

**Sucker Lake  
Sockeye Salmon  
Data Report  
2010**

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**The Sucker Lake Project was made possible through an Alaska Sustainable Salmon Fund grant received from the Alaska Department of Fish & Game and the National Oceanic and Atmospheric Administration, and a State of Alaska Designated Legislative Grant.**

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## **DISCLAIMER**

The Cook Inlet Aquaculture Association (CIAA) conducts salmon enhancement and restoration projects in Area H, Cook Inlet and associated waters. As an integral part of these projects a variety of monitoring and evaluation studies are conducted. The following data report is a synopsis of the monitoring and evaluation studies conducted for Sucker Lake. The Sucker Lake Data Report encompasses data collected from the 2010 adult sockeye salmon escapement as it falls under the Alaskan Sustainable Salmon Fund grant.

The purpose of the data report is to provide a vehicle to distribute the information produced by the monitoring and evaluation studies. Data collected each year are presented with a summary of the information previously collected for comparative purposes. These reports are intended to provide a general description of project activity and are not an exhaustive evaluation of any restoration or enhancement project. The information presented in this report has not undergone an extensive review. As reviews are completed, the information may be updated and presented in other reports.

The Sucker Lake Data Report was prepared by CIAA under award of the Alaskan Sustainable Salmon Fund 45888 from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, administered by the Alaska Department of Fish and Game (ADF&G). The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the National Oceanic and Atmospheric Administration, the U.S. Department of Commerce, or ADF&G.

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Our equal employment opportunity philosophy applies to all aspects of employment with CIAA including recruiting, hiring, training, transfer, promotion, job benefits, pay, dismissal, and educational assistance.

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## **ACKNOWLEDGEMENTS**

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## **ABSTRACT**

As part of the continued evaluation of lakes in the Susitna River watershed to determine the sockeye salmon (*Oncorhynchus nerka*) abundance in key salmon producing lakes with and without northern pike (*Esox lucius*), Cook Inlet Aquaculture Association (CIAA) and the Alaska Department of Fish and Game (ADF&G) agreed to monitor adult sockeye salmon returns to Sucker Lake. Sucker Lake was known to have a population of northern pike.

The 2010 Sucker Lake adult escapement monitoring was the first time CIAA enumerated salmon escapement to Sucker Lake. Adult salmon escapement was enumerated daily as fish passed through a weir in the outlet stream below Sucker Lake from 27 July through 25 August except for August 18, 19 and 20 when the weir was unmonitored and open. During the time the weir was monitored, zero adult salmon returned to Sucker Lake.

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## INTRODUCTION AND PURPOSE

To better understand the recent low adult sockeye salmon returns to the Susitna River drainage system, the Cook Inlet Aquaculture Association (CIAA), in cooperation with the Alaska Department of Fish and Game (ADF&G), is assessing sockeye salmon populations at several key salmon producing lakes with and without northern pike (*Esox lucius*) in the Susitna River drainage. The overall objective of this effort is to enumerate the smolt and adult returns and to assess the characteristics of these populations in terms of age composition, sex and size. Additionally, for some lake systems, environmental conditions and water quality measurements are being collected as well as genetic samples, mark-recapture studies and hydroacoustic surveys. The goal is to collect sound biological data to provide the foundation on which decisions for management and rehabilitation strategies can be made. Understanding the adult to juvenile relationship will allow management biologists to analyze and evaluate the production and rearing condition of each lake.

The enumeration of adult salmon returns to Sucker Lake was completed in the second year of a three year effort to enumerate sockeye salmon returns to the Susitna River drainage. Sucker Lake was chosen for enumeration because invasive Northern Pike were known to be present.

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## PROJECT AREA

Sucker Lake (Latitude/Longitude 61° 38 N, 150° 52 W) is located approximately 90 km southwest of Talkeetna, Alaska (Figure 1). The main lake is fed by Upper Sucker Creek and two smaller lakes. The outlet, Lower Sucker Creek, flows southeast to Alexander Creek and the Yentna River. Beaver dams and northern pike are prevalent in this area.

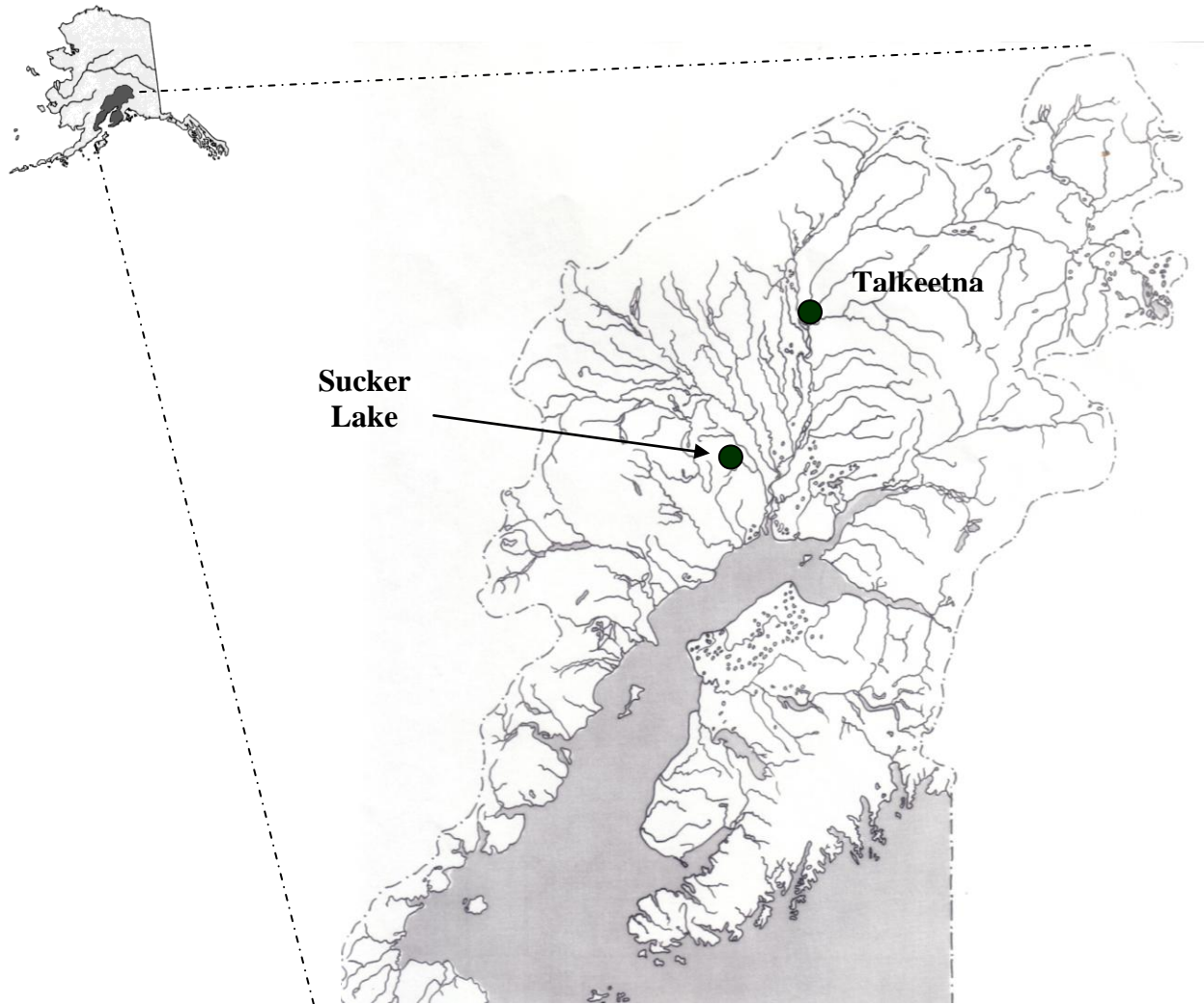


Figure 1 Sucker Lake in Relation to Cook Inlet and Alaska.

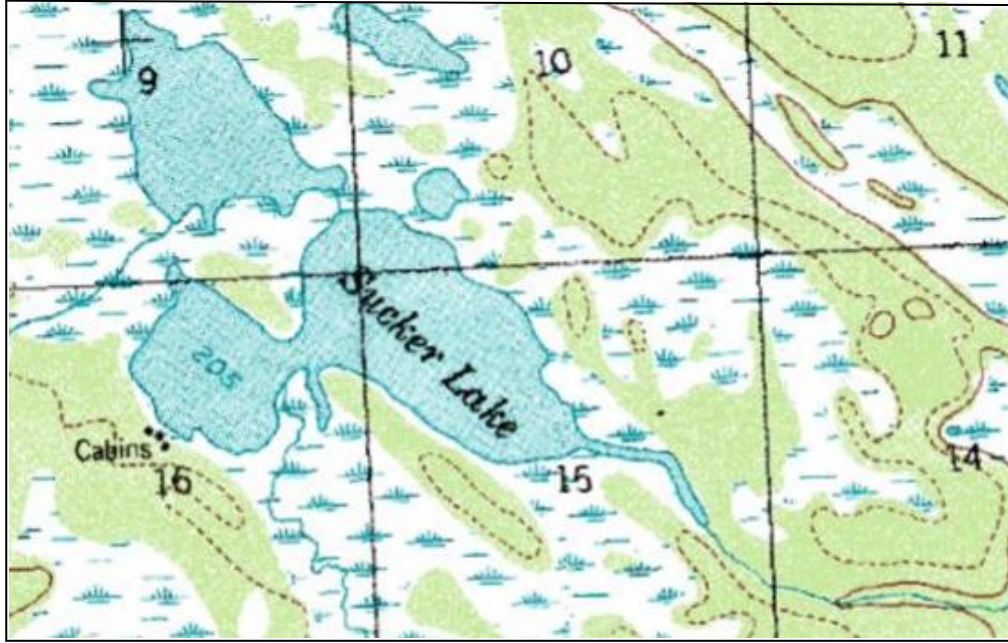


Figure 2 USGS 1:63 360 Series Topographic Map (Tyonek (C-3) Quadrangle) of Sucker Lake.



Figure 3 Google Earth Image of the Outlet of Sucker Lake Showing the Location of the Field Camp and Weir.



## **METHODS**

### **Environmental Conditions**

To assess the environmental conditions during the adult sockeye salmon migration to Sucker Lake, percent cloud cover was visually estimated, stream stage measured to the nearest tenth of a foot, precipitation measured to the nearest millimeter and water and air temperatures were recorded at 5:00 P.M. each day. Standard CIAA procedures were followed for collecting these observations (CIAA 2010).

### **Adult Enumeration**

To enumerate and collect adult salmon returning to Sucker Lake, a counting weir was temporarily installed in the outlet stream below Sucker Lake in 2010. The weir was constructed of 1.9 cm galvanized pipe and 7.6 cm aluminum channel. The galvanized pipe was picketed through 1.9 cm holes in the aluminum channel spaced 2.54 cm apart.

Field personnel were stationed at the weir to visually count and identify to species adult fish as they ascended the outlet stream. By removing one or two pickets, fish are permitted to pass through the weir. Initially, visual inspections of the weir were made at least twice a day. During the projected peak migration, visual inspections were made more frequently.

In addition to the enumeration of the adult salmon escapement, field personnel were also directed to collect a sample of sockeye salmon to identify the sex, age and standard fork length<sup>1</sup> of the returning population of sockeye salmon.

During the 2010 adult escapement, no salmon returned to Sucker Lake and no samples were collected.

To support the observations made at the weir, aerial and boat/foot surveys were also made of the outlet stream, Lower Sucker Creek, to assure that no fish were spawning below Sucker Lake or were being obstructed by beaver dams.

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<sup>1</sup>Standard fork length was defined as the measurement from mid-eye to the fork of the tail.

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## **RESULTS AND DISCUSSION**

### **Environmental Conditions**

During the 2010 adult escapement, environmental conditions were monitored from 27 July to 25 August except for August 18, 19 and 20, 2010 when field personnel were not on-site and water and stream temperature measurements were not recorded after August 17, 2010.

Stream stage measurements averaged 1.88 feet and ranged from 1.40 feet to 2.32 feet. Stream temperatures averaged 15°C and ranged from 14 to 18°C. Air temperatures averaged 16°C and ranged from 13 to 22°C. Zero percent of the days were clear, 41% were partly cloudy, and 59% were completely overcast. Measurable rain was recorded on 13 days during the adult escapement. A total of 117 mm of rain fell during this period.

### **Adult Enumeration**

Adult salmon escapement to Sucker Lake was enumerated daily from 27 July through 25 August except for a 2.5 day period between August 18 and August 20 when the field crew was off-site. During the escapement monitoring, zero fish returned to Sucker Lake. Typical run timing for sockeye salmon returning to lakes in the Susitna River drainage is late July through the middle of August.

On August 15, 2010, a boat/foot survey of the outlet stream of Sucker Lake was made to determine if there were any fish below Sucker Lake or if there were any obstacles to fish migration. No fish were observed in the outlet stream below Sucker Lake; however, three beaver dams were observed. The first beaver dam below the lake was the largest measuring 35 feet in length and 3 feet in height. Water was flowing over the top of this dam and it appeared to be a significant obstacle to fish migration. No fish were observed immediately below this dam. Two other beaver dams were also observed further downstream, neither appeared to be active nor did they an obstacle to fish migration.

On 28 August 2010, CIAA personnel conducted an aerial survey of Lower Sucker Creek from

Sucker Lake to its confluence with Alexander Creek. Visibility was good during the survey. No fish were observed in Lower Sucker Creek and the only obstacle to fish migration was the beaver dam previously surveyed on August 15, 2010.

## **RECOMMENDATIONS**

No salmon returned to Sucker Lake in 2010 and no sockeye salmon have been known to return to Sucker Lake. Additional adult escapement monitoring is not necessary at Sucker Lake; however, water quality and zooplankton sampling of Sucker Lake to assess potential rearing conditions may be warranted.

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## **LITERATURE CITED**

CIAA, 2010. Sucker Lake Procedures Manual. Cook Inlet Aquaculture Association 40610 Kalifornsky Beach Road Kenai, Alaska 99611, page 20.

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## **APPENDICES**

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## Appendix 1 Sucker Lake 2010 – Environmental Conditions

Adult Migration					
Date	Sky	Precip. (mm)	Stage (ft)	Water Temp. (°C)	Air Temp. (°C)
27-Jul	2	0.0	2.10	14	17
28-Jul	4	0.0	2.16	14	13
29-Jul	4	2.5	2.04	14	14
30-Jul	5	7.5	1.90	15	16
31-Jul	3	9.8	1.86	16	17
1-Aug	3	2.5	1.80	17	21
2-Aug	3	0.0	1.70	18	20
3-Aug	4	0.0	1.66	18	20
4-Aug	5	44.5	1.78	17	13
5-Aug	2	5.2	2.30	17	22
6-Aug	4	2.0	2.32	16	15
7-Aug	5	0.0	2.20	15	15
8-Aug	5	0.0	2.12	15	15
9-Aug	4	18.1	2.11	15	14
10-Aug	3	0.0	2.05	15	16
11-Aug	4	0.0	2.02	15	16
12-Aug	4	0.0	1.98	15	15
13-Aug	5	1.0	1.90	15	16
14-Aug	3	0.0	1.84	15	18
15-Aug	4	0.0	1.78	15	16
16-Aug	4	5.0	1.70	15	14
17-Aug	5	8.5	1.72	14	14
18-Aug	ND	ND	ND	ND	ND
19-Aug	ND	ND	ND	ND	ND
20-Aug	ND	ND	ND	ND	ND
21-Aug	5	8.0	1.65	ND	ND
22-Aug	3	2.0	1.60	ND	ND
23-Aug	3	0.0	1.60	ND	ND
24-Aug	3	0.0	1.50	ND	ND
25-Aug	2	0.0	1.40	ND	ND
Total		117			
Avg.		4.3	1.88	15	16
Min.		0.0	1.40	14	13
Max.		44.5	2.32	18	22

Ice out = ND

Summary of Cloud Cover - Percent of Days					
	No.	Meas.	Partly		Clear
	Days	Rain	Overcast	Cloudy	
Adults	27	48%	59%	41%	0%

1.0 = Clear  
 2.0 = Cloud Cover <50%  
 3.0 = Cloud Cover >50%  
 4.0 = Overcast  
 5.0 = Rain

ND = No Data

## Appendix 2 Sucker Lake 2010 – Adult Escapement

Date	Sockeye		Coho	King	Pink	Chum	Rainbow	D.V.
	Daily Escapement	Total Return	Daily Escapement	Daily Escapement	Daily Escapement	Daily Escapement	Daily Escapement	Daily Escapement
27-Jul	0	0	0	0	0	0	0	0
28-Jul	0	0	0	0	0	0	0	0
29-Jul	0	0	0	0	0	0	0	0
30-Jul	0	0	0	0	0	0	0	0
31-Jul	0	0	0	0	0	0	0	0
1-Aug	0	0	0	0	0	0	0	0
2-Aug	0	0	0	0	0	0	0	0
3-Aug	0	0	0	0	0	0	0	0
4-Aug	0	0	0	0	0	0	0	0
5-Aug	0	0	0	0	0	0	0	0
6-Aug	0	0	0	0	0	0	0	0
7-Aug	0	0	0	0	0	0	0	0
8-Aug	0	0	0	0	0	0	0	0
9-Aug	0	0	0	0	0	0	0	0
10-Aug	0	0	0	0	0	0	0	0
11-Aug	0	0	0	0	0	0	0	0
12-Aug	0	0	0	0	0	0	0	0
13-Aug	0	0	0	0	0	0	0	0
14-Aug	0	0	0	0	0	0	0	0
15-Aug	0	0	0	0	0	0	0	0
16-Aug	0	0	0	0	0	0	0	0
17-Aug	0	0	0	0	0	0	0	0
18-Aug	ND	ND	ND	ND	ND	ND	ND	ND
19-Aug	ND	ND	ND	ND	ND	ND	ND	ND
20-Aug	ND	ND	ND	ND	ND	ND	ND	ND
21-Aug	0	0	0	0	0	0	0	0
22-Aug	0	0	0	0	0	0	0	0
23-Aug	0	0	0	0	0	0	0	0
24-Aug	0	0	0	0	0	0	0	0
25-Aug	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0

ND = No Data, Crew was offsite for 2.5 days August 18, 2010 through August 20, 2012.  
 The weir was open to fish passage during this time.

### Appendix 3 Sucker Lake 2010 – Sockeye Escapement Hourly Counts

	AM					PM												AM							
	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00	1:00	2:00	3:00	4:00	5:00	
7/27/2010			0				0				0														
7/28/2010			0								0														
7/29/2010			0				0			0															
7/30/2010			0								0				0										
7/31/2010			0								0														
8/1/2010			0						0		0														
8/2/2010				0							0														
8/3/2010						0					0					0									
8/4/2010				0							0														
8/5/2010					0				0		0														
8/6/2010				0							0			0											
8/7/2010		0			0						0														
8/8/2010				0							0														
8/9/2010				0							0														
8/10/2010					0						0														
8/11/2010						0					0				0										
8/12/2010				0							0														
8/13/2010								0			0														
8/14/2010		0									0														
8/15/2010					0						0														
8/16/2010						0					0			0											
8/17/2010				0							0														
8/18/2010				0							0														
8/19/2010											0														
8/20/2010											0														
8/21/2010											0												0		
8/22/2010							0									0							0		
8/23/2010					0																		0		
8/24/2010						0																	0		
8/25/2010				0									0												

## Appendix 3 Sucker Lake 2010 – Update

Misc. Activities	
Adult Crew On-site:	27-Jul
Adult Crew Off-site:	25-Aug

Adult Migration				
Dates:	27-Jul to	25-Aug		
Sockeyes:			No.	%
Males			0	100%
Females			NA	
Mortalities:			NA	
Age 1.2:			0	
Age 1.3:			NA	
Age 2.2:			NA	
Age 2.3:			NA	
Coho:			0	
King:			0	
Pink:			0	
Chum:			0	
Rainbow:			0	
Dolly Varden			0	

