 during periods of moderate to high mainstem discharge. The predominate substrate in this backwater area consists of silt and sand.

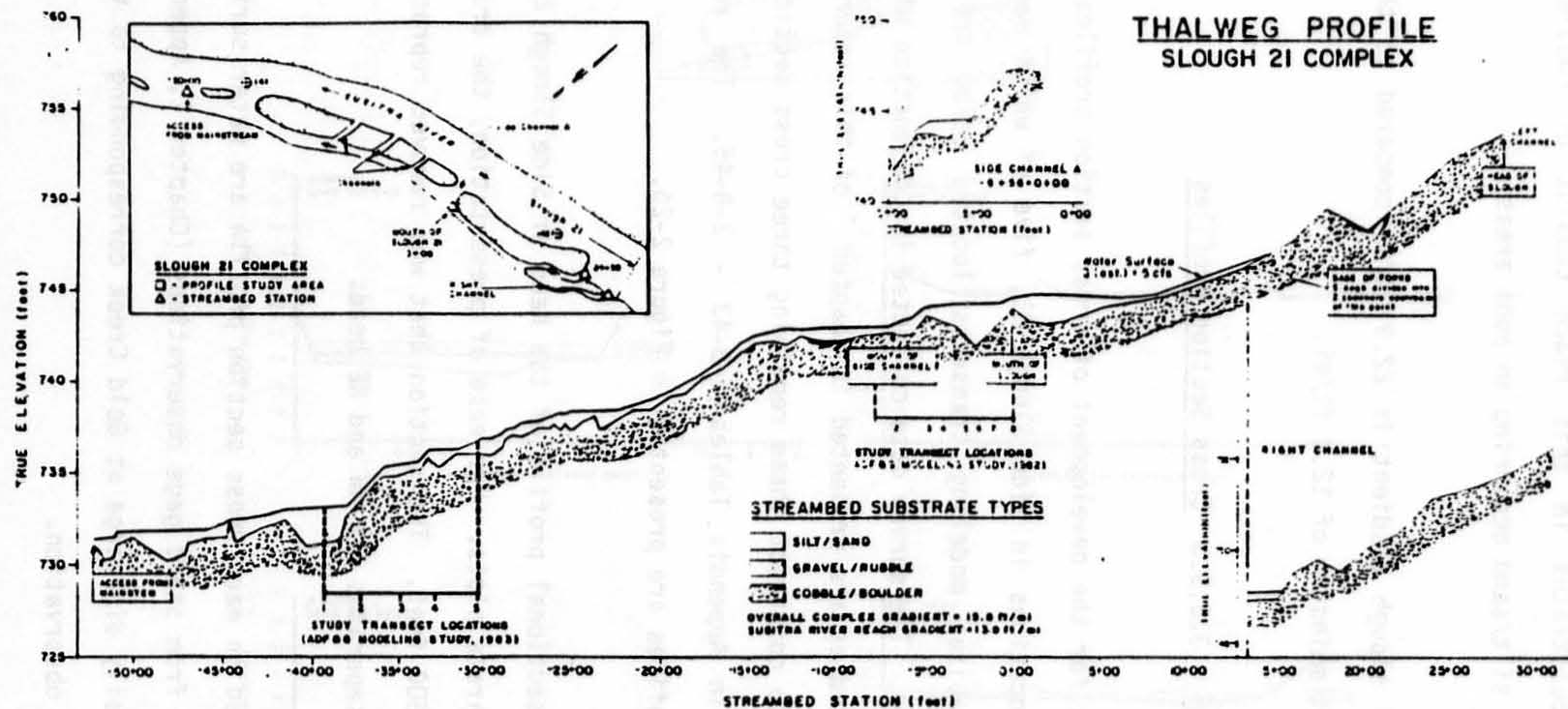


Figure 2-25 Streambed (thalweg) profile of Slough 21 Complex (RM 140.6).

Above the backwater area, the channel consists of a series of pools and riffles. Substrates in this reach consist of cobble/boulder with deposits of silt/sand occurring in pool areas.

The overall slough gradient is 22.9 ft/mi compared to the gradient of the adjacent mainstem of 12.2 ft/mi.

3.3.9.3 Cross Section Profiles

Survey data for the development of cross section profiles were obtained at eight locations in Side Slough 21, five of which were obtained at physical habitat modeling transects located below the slough mouth (Table 2-14). The survey data collected in conjunction with the habitat modeling studies are presented in Chapter 7 of this report. The survey data used to construct these remaining three cross section profiles are presented in Appendix Tables 2-8-43 - 2-8-45. The resultant cross section profiles are presented in Figure 2-26.

The cross sectional profile of the head of Side Slough 21 is presented as two separate plots. For ease of presentation, the cross section was shortened 600 feet. The section that was removed represents the river bank that separates the NW and NE heads

Superimposed on each cross section profile are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-7) and mean daily discharge at Gold Creek corresponding to the time of the staff gage observation.

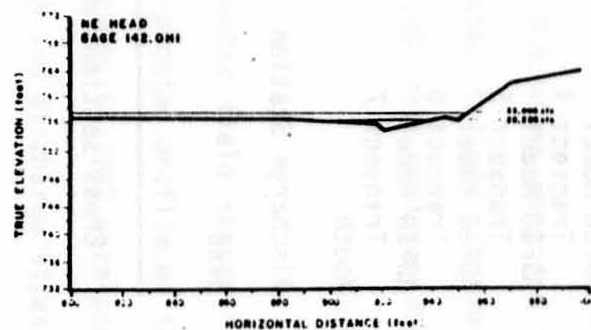
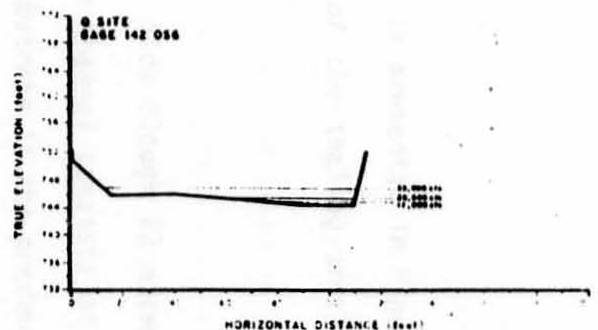
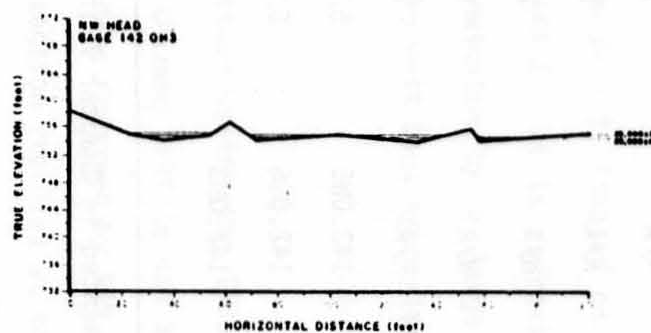
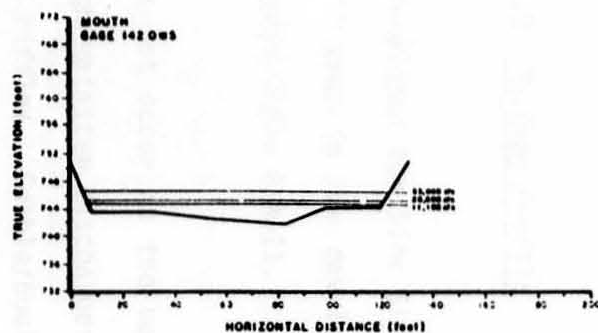
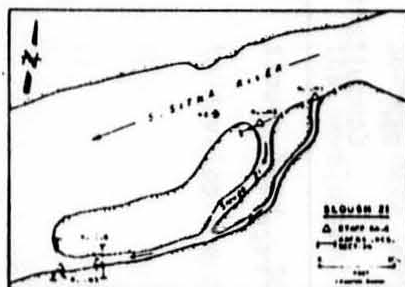


Figure 2-26 Cross section profiles developed for staff gage sites within Side Slough 21 (RM 141.8).

Table 2-14. Sites within Side Slough 21 for which cross sections were constructed.

ADF&G Model	N/A	1983 ¹	ADF&G
Transect 3			
ADF&G Model	N/A	1983 ¹	ADF&G
Transect 4			
ADF&G Model	N/A	1983 ¹	ADF&G
Transect 5			
ADF&G Model	N/A	1983 ¹	ADF&G
Transect 6			
ADF&G Model	N/A	1983 ¹	ADF&G
Transect 7			
Mouth	142.0W5	5/17/83	ADF&G
Discharge Station	142.0S6	5/17/83	ADF&G
Head	142.0H3	7/11/82	R&M Consultants

¹ Cross sections are presented in Chapter 7 of this report.

3.3.10 Side Slough 22 (RM 144.2)

3.3.10.1 Site Description

Side Slough 22 (Figure 2-1) is located on the north bank of the Susitna River at river mile 144.2. It is approximately 0.5 miles long and is separated from the mainstem by a large vegetated island. A small tributary enters on the west bank approximately 2,000 feet upstream from the slough mouth.

Survey data were obtained during the 1983 open water field season for the development of a thalweg profile and a cross section profile of the slough head. Survey data obtained by R&M Consultants in 1982 were used to develop the cross section profiles at the mouth and discharge sites.

3.3.10.2 Thalweg Profile

The thalweg profile developed for Side Slough 22 is presented in Figure 2-27. The survey data used in the development of the thalweg profile are presented in Appendix Table 2-A-11.

A backwater area does not occur at the mouth of Side Slough 22 except during periods of high mainstem discharges. The channel consists of a sequence of pools and riffles. Cobble/boulder substrate is the predominate substrate type found in the slough with deposits of gravel/rubble being found in riffle areas and deposits of silt/sand being found in pool areas.

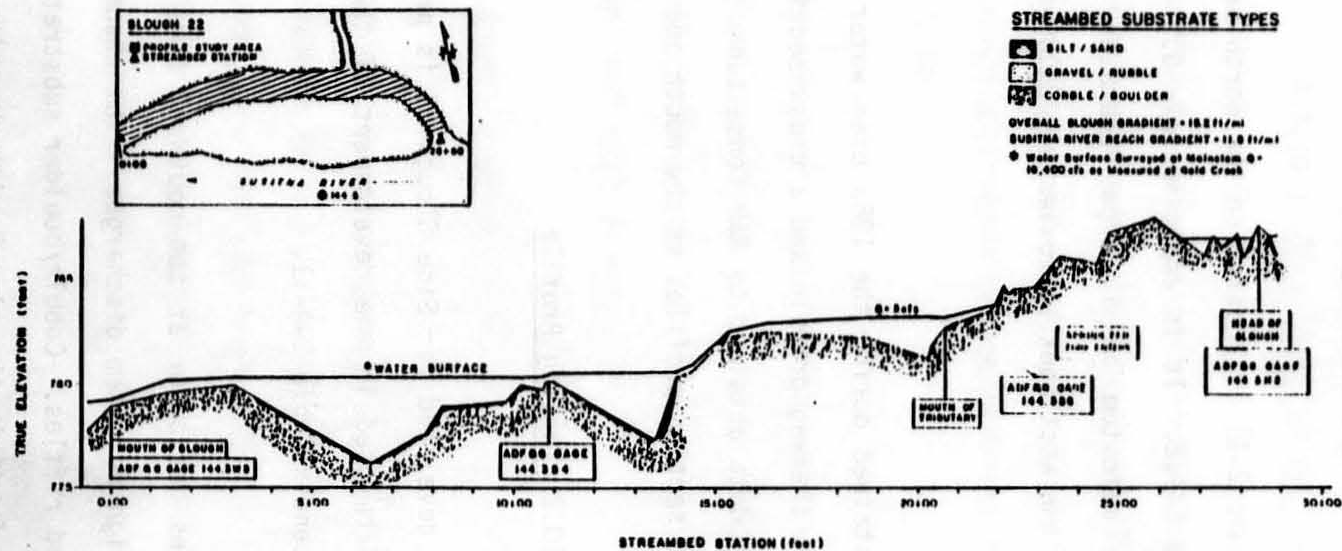


Figure 2-27. Streambed (thalweg) profile of Side Slough 22 (RM 144.2).

The overall gradient of the slough is 15.2 ft/mi as compared to the gradient of the adjacent mainstem of 11.5 ft/mi.

3.3.10.3 Cross Section Profile

Survey data for the development of cross sectional profiles were developed for three staff gage locations (Table 2-15) within Side Slough 22. These cross sections are presented in Figure 2-28. The survey data from which the cross sections were developed are presented in Appendix Tables 2-B-46 - 2-B-49.

Superimposed on each cross section are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-7) and the corresponding mean daily mainstem discharge at Gold Creek at the time of the staff gage observation.

3.4 Upland Slough Habitats

Survey data for the development of thalweg and cross sectional profiles were obtained at three upland (upland sloughs unlike side sloughs are not connected with the mainstem or its sidechannels except at their mouths) slough sites located in the Talkeetna to Devel Canyon reach of the Susitna River (Figure 2-1). These data are presented below.

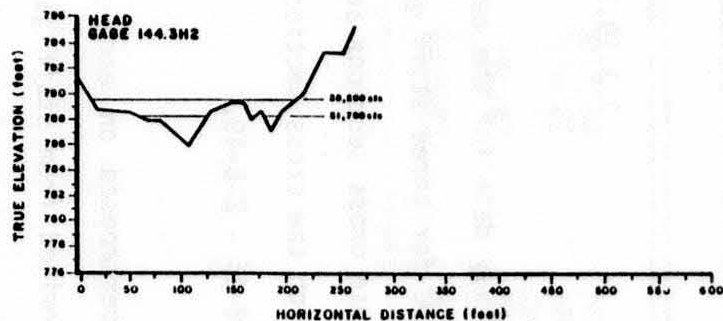
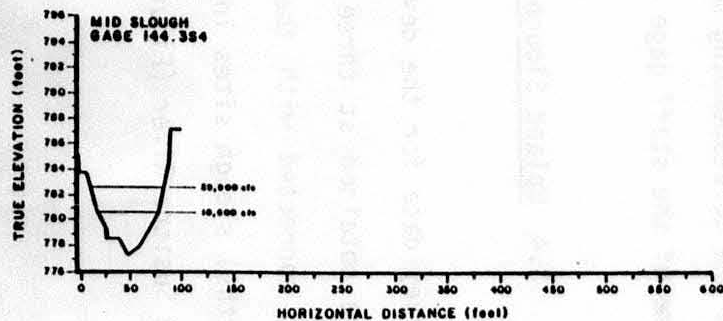
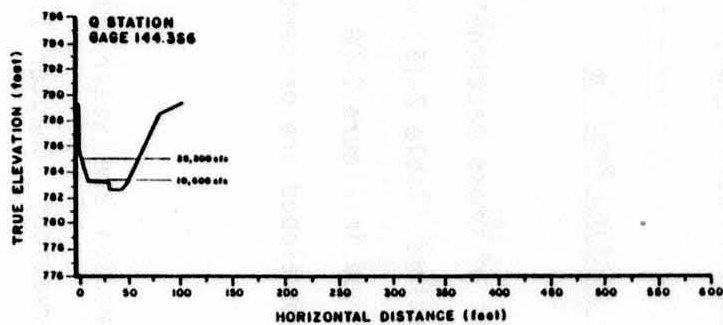
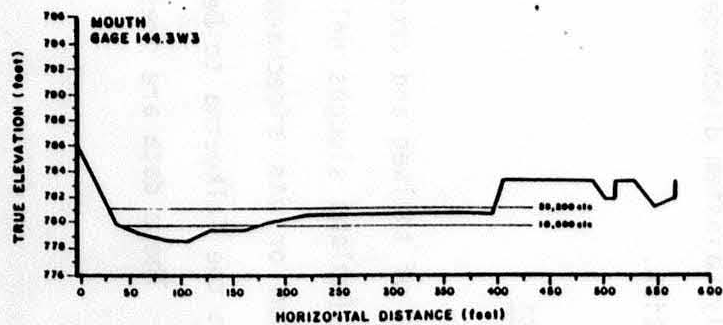
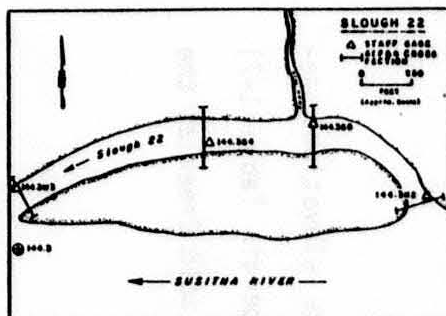


Figure 2-28 Cross section profiles developed for staff gage sites within Side Slough 22.

Table 2-15. Sites within Side Slough 22 for which cross sections were constructed.

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

3.4.1 Upland Slough 6A (RM 112.3)

3.4.1.1 Site Description

Upland Slough 6A is located on the west bank of the Susitna River at river mile 112.3 (Figure 2-1). The slough divides into two forks approximately 1,200 feet from the slough mouth. A beaver dam is located approximately 1,300 feet upstream from the slough mouth.

During the 1983 open water field season, survey data were obtained for the development of a thalweg profile and two cross sectional profiles at this site.

3.4.1.2 Thalweg Profile

The thalweg profile developed for Upland Slough 6A is presented in Figure 2-29. The survey data used to construct the profile are presented in Appendix Table 2-A-10.

A substantial area of backwater exists during periods of low to high mainstem discharges at the mouth of this upland slough extending upstream to the beaver dam. The predominate substrate consists of silt/sand.

The overall gradient of the slough is 6.3 ft/mi compared to the gradient of the adjacent mainstem of 10.6 ft/mi.

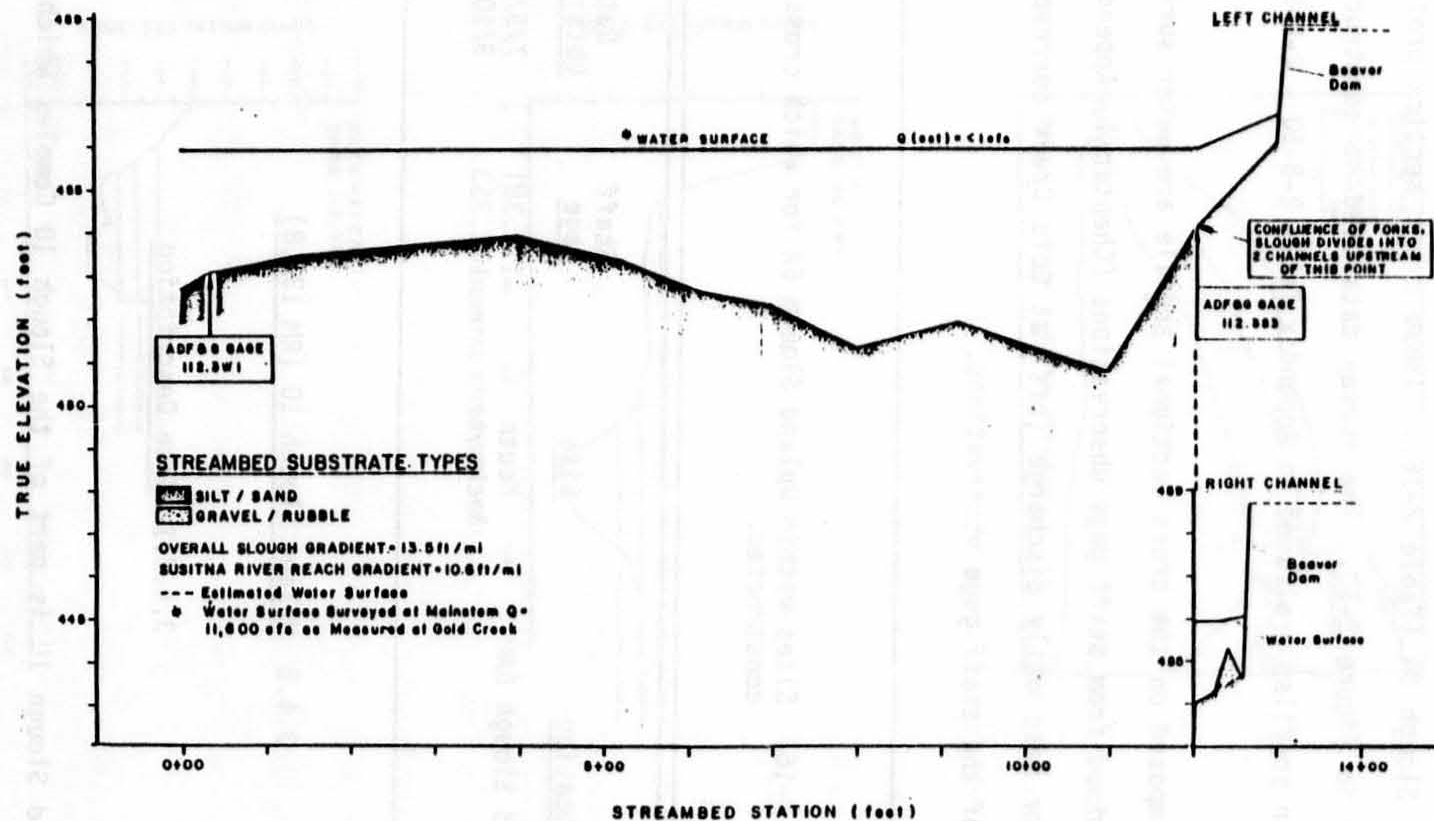
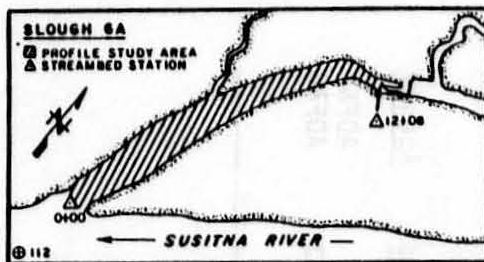


Figure 2-29 Streambed (thalweg) profile of Upland Slough 6A.

3.4.1.3 Cross Section Profiles

Data for the development of two cross section profiles were collected in Upland Slough 6A (Table 2-16). These cross section profiles are presented in Figure 2-30. The survey data used to construct these cross section profiles are found in Appendix Table 2-B-50 - 2-B-51.

Superimposed on the cross sectional profile are water surface elevation determined from staff gage observations (Chapter 1, Appendix Table 1-7) and the mean daily discharge (cfs) at Gold Creek corresponding to the time of the staff gage observations.

Table 2-16. Sites within Upland Slough 6A for which cross sections were constructed.

<u>Location</u>	<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
Upland Slough 6A	Mouth Backwater	112.3W1	7/5/83	ADF&G
		112.3S3	9/10/83	ADF&G

3.4.2 Upland Slough 10 (RM 133.8)

3.4.2.1 Site Description

Upland Slough 10 is part of the Slough 10 Complex which is located on the west bank of the Susitna River at river mile 133.8. Upland Slough 10 divides into two channels approximately 800 feet from the slough

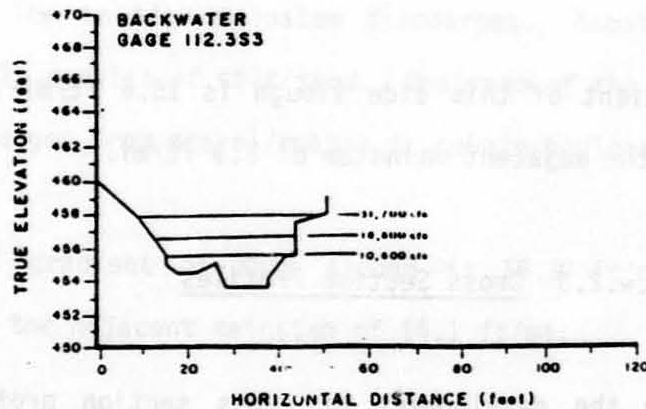
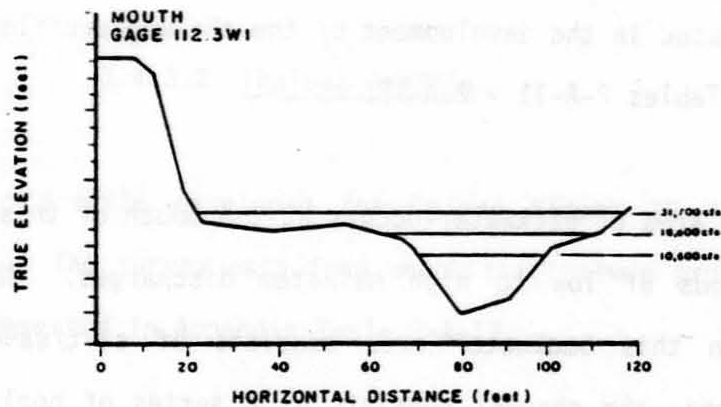
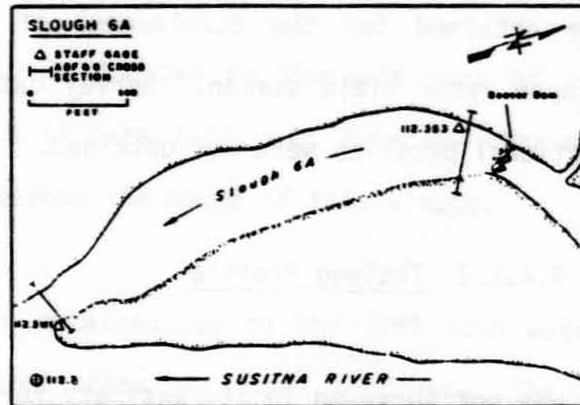


Figure 2-30 Cross section profiles developed for staff gage sites within Upland Slough 6A.

mouth. Side Channel 10 flows into Upland Slough 10 approximately 200 feet from the slough mouth.

Survey data were obtained for the development of a thalweg profile during the 1983 open water field season. Survey data for the development of cross sectional profiles were not obtained.

3.4.2.2 Thalweg Profile

Upland Slough 10 was not surveyed in its entirety for the development of the thalweg profile. The thalweg profile constructed for Upland Slough 10 is presented as part of the Slough 10 Complex (Figure 2-5). The survey data used in the development of the thalweg profile are presented in Appendix Tables 2-A-11 - 2-A-12.

An extensive area of backwater occurs at the mouth of this upland slough during periods of low to high mainstem discharges. The predominate substrate in this backwater area consists of silt/sand. Above the backwater area, the channel consists of a series of pools and riffles. Substrates in this area consist of cobble/boulder.

The overall gradient of this side slough is 15.6 ft/mi as compared to the gradient of the adjacent mainstem of 8.9 ft/mi.

3.4.2.3 Cross Section Profiles

Survey data for the development of cross section profiles were not obtained for Upland Slough 10.

3.4.3 Upland Slough 19 (RM 140.0)

3.4.3.1 Site Description

Upland Slough 19 is located on the east bank of the Susitna River at river mile 140.0 (Figure 2-1). An overflow channel conducts mainstem flow laterally across the mouth of this slough.

Survey data were obtained during the 1983 open water field season for the development of cross sectional profiles. The thalweg profile was constructed from cross sectional elevations which were surveyed by ADF&G in 1981.

3.4.3.2 Thalweg Profile

The thalweg profile developed for Upland Slough 19 is presented in Figure 2-31. The survey data from which the thalweg profile was developed are presented in Appendix Table 2-A-13.

A backwater area occurs at the mouth of this upland slough during periods of low to high mainstem discharges. Substrates in this area predominately consist of silt/sand. Upstream of the backwater area, the substrate ranges from gravel/rubble to cobble/boulder.

The overall gradient of this slough is 16.9 ft/mi compared to the gradient of the adjacent mainstem of 14.1 ft/mi.

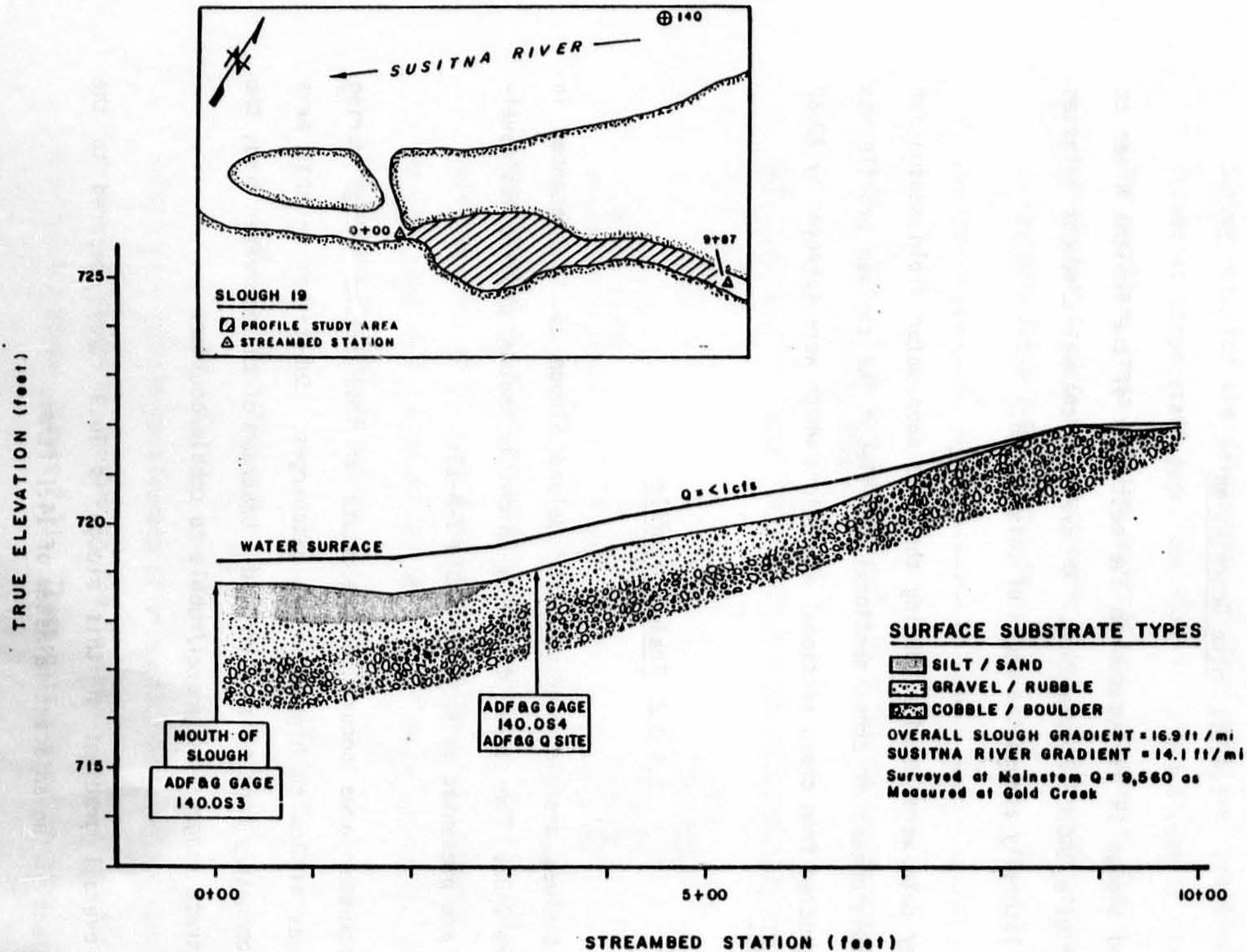


Figure 2-31 Streambed (thalweg) profile of Upland Slough 19 (RM 140.0).

3.4.3.3 Cross Section Profile

Survey data for the development of cross sectional profiles were collected at three staff gage locations in Upland Slough 19 (Table 2-17). The resultant cross section profiles are presented in Figure 2-32. The survey data used to construct these cross section profiles are presented in Appendix Table 2-B-52 - 2-B-54.

Table 2-17. Sites within Upland Slough 19 for which cross sections were constructed.

<u>Site</u>	<u>Staff Gage</u>	<u>Date Obtained</u>	<u>Agency</u>
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

Superimposed on each cross section are water surface elevations determined from staff gage observations (Chapter 1, Appendix Table 1-7) and the mean daily mainstem at Gold Creek corresponding to the time of the staff gage observations.

3.5 Tributary Habitats

Survey data for the development of cross section profiles were collected at four tributaries located in the Talkeetna to Devil Canyon reach of the Susitna River (Figure 2-1). These data are presented below by site.

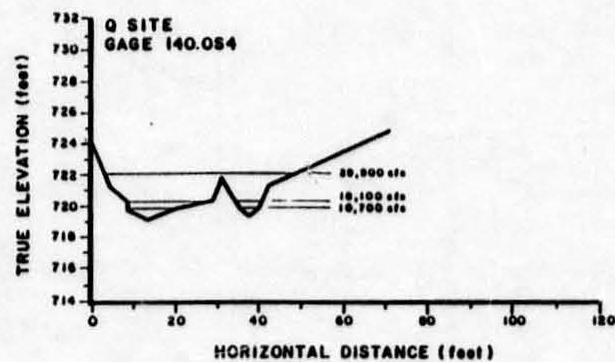
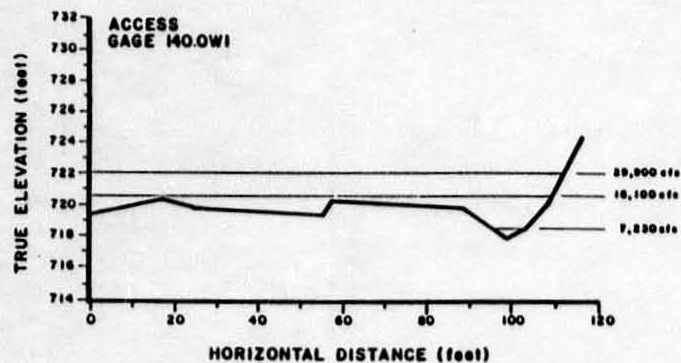
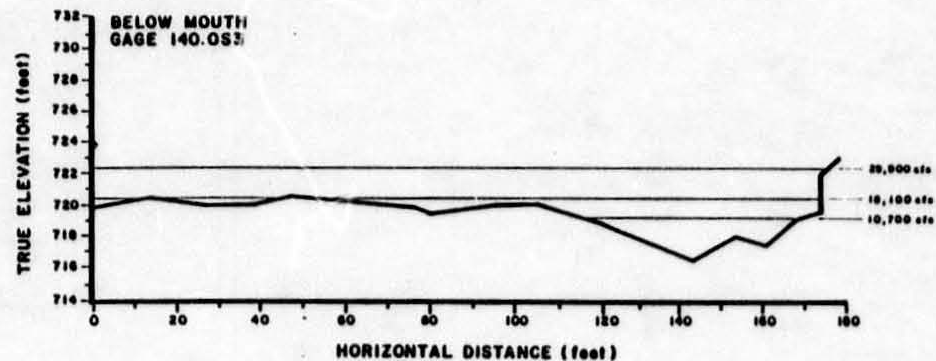
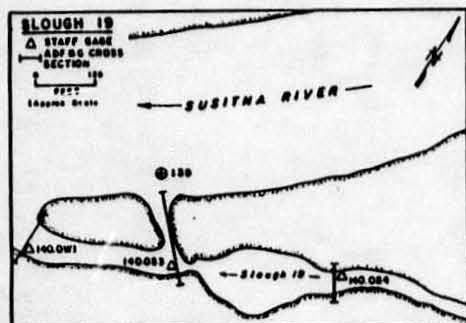


Figure 2-32 Cross section profiles developed for staff gage sites within Upland Slough 19.

3.5.1 Fourth of July Creek (RM 131.1)

3.5.1.1 Site Description

Fourth of July Creek (Figure 2-1) is located on the west bank of the Susitna River at river mile 131.1. It can be characterized as a narrow, fast-running, clear-water stream having a relatively steep gradient.

3.5.1.2 Cross Section Profile

A cross section profile was developed for the discharge station and is presented in Figure 2-33. The survey data used to develop the cross section are presented in Appendix Table 2-B-55. Superimposed on the cross section are water surface elevations determined from staff gage observations obtained during streamflow measurements (Chapter 1, Appendix Table 1-A-8).

3.5.2 Gold Creek (RM 136.8)

3.5.2.1 Site Description

Gold Creek is located on the east bank of the Susitna River at river mile 136.8. It can be characterized as a steep, fast running clear water stream which is confined to a single channel.

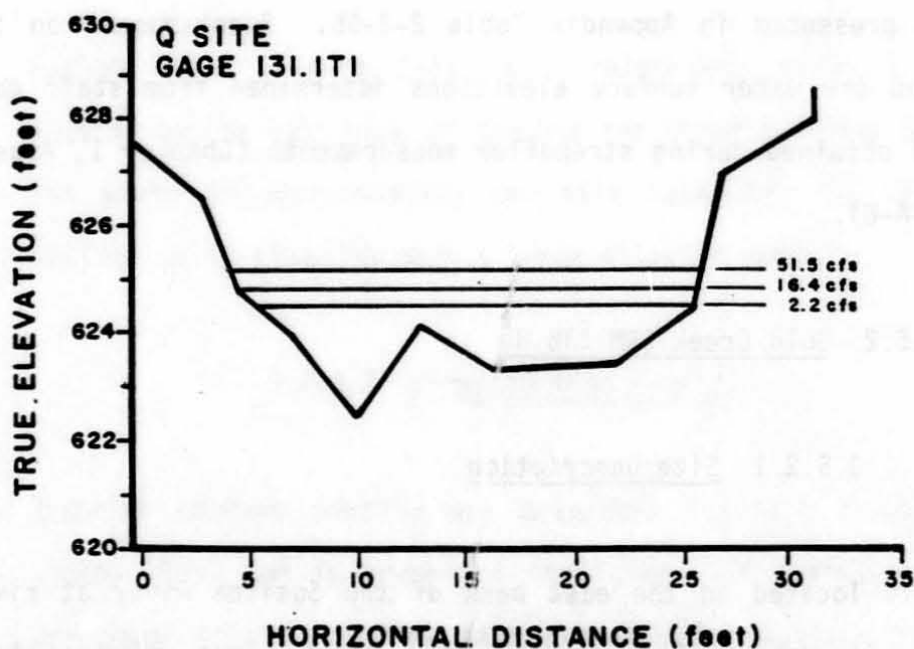
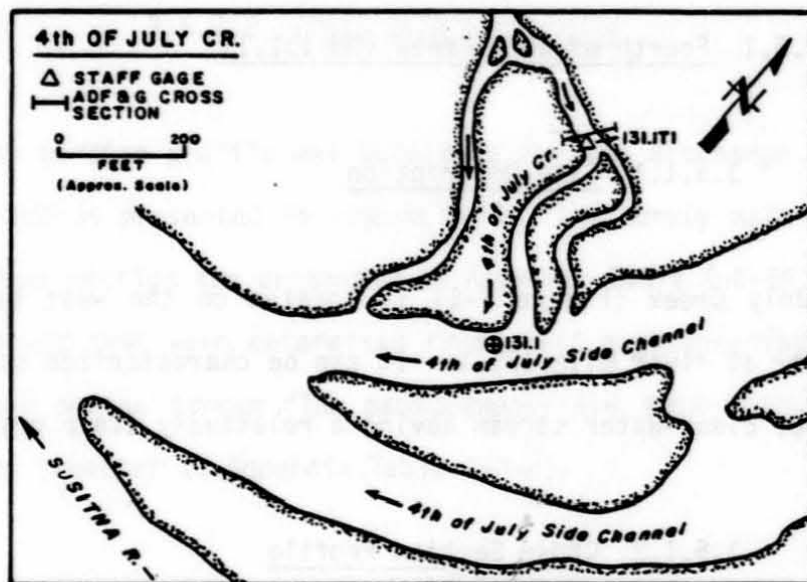


Figure 2-33 Cross section profile developed for the staff gage site within Fourth of July Creek (RM 131.1).

3.5.2.2 Cross Section Profile

A cross section profile was developed for the discharge station in Gold Creek and is presented in Figure 2-34. The survey data used to develop the cross section are presented in Appendix Table 2-B-56. Water surface elevations that were determined from staff gage observations which were obtained during stream flow measurements are superimposed on the cross section (Chapter 1, Appendix Table 1-A-8).

3.5.3 Indian River (RM 138.6)

3.5.3.1 Site Description

Indian River (Figure 2-1) is a relatively large tributary that is located on the east bank of the Susitna River at river mile 138.6. From its mouth to approximately one mile upstream, the channel is highly braided as it flows through a large alluvial deposit.

3.5.3.2 Cross Section Profile

A cross section profile was developed for the discharge station in Indian River and is presented in Figure 2-35. This cross section was developed from streamflow measurement data obtained by ADF&G in 1983 which are presented in Appendix Table 2-B-57. Streambed elevations were derived by subtracting the depth of the water column from the water surface elevation obtained at the time the stream flow measurement was made. This computation was made for each station on the transect from which a stream flow measurement was computed. The horizontal distances

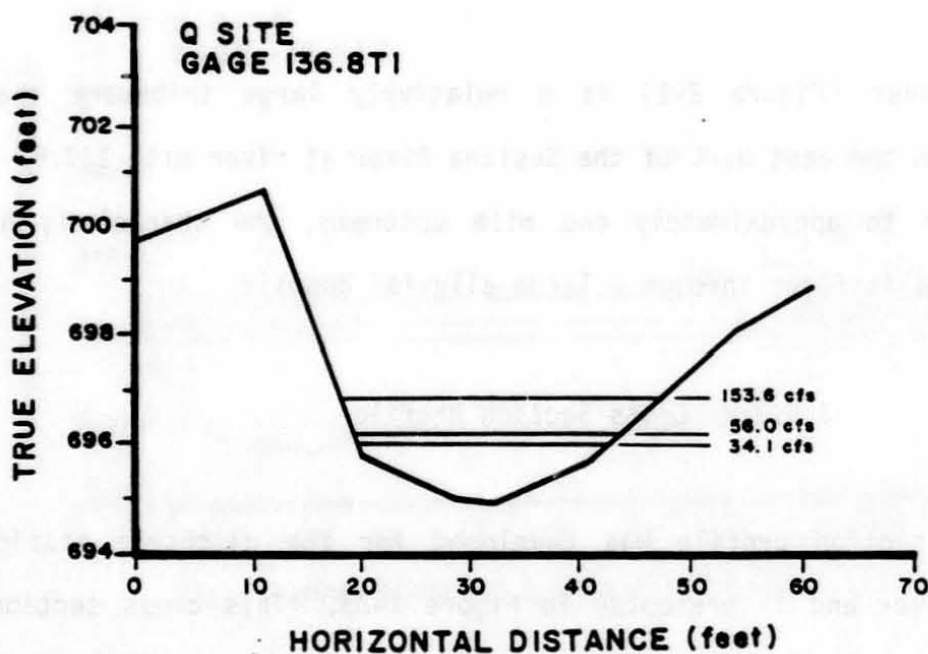
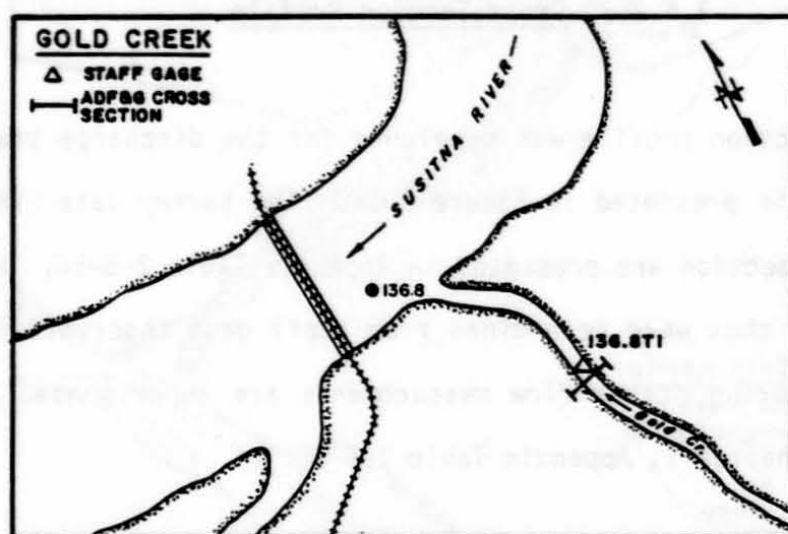


Figure 2-34 Cross section profile developed for the staff gage site within Gold Creek (RM 136.8).

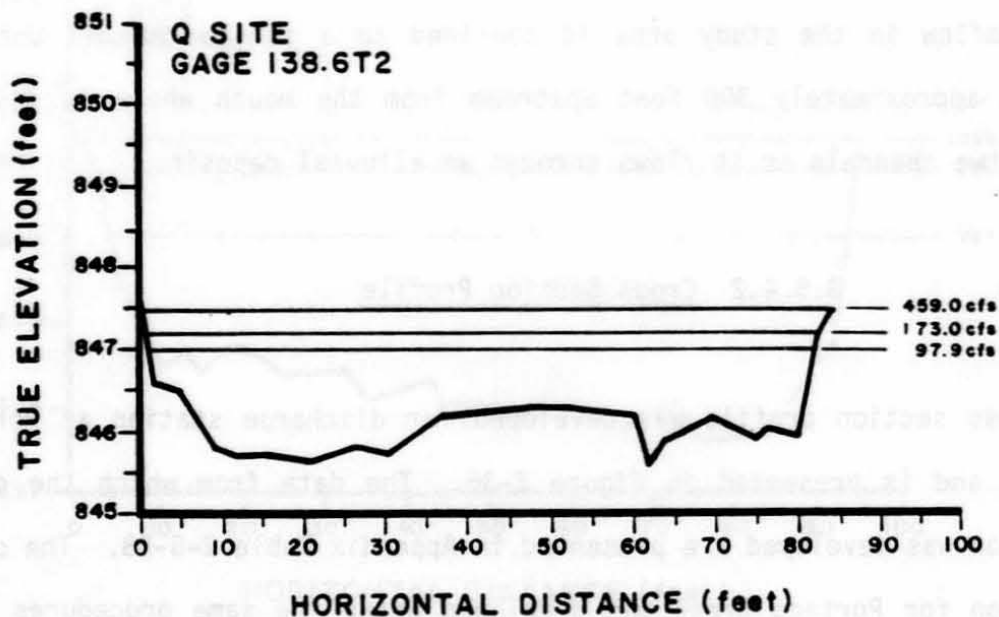
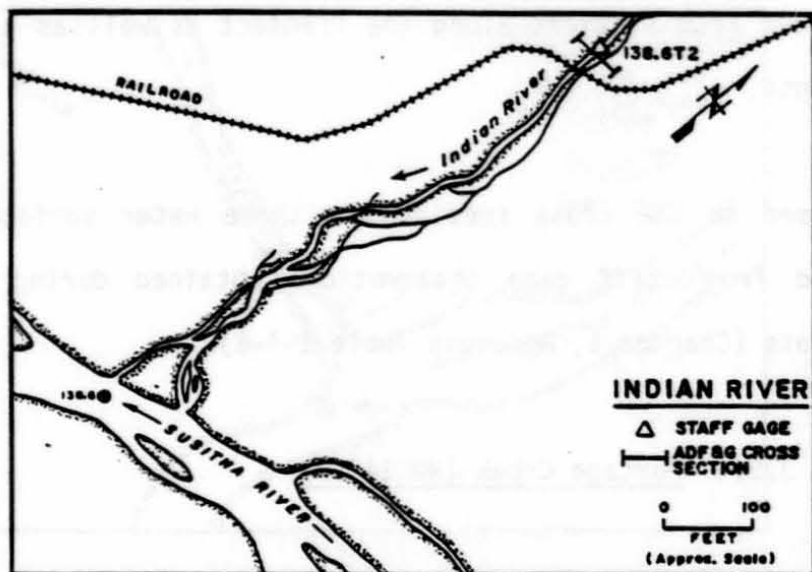


Figure 2-35 Cross section profile developed for the staff gage site within Indian River (RM 138.6).

were derived from stations along the transect as well as edge of water measurements.

Superimposed on the cross section are three water surface elevations determined from staff gage observations obtained during stream flow measurements (Chapter 1, Appendix Table 1-A-8).

3.5.4 Portage Creek (RM 148.9)

3.5.4.1 Site Description

Portage Creek enters the Susitna River at river mile 148.9 (Figure 2-1). Streamflow in the study area is confined to a single channel until a point approximately 300 feet upstream from the mouth where it divides into two channels as it flows through an alluvial deposit.

3.5.4.2 Cross Section Profile

A cross section profile was developed for discharge station at Portage Creek and is presented in Figure 2-36. The data from which the cross section was developed are presented in Appendix Table 2-B-58. The cross section for Portage Creek was developed using the same procedures used for developing the Indian River cross section.

Superimposed on the cross section are three water surface elevations determined from staff gage observation obtained during stream flow measurements (Chapter 1, Appendix Table 1-A-8).

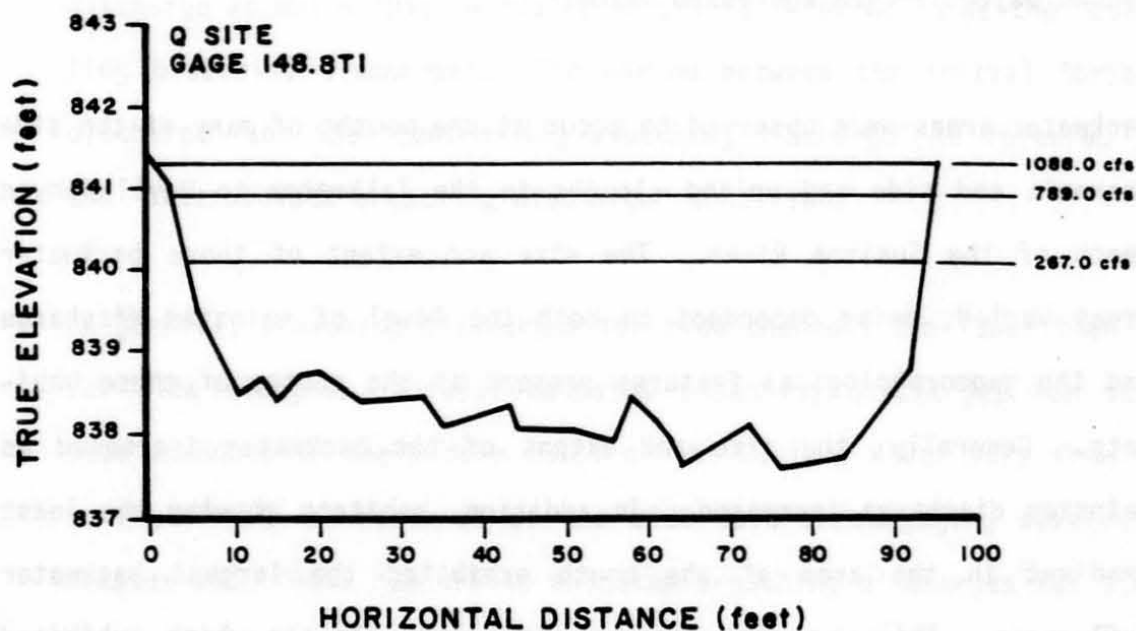
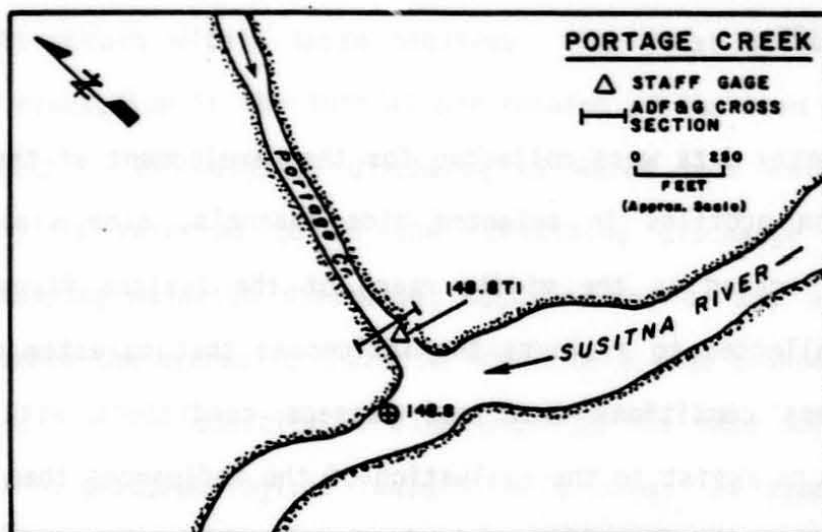


Figure 2-36 Cross section profile developed for the staff gage site within Portage Creek (RM 148.9).

4.0 Discussion

Channel geometry data were collected for the development of thalweg and cross section profiles in selected side channels, side sloughs, and tributaries located in the middle reach of the Susitna River. These data were collected to evaluate the influences that mainstem discharge has on access conditions into and passage conditions within these habitats and to assist in the evaluation of the influences that mainstem discharge has on the formation of backwater at the mouths and breaching at the head of the habitats. Results pertaining to the first objective are addressed in Chapter 6 of this report. Results pertaining to the second objective are addressed below.

Backwater areas were observed to occur at the mouths of many of the side channels and side and upland sloughs in the Talkeetna to Devil Canyon reach of the Susitna River. The size and extent of these backwater areas varied, being dependent on both the level of mainstem discharge and the geomorphological features present at the mouths of these habitats. Generally, the size and extent of the backwater increased as mainstem discharge increased. In addition, habitats showing the least gradient in the area of the mouth exhibited the largest backwater influences. This was most apparent in upland sloughs which exhibited the largest backwater influences. Overall, upland slough habitats exhibited the largest backwater effects followed in order by side slough habitats and side channel habitats.

As the head portions of side channels and side sloughs become breached by progressively higher levels of mainstem discharge, a succession of

events occurs within these habitats. The first event that occurs in this succession is the initial overtopping of the head portion of these habitats. The mainstem discharge at which this initial overtopping occurs is referred to as the "breaching discharge". This initial overtopping mainstem discharge, however, may or may not significantly influence the hydraulic characteristics of a side channel or side slough due to the low quantity of flow entering the head portion and due to specific geomorphological features of a site. At some point, as progressively higher levels of mainstem discharge overtop the head portion of a side channel or side slough, the hydraulic characteristics of a site begin to become governed by mainstem discharge. The mainstem discharge at which this initially occurs is referred to as the "controlling breaching discharge". The period between the initial "breaching discharge" and the "controlling breaching discharge" is referred to as the "intermediate breaching discharge" condition.

In general, breaching discharges for side channels are lower than those for side sloughs. Initial mainstem breaching discharges for studied side channels in the middle reach of the Susitna River vary from 5,000 to 20,000 cfs as measured at the USGS Gold Creek gaging station (see Chapter 1). These compare to mainstem breaching discharges for studied side sloughs in the middle reach of the Susitna River which vary from 16,000 to 42,000 cfs as measured at the USGS Gold Creek gaging station (see Chapter 1).

These breaching discharges compare to controlling breaching discharges ranging from 5,000 to 25,000 cfs and 19,000 to 42,000 cfs as measured at the USGS Gold Creek gaging station for side channels and side sloughs,

respectively (see Chapter 1). In general, the controlling breaching discharges are closer to the breaching discharges in side channels than in side sloughs. The reasons for this may be linked to certain geomorphological features present in side channels that differ from those present in side sloughs. The cross sectional profile of the head portion of a side channel is much flatter and rounded than that of a side slough, allowing a larger quantity of water to flow over the head of a side channel at the initial point of overtopping. This causes a more immediate influence of mainstem discharge on the hydraulic characteristics of a side channel.

These initial breaching and controlling breaching discharges presented are based on a combined interpretation of field survey and water surface elevation data, aerial photography, field observations, and the professional judgement of our hydraulic engineering consultant. In addition, the figures are based on mean daily mainstem discharge as measured at the USGS Gold Creek gaging station rather than site specific discharge measurements. Because of this, some error may be associated with the figures, however, the error is believed to be small mounting to approximately 15% as such, the figures presented represent our best estimate of breaching and controlling discharges for the studied sites.

5.0 CONTRIBUTORS

PROJECT LEADER

Aquatic Habitat and Instream Flow
Project Leader

Christopher Estes

PRIMARY AUTHORS

Tim Quane
Isaac Queral
Tommy Withrow

REPORT COORDINATORS

Christopher Estes
Douglas Vincent-Lang
Tim Quane
Camille Stephens

EDITORS

Christopher Estes
Douglas Vincent-Lang

DATA PROCESSING

Allen Bingham
Camille Stephens

DATA COLLECTION

Pat Morrow
Isaac Queral
Tommy Withrow
Jody Miller
Chris Kent

DRAFTING

Sally Donovan

TYPING

Skeers Word
Processing

6.0 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.

7.0 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.

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

8.0 APPENDICES

APPENDIX A

LIST OF APPENDIX A TABLES

<u>Table</u>	<u>Page</u>
2-A-1 Data used in developing the streambed (thalweg) profile of Mainstem II, Northwest Channel (left), 1983.....	2-A-1
2-A-2 Data used in developing the streambed (thalweg) profile of Mainstem II, Northeast Channel (right), 1983.....	2-A-2
2-A-3 Data used in developing the streambed (thalweg) profile of Side Channel 10, 1983.....	2-A-7
2-A-4 Data used in developing the streambed (thalweg) profile of Upper Side Channel 11, 1983.....	2-A-10
2-A-5 Data used in developing the streambed (thalweg) profile of Whiskers Creek Side Slough, 1983.....	2-A-12
2-A-6 Data used in developing the streambed (thalweg) profile of Side Slough 9A, 1983.....	2-A-14
2-A-7 Data used in developing the streambed (thalweg) profile of Side Slough 16/16B, 1983.....	2-A-17
2-A-8 Data used in developing the streambed (thalweg) profile of Side Slough 20, 1983.....	2-A-21
2-A-9 Data used in developing the streambed (thalweg) profile of Side Slough 22, 1983.....	2-A-25
2-A-10 Data used in developing the streambed (thalweg) profile of Upland Slough 6A, 1983.....	2-A-29
2-A-11 Data used in developing the streambed (thalweg) profile of Side Slough 10, Left Channel, 1983.....	2-A-33
2-A-12 Data used in developing the streambed (thalweg) profile of Side Slough 10, Right Channel, 1983.....	2-A-36
2-A-13 Data used in developing the streambed (thalweg) profile of Upland Slough 19, 1983.....	2-A-39

Appendix Table 2-A-1. Data used in developing the streambed (thalweg) profile of Mainstem II, Northwest (Left) Channel, 1983.

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

3/5/84, 3/29/84, 4/20/84, 5/3/84
ACT/Thalweg Tables

Appendix Table 2-A-2. Data used in developing the streambed (thalweg) profile of Mainstem II, Northeast (Right) Channel, 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1	60	0 + 00	474.21	2.01	476.22	RUCO	Same as 16 + 13 on left channel survey, mouth of right channel
2	12	0 + 60	475.63	0.57	476.20	LGCO	
3	28	0 + 72	475.94	0.27	476.18	LGCO	
4	35	1 + 00	475.13	0.97	476.10	LGCO	
5	78	1 + 35	474.09	2.00	476.09	LGCO	
6	43	2 + 13	473.29	2.85	476.14	LGCO	
7	18	2 + 56	473.85	2.30	476.15	LGCO	
8	18	2 + 74	473.41	2.75	476.16	COLG	
9	16	2 + 92	475.77	0.40	476.17	COLG	
10	32	3 + 08	476.63	0.15	476.78	COLG	
11	111	3 + 40	477.20	0.15	477.35	COLG	
12	54	4 + 51	477.65	0.10	477.75	COLG	
13	39	5 + 05	477.17	0.60	477.77	COLG	
14	60	5 + 44	477.46	0.30	477.76	COLG	
15	67	6 + 04	476.82	0.95	477.77	COLG	

Appendix Table 2-A-2 Continued.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16	106	6 + 71	177.32	0.40	477.22	COLG	
17	117	7 + 77	477.35	0.40	477.75	COLG	
18	36	8 + 94	477.38	0.45	477.83	COLG	
19	87	9 + 30	477.24	0.52	477.76	COLG	
20	95	10 + 17	475.87	1.90	477.77	COLG	
21	12	11 + 12	476.32	1.40	477.72	LG	
22	9	11 + 24	476.77	1.00	477.77	LG	
23	34	11 + 33	477.35	0.42	477.70	LG	
24	68	11 + 67	477.72	0.05	477.77	LG	
25	162	12 + 35	476.69	0.95	477.64	COLG	
26	86	13 + 97	475.44	2.20	477.64	SASG	
27	112	14 + 83	474.48	3.20	477.68	SACO	
28	177	15 + 95	475.05	2.65	477.70	LGSG	
29	77	17 + 77	478.77	0.00	478.77	COLG	
30	170	18 + 49	478.30	0.10	478.40	COLG	

2-A-3

Appendix Table 2-A-2 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
31	71	20 + 19	477.62	0.80	478.42	COLG	
32	15	20 + 20	477.92	0.50	478.42	COLG	
33	13	21 + 05	478.38	0.20	478.58	COLG	
34	52	21 + 18	478.29	0.29	478.58	COLG	
35	63	21 + 70	478.65	0.10	478.75	COLG	
36	74	22 + 33	479.55	0.10	479.65	COLG	
37	13	23 + 07	479.67	0.10	479.77	COLG	
38	83	23 + 20	479.62	0.15	479.77	BOCO	
39	132	24 + 03	479.28	0.50	479.78	BOCO	
40	59	25 + 35	478.47	1.32	479.79	BOCO	
41	47	25 + 94	478.81	1.00	479.81	BOCO	
42	42	26 + 41	479.40	1.40	479.80	BOCO	
43	140	26 + 83	478.84	0.95	479.79	BOCO	
44	98	28 + 23	479.33	0.40	479.73	BOCO	
45	135	29 + 21	479.21	0.00	479.71	BOCO	
46	63	30 + 56	480.25	0.00	480.25	BOCO	

Appendix Table 2-A-2 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
47	16	31 + 19	480.51	0.00	480.51	BOCO	
48	11	31 + 35	480.68	0.00	480.68	BOCO	
49	58	31 + 46	480.14	0.40	480.54	BOCO	
50	26	32 + 04	480.05	0.41	480.46	BOCO	
51	24	32 + 30	479.83	0.64	480.47	BOCO	
52	53	32 + 54	481.54	0.00	481.54	BOCO	
53	114	33 + 07	481.00	0.00	481.00	BOCO	
54	305	34 + 21	481.12	0.00	481.12	BOCO	
55	161	37 + 36	482.71	0.00	482.71	BOCO	
56	141	38 + 87	482.59	0.00	482.59	BOCO	
57	57	40 + 28	482.77	0.00	482.77	BOCO	
58	41	40 + 85	482.65	0.00	482.65	BOCO	
59	27	41 + 26	482.55	0.10	482.65	BOCO	
60	41	41 + 53	482.42	0.25	482.67	BOCO	
61	19	41 + 94	482.55	0.12	482.67	BOCO	

Appendix Table 2-A-2 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
62	14 6 142	42 + 13	481.80	0.89	482.69	BOCO	
63		42 + 27	482.61	0.00	482.61	BOCO	
64		42 + 33	483.84	0.00	483.84	BOCO	
65		43 + 75	484.55	0.00	484.55	BOCO	

Appendix Table 2-A-2 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
62	14	42 + 13	481.80	0.89	482.69	BOCO	
63	6	42 + 27	482.61	0.00	482.61	BOCO	
64	142	42 + 33	483.84	0.00	483.84	BOCO	
65		43 + 75	484.55	0.00	484.55	BOCO	

Appendix Table 2-A-3. Data used in developing the streambed (thalweg) profile of Side Channel 10, 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1		0 + 00	647.67	2.18	649.85	C0	= 3 + 79 on left fork thalweg
	183						
2		1 + 83	650.67	0.51	651.18	SILT	Pool at mouth
	185						
3		3 + 68	650.69	0.51	651.20		
	64						
4		4 + 32	650.57	0.63	651.20		Backwater pool
	115						
5		5 + 47	649.85	1.36	651.21		
	85						
6		6 + 32	650.32	0.90	651.22	C0	
	197						
7		8 + 29	650.42	0.83	651.25		Bottom riffle
	81						
8		9 + 10	651.04	0.28	651.32		Bottom next riffle
	18						
9		9 + 28	651.33	0.31	651.64		Top of riffle
	52						
10		9 + 80	652.02	0.22	652.24		Top of riffle
	154						
11		11 + 34	652.05	0.36	652.41		Bottom of riffle
	52						
12		11 + 86	652.46	0.36	652.82		Top riffle
	73						
13		12 + 59	651.19	1.66	652.85		
	35						
14		12 + 94	650.72	2.12	652.84		Bottom pool
	35						
15		13 + 29	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
16		13 + 57	652.67	0.45	653.12		Top of riffle
	32						
17		13 + 89	648.94	4.22	653.16		Bottom of pool
	38						
18		14 + 27	652.26	0.93	653.19		Bottom of riffle
	10						
19		14 + 37	653.11	0.30	653.41		Top riffle
	74						
20		15 + 11	651.81	1.68	653.49		Pool
	46						
21		15 + 57	651.85	1.63	653.48		Pool
	21						
22		15 + 78	652.85	0.65	653.50		Pool
	40						
23		16 + 18	651.13	2.39	653.52		Pool
	62						
24		16 + 80	653.16	0.35	653.51		Bottom of riffle
	27						
25		17 + 07	654.24	0.25	654.49		Top of riffle/TR4
	131						
26		18 + 38	654.06	0.54	654.60		Pool
	52						
27		18 + 90	653.35	1.24	654.59		Pool
	52						
28		19 + 42	652.91	1.65	654.56		FHU TR5
	32						
29		19 + 74	652.77	1.79	654.56		Pool
	94						
30		20 + 68	654.11	0.43	654.54		Bottom of log jam
	5						

Appendix Table 2-A-3 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
31	20	20 + 73	654.53	0.58	655.11		Top of log jam/bottom of riffle
32	13	20 + 93	655.28	0.40	655.68		Top of riffle
33	58	21 + 06	655.30	0.40	655.70		Pool lower
34	56	21 + 64	654.86	0.85	655.71		Pool mid
35	40	22 + 20	655.24	0.47	655.71		Pool/riffle
36	24	22 + 60	655.80	0.46	656.26		Riffle/pool
37	24	22 + 84	655.94	0.35	676.29		Pool bottom
38		23 + 08	656.62	0.09	656.71		Head-barely breached

Appendix Table 2-A-4. Data used in developing the streambed (thalweg) profile of Upper Side Channel 11, 1983.

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

Appendix Table 2-A-4. Data used in developing the streambed (thalweg) profile of Upper Side Channel 11, 1983.

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

Appendix Table 2-A-4 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
16		10 + 12	680.50	0.65	681.15	COB0	Top of riffle
	157						
17		11 + 43	680.08	1.30	681.38	COB0	Top of riffle
	131						
18		12 + 08	679.42	1.95	681.37	COB0	Top of pool
	65						
19		13 + 73	680.56	1.35	681.91	COB0	Mid riffle
	165						
20		14 + 30	681.73	1.18	682.92	COB0	Riffle
	57						
21		15 + 41	681.91	1.38	683.29	COB0	Riffle
	111						
22		16 + 84	682.55	1.32	683.87	COB0	Riffle
	143						
23		17 + 77	682.71	1.35	684.06	COB0	Riffle
	93						
24		19 + 24	682.22	1.50	683.72	COB0	Riffle
	147						
25		19 + 95	683.91	1.25	685.16	COB0	Riffle
	71						
26		20 + 80	684.45	1.11	685.56	COB0	Top of riffle
	85						
27		21 + 69	684.04	1.66	685.70	LGB0	Mid pool at head
	89						
28		22 + 32	684.31	1.42	685.73	SISA	
	63						

2-A-11

Appendix Table 2-A-5. Data used in developing the streambed (thalweg) profile of Whiskers Side Slough, 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
	152						Pool lower 1/3
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 esti- mated - top of ice surveyed
	366						
15		21 + 45	365.47	0.32	365.79	RUCO	Pool/riffle
	106						

2-A-12

Appendix Table 2-A-5 Continued.

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

2-A-12

3/5/84, 3/29/84, 4/20/84, 5/3/84
ACT/Thalweg Tables

Appendix Table 2-A-6. Data used in developing 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-6 Continued.

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

Appendix Table 2-A-6 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-7. Data used in developing the streambed (thalweg) profile of Upland Slough 10 Left Channel, 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1	134	-3 + 29	644.26	5.40	649.66	SIB0	Mainstem
2	195	-1 + 95	645.63	4.16	649.79	SIB0	Mainstem
3	84	0 + 00	645.29	4.57	649.86	SIB0	Mouth at Gage 133.8 W5A, Pool - backwater
4	96	0 + 84	645.10	4.67	649.77	SIB0	Pool - backwater
5	53	1 + 80	647.20	2.66	649.86	SIB0	Pool - backwater
6	23	2 + 33	647.63	2.15	649.78	SIB0	Pool - backwater
7	26	2 + 56	647.34	2.49	649.83	SIB0	Pool - backwater
8	22	2 + 82	647.55	2.28	649.83	SIB0	Pool - backwater
9	9	3 + 04	647.06	2.76	649.82	SIB0	Pool - backwater
10	11	3 + 13	647.40	2.44	649.84	SISA	Pool - backwater
11	14	3 + 24	647.98	1.82	649.80	SISA	Pool - backwater
12	41	3 + 38	649.07	0.77	649.84	C0	Riffle
13	12	3 + 79	647.67	2.18	649.85	C0	Pool - backwater, sidechannel junction
14	26	3 + 91	646.98	2.83	649.81	C0	Pool/backwater/deep hole

2-A-17

Appendix Table 2-A-7 Continued.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
15	71	4 + 17	649.08	0.78	649.86	CO	Bottom of run/backwater
16	55	4 + 88	648.73	1.20	649.93	CO	Top of run/backwater
17	48	5 + 43	648.42	1.50	649.92	CO	Pool/backwater
18	45	5 + 91	647.97	1.96	649.93	SISA	Pool/backwater
19	70	6 + 36	648.15	1.77	649.92	SISA	Pool/backwater
20	36	7 + 06	648.80	1.10	649.90	SISA	Pool/backwater
21	54	7 + 42	648.25	1.68	649.93	SISA	Pool/backwater
22	18	7 + 96	647.74	2.20	649.94	SISA	Pool/backwater end of log right fork of Slough 10 starts here
23	36	8 + 24	647.54	2.48	650.02	SISA	Pool
24	19	8 + 50	647.75	2.27	650.02	SISA	Deephole - pool
25	41	8 + 69	649.00	1.02	650.02	SISA	Pool
26	20	9 + 10	648.64	1.39	650.03	SISA	Pool
27	55	9 + 30	648.89	1.14	650.03	SARU	Pool

2-A-18

Appendix Table 2-A-7 Continued.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
28		9 + 85	648.64	1.38	650.02	SABO	Pool
	48						
29		10 + 33	648.85	1.17	650.02	SABO	Pool
	94						
30		11 + 27	647.72	2.30	650.02	SABO	Pool
	43						
31		11 + 70	648.15	1.86	650.01	SACO	Pool
	3						
32		11 + 73	647.95	2.06	650.01	SACO	Pool
	37						
33		12 + 10	648.31	1.71	650.02	SACO	Pool
	37						
34		12 + 47	648.46	1.57	650.03	SACO	Pool
	49						
35		12 + 96	647.78	2.22	650.00	SI	Pool
	50						
36		13 + 46	648.01	2.00	650.00	SI	Pool
	61						
37		14 + 07	648.07	1.93	650.00	SICO	Pool
	64						
38		14 + 71	648.20	1.80	650.00	SILG	Pool
	20						
39		14 + 91	647.87	2.13	650.00	SILG	Pool (mainstem backwater from this point to the mouth
	80						Bottom riffle
40		15 + 71	649.00	1.07	650.07	BOCO	
	66						
41		16 + 37	649.65	1.16	650.81	SICO	End of pool/top of riffle
	81						
42		17 + 18	649.24	1.58	650.82	SICO	Mid pool
	71						

Appendix Table 2-A-7 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
43		17 + 89	649.75	1.08	650.83	COBO	Bottom of riffle/top of pool
	6						
44		17 + 95	650.39	0.65	651.04	COBO	End of pool/top of riffle
	52						
45		18 + 47	649.33	1.72	651.05	SICO	Pool
	32						
46		18 + 79	650.61	0.46	651.07	COLG	Bottom riffle
	32						
47		19 + 11	650.86	0.56	651.42	COLG	R&M Q Station

Appendix Table 2-A-8. Data used in developing the streambed (thalweg) profile of Upland Slough 10 Right Channel, 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1	8	0 + 00	647.74	2.20	649.94	SISA	Point = 7 + 96 on slough left channel thalweg, pool/backwater, end of log
2	18	0 + 08	648.22	1.72	649.94	SI	
3	24	0 + 26	648.58	1.36	649.94	SIB0	
4	49	0 + 50	648.74	1.20	649.94	SIB0	
5	20	0 + 99	648.73	1.20	694.93	SIB0	
6	15	1 + 19	648.66	1.27	649.93	SIB0	Numerous decaying logs
7	13	1 + 34	648.89	1.04	649.93	SIB0	
8	21	1 + 47	649.05	0.88	649.93	SIB0	
9	36	1 + 68	649.16	0.89	649.94	SIB0	
10	10	2 + 04	648.75	0.78	649.94	SIB0	
11	21	2 + 14	648.91	1.19	649.94	SIB0	
12	24	2 + 35	649.14	1.04	649.95	SIB0	
13	19	2 + 59	649.14	0.82	649.96	SIB0	
14	22	2 + 78	649.38	0.58	649.96	SIB0	
15	22	3 + 00	649.34	0.64	649.98	SIB0	

2-A-21

Appendix Table 2-A-8 Continued.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16		3 + 22	649.79	0.38	650.17	SIB0	
	23						
17		3 + 45	649.79	0.42	650.21	SIB0	
	18						
18		3 + 63	649.43	0.80	650.23	SIB0	
	14						
19		3 + 77	649.84	0.39	650.23	SIB0	
	11						
20		3 + 88	649.61	0.66	650.27	SIB0	
	30						
21		4 + 18	649.60	0.72	650.32	SIB0	
	30						
22		4 + 48	649.88	0.55	650.43	SIB0	
	17						
23		4 + 65	650.00	0.46	650.46	SIB0	30 fry in pool near log across slough
	24						
24		4 + 89	650.00	0.53	650.53	SIB0	
	12						
25		5 + 01	650.27	0.35	650.62	SIB0	
	42						
26		5 + 43	650.35	0.47	650.82	SIB0	
	42						
27		5 + 85	650.86	0.22	651.08	SIB0	
	34						
28		6 + 19	650.96	0.24	651.20	SIB0	
	16						
29		6 + 35	650.91	0.30	651.21	SIB0	
	23						
30		6 + 58	650.53	0.72	651.25	SIB0	
	27						

Appendix Table 2-A-8 Continued.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
31		6 + 85	650.44	0.82	651.26	SIBO	
	28						
32		7 + 13	650.37	0.89	651.26	SIBO	
	23						
33		7 + 36	650.66	0.64	651.30	SIBO	
	24						
34		7 + 60	650.49	0.85	651.34	SIBO	
	26						
35		7 + 86	650.45	0.89	651.34	SIBO	
	22						
36		8 + 08	650.58	0.75	651.33	SIBO	
	28						
37		8 + 36	650.23	1.10	651.33	SIBO	
	25						
38		8 + 61	650.87	0.48	651.35	SIBO	
	14						
39		8 + 75	651.02	0.33	651.35	SIBO	
	23						
40		8 + 98	650.82	0.56	651.38	SIBO	Bank seepage - bear kill chum salmon
	19						
41		9 + 17	650.48	0.90	651.38	SIBO	
	18						
42		9 + 35	650.08	1.32	651.40	SIBO	
	14						
43		9 + 49	650.71	0.70	651.41	SIBO	
	18						
44		9 + 67	649.99	1.41	651.40	SIBO	
	23						
45		9 + 90	650.60	0.80	651.40	SIBO	
	15						

2-A-72

Appendix Table 2-A-8 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
46	12	10 + 05	650.99	0.40	651.39	SIB0	
47	12	10 + 17	650.77	0.60	651.37	SIB0	
48		10 + 29	651.99			SIB0	Elevation of nail placed on log as TBM

Appendix Table 2-A-9. Data used in developing the streambed profile (thalweg) of Side Slough 16/16B, 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
	27						Head 16

2-A-25

Appendix Table 2-A-9 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						

2-A-26

Appendix Table 2-A-9 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 pool
	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						

2-A-27

Appendix Table 2-A-9 Continued.

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

Appendix Table 2-A-10 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
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
	30						Head of pool
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

2-A-29

Appendix Table 2-A-10 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
32	107	17 + 27	726.15	1.46	727.61	SICO	High point in pool
33	105	18 + 34	725.69	1.92	727.61	SICO	Low point in pool
34	94	19 + 39	725.81	1.80	727.61	SICO	Low point in pool
35	25	20 + 33	725.18	2.45	727.63	RUCO	Riffle/pool
36	176	20 + 58	726.76	0.27	728.03	LGRU	Run/riffle
37	123	22 + 34	728.10	0.06	728.26	SALG	High point in run
38	39	23 + 57	727.90	0.45	728.35	LGRU	Low point in run
39	22	23 + 96	728.21	0.17	728.38	LGC0	High point in run
40	25	24 + 18	727.87	0.57	728.44	LGC0	Low point in run
41	21	24 + 43	728.09	0.39	728.48	RULG	Riffle/run
42	55	24 + 64	728.68	0.29	728.97	RULG	Run/riffle
43	108	25 + 19	728.47	0.59	729.06	CORU	Low point in run
44	81	26 + 27	728.96	0.42	729.38	COLG	Pool/run
45	21	27 + 08	728.50	0.91	729.41	LGC0	Low point in pool
46	10	27 + 29	729.16	0.26	729.42	SGLG	Riffle/pool
47	17	27 + 39	729.69	0.19	729.88	LGRU	Pool/riffle

Appendix Table 2-A-10. Data used in developing the streambed (thalweg) profile of Side Slough 20, 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-10 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-11. Data used in developing the streambed (thalweg) profile of Side Slough 22, 1983.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
1	0	0 + 00	777.79	1.4	779.19	C0	Mainstem
2	40	0 + 40	778.91	0.30	779.21	BOC0	Riffle/backwater
3	141	1 + 81	779.57	0.65	780.22	COB0	Run/riffle
4	162	3 + 43	779.52	0.77	780.29	COB0	Pool/run
5	346	6 + 89	776.25	4.08	780.33	SI	Low point in pool
6	116	8 + 05	777.74	2.57	780.31	SIC0	High point in pool
7	16	8 + 21	777.56	2.75	780.31	SI	Low point in pool
8	40	8 + 61	778.88	1.40	780.28	SI	Mid-point
9	156	10 + 17	779.24	1.06	780.30	SIC0	Low point in pool
10	41	10 + 58	779.95	0.34	780.29	SI	Run/pool
11	55	11 + 13	779.75	0.60	780.35	COSI	Riffle/run
12	13	11 + 26	780.06	0.35	780.41	COB0	Staff gage 144.3 S4C
13	13	11 + 39	780.11	0.39	780.50	COB0	Pool/riffle
14	251	13 + 90	777.29	3.23	780.52	SIC0	Low point in pool
15	21	14 + 11	778.12	2.41	780.53	SAC0	Channels converge
	34						

Appendix Table 2-A-11 Continued.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
16	40	14 + 45	780.32	0.20	780.52	SALG	Riffle/pool
17	88	14 + 85	780.64	0.27	780.91	SGRU	Gradient change
18	95	15 + 73	782.33	0.12	782.45	BOLG	Bend
19	254	16 + 68	782.49	0.33	782.82	COLG	Riffle divides
20	143	19 + 22	782.42	0.66	783.08	COBO	Pool/riffle
21	7	20 + 65	781.25	1.85	783.10	RUCO	Low point in pool
22	34	20 + 72	781.73	1.37	783.10	COBO	
23	9	21 + 06	782.62	0.48	783.10	CORU	Riffle/pool
24	107	21 + 15	782.73	0.43	783.16	CORU	Staff gage
25	40	22 + 22	783.41	0.30	783.71	RUBO	Spring fed fork of slough enters
26	3	22 + 62	784.66	0.00	784.66	BORU	High point, dewatered
27	10	22 + 65	784.28	0.00	784.28	BORU	Low point, dewatered
28	52	22 + 75	784.47	0.00	784.47	CORU	Bend, dewatered
29	63	23 + 27	784.55	0.00	784.55	CORU	Low point, dewatered
30		23 + 90	786.02	0.00	786.02	CORU	High point, dewatered

2-A-34

Appendix Table 2-A-11 Continued.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
31		24 + 45	785.84	0.00	785.84	CORU	High point, dewatered
	29						
32		24 + 74	785.66	0.00	785.67	BORU	Low point in pool, dewatered
	43						
33		25 + 17	787.17	0.00	787.17	CORU	Bend, dewatered
	109						
34		26 + 26	787.91	0.00	787.91	CORU	High point, dewatered
	121						
35		27 + 47	786.06	0.87	786.93	COB0	Low point in pool
	19						
36		27 + 66	787.00	0.00	787.00	COB0	High point, dewatered
	29						
37		27 + 95	786.45	0.42	786.87	SIB0	Low point in pool
	30						
38		28 + 25	786.17	0.00	786.17	SIC0	High point, dewatered
	22						
39		28 + 47	785.96	0.95	786.91	SIB0	Low point in pool
	32						
40		28 + 79	787.45	0.00	787.45	CORU	High point
	32						
41		29 + 11	787.00	0.00	787.00	SA	Mainstem LWL
	9						
42		29 + 20	786.08	0.96	787.04	COSA	Mainstem

2-A-35

Appendix Table 2-A-12. Data used in developing the streambed (thalweg) profile of Upland Slough 6A, 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	454.20	1.66	455.86	SI	RJ-TR9

2-A-36

Appendix Table 2-A-12 Continued.

Point	Distance (ft)	Station (ft)	Thalweg Elevation (ft)	Depth (ft)	WSEL (ft)	Substrate	Comments
11	95	12 + 08	454.13	1.86	455.99	SI	RJ-TR9
12	7	13 + 03	456.07	0.39	456.45	SI	Left fork bottom of dam
13		13 + 10	458.64	0.00	458.64	LOGS	Left fork - top of dam
11A	17	12 + 08	454.13	1.86	455.99	SI	RJ-TR9
12A	17	12 + 25	454.36	1.53	455.89	SI	Mouth of right fork
13A	18	12 + 42	455.25	0.74	455.99	LGSG	Top of gravel bar downstream of dam
14A	7	12 + 60	454.64	1.50	456.10	SI	Right fork - bottom of dam
15A		12 + 67	458.72	0.00	458.72	LOGS	Right fork - top of dam

2-A-37

Appendix Table 2-A-12 Continued.

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
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-13. Data used in developing the streambed (thalweg) profile of Upland Slough 19, 1983

<u>Point</u>	<u>Distance (ft)</u>	<u>Station (ft)</u>	<u>Thalweg Elevation (ft)</u>	<u>Depth (ft)</u>	<u>WSEL (ft)</u>	<u>Substrate</u>	<u>Comments</u>
1	79	0 + 00	718.79	0.39	719.18	SISA	Mouth of slough
2	100	0 + 79	718.77	0.46	719.23	SISA	
3	105	1 + 79	718.58	0.68	719.26	SISA	
4	127	2 + 84	718.81	0.71	719.52	SISA	
5	216	4 + 11	719.58	0.57	720.15	LGRU	
6	103	6 + 27	720.32	0.51	720.83	LGRU	
7	141	7 + 30	721.15	0.12	721.27	COB0	
8	61	8 + 71	722.01	0.00	722.01	COB0	Dewatered
9	55	9 + 32	721.88	0.14	722.02	COB0	
10		9 + 87	721.95	0.03	721.98	COB0	

2-A-39

LIST OF APPENDIX B TABLES

<u>Table</u>	<u>Page</u>
2-B-1 Cross sectional elevations obtained at Mainstem II Side channel mouth, staff gage 114.4W6. Surveyed by ADF&G on September 22, 1983.....	2-B-1
2-B-2 Cross sectional elevations obtained at Mainstem II Side channel (lower backwater), staff gage 114.4S9. Surveyed by ADF&G on September 22, 1983.....	2-B-3
2-B-3 Cross sectional elevations obtained at Mainstem II Side channel (upper backwater), staff gage 114.4S7. Surveyed by ADF&G on September 22, 1983.....	2-B-5
2-B-4 Cross sectional elevations obtained at Mainstem II Side Channel (northwest channel Q site), staff gage 114.4S5. Surveyed by ADF&G on August 6, 1983.....	2-B-7
2-B-5 Cross sectional elevations obtained at Mainstem II (northwest channel head), staff gage 114.4H3. Surveyed by ADF&G on September 24, 1983.....	2-B-9
2-B-6 Cross sectional elevations obtained at Mainstem II Side Channel (northwest channel Q site), staff gage 114.4S8. Surveyed by ADF&G on July 4, 1983.....	2-B-11
2-B-7 Cross sectional elevations obtained at Mainstem II Side Channel (northwest channel head), staff gage 114.4H1. Surveyed by ADF&G on September 23, 1983	2-B-12
2-B-8 Cross sectional elevations obtained at Side Channel 10 mouth, staff gage 133.8W5. Surveyed by ADF&G on July 17, 1983	2-B-13
2-B-9 Cross sectional elevations obtained at Side Channel 10 head, staff gage 133.8H4. Surveyed by ADF&G on September 11, 1983	2-B-14
2-B-10 Cross sectional elevations obtained at Upper Side Channel 11 mouth, staff gage 136.2W3. Surveyed by ADF&G on July 20, 1983	2-B-15
2-B-11 Cross sectional elevations obtained at Upper Side Channel 11 (Q site), staff gage 136.2S1. Surveyed by ADF&G on May 18, 1983	2-B-16

2-B-12	Cross sectional elevations obtained at Upper Side Channel 11 head, staff gage 136.2H2. Surveyed by ADF&G on July 18, 1983	2-B-17
2-B-13	Cross sectional elevations obtained at Side Channel 21 mouth, staff gage 140.6W1. Surveyed by ADF&G on September 12, 1983	2-B-18
2-B-14	Cross sectional elevations obtained at Side Channel 21 (lower Q site), staff gage 140.6S4. Surveyed by ADF&G on September 12, 1983	2-B-19
2-B-15	Cross sectional elevations obtained at Side Channel 21 (mid channel), staff gage 140.6S2. Surveyed by ADF&G on September 12, 1983	2-B-20
2-B-16	Cross sectional elevations obtained at Side Channel 21 (A5 Head), staff gage 140.6S3. Surveyed by R&M in 1982.....	2-B-21
2-B-17	Cross sectional elevations obtained at Side Channel 21 (upper Q site), staff gage 140.6S7. Surveyed by ADF&G on September 13, 1983	2-B-22
2-B-18	Cross sectional elevations obtained at Side Channel 21 (A6 head), staff gage 140.6H5. Surveyed by R&M in 1982.....	2-B-23
2-B-19	Cross sectional elevations obtained at Whiskers Side Slough mouth, staff gage 101.2W1. Surveyed by ADF&G on September 11, 1983.....	2-B-25
2-B-20	Cross sectional elevations obtained at Whiskers Side Slough (Q site), staff gage 101.2S3. Surveyed by ADF&G on July 3, 1983.....	2-B-26
2-B-21	Cross sectional elevations obtained at Whiskers Side Slough head, staff gage 101.2H5. Surveyed by ADF&G on July 3, 1983.....	2-B-27
2-B-22	Cross sectional elevations obtained at Side Slough 8 (below mouth), staff gage 113.6W8. Surveyed by ADF&G on September 12, 1983.....	2-B-28
2-B-23	Cross sectional elevations obtained at Side Slough 8 mouth, staff gage 113.6W8. Surveyed by ADF&G on July 5, 1983.....	2-B-29
2-B-24	Cross sectional elevations obtained at Side Slough 8 (Q site), staff gage 113.6S2. Surveyed by ADF&G on July 5, 1983.....	2-B-30

2-B-25	Cross sectional elevations obtained at Side Slough 8 head, staff gage 113.6H4. Surveyed by ADF&G on July 5, 1983.....	2-B-31
2-B-26	Cross sectional elevations obtained at Side Slough 8A mouth, staff gage 125.3W5. Surveyed by ADF&G on October 19, 1983.....	2-B-32
2-B-27	Cross sectional elevations obtained at Side Slough 8A (upper backwater), staff gage 125.3S6. Surveyed by ADF&G on July 18, 1983.....	2-B-33
2-B-28	Cross sectional elevations obtained at Side Slough 8A (lower Q site), staff gage 125.3S4. Surveyed by ADF&G on July 18, 1983.....	2-B-34
2-B-29	Cross sectional elevations obtained at Side Slough 8A (northwest channel Q site), staff gage 125.3S3. Surveyed by ADF&G on July 18, 1983.....	2-B-36
2-B-30	Cross sectional elevations obtained at Side Slough 8A (northwest channel head), staff gage 125.3H2. Surveyed by ADF&G on May 15, 1983.....	2-B-37
2-B-31	Cross sectional elevations obtained at Side Slough 8A (northwest channel head), staff gage 125.3H7. Surveyed by ADF&G on August 4, 1983.....	2-B-38
2-B-32	Cross sectional elevations obtained at Side Slough 9 mouth, staff gage 128.3W3. Surveyed by ADF&G on September 14, 1983.....	2-B-40
2-B-33	Cross sectional elevations obtained at Side Slough 9 (Q site), staff gage 128.3S1. Surveyed by ADF&G on August 3, 1983.....	2-B-41
2-B-34	Cross sectional elevations obtained at Side Slough 9 head, staff gage 128.3H3. Surveyed by ADF&G on August 23, 1983.....	2-B-42
2-B-35	Cross sectional elevations obtained at Side Slough 11 mouth, staff gage 135.3W1. Surveyed by ADF&G on October 19, 1983.....	2-B-44
2-B-36	Cross sectional elevations obtained at Side Slough 11 (Q site), staff gage 135.3S6. Surveyed by ADF&G on June 29, 1983.....	2-B-45
2-B-37	Cross sectional elevations obtained at Side Slough 11 head, staff gage 135.3H3. Surveyed by R&M in 1982	2-B-46

2-B-38	Cross sectional elevations obtained at Side Slough 16B (Q site), staff gage 138.0S5. Surveyed by R&M in 1982	2-B-48
2-B-39	Cross sectional elevations obtained at Side Slough 16B head, staff gage 138.0H3. Surveyed by R&M in 1982	2-B-49
2-B-40	Cross sectional elevations obtained at Side Slough 20 mouth, staff gage 140.1W4. Surveyed by R&M in 1982	2-B-50
2-B-41	Cross sectional elevations obtained at Side Slough 20 (Q site), staff gage 140.1S5. Surveyed by R&M in 1982	2-B-51
2-B-42	Cross sectional elevations obtained at Side Slough 20 head, staff gage 140.1H3. Surveyed by R&M in 1982	2-B-52
2-B-43	Cross sectional elevations obtained at Side Slough 21 mouth, staff gage 142.0W5. Surveyed by ADF&G on May 17, 1983.....	2-B-53
2-B-44	Cross sectional elevations obtained at Side Slough 21 (Q site), staff gage 142.0S6. Surveyed by ADF&G on May 17, 1983.....	2-B-54
2-B-45	Cross sectional elevations obtained at Side Slough 21 head, staff gage 142.0H3. Surveyed by R&M in 1982.....	2-B-55
2-B-46	Cross sectional elevations obtained at Side Slough 22 mouth, staff gage 144.3W3. Surveyed by ADF&G on September 15, 1983.....	2-B-57
2-B-47	Cross sectional elevations obtained at Side Slough 22 (mid Slough) staff gage 144.3S4. Surveyed by R&M in 1982.....	2-B-59
2-B-48	Cross sectional elevations obtained at Side Slough 22 (Q site) staff gage 144.3S6. Surveyed by R&M in 1982.....	2-B-60
2-B-49	Cross sectional elevations obtained at Side Slough 22 head, staff gage 144.3H2. Surveyed by ADF&G on September 15, 1983.....	2-B-61
2-B-50	Cross sectional elevations obtained at Upland Slough 6A mouth, staff gage 112.3W1. Surveyed by ADF&G on July 5, 1983.....	2-B-62

2-B-51	Cross sectional elevations obtained at Upland Slough 6A backwater, staff gage 112.3S3. Surveyed by ADF&G on September 12, 1983.....	2-B-63
2-B-52	Cross sectional elevations obtained at Upland Slough 19 (access), staff gage 140.0W1. Surveyed by ADF&G on September 14, 1983.....	2-B-64
2-B-53	Cross sectional elevations obtained at Upland Slough 19 (below mouth), staff gage 140.0S3. Surveyed by ADF&G on September 14, 1983.....	2-B-65
2-B-54	Cross sectional elevations obtained at Upland Slough 19 (Q site), staff gage 140.0S4. Surveyed by ADF&G on September 14, 1983.....	2-B-66
2-B-55	Cross sectional elevations obtained at 4th July Creek (Q site), staff gage 131.1T1. Surveyed by ADF&G on July 3, 1983.....	2-B-67
2-B-56	Cross sectional elevations obtained at Gold Creek (Q site), staff gage 136.8T1. Surveyed by ADF&G on May 16, 1983.....	2-B-68
2-B-57	Cross sectional elevations obtained at Indian River (Q site), staff gage 136.8T2. Surveyed by ADF&G 1983 stream flow data.....	2-B-71
2-B-58	Cross sectional elevations obtained at Portage Creek (Q site), staff gage 148.8T1. Surveyed by ADF&G 1983 stream flow data.....	2-B-72

Appendix Table 2-B-1. Cross sectional elevations obtained at Mainstem II 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

Appendix Table 2-B-1. continued.

STATION	ELEVATION	DESCRIPTION
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 obtained at Mainstem II 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
11.5	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

Appendix Table 2-B-2. continued

STATION	ELEVATION	DESCRIPTION
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 obtained at Mainstem II Side Channel (upper backwater), staff gage 114.4S7. Surveyed by ADF&G on September 22, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	484.93	LBHP 114.4S7LE 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

Appendix Table 2-B-3. continued.

STATION	ELEVATION	DESCRIPTION
411.4	483.93	GROUND BY RIGHT BANK
411.4	484.66	114.4S7RB ADF&G REBAR

Appendix Table 2-B-3. continued.

STATION	ELEVATION	DESCRIPTION
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 obtained at Mainstem II 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	

Appendix Table 2-B-4. continued.

STATION	ELEVATION	DESCRIPTION
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 obtained at Mainstem II (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 obtained at Mainstem II 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 obtained at Mainstem II 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 obtained at
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 obtained at
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 obtained at 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 obtained at Upper Side Channel 11 (Q site), staff gage 136.2S1. Surveyed by ADF&G on May 18, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	686.14	LBHP R&M ALCAP 136.5Q3RB 82
28.0	681.36	LEW BOTTOM OF BANK
37.0	680.58	
73.0	680.21	
121.0	681.33	REW
153.0	683.77	
169.0	681.85	
189.0	684.80	BOTTOM OF BANK
201.7	688.63	RBHP R&M ALCAP 136.5Q3LB 82

Appendix Table 2-B-12. Cross sectional elevations obtained at 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-13. Cross sectional elevations obtained at
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-14. Cross sectional elevations obtained at 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-15. Cross sectional elevations obtained at 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-16. Cross sectional elevations obtained at
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-17. Cross sectional elevations obtained at 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-18. Cross sectional elevations obtained at
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	

Appendix Table 2-B-18. continued

STATION	ELEVATION	DESCRIPTION
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-19. Cross sectional elevations obtained at Whiskers 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-20. Cross sectional elevations obtained at Whiskers 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-21. Cross sectional elevations obtained at Whiskers 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-22. Cross sectional elevations obtained at 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-23. Cross sectional elevations obtained at
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	
15.0	466.37	
19.0	465.85	
25.0	467.58	REW
34.0	468.42	
41.0	468.93	
51.0	469.63	
74.4	470.19	
100.0	470.26	EDGE OF VEGETATION
112.0	470.84	

Appendix Table 2-B-24. Cross sectional elevations obtained at
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-25. Cross sectional elevations obtained at
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-26. Cross sectional elevations obtained at
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-27. Cross sectional elevations obtained at 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-28. Cross sectional elevations obtained at 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

Appendix Table 2-B-28. continued.

STATION	ELEVATION	DESCRIPTION
239.0	568.89	GROUND BY ALCAP
239.0	569.28	RBHP 125.3S4 ADF&G ALCAP

Appendix Table 2-B-29. Cross sectional elevations obtained at 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-30. Cross sectional elevations obtained at 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-31. Cross sectional elevations obtained at 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	

Appendix Table 2-B-31. continued.

STATION	ELEVATION	DESCRIPTION
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-32. Cross sectional elevations obtained at
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-33. Cross sectional elevations obtained at 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-34. Cross sectional elevations obtained at
Side Slough 9 head, staff gage 128.3H3.
Surveyed by ADF&G on August 23, 1983.

STATION	ELEVATION	DESCRIPTION
0.0	604.97	ADF&G REBAR LBHP GROUND BY LBHP
0.0	604.50	
15.0	604.77	LWE
25.0	604.45	
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	RWE
175.0	604.63	
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	

Appendix Table 2-B-34. continued.

STATION	ELEVATION	DESCRIPTION
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-35. Cross sectional elevations obtained at
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-36. Cross sectional elevations obtained at
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-37. Cross sectional elevations obtained at
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

Appendix Table 2-B-37. continued.

STATION	ELEVATION	DESCRIPTION
307.0	689.36	RBHP ALCAP 136.5H4LB

Appendix Table 2-B-38. Cross sectional elevations obtained at
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-39. Cross sectional elevations obtained at 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-40. Cross sectional elevations obtained at
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	
30.0	729.48	
		TOP BANK
		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-41. Cross sectional elevations obtained at 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 TOP BANK
4.0	731.70	
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	LBHP R&M ALCAP 140.2S2RB
74.0	728.40	
79.0	729.66	

Appendix Table 2-B-42. Cross sectional elevations obtained at
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	BOTTOM
117.0	730.60	
123.0	730.50	
129.0	730.50	
134.0	731.71	
141.0	737.33	LBHP R&M ALCAP 140.6H3RB

Appendix Table 2-B-43. Cross sectional elevations obtained at
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-44. Cross sectional elevations obtained at 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-45. Cross sectional elevations obtained at
Side Slough 21 head, staff gage 142.0H3.
Surveyed by R&M in 1982.

STATION	ELEVATION	DESCRIPTION
0.0	759.26	LBHP R&M LRX-56 GROUND BY LRX-56
0.0	758.34	
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	
243.0	756.24	
290.0	756.44	
334.0	756.54	
375.0	756.64	
411.0	756.44	
465.0	756.14	
486.0	756.34	
526.0	757.04	
562.0	757.24	
587.0	756.74	
626.0	757.44	
654.0	757.04	
675.0	757.21	

Appendix Table 2-B-45. continued.

STATION	ELEVATION	DESCRIPTION
715.0	756.81	
754.0	757.11	
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 obtained at
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	

Appendix Table 2-B-46. continued.

STATION	ELEVATION	DESCRIPTION
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 obtained at 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 obtained at
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 obtained at
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 COTTONWOOD

Appendix Table 2-A-50. Cross sectional elevations obtained at 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	
42.0	457.23	LEW
56.0	457.35	
69.0	456.77	
71.0	455.96	
83.0	452.16	
88.0	452.54	REW RIGHT HIGH BANK
94.0	453.42	
102.0	456.28	
112.0	457.28	
120.0	458.64	

Appendix Table 2-B-51. Cross sectional elevations obtained at 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 obtained at 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 obtained at 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	LEW
81.0	719.75	
95.0	719.85	
105.0	720.02	
120.0	719.11	
135.0	717.01	THALWEG
142.0	716.80	
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 obtained at 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	GROUND BY ALCAP
71.0	725.22	RBHP ALCAP ADF&G 140.0S4RB 83

Appendix Table 2-B-55. Cross sectional elevations obtained at
4th 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 131.1T3LE
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 obtained at 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. continued.

STATION	ELEVATION	DESCRIPTION
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	
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	

Appendix Table 2-B-57. continued.

STATION	ELEVATION	DESCRIPTION
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-57. Cross sectional elevations obtained at Indian River (Q site), staff gage 138.6T2. Developed from ADF&G 1983 stream flow 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	

Appendix Table 2-B-58. Cross sectional elevations obtained at Portage Creek (Q site), staff gage 148.8T1. Developed from ADF&G 1983 stream flow 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