KLAG LAKE SOCKEYE SALMON (*ONCORHYNCHUS NERKA*) STOCK ASSESSMENT PROJECT: 2009 ANNUAL REPORT AND 2007 – 2009 FINAL REPORT.

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2007-2009 Final Report to USFWS Office of Subsistence Management to fulfill obligations for project 07-604

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ABSTRACT

From 2007 – 2009 sockeye salmon (*Oncorhynchus nerka*) escapement into Klag Lake and sockeye salmon harvest in Klag Bay was estimated by means of weir counts and creel surveys. In 2007 9,194 sockeye salmon were counted migrating through the weir. In 2008, only 4,213 sockeye salmon were counted and in 2009, 14,841 sockeye salmon were counted migrating through the weir. The most abundant age classes were 1.3 at 54.6% (2007) of the samples aged, 1.2 at 43.5% (2008), and 1.3 at 46.9% (2009). Low water levels in 2009 prevented sockeye salmon from migrating upstream early in the season. By July 23rd only 106 sockeye salmon had passed through the weir and over 5,000 had been harvested from Klag Bay prompting Alaska Department of Fish and Game to issue a fishery closure emergency order effective as of 12:01 am July 25th. At the time of the closure, a total of 6,047 sockeye salmon were harvested from Klag Bay and only 485 had been counted through the weir. Escapement remained low (a total of approximately 1,700 sockeye salmon) until August 16th when the water level in the stream raised from 0.7 to 1.1 m and close to 7,870 sockeye salmon migrated through over the following three days. In 2007 approximately 3,011 sockeye salmon were harvested from Klag Bay. Harvest was almost identical at 3,013 in 2008 and a record harvest of 6,047 was taken in 2009. Sport harvest was negligible in all three years at only 25 sockeye salmon in both 2007 and 2008 and 159 in 2009.

INTRODUCTION

This introduction was taken directly from Woody and Conitz (2008).

Currently, Klag Lake (ADF&G Stream No. 113-72-002) is one of the larger producers of sockeye salmon in Southeast Alaska. For subsistence users in Sitka, it is second or third in importance, after Necker Bay and, depending on the year, Redoubt Lake. The abundance of Redoubt Lake sockeye salmon has fluctuated a great deal in recent years (Geiger 2003). In years when sockeye salmon runs to Redoubt Lake are small and conservation measures are in place, subsistence users rely more heavily on sockeye salmon from Klag Bay. Fisheries managers became concerned about increasing effort and large sockeye salmon harvests in Klag Bay during some seasons. Having no adequate estimates of abundance for Klag Lake sockeye salmon, managers at ADF&G were compelled to implement conservative management practices when fishing effort appeared to be high. For example, they closed the subsistence fishery early in 1997, after observing few fish in the system during aerial surveys (Dave Gordon ADF&G Division of Commercial Fisheries, personal communication 2005). In 2000 the Sitka Tribe of Alaska (STA), the U.S. Forest Service, and ADF&G responded to concerns about possible over-harvesting of Klag Lake sockeye salmon stocks by initiating a three-year sockeye salmon monitoring project at Klag Lake, in 2001.

ADF&G has compiled subsistence fishery data since 1985 from subsistence permit holders who returned their harvest information at the end of the season or upon requesting a permit for the following season. For the four-year period, 2002 – 2005, the average annual harvest of sockeye

salmon from Klag Bay increased to about three times what it was in the preceding seventeen years, 1985 – 2001, and the number of permits issued annually for Klag Bay doubled during the same recent period (Appendix A). Furthermore, the average harvest per permit increased from 25 to 40 sockeye salmon. However, these reported annual harvest totals do not necessarily represent the actual sockeye salmon harvest, because ADF&G does not independently verify the user-reported harvest numbers. Evidence from the few subsistence sockeye salmon systems in which on-site harvest surveys have been conducted shows that harvest is typically, but not always, under-reported; the degree of under-reporting appears to be highly variable (Conitz and Cartwright 2003 and 2005; Lewis and Cartwright 2004; Lorrigan et al. 2004; Conitz et al. 2005). Klag Bay subsistence fishers have exhibited the unusual practice of reporting higher harvest numbers on their permits than during on-site interviews. Possibly, they obtain more accurate fish counts when they process their harvests after returning to Sitka. An important project objective was to obtain accurate annual estimates of fishing effort and sockeye salmon harvest in Klag Bay, using direct observation and interviews in the sport and subsistence fisheries.

Prior to the start of the Klag Lake subsistence sockeye salmon project, the only escapement data available for Klag Lake were unreliable aerial survey counts for some years. The Klag Lake subsistence sockeye salmon project was initiated to provide accurate annual sockeye salmon escapement estimates, using a weir and mark-recapture study. From 2001 through 2006 the weir counts, verified with mark-recapture estimates, ranged from about 12,000 to about 23,000 fish (Conitz et al. 2005). Overall, the Klag Lake sockeye salmon population appeared to be stable and adequate to support subsistence and sport harvests at existing levels. The purpose of the 2007 to 2009 continuation of the project, therefore, was to monitor this stock through annual estimates of escapement, harvest, and run timing.

OBJECTIVES

1. Estimate the escapement of sockeye salmon using a weir and validate using mark-recapture methods.
2. Describe the run-timing and daily passage of sockeye salmon through the weir.
3. Describe the escapement age, sex and length composition.
4. Estimate sport and subsistence harvest in Klag Bay using an on-sight creel survey.

METHODS

Study Site

Klag Bay (figure 1) located at N 57° 38.5', W 136° 42.2' is the outermost bay in a system of inland saltwater bays or lagoons, which also includes Lake Anna and Sister Lake. Klag Lake receives drainage from approximately seven square kilometers of sparsely wooded low hills, large areas of muskeg, and numerous small shallow lakes and ponds with a maximum elevation of 550 m. With a chain of small lakes, streams, and ponds to the northeast, Klag Lake has only one active salmon spawning stream. Many smaller streams drain into the lake but anadromous salmon spawning has not been observed in these streams. Sockeye salmon are blocked from further upstream migration in the main stream by a 1.3 m high barrier falls approximately 500 m upstream. The lake itself is at a 12 m elevation and has a surface area of 83 hectares; the maximum lake depth is 43 m. The lake drains to the south via an outlet that flows through a series of 3 large ponds before emptying into the east side of Klag Bay. The extensive network of muskegs and ponds buffers flow through the system.

(Taken from Woody and Conitz 2008)

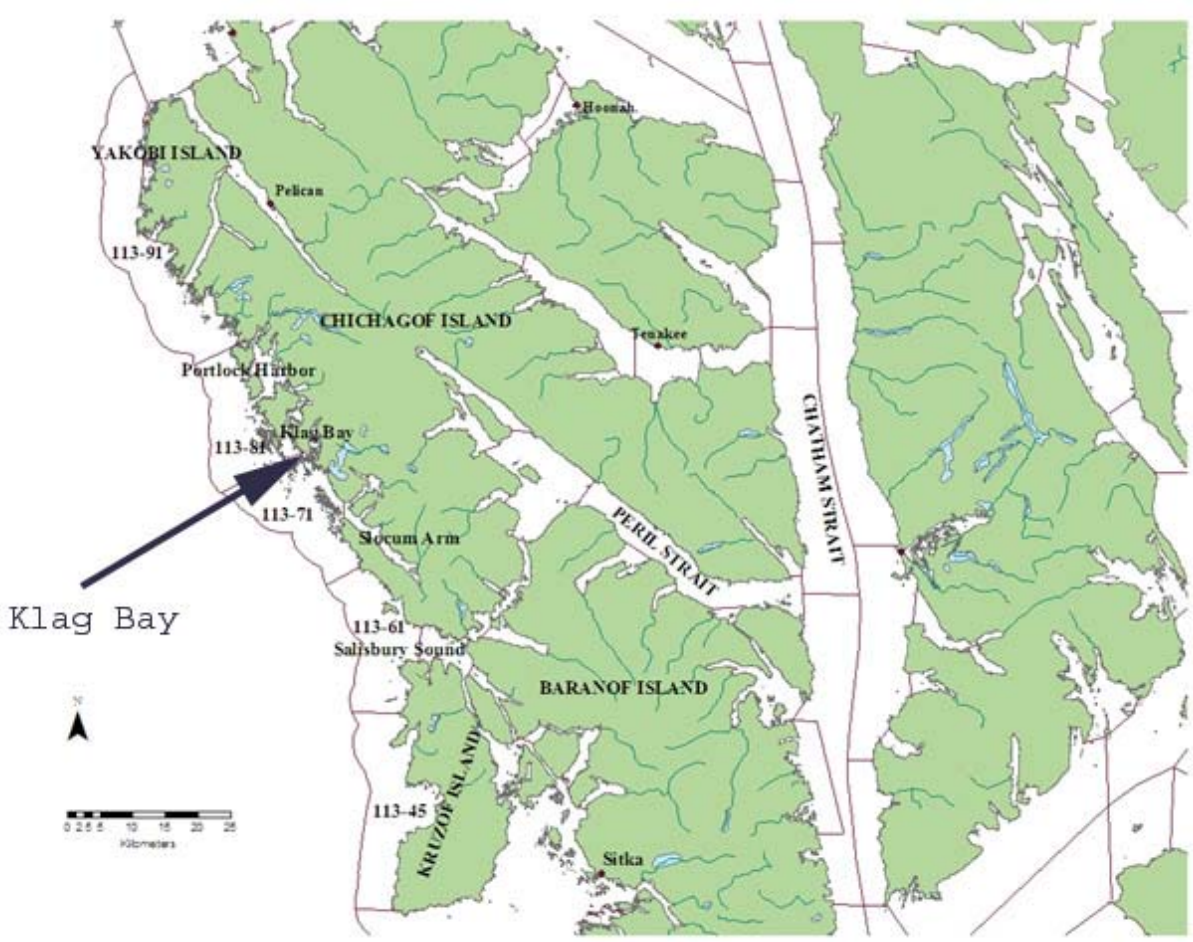

Figure 1. Location of Klag Bay on Chichagof Island.

Sockeye Salmon Escapement Estimates and Run Timing

A rigid weir was placed approximately 100 meters from the estuary in the same location and with the same construction used since 2001 (Woody and Conitz 2008). Migrating salmon were channeled into a trap fixed to the weir where they were counted by species and released upstream. Sockeye salmon were systematically marked at a rate of 1 of every 5 fish to maintain a 20% marking goal in order to conduct a mark-recapture study in the event of a weir failure or suspected breach.

A stratified, two-sample mark recapture study design was implemented as described by Arnason et al. (1996). Twenty percent of the sockeye salmon passing through the weir were collected and marked with a primary and a secondary mark. The primary mark was an adipose fin clip and the secondary marks were left and right ventricle fin clips. The mark-recapture data however will not be utilized due to poor record keeping and missing data sheets for the 2007 and 2008

seasons. Because the weir at Klag Bay is believed to be a solid weir with no leaks and was never suspected to have been breached, the actual weir count will be reported as the escapement estimate for the 2007-2009 field seasons. In future studies, the marking portion of the mark-recapture study will be conducted; however, unless the weir is believed to be breached, recapture events will be unnecessary.

Sockeye salmon passing through the weir were counted and the count was recorded on weir count data sheets (Appendix B) and Rite-in-the-Rain ™ field notebooks. Weir count data was later entered into a Microsoft Excel spreadsheet. Daily counts were called into the U.S. Forest Service via the Forest Service Radio Network and to the weir manager via satellite phone on a daily basis throughout the field season.

Escapement Sex, Age, and Size Distribution

According to Bromaghin (1993) a sample size of n=174 would be sufficient to estimate sex and age composition within ten percent (d=0.10) of the true value ninety-five percent of the time (α=0.05) based on seven age classes (k=7). However, because sampling designs were developed by different researchers, scales were collected from every 5th fish during the 2009 field season. Scales were prepared for analysis as described by Clutter and Whitsel (1956). Three scales were collected from the preferred location from sampled fish (INPFC 1963). Scales were placed on gum cards and were matched with sex and length data in order to describe age class and size distribution throughout the season. Length and sex data were recorded on Alaska Department of Fish and Game (ADF&G) Age-Sex-Length (ASL) sheets. Lengths were measured from mideye-to-tail-fork to the nearest millimeter (mm) and later rounded to the nearest 5 mm. The scale cards and ASL data were sent to the ADF&G Salmon Aging Laboratory in Douglas, Alaska for aging. Age classes were designated by the European aging system where freshwater and saltwater years are separated by a period (e.g. 1.3 denotes 1-year freshwater and 3-years saltwater; Koo 1962). Brood year tables were compiled by sex and brood year to describe the age structure of the returning adult sockeye salmon populations. Similar tables were constructed to describe the lengths of migrating sockeye salmon.

Subsistence and Sport Sockeye Salmon Harvest in Klag Bay

The harvest of sockeye salmon in Klag Bay was determined using a creel surveys throughout the season. Harvest efforts took place in Klag Bay directly in front of the U.S. Forest Service cabin where the crew was housed during the season. Therefore, the field crew was able to interview nearly all fishermen involved in the sockeye salmon harvest. If a fishing party was missed or declined an interview, it was noted on the creel survey as a "missed interview". Data was collected and recorded on creel survey data sheets (Appendix C) and in Rite-in-the-Rain™ field notebooks. Harvest data was later entered into a Microsoft Excel spreadsheet.

Surveyors recorded the date, time, harvest type (subsistence or sport), harvest method (gear used), number of each gear type used, number of hours fished, and number of each fish species collected. For the purpose of this report only data regarding the harvest of sockeye salmon will

be presented. Overall harvest effort will be calculated by multiplying the number of each gear type by the number of hours fished per gear type. The number of fish harvested will then be divided by the number of effort hours to calculate catch-per-unit-effort (CPUE).

RESULTS

Sockeye Salmon Escapement Estimates

In 2009 sockeye salmon began migrating through the weir on 20-July and the last fish was counted through on 14-September. Run patterns were similar to previous years (Figure 2). Few fish passed the weir before 10-August due to low water levels and the run peaked on 16-August with a surge of 3,126 sockeye salmon migrating through (Figure 3). As of 14-September a total escapement of 14,841 sockeye salmon migrated upstream of the weir to spawn. The 2009 overall escapement was up considerably from 2007 and 2008 (Figure 4) and the run timing occurred in conjunction with high water levels as has been the case in previous years (Stahl et al. 2007, Woody and Conitz 2008).

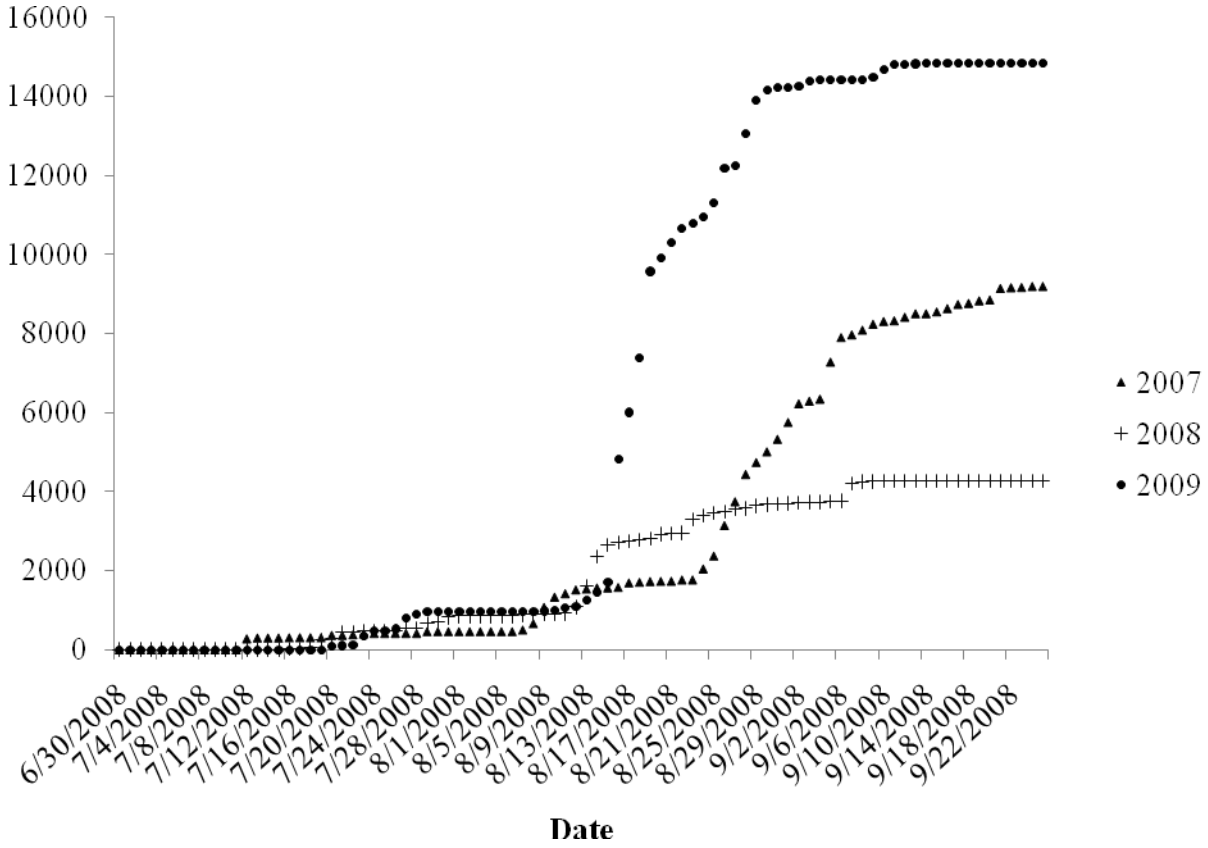

Figure 2. Graph illustrating run timing and cumulative daily escapement between years 2007 – 2009.

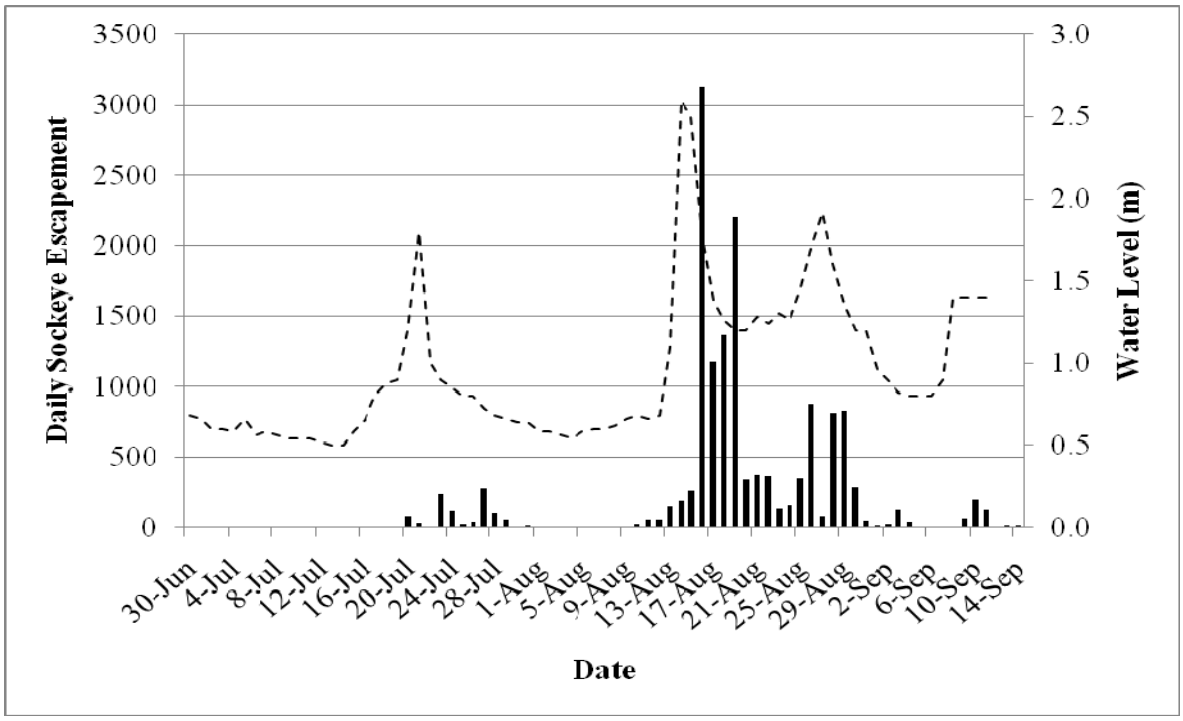

Figure 3. 2009 daily sockeye salmon escapement into Klag Lake and relative water depth (m).

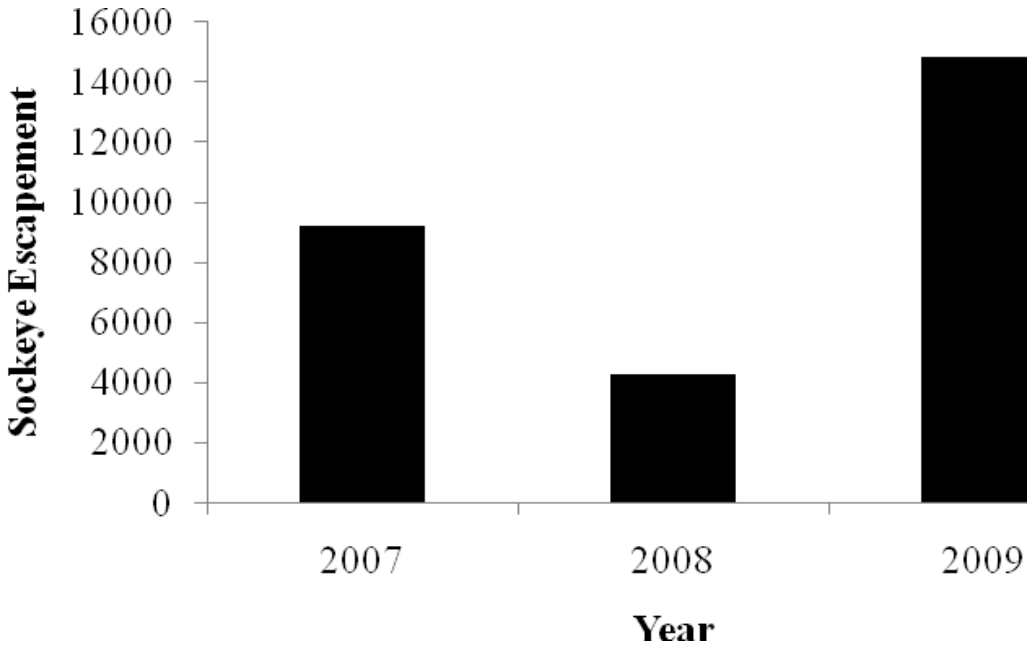

Figure 4. Total sockeye salmon escapement into Klag Lake from 2007 – 2009.

Marking efforts resulted in 3,062 sockeye salmon being marked, approximately 20.6% of the escapement. During 4 separate recapture events, a total of 860 sockeye salmon were recovered and of those 184 (21.4%) were marked. Because the ratio of fish marked at the weir to fish recovered with marks was so close, the weir count was considered reliable and an escapement estimate based on mark-recapture data was not formulated. The weir count of 14,841 therefore is considered to be the actual escapement size. In addition to sockeye salmon, there were 2,539 coho salmon (*O. kisutch*), 15,933 pink salmon (*O. gorbuscha*) , and 463 dolly varden (*Salvelinus malma*) that migrated through the weir.

Escapement Age and Size Distribution

Because sampling methods were developed by different researchers for the 2009 field season, sampling goals were much higher than those described by Bromaghin. In 2009, 1,172 sockeye salmon were successfully aged from scale analysis. Of these, 48.3% were males and 51.7% females. Age 1.2 sockeye salmon comprised the largest age class at 39.1% of the sample, just slightly higher than age 2.2 (38.5% of the sample, Table 1). In 2007 age 1.3 sockeye salmon were the largest age class (54.6%) followed by 1.2 age fish at 29.4%. In 2008, age 1.2 and 1.3 age classes were the most abundant at 43.5% and 35.6% respectively.

Table 1. Age and sex composition of sockeye salmon sampled from the Klag Lake escapement in 2009.

Age	**1.1**	**1.2**	**1.3**	**2.1**	**2.2**	**2.3**	**Total**
Male							
Sample Size	74	205	60	0	218	0	557
% Population	6.4%	17.8%	5.2%	0.0%	18.9%	0.0%	48.3%
Standard Error	0.7%	1.1%	0.7%	0.0%	1.2%	0.00%	
Female							
Sample Size	33	246	89	1	226	2	597
% Population	2.9%	21.3%	7.7%	0.1%	19.6%	0.2%	51.7%
Standard Error	0.5%	1.2%	0.8%	0.1%	1.2%	0.1%	
All Fish							
Sample Size	107	451	149	1	444	2	1154
% Population	9.3%	39.1%	12.9%	0.1%	38.5%	0.2%	100.0%
Standard Error	0.9%	1.5%	0.1%	0.1%	1.4%	0.1%	

The average mideye-to-tail-fork for the sampled population was 420 mm in 2009. Of the returning males, age class 1.3 fish had the largest average length at 555 mm. The largest average length was also found for age 1.3 females at 545 mm. Similar to previous years, fish that spent 3 years in saltwater had greater average lengths than those only spending 2 years in saltwater (Table 2). Stahl et al. 2007, Woody and Conitz 2008).

Table 2. Length composition (rounded to the nearest 5mm) of adult sockeye salmon returning to Klag Lake in 2009.

Age	1.1	1.2	1.3	1.4	2.1	2.2	2.3	Total
Male								
Sample Size	9	149	314	1	9	178	36	696
Mean Length (mm)	360	490	555	530	365	500	560	
% Population	1.3%	21.4%	45.1%	0.1%	1.3%	25.6%	5.2%	
Standard Error	0.4%	1.6%	1.9%	0.1%	0.4%	1.7%	0.8%	
Female								
Sample Size	12	84	236	0	14	102	28	476
Mean Length (mm)	360	490	545	-	370	500	540	
% Population	2.5%	17.6%	49.6%	0.0%	2.9%	21.4%	5.9%	
Standard Error	0.7%	1.7%	2.3%	0.0%	0.8%	1.9%	1.1%	
All Fish								
Sample Size	21	233	550	1	23	280	64	1172
Mean Length (mm)	360	490	550	530	370	500	550	
% Population	1.8%	19.9%	46.9%	0.1%	2.0%	23.9%	5.5%	
Standard Error	0.4%	1.2%	1.5%	0.1%	0.4%	1.2%	0.7%	

Subsistence and Sport Harvest

A total of 40 creel surveys were conducted at Klag Bay during the 2009 field season. Of these, 28 of the groups surveyed were subsistence harvesters and 12 were sport fishing. A total of 6,047 sockeye salmon were harvested as reported by creel surveys, up from an estimated 3,011 in 2007 (Stahl et al. 2007) and 3,013 in 2008 (Mann in review). Beach seining was the most effective method of harvest with a total of 5,019 sockeye salmon taken and a catch-per-unit effort (CPUE) of 68 sockeye salmon/hr. Gill nets accounted for 867 harvested sockeye salmon (CPUE = 17) and angling methods accounted for 161 harvested sockeye salmon (CPUE = 2). Combining harvest totals with escapement totals yields an overall successful sockeye salmon return of 20,888 fish to the terminal area. The exploitation rate of the 2009 return (2009 harvest divided by the overall return to Klag Bay) was approximately 29% up from 25% in 2007 and down from 41% in 2008. Harvest records for 2009 as reported to ADF&G on subsistence

permits are not available. Figure 5 shows ADF&G harvest records and corresponding STA creel survey records through 2008.

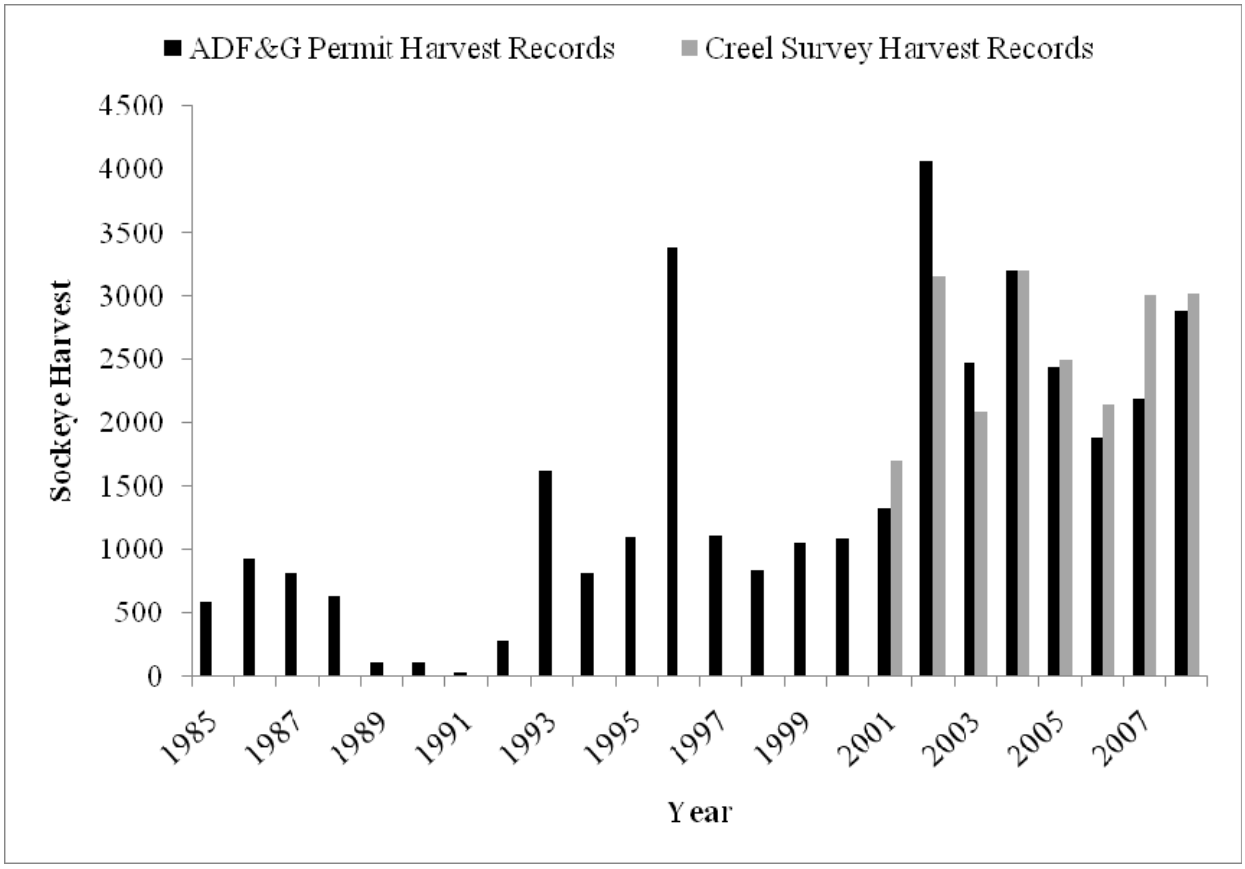

Figure 5. Historical subsistence harvest data from Klag Bay as reported on harvest permits (Data supplied by Dave Gordon, ADF&G).

DISCUSSION

The 2009 sockeye salmon escapement was strong relative to recent years at 14,841 sockeye salmon successfully counted through the weir on the Klag Lake outflow. Age and sex distribution data were similar to previous years with age 1.2 fish comprising the largest proportion of the run and a close proportion of males to females. In 2007 and 2008 overall lengths ranged from 340 mm – 680 mm and 380 – 615 mm respectively. Length measurements in 2009 ranged from 325 mm – 685 mm including all age classes. The estimated harvest in 2009 (6,047 sockeye salmon) was a record harvest. The exploitation rate on the population successfully returning to the terminal area in Klag Bay was approximately 29%. Though a strong number of sockeye salmon successfully migrated past the weir, this rate of harvest could be detrimental to the population if not carefully managed. The entire harvest took place early in

the season during a period of low water levels. Over 4,500 sockeye salmon were harvested before any were able to migrate through the weir. By the emergency fishery closure date (25-July) only 464 sockeye salmon were counted through the weir. While the escapement seemed strong, it may be detrimental to the genetic diversity to remove close to 30% of the returning population over such a short period.

Overall, the escapement in 2009 was much stronger than 2007 and 2008 returns. With careful management the Klag Bay subsistence fishery seems sustainable though there may need to be regulation to prevent large harvest from taking place in short time intervals. There has been question about the need for creel surveyors at Klag Bay, however, the record harvest and consequential fishery closure verifies the need for an in-season management technique. Numbers reported to ADF&G became a critical management tool in 2009. Low water levels early in the season caused sockeye salmon to be highly vulnerable to harvest. Without the fishery closure, this population could have been easily overharvested. I recommend continued monitoring of the sockeye salmon population as well as monitoring of the Klag Bay fishery in order to assure effective management strategies and adequate escapement goals are met.

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APPENDICES

Appendix A. **Numbers of subsistence fishing permits, total annual subsistence harvest, and average number of sockeye salmon harvested per permit. (ADF&G Commercial Fisheries Database 2009).**

Year	Number of Permits	Sockeye Harvest	Average Harvest per Permit
1985	29	582	20
1986	46	919	20
1987	42	816	19
1988	26	629	24
1989	5	114	23
1990	5	115	23
1991	1	23	23
1992	11	276	25
1993	59	1626	28
1994	31	809	26
1995	28	1098	39
1996	100	3381	34
1997	42	1106	26
1998	33	834	25
1999	42	1048	25
2000	48	1082	23
2001	65	1325	20
2002	94	4065	43
2003	70	2475	35
2004	75	3196	43
2005	63	2431	39

2006	42	1885	45
2007	43	2190	51

Appendix B. Daily weir count data sheet.

Sockeye Salmon Daily Weir Count Data Form

Lake	**Weather**	
Trap	**Water Level**	
Date	**Water Temp**	
Mark Used	**Air Temp**	**Samplers:**

Sampling Period	**Time**	**Fish Counts By Species**							**# of Sockeye Marked**
		Sockeye	**Coho**	**King**	**Chum**	**Pink**	**Dolly Varden**	**Other**	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
Daily Totals									
Number of mortalities at the weir (indicate whether marked or not)									

Appendix C. Sockeye salmon harvest daily interview form (Subsistence and Sport).

Sockeye Salmon Harvest Daily Interview Form (Subsistence and Sport)

Stream :

Samplers:

Date: Start Time: End Time:

Time	Subsistence (1) / Sport (2)	Beach Seine (BS) / Gillnet (GN)	Number of Rods or Nets	Hours Fished per Rod or Net	Total Hours Fished (gear x hrs)	Sockeye	Coho	Chum	Chinook	Pink	Comments

Appendix D. Age, Sex, and Length (mm) data (scales anaylized by ADF&G scale analysis lab in Douglas, Alaska) for 2009 Klag Lake samples.

SAMPLE DATE	SEX CODE	LENGTH	AGE
7/20/2009	1	410	12
7/20/2009	1	480	12
7/20/2009	1	490	12
7/20/2009	1	490	12
7/20/2009	1	500	12
7/20/2009	1	500	12
7/20/2009	1	520	12
7/20/2009	1	530	12
7/20/2009	1	530	12
7/20/2009	1	540	12
7/20/2009	1	560	12
7/20/2009	2	470	12
7/20/2009	2	490	12
7/20/2009	2	490	12
7/20/2009	2	490	12
7/20/2009	2	500	12
7/20/2009	2	500	12
7/20/2009	2	510	12
7/20/2009	2	520	12
7/20/2009	1	510	13
7/20/2009	1	520	13
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7/20/2009	1	560	13
7/20/2009	1	560	13
7/20/2009	1	560	13
7/20/2009	1	570	13
7/20/2009	1	570	13
7/20/2009	1	580	13
7/20/2009	1	590	13
7/20/2009	1	600	13
7/20/2009	2	530	13
7/20/2009	2	530	13

7/20/2009	2	540	13
7/20/2009	2	540	13
7/20/2009	2	540	13
7/20/2009	2	550	13
7/20/2009	2	550	13
7/20/2009	2	570	13
7/20/2009	2	570	13
7/20/2009	2	580	13
7/20/2009	2	610	13
7/20/2009	1	530	14
7/20/2009	1	490	22
7/20/2009	1	500	22
7/20/2009	1	500	22
7/20/2009	1	500	22
7/20/2009	1	500	22
7/20/2009	1	510	22
7/20/2009	1	510	22
7/20/2009	1	510	22
7/20/2009	1	510	22
7/20/2009	1	530	22
7/20/2009	1	540	22
7/20/2009	1	550	22
7/20/2009	2	490	22
7/20/2009	2	520	22
7/20/2009	2	520	22
7/20/2009	2	540	22
7/20/2009	2	550	22
7/20/2009	1	570	23
7/20/2009	1	580	23
7/20/2009	2	530	23
7/21/2009	1	430	12
7/21/2009	1	450	12
7/21/2009	1	470	12
7/21/2009	1	480	12
7/21/2009	1	490	12
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8/13/2009	2	500	12
8/13/2009	2	510	12
8/13/2009	2	510	12
8/13/2009	2	520	12
8/13/2009	2	530	12
8/13/2009	2	530	12
8/13/2009	1	420	13
8/13/2009	1	520	13
8/13/2009	1	530	13
8/13/2009	1	530	13
8/13/2009	1	530	13
8/13/2009	1	530	13
8/13/2009	1	540	13
8/13/2009	1	540	13
8/13/2009	1	540	13
8/13/2009	1	540	13
8/13/2009	1	540	13
8/13/2009	1	540	13
8/13/2009	1	550	13
8/13/2009	1	550	13
8/13/2009	1	550	13
8/13/2009	1	550	13
8/13/2009	1	550	13
8/13/2009	1	550	13
8/13/2009	1	550	13
8/13/2009	1	550	13
8/13/2009	1	560	13
8/13/2009	1	560	13
8/13/2009	1	560	13
8/13/2009	1	560	13
8/13/2009	1	570	13
8/13/2009	1	570	13
8/13/2009	1	570	13
8/13/2009	1	570	13

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8/13/2009	1	570	13
8/13/2009	1	580	13
8/13/2009	1	590	13
8/13/2009	1	590	13
8/13/2009	1	590	13
8/13/2009	1	590	13
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8/13/2009	1	600	13
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8/13/2009	2	530	13
8/13/2009	2	530	13
8/13/2009	2	540	13
8/13/2009	2	540	13
8/13/2009	2	540	13
8/13/2009	2	550	13
8/13/2009	2	550	13
8/13/2009	2	550	13
8/13/2009	2	550	13
8/13/2009	2	550	13
8/13/2009	2	550	13
8/13/2009	2	560	13
8/13/2009	2	560	13
8/13/2009	2	560	13
8/13/2009	2	560	13
8/13/2009	2	560	13
8/13/2009	2	570	13
8/13/2009	2	600	13
8/13/2009	2	370	21
8/13/2009	2	370	21
8/13/2009	2	380	21
8/13/2009	2	400	21
8/13/2009	2	400	21
8/13/2009	1	450	22
8/13/2009	1	450	22
8/13/2009	1	450	22
8/13/2009	1	460	22
8/13/2009	1	470	22
8/13/2009	1	480	22
8/13/2009	1	480	22
8/13/2009	1	480	22

8/13/2009	1	480	22
8/13/2009	1	480	22
8/13/2009	1	480	22
8/13/2009	1	490	22
8/13/2009	1	490	22
8/13/2009	1	490	22
8/13/2009	1	500	22
8/13/2009	1	500	22
8/13/2009	1	510	22
8/13/2009	1	510	22
8/13/2009	1	510	22
8/13/2009	1	540	22
8/13/2009	1	540	22
8/13/2009	2	480	22
8/13/2009	2	480	22
8/13/2009	2	480	22
8/13/2009	2	500	22
8/13/2009	2	500	22
8/13/2009	2	510	22
8/13/2009	2	510	22
8/13/2009	2	510	22
8/13/2009	2	510	22
8/13/2009	2	520	22
8/13/2009	2	520	22
8/13/2009	2	530	22
8/13/2009	1	520	23
8/13/2009	1	530	23
8/13/2009	1	540	23
8/13/2009	1	540	23
8/13/2009	1	540	23
8/13/2009	1	560	23
8/13/2009	1	560	23
8/13/2009	1	580	23
8/13/2009	1	580	23
8/13/2009	2	540	23
8/13/2009	2	560	23
8/16/2009	1	330	11
8/16/2009	1	360	11
8/16/2009	1	440	12
8/16/2009	1	450	12
8/16/2009	1	490	12

8/16/2009	1	510	12
8/16/2009	1	510	12
8/16/2009	1	510	12
8/16/2009	1	520	12
8/16/2009	1	520	12
8/16/2009	1	540	12
8/16/2009	2	460	12
8/16/2009	2	470	12
8/16/2009	2	480	12
8/16/2009	2	480	12
8/16/2009	2	480	12
8/16/2009	2	480	12
8/16/2009	2	480	12
8/16/2009	2	490	12
8/16/2009	2	490	12
8/16/2009	2	490	12
8/16/2009	2	500	12
8/16/2009	2	500	12
8/16/2009	2	510	12
8/16/2009	2	520	12
8/16/2009	2	520	12
8/16/2009	2	530	12
8/16/2009	1	530	13
8/16/2009	1	530	13
8/16/2009	1	540	13
8/16/2009	1	540	13
8/16/2009	1	540	13
8/16/2009	1	540	13
8/16/2009	1	550	13
8/16/2009	1	550	13
8/16/2009	1	550	13
8/16/2009	1	550	13
8/16/2009	1	550	13
8/16/2009	1	550	13
8/16/2009	1	550	13
8/16/2009	1	550	13
8/16/2009	1	560	13
8/16/2009	1	560	13
8/16/2009	1	560	13
8/16/2009	1	590	13
8/16/2009	1	620	13
8/16/2009	1	620	13

8/16/2009	2	520	13
8/16/2009	2	520	13
8/16/2009	2	530	13
8/16/2009	2	530	13
8/16/2009	2	540	13
8/16/2009	2	550	13
8/16/2009	2	560	13
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8/16/2009	2	570	13
8/16/2009	2	570	13
8/16/2009	2	580	13
8/16/2009	2	580	13
8/16/2009	2	590	13
8/16/2009	1	370	21
8/16/2009	2	380	21
8/16/2009	2	390	21
8/16/2009	1	460	22
8/16/2009	1	480	22
8/16/2009	1	490	22
8/16/2009	1	490	22
8/16/2009	1	510	22
8/16/2009	1	520	22
8/16/2009	1	520	22
8/16/2009	1	580	22
8/16/2009	2	480	22
8/16/2009	2	480	22
8/16/2009	2	490	22
8/16/2009	2	490	22
8/16/2009	2	500	22
8/16/2009	2	510	22
8/16/2009	2	510	22
8/16/2009	2	550	22
8/16/2009	1	580	23
8/16/2009	1	590	23
8/16/2009	1	600	23
8/16/2009	2	530	23
8/16/2009	2	540	23
8/16/2009	2	570	23

8/17/2009	1	480	12
8/17/2009	1	520	12
8/17/2009	2	470	12
8/17/2009	2	480	12
8/17/2009	2	480	12
8/17/2009	2	520	12
8/17/2009	1	530	13
8/17/2009	1	530	13
8/17/2009	1	550	13
8/17/2009	2	530	13
8/17/2009	2	540	13
8/17/2009	2	540	13
8/17/2009	2	550	13
8/17/2009	2	560	13
8/17/2009	2	560	13
8/17/2009	2	560	13
8/17/2009	2	560	13
8/17/2009	2	570	13
8/17/2009	1	490	22
8/17/2009	1	490	22
8/17/2009	1	520	22
8/17/2009	2	520	22
8/17/2009	2	520	22
8/17/2009	2	520	22
8/17/2009	2	530	23
8/17/2009	2	530	23
8/17/2009	2	550	23
8/18/2009	2	490	12
8/18/2009	2	510	12
8/18/2009	1	540	13
8/18/2009	1	570	13
8/18/2009	1	590	13
8/18/2009	2	520	13
8/18/2009	2	540	13
8/18/2009	2	540	13
8/18/2009	2	540	13
8/18/2009	2	560	13
8/18/2009	1	520	22
8/18/2009	2	460	22
8/18/2009	2	470	22
8/18/2009	2	490	22

8/18/2009	2	520	22
8/18/2009	2	520	22
8/23/2009	1	470	12
8/23/2009	1	500	12
8/23/2009	1	520	12
8/23/2009	1	520	12
8/23/2009	2	480	12
8/23/2009	2	510	12
8/23/2009	2	520	12
8/23/2009	1	520	13
8/23/2009	1	530	13
8/23/2009	1	540	13
8/23/2009	1	540	13
8/23/2009	1	540	13
8/23/2009	1	560	13
8/23/2009	1	570	13
8/23/2009	2	500	13
8/23/2009	2	520	13
8/23/2009	2	530	13
8/23/2009	2	530	13
8/23/2009	2	540	13
8/23/2009	2	540	13
8/23/2009	2	550	13
8/23/2009	2	570	13
8/23/2009	2	580	13
8/23/2009	1	510	22
8/23/2009	2	490	22
8/23/2009	2	510	22
8/23/2009	2	510	22
8/24/2009	1	490	12
8/24/2009	1	500	12
8/24/2009	2	500	12
8/24/2009	2	520	12
8/24/2009	1	530	13
8/24/2009	1	530	13
8/24/2009	1	560	13
8/24/2009	1	560	13
8/24/2009	1	580	13
8/24/2009	1	590	13
8/24/2009	2	520	13
8/24/2009	2	540	13

8/24/2009	2	560	13
8/24/2009	2	560	13
8/24/2009	2	580	13
8/24/2009	1	480	22
8/24/2009	1	500	22
8/24/2009	1	520	22
8/24/2009	2	490	22
8/24/2009	2	490	22
8/24/2009	1	500	23
8/24/2009	1	540	23
8/24/2009	1	570	23
8/24/2009	2	510	23
8/24/2009	2	530	23
8/24/2009	2	530	23
8/25/2009	1	470	12
8/25/2009	1	500	12
8/25/2009	1	500	12
8/25/2009	1	520	12
8/25/2009	2	460	12
8/25/2009	2	470	12
8/25/2009	2	490	12
8/25/2009	1	530	13
8/25/2009	1	540	13
8/25/2009	1	540	13
8/25/2009	1	550	13
8/25/2009	1	550	13
8/25/2009	1	560	13
8/25/2009	1	560	13
8/25/2009	1	560	13
8/25/2009	1	580	13
8/25/2009	2	490	13
8/25/2009	2	510	13
8/25/2009	2	530	13
8/25/2009	2	540	13
8/25/2009	2	560	13
8/25/2009	2	560	13
8/25/2009	2	590	13
8/25/2009	2	500	22
8/25/2009	1	590	23
8/25/2009	2	540	23
8/26/2009	2	520	12

8/26/2009	1	520	13
8/26/2009	1	550	13
8/26/2009	1	560	13
8/26/2009	1	580	13
8/26/2009	1	580	13
8/26/2009	1	580	13
8/26/2009	1	620	13
8/26/2009	2	530	13
8/26/2009	2	540	13
8/26/2009	2	540	13
8/26/2009	2	550	13
8/26/2009	2	550	13
8/26/2009	2	550	13
8/26/2009	2	570	13
8/26/2009	1	490	22
8/26/2009	1	510	22
8/26/2009	2	520	22
8/30/2009	1	490	12
8/30/2009	1	510	12
8/30/2009	2	510	12
8/30/2009	1	520	13
8/30/2009	1	530	13
8/30/2009	1	540	13
8/30/2009	1	560	13
8/30/2009	1	570	13
8/30/2009	2	530	13
8/30/2009	2	530	13
8/30/2009	2	540	13
8/30/2009	1	490	22
8/30/2009	1	500	22
8/30/2009	2	500	22
8/30/2009	2	510	22
8/30/2009	2	530	23
8/30/2009	2	530	23
8/30/2009	2	540	23
8/30/2009	2	550	23
8/31/2009	1	510	12
8/31/2009	1	520	12
8/31/2009	1	520	13
8/31/2009	1	550	13
8/31/2009	1	550	13

8/31/2009	1	570	13
8/31/2009	1	570	13
8/31/2009	1	590	13
8/31/2009	2	530	13
8/31/2009	2	530	13
8/31/2009	2	530	13
8/31/2009	2	540	13
8/31/2009	2	550	13
8/31/2009	2	550	13
8/31/2009	2	560	13
8/31/2009	2	600	13
8/31/2009	1	450	22
8/31/2009	1	510	22
8/31/2009	1	520	22
8/31/2009	1	540	23
9/1/2009	2	540	13
9/2/2009	1	510	12
9/2/2009	1	520	12
9/2/2009	1	560	13
9/2/2009	1	570	13
9/2/2009	1	600	13
9/2/2009	2	530	13
9/2/2009	2	540	13
9/2/2009	2	540	13
9/2/2009	2	550	13
9/2/2009	2	550	13
9/2/2009	2	560	13
9/2/2009	1	510	22
9/2/2009	2	510	22
9/2/2009	2	530	22
9/2/2009	1	560	23
9/2/2009	1	580	23
9/2/2009	1	590	23
9/2/2009	2	520	23
9/6/2009	1	520	12
9/7/2009	1	520	12
9/9/2009	1	480	12
9/9/2009	1	490	12
9/9/2009	1	490	12
9/9/2009	1	520	12
9/9/2009	1	530	13

9/9/2009	1	530	13
9/9/2009	1	530	13
9/9/2009	1	540	13
9/9/2009	1	540	13
9/9/2009	1	550	13
9/9/2009	1	560	13
9/9/2009	1	560	13
9/9/2009	1	560	13
9/9/2009	1	560	13
9/9/2009	1	560	13
9/9/2009	1	570	13
9/9/2009	1	570	13
9/9/2009	1	570	13
9/9/2009	1	570	13
9/9/2009	1	570	13
9/9/2009	1	580	13
9/9/2009	1	580	13
9/9/2009	1	580	13
9/9/2009	1	580	13
9/9/2009	1	590	13
9/9/2009	1	600	13
9/9/2009	1	600	13
9/9/2009	1	600	13
9/9/2009	1	620	13
9/9/2009	1	620	13
9/9/2009	1	620	13
9/9/2009	1	630	13
9/9/2009	2	540	13
9/9/2009	2	540	13
9/9/2009	2	550	13
9/9/2009	2	550	13
9/9/2009	2	550	13
9/9/2009	2	560	13
9/9/2009	2	570	13
9/9/2009	2	600	13
9/9/2009	1	490	22
9/9/2009	1	490	22
9/9/2009	1	500	22
9/9/2009	1	520	22
9/9/2009	1	520	22
9/9/2009	2	450	22

9/9/2009	2	520	22
9/9/2009	2	530	22
9/9/2009	1	550	23
9/9/2009	1	580	23
9/9/2009	1	600	23
9/9/2009	2	510	23
9/13/2009	1	560	13
9/13/2009	1	590	13
9/13/2009	2	480	13
9/13/2009	2	490	13
9/13/2009	2	530	13
9/13/2009	2	540	13
9/13/2009	2	360	21
9/13/2009	2	500	22
9/13/2009	2	510	22
9/14/2009	1	510	12
9/14/2009	1	510	13
9/14/2009	1	520	13
9/14/2009	1	530	13
9/14/2009	1	540	13
9/14/2009	1	580	13
9/14/2009	1	600	13
9/14/2009	2	540	13
9/14/2009	2	570	13
9/14/2009	2	570	13
9/14/2009	2	570	13
9/14/2009	2	590	13
9/14/2009	2	530	22
9/14/2009	2	590	23

*** SEX CODE (1=M, 2=F)**

Appendix E. 2009 Klag Bay sport and subsistence harvest data.

	Type of Fishery					Total Harvest by Species				
Date	Subsistence/Sport	Gear Used	# of Gear	Hours Fished with gear	Total Hours Fished	Sockeye	Coho	Chum	Chinook	Pink
30-Jun	SUB	GN	1	4	4	42	0	0	0	0
2-Jul	SUB	BS	1	5	5	200	0	0	0	0
	SPT	RD	2	2	2	0	0	0	0	0
	SUB	GN	2	2		33	0	0	0	0
4-Jul	SUB	BS	1	3	3	50	0	0	0	0
	SUB	GN	1	8	8	33	1	0	0	0
5-Jul	SUB	GN,RD	4	3	12	100	0	0	0	0
8-Jul	SPT	RD	2	2	4	3	0	0	0	0
9-Jul	SUB	BS	1	4	4	297	0	0	0	0
	SPT	GN	1	5	5	33	0	0	0	0
10-Jul	SUB	BS	1			450	0	0	0	0
	SUB	GN	1	5	5	168	0	0	0	0
	SPT	RD	1	6.5	6.5	5	0	0	0	0
	SPT	RD	2	4	8	0	0	0	0	0
	SUB	BS	1	7	7	93	0	0	0	0
11-Jul	SUB	BS	1	6	6	292	0	0	0	0
	SUB	BS	1	4.5	4.5	300	12	1	0	2
	SUB	BS	1	3.5	3.5	150	3	0	0	0
	SUB	BS	1	1	1	190	0	0	0	0
	SUB	GN	1	2	2	100	0	0	0	0

12-Jul	SUB	GN	1			92	0	0	0	0
	SPT	RD	2	1	2	0	0	0	0	0
13-Jul	SUB	GN	1	3	3	30	0	0	0	0
14-Jul	SUB	BS	1	1	1	337	0	0	0	0
	SUB	BS	1	5	5	293	0	0	0	0
	SUB	BS	1	5	5	65	0	0	0	0
	SUB	BS	1	5	5	297	0	0	0	0
	SPT	RD	2	6	12	62	1	0	0	0
16-Jul	SPT	RD	2	1	2	51	1	0	0	0
17-Jul	SUB	BS	1	5	5	475	0	0	0	0
	SUB	BS	1	5	5	230	0	0	0	0
	SPT	RD	3	2	6	5	0	0	0	0
18-Jul	SPT	RD	6	6	36	30	0	0	0	0
	SPT	RD	2	2	4	5	0	0	0	0
24-Jul	SUB	BS	1	5	5	900	0	0	0	0
	SUB	GN	3	7	21	236	0	0	0	0
	SUB	BS,RD	3	4	12	50	0	0	0	0
	SUB	BS	1	5	5	350	0	0	0	0
26-Jul	FISHERY CLOSED UNTIL FURTHER NOTICE									

Appendix F. 2006 Daily weir count (sockeye salmon).

Date	Sockeye	Coho	King	Chum	Pink	Dolly Varden
30-Jun	0	0	0	0	0	0
1-Jul	0	0	0	0	0	0
2-Jul	0	0	0	0	0	0
3-Jul	0	0	0	0	0	0
4-Jul	0	0	0	0	0	0
5-Jul	0	0	0	0	0	0
6-Jul	0	0	0	0	0	0
7-Jul	0	0	0	0	0	0
8-Jul	0	0	0	0	0	0
9-Jul	0	0	0	0	0	0
10-Jul	0	0	0	0	0	0
11-Jul	0	0	0	0	0	0
12-Jul	0	0	0	0	0	0
13-Jul	0	0	0	0	0	0
14-Jul	0	0	0	0	0	0
15-Jul	0	0	0	0	0	0
16-Jul	0	0	0	0	0	0
17-Jul	0	0	0	0	0	0
18-Jul	0	0	0	0	0	0
19-Jul	0	0	0	0	0	9
20-Jul	78	2	0	0	0	5
21-Jul	28	0	0	0	0	1
22-Jul	2	0	0	0	0	0
23-Jul	239	57	0	0	0	25
24-Jul	117	0	0	0	0	2
25-Jul	21	6	0	0	0	4
26-Jul	39	0	0	0	0	1
27-Jul	272	1	0	0	0	1

28-Jul	104	3	0	0	0	1
29-Jul	53	1	0	0	0	1
30-Jul	4	0	0	0	0	2
31-Jul	13	0	0	0	0	2
1-Aug	0	0	0	0	0	2
2-Aug	3	0	0	0	0	1
3-Aug	0	0	0	0	0	0
4-Aug	0	0	0	0	0	0
5-Aug	0	0	0	0	0	0
6-Aug	0	0	0	0	0	0
7-Aug	0	0	0	0	0	0
8-Aug	0	0	0	0	0	1
9-Aug	4	12	0	0	1	3
10-Aug	22	57	0	0	6	2
11-Aug	50	67	0	0	4	6
12-Aug	51	53	0	0	0	14
13-Aug	153	75	0	0	2	0
14-Aug	190	24	0	0	0	1
15-Aug	261	47	0	0	0	0
16-Aug	3126	435	0	0	439	20
17-Aug	1174	42	0	0	215	10
18-Aug	1368	96	0	0	743	2
19-Aug	2202	315	0	0	1850	18
20-Aug	342	55	0	0	183	2
21-Aug	375	204	0	0	148	8
22-Aug	363	70	0	0	289	9
23-Aug	134	41	0	0	51	4
24-Aug	163	16	0	0	36	0
25-Aug	348	26	0	0	67	2
26-Aug	874	109	0	0	353	3

27-Aug	77	55	0	0	212	1
28-Aug	814	206	0	0	1199	4
29-Aug	829	117	0	0	4745	0
30-Aug	280	68	0	0	1733	0
31-Aug	45	30	0	0	149	0
1-Sep	9	8	0	0	35	0
2-Sep	21	18	0	0	119	6
3-Sep	128	8	0	0	38	14
4-Sep	35	21	0	0	74	22
5-Sep	5	9	0	0	42	44
6-Sep	1	2	0	0	53	16
7-Sep	1	5	0	0	61	12
8-Sep	0	1	0	0	17	10
9-Sep	63	1	0	0	55	3
10-Sep	202	83	0	0	2137	72
11-Sep	125	71	0	0	628	66
12-Sep	7	2	0	0	57	14
13-Sep	10	10	0	0	132	12
14-Sep	16	10	0	0	60	5
Total	**14841**	**2539**	**0**	**0**	**15933**	**463**