

**Delight Lake
Sockeye Salmon Enumeration
Progress Report
2018**

**Prepared by:
Emily Heale, Biologist
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The 2018 Delight Lake Project was made possible through enhancement taxes paid by the commercial fishermen in Area H, Cook Inlet and associated waters and through the harvest and sale of surplus fish.

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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 progress report is a synopsis of the monitoring and evaluation studies conducted for Delight Lake. This Delight Lake Progress Report gives the 2018 update of adult sockeye salmon enumeration data and includes historical adult return data collected by the Alaska Department of Fish & Game (ADFG).

The purpose of this progress report is to provide a vehicle to distribute the information produced by the monitoring and evaluation studies. 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.

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Table of Contents

DISCLAIMER	iii
ACKNOWLEDGEMENTS	v
ABSTRACT	1
INTRODUCTION AND PURPOSE	3
PROJECT AREA	5
METHODS	9
Environmental Conditions.....	9
Adult Enumeration and Characteristics.....	9
RESULTS AND DISCUSSION	11
Environmental Conditions.....	11
Adult Enumeration and Characteristics.....	11
Aerial Surveys versus Weir Counts	14
RECOMMENDATIONS	15
LITERATURE CITED	17
APPENDICES	19

LIST OF FIGURES

Figure 1: Delight Lake in relation to Cook Inlet and Alaska.....	6
Figure 2: Bathymetric map of Delight Lake	7
Figure 3: Daily adult migration, Delight Lake, 2018.....	12
Figure 4: Cumulative adult migration, Delight Lake, 2018.....	13
Figure 5: Trap Weir, two rows of pickets and no live box	15
Figure 6: Delight Lake Weir, single row of pickets with live box	15

LIST OF TABLES

Table 1: Summary of environmental conditions, Delight Lake, 2018.....	11
Table 2: Comparisons of aerial survey versus weir counts, Delight Lake, 2014–2018.....	14

LIST OF APPENDICES

Appendix 1: Environmental Conditions, Delight Lake, 2018	20
Appendix 2: Daily Adult Sockeye Migration, Delight Lake, 2018	21
Appendix 3: Daily Migration of Other Fish Species, Delight Lake, 2018	22
Appendix 4: Sockeye ASL Composition, Delight Lake, 2018.....	23
Appendix 5: Historical Escapement, Delight Lake, 1997–2018.....	24
Appendix 6: 2018 Escapement and Sustainable escapement goal (SEG) range	25

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ABSTRACT

As part of the continued evaluation of lakes in the Lower Cook Inlet watershed to determine the sockeye salmon (*Oncorhynchus nerka*) abundance in key salmon producing lakes, Cook Inlet Aquaculture Association agreed to monitor adult sockeye salmon returns to Delight Lake for the Alaska Department of Fish and Game beginning in 2018.

The 2018 Delight Lake sockeye salmon adult escapement was enumerated from July 3 and continued daily until August 1. During this time 13,428 adult sockeye salmon returned to Delight Creek. During the enumeration staff collected 269 samples of which 227 adult sockeye scales were readable for age composition.

Staff recorded basic environmental conditions from July 3 through July 31. Accumulated rainfall was measured at 378.3 mm, water level fluctuated in Delight Creek 1.58 ft., water temperature average 14.9°C, and air temperature averaged 14.3°C.

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INTRODUCTION AND PURPOSE

Delight Lake is a major natural producer of sockeye salmon (*Onchorynchus nerka*) (Hollowell et al., 2015). Delight Lake (along with Desire Lake) contributes to most of the commercial salmon catch within the East Nuka Bay subdistrict on the outer coast of the Kenai Peninsula. The salmon resource is also important for residents of Port Graham and Nanwalek—their subsistence usage of salmon dates back to the early 1900s (Stanek, 1997) and continues today. Delight Lake also supports a popular fly-in sport fishery for sockeye and coho salmon (*Oncorhynchus kisutch*), as well as Dolly Varden (*Salvelinus malma*) (Edmundson, 2001).

Sockeye salmon have been enumerated using a picket weir and crew by the Alaska Department of Fish and Game (ADF&G) since 1997. From 1997 through 2014 ADF&G conducted physical weir counts on Delight Creek. In 2015 funding was cut and since then ADF&G has been conducting aerial surveys (Hollowell et al., 2017), which was the enumeration method prior to 1997. Aerial surveys, by nature, are variable because there are a lot of factors that affect the ability to get an accurate count, i.e., weather, water clarity, salmon migration timing, and water depth. Boat surveys, by ADF&G, revealed that there was limited spawning habitat available on shallow beaches and within the small inlet stream entering the lake. It appeared that there may have been a substantial amount of sockeye salmon spawning in deep nearshore waters. Comparisons between physical weir counts and a visual lake assessment were made in 1997 and the numbers were inconsistent concluding that many adult sockeye entering the lake may not be detected by aerial surveys (Edmundson et al., 2001).

The purpose of the weir counts and aerial surveys are to inform resource managers—in this case ADF&G—to the number of sockeye salmon returning to a system in order to properly open or close the commercial harvest, and to help set future sustainable escapement goals. Delight Lake is one of two lakes that have wild salmon stocks found within the Outer District making it important for commercial harvests (Edmundson et al., 2001).

This report provides data from the 2018 adult enumeration efforts as well as historical data regarding past sockeye salmon escapements.

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PROJECT AREA

Delight Lake (59° 34'N, 150° 15'W) is located on the outer Kenai Peninsula within the East Nuka Bay drainage (Edmundson et al., 1998) (Figure 1). Delight Lake lies within the maritime zone where coastal mountains annually produce up to 380 cm of precipitation (Milner et al., 1997). Coastal temperate rainforests that are influenced by the oceanic currents of the North Gulf Coast characterize the region. Geologically the Delight Lake drainage is relatively new, having only been deglaciated since the 1930s (Milner, 1997). Delight Lake is predominately surrounded by immature spruce (*Picea sitchensis*) (York and Milner, 1996). Delight Lake sits at an elevation of 15 m and its outflow runs 3.5 km west into McCarthy Lagoon. One small inlet creek enters the lake at the north end that drains a small, steep area (Edmundson et al. 1998).

Edmundson et al. (1998) determined that Delight Lake has a surface area of 2.8 km², a mean depth of 22 m, a maximum depth of 39.5 m, and a volume of 60.2 x 10⁶ m³ (Figure 2). The estimated drainage area of the lake is 11.2 km². Based on total volume and estimated total annual outflow, derived from drainage area and mean annual precipitation, yields and estimated water residence time of 2.08 years. Delight Lake is quite clear with light extinction coefficients ranging from 0.11 to 0.48 m⁻¹, euphotic zone depth ranging from 9.6 to 41.9 m, and Secchi transparencies ranging from 2.8 to 10 m. The estimated euphotic zone is 46.3 x 10⁶ m³, which represents 77% of the total volume in Delight Lake. The duration of the growing season for the lake is six months. Delight Lake is a clear water system as opposed to organically stained or turbid.

Delight Creek is part of the Anadromous Waters Catalog, code 232-23-10100. Delight Lake is also logged in the Anadromous Waters Catalog, code 232-23-10100-0010 (Johnson and Blanche, 2010), which indicates that this system is recognized by ADF&G as an important stream for salmon spawning and migration.

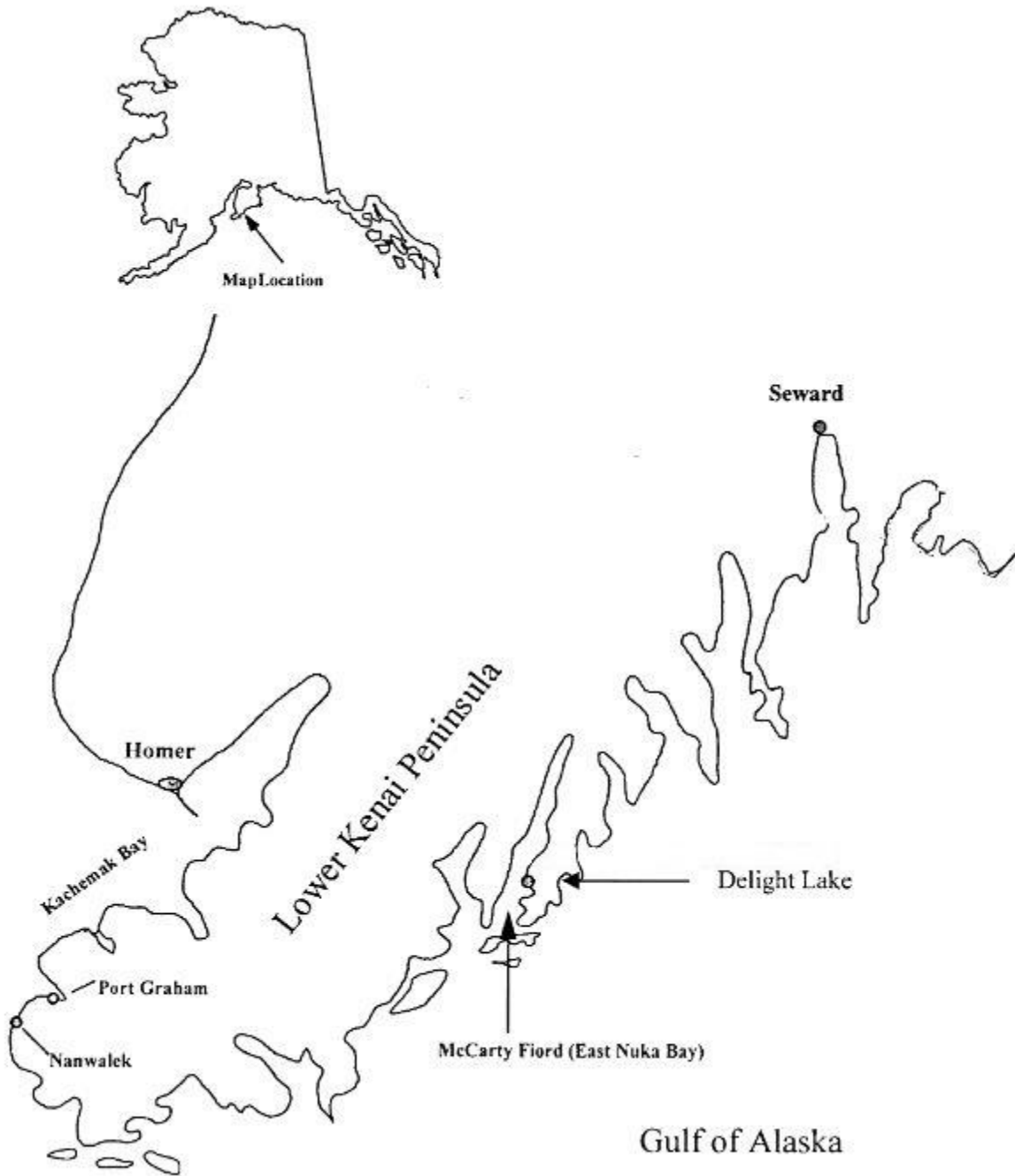


Figure 1: Delight Lake in relation to Cook Inlet and Alaska



DELIGHT LAKE

Latitude: 59° 34'

Longitude: 150° 15'

Elevation: 15 m

Area: $2.8 \times 10^6 \text{ m}^2$

Mean Depth: 22.0 m

Maximum Depth: 39.5 m

Volume: $60.2 \times 10^6 \text{ m}^3$

Contours in feet

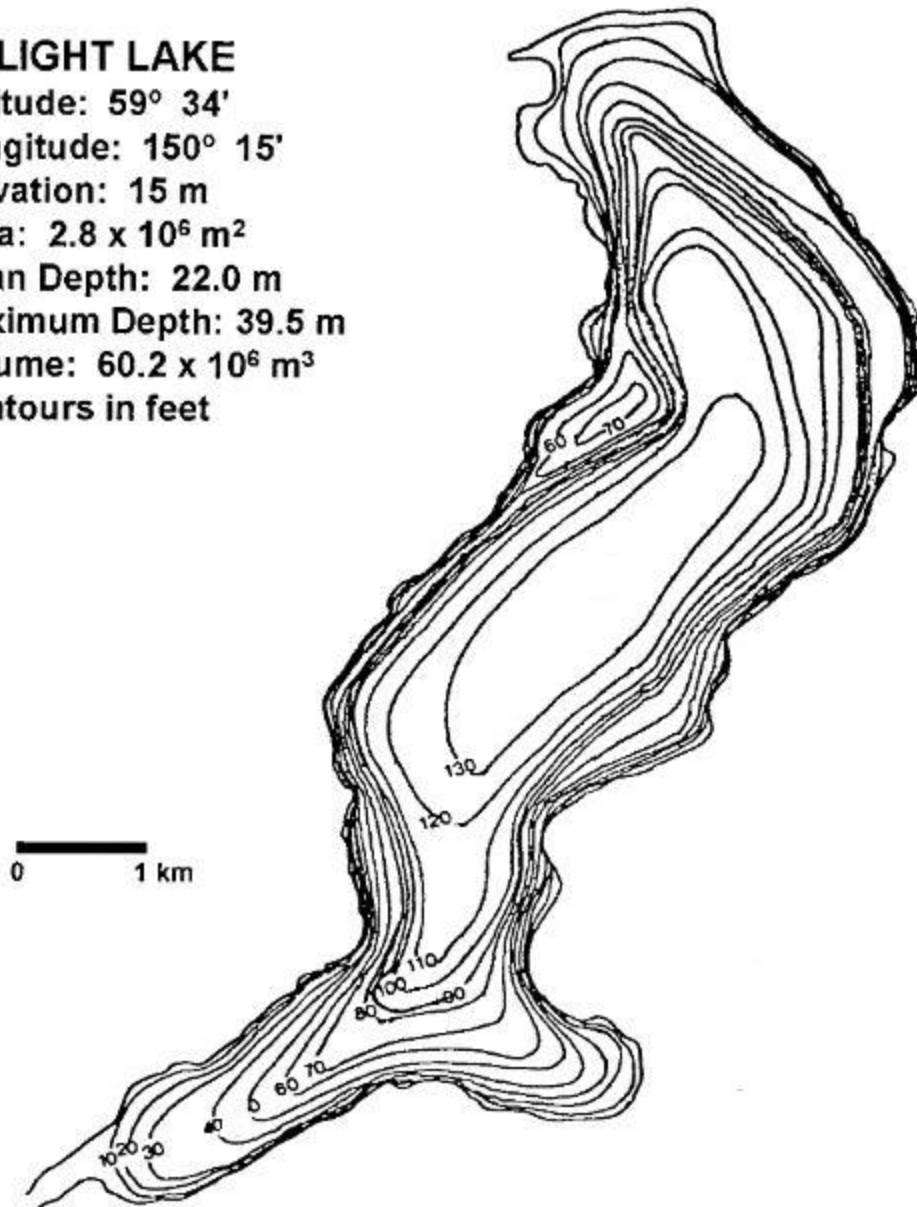


Figure 2: Bathymetric map of Delight Lake

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METHODS

Environmental Conditions

To assess the environmental conditions during the adult sockeye salmon migration to Delight Lake, percent cloud cover was visually estimated, water levels were recorded to the nearest tenth of a foot, precipitation measured to the nearest millimeter, and water and air temperatures measured to the nearest degree centigrade. All measurements were recorded at 5:00 PM each day per the Delight Lake Adult Procedures Manual (CIAA, 2018).

Adult Enumeration and Characteristics

To enumerate and collect adult salmon returning to Delight Creek, a weir is temporarily installed in Delight Creek—approximately 100 meters downstream from the lake. The weir is erected to completely block off the stream to migrating adult salmon. It is constructed of $\frac{3}{4}$ inch metal conduit pickets supported by aluminum channel. The aluminum channel is horizontally attached to vertical wood supports. The pickets are spaced apart $1\frac{1}{2}$ inches to allow for ample water flow through the weir. Attached to the weir is a live box used for age, sex, length (ASL) measurements. The use of the picket weir enabled staff to sample the entire width of the creek to ensure a total count of adults.

Field personnel visually identified species and counted the adult fish as they headed into Delight Lake at least twice a day—as the numbers of fish passing through the weir increased counts were made more frequently. By removing one or two pickets, fish were permitted to pass through the weir. Staff collected ASL data from a random sample of the migrating adults. The CIAA procedures manual sets forth a protocol for the collection of random ASL samples totaling—every 50th migrating sockeye adult. Two-hundred and sixty nine adult sockeye scales and ASL measurements were collected throughout the run. Of the scales collected, n=227 were readable. Each adult sampled was randomly selected then measured from mid-eye to fork length to the nearest millimeter and sexed. Scales were removed¹ from the salmon and placed on a corresponding gum card for subsequent age determination by CIAA staff. The Delight Lake Adult Procedures Manual outlines the ASL procedures (CIAA, 2018).

¹ The preferred scale area is two rows above the lateral line on a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin.

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RESULTS AND DISCUSSION

Environmental Conditions

During the 2018 adult sockeye salmon migration environmental conditions were monitored from July 3–31 (Table 1). Water level fluctuated 1.58 ft. during the monitoring period. Air temperature averaged 14.3°C and ranged from 10.3 to 20.8°C. Stream temperature averaged 14.9°C and ranged from 12.3 to 21.2°C. Measured rain was recorded on 17 days of the adult migration, owing to a total of 378.3 mm of rain in 29 days. Twenty-one percent of the days were clear and all the others had some amount of cloud cover.

Table 1: Summary of environmental conditions, Delight Lake, 2018

	Precipitation (mm)	Staff Gauge (ft)	Water Temperature (°C)	Air Temperature (°C)
Average	13.0	2.34	14.9	14.3
Minimum	0.0	1.64	12.3	10.3
Maximum	80.0	3.48	21.2	20.8
Total	378.3	n/a	n/a	n/a
n/a = Not Applicable				
Summary of Cloud Cover – Percent of Days				
Number of Days	Rain	Overcast	Partly Cloudy	Clear
29	48%	7%	24%	21%

Adult Enumeration and Characteristics

The Delight Lake adult migration was enumerated from July 3 through August 1, 2018. During that time staff counted 13,428 sockeye salmon adults migrating to Delight Lake. The peak migration was 2,053 adults, which occurred on July 24. The daily and cumulative smolt migration for 2018 is depicted in figures 3 and 4.

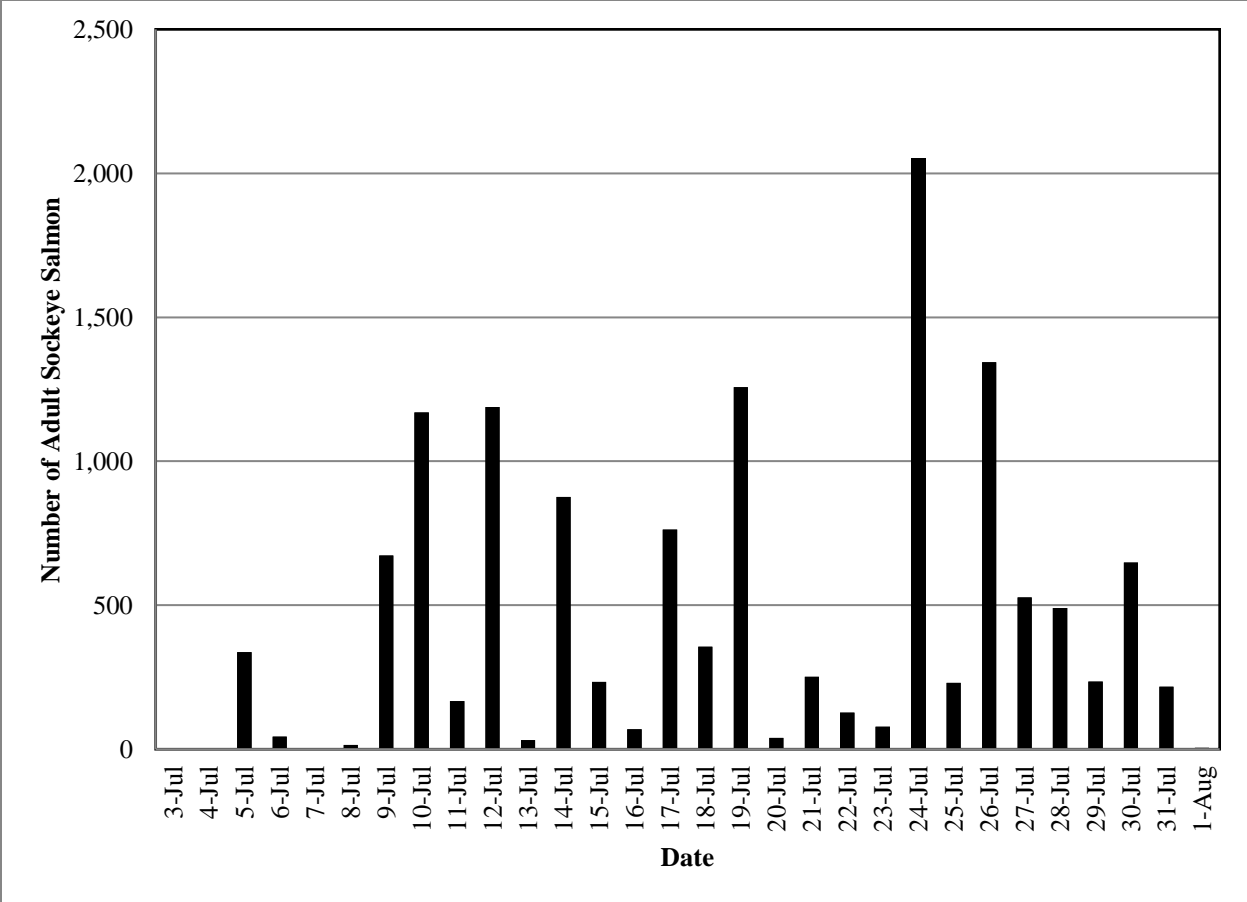


Figure 3: Daily adult migration, Delight Lake, 2018

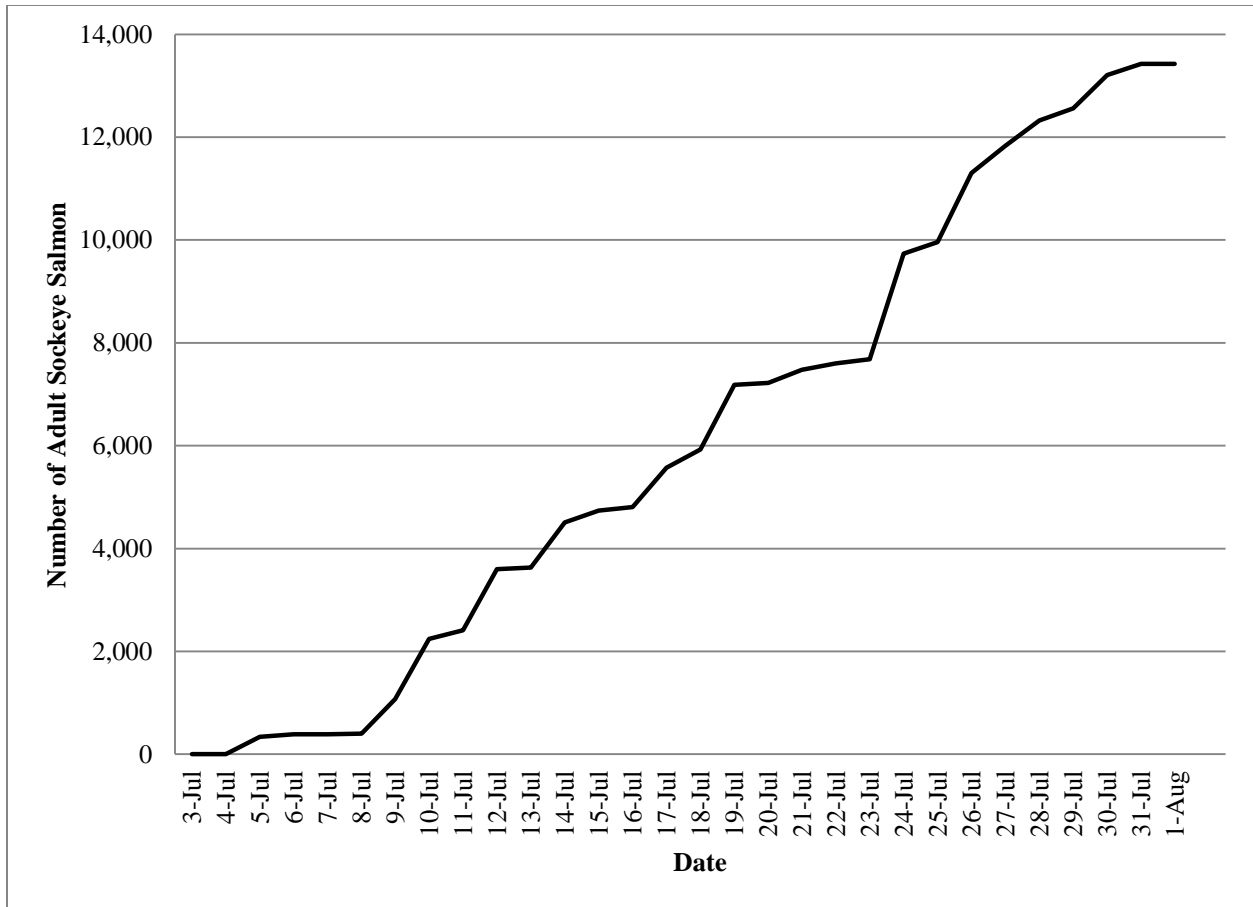


Figure 4: Cumulative adult migration, Delight Lake, 2018

Throughout the migration, staff collected 269 adult sockeye salmon; sexed them, took scale samples, and measurements for fork length. Based on the 227 scale samples that were readable, there were five age classes observed during the migration. Within the sample, age-1.2 was the most abundant age class comprising 66.5% of the migration; age-1.3 adults accounted for 32.2%; and ages-2.1, 2.2, 2.3 adults (only one sample of each) accounted for a combined total of 1.2%. The average length of the sampled age-1.2 sockeye adults was 503 mm (± 22.4). The average length of the age-1.3 sockeye adults was 546 mm (± 26.5). There are no length averages for the age 2.1, 2.2, and 2.3 aged sockeye adults because there was only one of each; they were 338 mm, 498 mm, and 562 mm respectively.

Other adult fish counted during this time were 1 coho (*O. kisutch*), 16 Chinook (*O. tshawytscha*), 98 pink (*O. gorbuscha*), and 12 chum salmon (*O. keta*); and 8,619 Dolly Varden (*Salvelinus malma*).

Aerial Surveys versus Weir Counts

Aerial survey coverage for Delight Lake has varied over the years depending on whether ADF&G was relying on the weir for escapement numbers or not; and also upon which sustainable escapement goal (SEG) was in place. There are two SEG for the system; if aerial surveys are used the SEG is 5,100–10,600 fish; but if a weir count is used the SEG is higher at 7,500–17,650. Both SEGs are relevant and have applicability depending on the method being used (Hollowell and Ford, 2018). There is wide variation among years when comparing aerial surveys counts with weir counts (Table 2). This is not surprising because of the difficulty to get consistently representative aerial surveys in the Delight Lake system, and why Delight Lake is an ideal place to have weir numbers for active management (E. Ford, Assistant Area Management Biologist, ADF&G, Homer, personal communication). As reported by Otis et al. (2013), “Weir counts are considered more reliable than aerial surveys.”

Delight Creek is fairly short distance from saltwater to the lake, with most of it covered by trees. The freshwater lagoon sometimes has flow issues—due to low rain or surface water runoff—that may result in die-offs of salmon before they reach the lake to spawn. During years with low flow the fish can get stranded in the freshwater lagoon because there is not enough water for them to migrate up the creek. With the low water level in the lagoon the temperature can rise above the lethal range for salmon (E. Ford, Assistant Area Management Biologist, ADF&G, Homer, personal communication). Once in the lake, the majority of the sockeye salmon tend to disappear into the depths for much of the season—ground surveys conducted by ADF&G in 1997 indicated that a large number of sockeye salmon spawned in deeper water and could not be identified by aerial surveys (Edmundson et al., 2011).

Otis et al. (2013) point out that there is a sizable amount of literature that documents that aerial surveys—especially peak aerial surveys—tend to underestimate total escapement, often by 30–50%. Weirs are capable of providing a precise count of adult salmon escaping to points upstream of the weir. In 2014 and 2018, both aerial surveys and weir counts were conducted at Delight Lake and the numbers vary significantly (Table 2).

Table 2: Comparison of aerial survey vs weir counts, Delight Lake, 2014–2018

Year	Aerial Survey	Weir Count
2014	2,971	22,289
2015	3,200	a
2016	5,110	a
2017	5,380	a
2018	6,735	13,428

a. Due to cut funding the weir was not operated in 2015–2017.

RECOMMENDATIONS

It is recommended that the adult sockeye salmon enumeration at Delight Lake continue to more accurately determine if the escapement goal is being met in order to enable commercial harvest opportunities.

Something else to consider as CIAA continues to assist ADF&G with the Delight Lake weir in the future, is determining if a trap weir (Figure 5) would be more efficient than the single row of pickets (Figure 6) with the live box that is currently used. For now the system is working well and will continue to be used in 2019.



Figure 5: Trap Weir, two rows of pickets and no live box. *By removing a few downstream pickets salmon can be let into the weir and then be scooped out to be sampled, easier than getting them into the live box.*

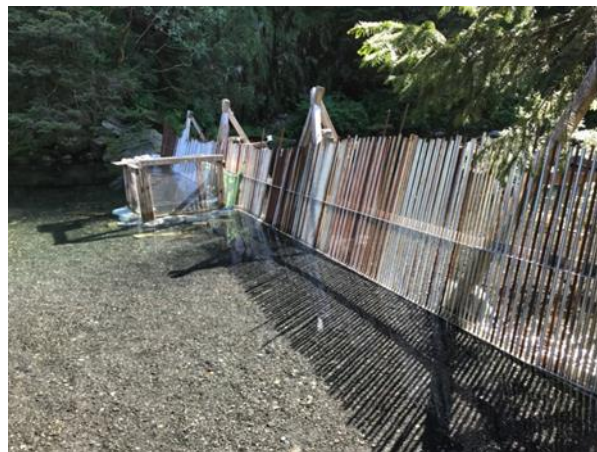


Figure 6: Delight Lake Weir, single row of pickets with live box.

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APPENDICES

Appendix 1: Environmental Conditions, Delight Lake, 2018

Date	Sky	Precip. (mm)	Stage (ft)	Stage Change (ft)	Water Temp. (°C)	Air Temp. (°C)
3-Jul	1	0.0	1.9	0.00	15.18	20.79
4-Jul	1	0.0	1.8	-0.10	15.84	18.77
5-Jul	1	0.0	1.78	-0.12	17.56	19.87
6-Jul	1	0.0	1.75	-0.15	21.22	18.99
7-Jul	5	0.0	1.7	-0.20	17.65	14.82
8-Jul	5	27.5	1.9	0.00	16.30	11.73
9-Jul	5	80.0	3.12	1.22	13.93	10.25
10-Jul	5	45.0	3.48	1.58	12.29	10.91
11-Jul	5	6.0	3.05	1.15	12.36	12.61
12-Jul	4	0.8	2.64	0.74	13.93	14.86
13-Jul	5	29.0	3.28	1.38	13.64	10.47
14-Jul	5	17.5	2.7	0.80	12.92	10.93
15-Jul	2	22.5	2.62	0.72	12.97	13.26
16-Jul	3	0.1	2.38	0.48	13.59	14.12
17-Jul	2	0.0	2.18	0.28	15.46	14.41
18-Jul	1	0.0	1.98	0.08	15.08	16.13
19-Jul	2	0.0	1.88	-0.02	14.63	13.40
20-Jul	2	0.0	1.8	-0.10	14.36	15.65
21-Jul	1	0.0	1.78	-0.12	15.51	14.70
22-Jul	4	0.0	1.64	-0.26	16.11	13.71
23-Jul	5	29.5	1.92	0.02	15.72	13.35
24-Jul	5	50.0	2.64	0.74	15.27	13.59
25-Jul	5	34.0	2.98	1.08	14.60	13.88
26-Jul	5	17.5	3	1.10	13.83	12.56
27-Jul	5	10.0	2.8	0.90	14.17	12.17
28-Jul	5	2.0	2.54	0.64	14.36	13.21
29-Jul	5	5.0	2.38	0.48	13.98	14.24
30-Jul	3	2.0	2.28	0.38	14.48	14.72
31-Jul	3	0.0	2.06	0.16	15.03	15.65
1-Aug				-1.90		
2-Aug				-1.90		
3-Aug				-1.90		
Total		378.3				
Avg.		13.0	2.34	0.22	14.90	14.27
Min.		0.0	1.64	-1.90	12.29	10.25
Max.		80.0	3.48	1.58	21.22	20.79
Sky Key: 1 = Clear, 2 = Cloud Cover < 50%, 3 = Cloud Cover > 50%, 4 = 100% Overcast, 5 = Rain						

Appendix 2: Daily Adult Sockeye Migration, Delight Lake, 2018

Date	Sockeye	
	Daily	Total
3-Jul	1	1
4-Jul	3	4
5-Jul	337	341
6-Jul	44	385
7-Jul	0	385
8-Jul	15	400
9-Jul	673	1,073
10-Jul	1,169	2,242
11-Jul	167	2,409
12-Jul	1,188	3,597
13-Jul	32	3,629
14-Jul	876	4,505
15-Jul	234	4,739
16-Jul	69	4,808
17-Jul	763	5,571
18-Jul	356	5,927
19-Jul	1,257	7,184
20-Jul	39	7,223
21-Jul	251	7,474
22-Jul	127	7,601
23-Jul	78	7,679
24-Jul	2,053	9,732
25-Jul	230	9,962
26-Jul	1,344	11,306
27-Jul	527	11,833
28-Jul	490	12,323
29-Jul	235	12,558
30-Jul	648	13,206
31-Jul	217	13,423
1-Aug	5	13,428
Total	13,428	

Appendix 3: Daily Migration of Other Fish Species, Delight Lake, 2018

Date	Coho		Chinook		Pink		Chum		Rainbow		Dolly Varden	
	Daily	Total	Daily	Total	Daily	Total	Daily	Total	Daily	Total	Daily	Total
3-Jul	0	0	0	0	0	0	0	0	0	0	0	0
4-Jul	0	0	0	0	0	0	0	0	0	0	22	22
5-Jul	0	0	0	0	0	0	0	0	0	0	43	65
6-Jul	0	0	0	0	0	0	0	0	0	0	14	79
7-Jul	0	0	0	0	0	0	0	0	0	0	0	79
8-Jul	0	0	0	0	0	0	0	0	0	0	27	106
9-Jul	0	0	1	1	0	0	0	0	0	0	1,635	1,741
10-Jul	0	0	1	2	0	0	0	0	0	0	582	2,323
11-Jul	0	0	0	2	0	0	0	0	0	0	290	2,613
12-Jul	0	0	2	4	0	0	0	0	0	0	2,317	4,930
13-Jul	0	0	0	4	0	0	0	0	0	0	76	5,006
14-Jul	0	0	1	5	3	3	0	0	0	0	472	5,478
15-Jul	0	0	0	5	7	10	1	1	0	0	327	5,805
16-Jul	0	0	0	5	3	13	0	1	0	0	77	5,882
17-Jul	0	0	0	5	7	20	2	3	0	0	319	6,201
18-Jul	0	0	0	5	5	25	0	3	0	0	154	6,355
19-Jul	0	0	1	6	5	30	1	4	0	0	238	6,593
20-Jul	0	0	0	6	8	38	0	4	0	0	56	6,649
21-Jul	0	0	1	7	12	50	0	4	0	0	219	6,868
22-Jul	0	0	0	7	0	50	0	4	0	0	64	6,932
23-Jul	0	0	0	7	2	52	0	4	0	0	11	6,943
24-Jul	0	0	7	14	17	69	3	7	0	0	1,081	8,024
25-Jul	0	0	0	14	0	69	0	7	0	0	273	8,297
26-Jul	0	0	2	16	9	78	3	10	0	0	126	8,423
27-Jul	1	1	0	16	5	83	1	11	0	0	57	8,480
28-Jul	0	1	0	16	5	88	0	11	0	0	53	8,533
29-Jul	0	1	0	16	7	95	1	12	0	0	19	8,552
30-Jul	0	1	0	16	1	96	0	12	0	0	43	8,595
31-Jul	0	1	0	16	1	97	0	12	0	0	22	8,617
1-Aug	0	1	0	16	1	98	0	12	0	0	2	8,619
Total	1		16		98		12		0		8,619	

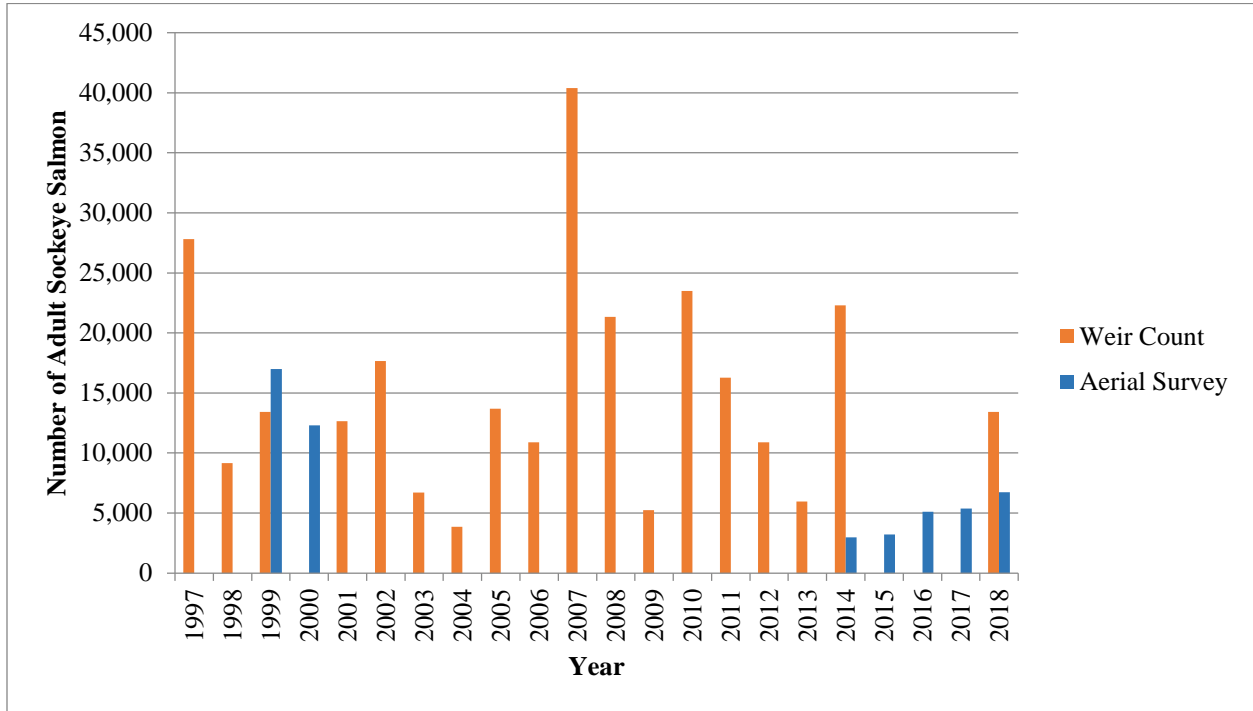
Appendix 4: Sockeye ASL Composition, Delight Lake, 2018

	Age					Total
	1.2	1.3	2.1	2.2	2.3	
Sample Period:	July 3 - August 1, 2018					
Males (No.)	4,200	2,011				6,211
Percent	67.6%	32.4%				48.8%
Sample Size	71	34				105
Total Sample Size						
Mean Length (mm)	512	552				532
St Dev	20.4	26.0				23
Females (No.)	4,259	2,070	59	59	59	6,506
Percent	65.5%	31.8%	0.9%	0.9%	0.9%	51.2%
Sample Size	72	35	1	1	1	110
Total Sample Size						
Mean Length (mm)	492	539	338	498	562	486
St Dev	20.4	26.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Both Sexes (No.)	8,932	4,318	59	59	59	12,717
Percent	66.5%	32.2%	0.4%	0.4%	0.4%	99.9%
Sample Size	151	73	1	1	1	227
Total Sample Size						
Mean Length (mm)	503	546	338	498	562	489
St Dev	22.4	26.5	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Total means for males, females and both sexes are generated from the total sample size

*Grey boxes indicate areas where there is not a large enough sample size to complete analysis

Appendix 5: Historical Escapement, Delight Lake, 1997–2018



Appendix 6: 2018 Escapement and Sustainable escapement goal (SEG) ranges,
Lower Cook Inlet, AK

Stock	2018 Escapement	Escapement Goal			Monitoring Method				Comments	
		Type (BEG, SEG)	Lower	Mid-Point	Upper	Aerial	Ground	Video		Weir
Chum Salmon (12 with goals)										
Port Graham River	3,725	SEG	1,200	1,950	2,700			X		
Dogfish Lagoon	7,615	SEG	3,500	6,050	8,600	X	X			used ground index
Rocky River	5,620	SEG	1,500	2,950	4,400	X				
Port Dick Creek	724	SEG	1,900	3,100	4,300	X	X			used ground index
Island Creek	1,368	SEG	5,100	8,500	11,900	X	X			used ground index
Big Kamishak River	7,694	SEG	6,800	11,200	15,600	X				
Little Kamishak River	14,417	SEG	8,000	12,400	16,800	X				
McNeil River	37,331	SEG	24,000	36,000	48,000	X				
Bruin River	28,497	SEG	5,200	7,600	10,000	X				
Ursus Cove	3,718	SEG	5,900	8,000	10,100	X				
Cottonwood Creek	1,326	SEG	5,200	8,700	12,200	X				
Iniskin Bay	9,149	SEG	5,900	9,750	13,600	X				
Pink Salmon (18 with goals)										
Humpy Creek	54,816	SEG	17,500	34,450	51,400			X		
China Poot Creek	2,280	SEG	2,500	4,400	6,300			X		
Tutka Creek	60,691	SEG	6,500	11,750	17,000			X		
Barabara Creek	7,236	SEG	2,000	3,800	5,600			X		
Seldovia Creek	50,827	SEG	21,800	29,600	37,400			X		
Port Graham River	33,419	SEG	7,700	13,700	19,700			X		
Dogfish Lagoon Cks.	8,398	SEG	800	3,950	7,100	X	X			used aerial index
Port Chatham	18,122	SEG	7,800	12,950	18,100	X	X			used ground index
Windy Creek Right	8,925	SEG	3,400	7,300	11,200	X				
Windy Creek Left	14,043	SEG	5,400	16,250	27,100	X				
Rocky River	2,088	SEG	11,700	33,250	54,800	X				
Port Dick Creek	94,585	SEG	17,900	33,850	49,800	X	X			used ground index
Island Creek	5,558	SEG	9,600	21,050	32,500	X	X			used ground index
S. Nuka Island Creek	545	SEG	2,800	7,000	11,200	X				
Desire Lake	2,547	SEG	1,500	9,750	18,000	X				
Bruin River	94,715	SEG	17,800	60,400	103,000	X				
Sunday Creek	3,400	SEG	4,400	14,650	24,900	X				
Brown's Peak Creek	1,341	SEG	2,600	10,050	17,500	X				
Sockeye Salmon (8 with goals)										
English Bay	18,304	SEG	6,000	9,750	13,500	X			X	used weir count
Delight Lake	13,428	SEG	5,100	7,850	10,600	X			X	used weir count
Desire Lake	9,840	SEG	4,800	8,350	11,900	X		-		
Bear Lake	10,568	SEG	700	4,500	8,300				X	
Aialik Lake	2,620	SEG	3,200	4,300	5,400	X				
Mikfik Lake	4,966	SEG	3,400	7,200	11,000				X	
Chenik Lake	6,651	SEG	2,900	8,300	13,700				X	
Amakdedori Creek	1,916	SEG	1,200	1,900	2,600	X				

Source: Lower Cook Inlet commercial fisheries data, ADF&G