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Abundance and Run Timing of Adult Salmon in Long Lake in the
Wrangell-St. Elias National Park and Preserve: 2004-2006 Final Report.

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TABLE OF CONTENTS

TABLE OF CONTENTS	iii
TABLE OF FIGURES	iv
LIST OF TABLES.....	iv
LIST OF APPENDICES	iv
INTRODUCTION	1
Background	1
OBJECTIVES.....	4
METHODS.....	5
<i>Site Description</i>	5
<i>Biological Data</i>	7
RESULTS.....	9
<i>Weir Operation</i>	9
<i>Biological Data</i>	10
<i>Run Timing</i>	15
DISCUSSION.....	16
RECOMMENDATIONS	17
ACKNOWLEDGMENTS.....	18
LITERATURE CITED	18

TABLE OF FIGURES

Figure 1. Salmon spawning in Long Lake in April, 2004.....	3
Figure 2. Cliff Collins at the weir at age 93 with Karelian bear dog.....	4
Figure 4. Long Lake weir, 2006.....	6
Figure 5. Sampling box and weir, 2006.....	7
Figure 6. Staff gauge at Long Lake weir, 2006.....	8
Figure 7. Daily staff gauge readings at Long Lake weir, 2006.....	9
Figure 8. Comparison of 2004, 2005 and 2006 staff gauge readings.	10
Figure 9. Daily water temperature, 2005 and 2006.....	11
Figure 10. Daily sockeye salmon count, 2004-2006.	11
Figure 11. Long Lake weir sockeye salmon estimates, 1974-2006.	12
Figure 12. Comparison between Long Lake weir and Miles Lake sonar annual sockeye salmon estimates (1978-2006).	12
Figure 13. Average migratory run timing for 1974-2006, and annual run timing for 2004, 2005, and 2006....	16

LIST OF TABLES

Table 1. Long Lake weir counts and sonar estimates, 1974-2006.....	2
Table 2. Numbers by sex and age, entire 2006 field season.....	13
Table 3. Length by sex and age, August 16 – September 22, 2006	13
Table 4. Numbers by sex and age, entire 2005 field season.....	14
Table 5. Length by sex and age, August 11 – September 20, 2005.	14
Table 6. Numbers by sex and age, entire 2004 field season.....	15
Table 7. Length by sex and age, July 15-October 21, 2004.	15
Table 8. Annual date of arrival of the first sockeye salmon, and median point of the sockeye migration past the Long Lake weir.	16

LIST OF APPENDICES

Appendix A. Daily and cumulative sockeye and coho salmon weir counts, Long Lake, 2004.	19
Appendix B. Sockeye and coho salmon daily and cumulative weir counts, Long Lake, 2005.	22
Appendix C. Daily and cumulative sockeye and coho salmon weir counts, Long Lake, 2006	25
Appendix D. Age, sex and length data for sockeye salmon, Long Lake weir, 2006. Ages reported in European notation, where first number is freshwater annuli and second is saltwater annuli....	28

INTRODUCTION

The upper Copper River drainage provides spawning habitat for sockeye salmon *Oncorhynchus nerka*, coho salmon *O. kisutch*, and Chinook salmon *O. tshawytscha*. Significant numbers of adult salmon are harvested in commercial drift gillnet operations near the mouth of the Copper River from mid-May to September. Salmon escapement into the upper Copper River system contributes to federal and state subsistence fishing through September each year. The monitoring and evaluation of these runs is essential to ensure that Wrangell - St. Elias National Park and Preserve (WRST) maintains natural and healthy populations of fish as required by the Alaska National Interest Lands Conservation Act (ANILCA).

Accurate assessment of yearly run strength and migratory timing in tributaries to the Copper River is essential to the development of a management strategy that meets the mandates of ANILCA. Upper Copper River sockeye salmon populations are of particular importance to both federally qualified and state subsistence users. The primary assessment of inriver abundance for Copper River sockeye salmon occurs at the Miles Lake sonar. However, migratory timing of sockeye salmon into the Copper River is prolonged (May-August), and subsequent assessments of escapement into some drainages are needed to determine spawning distribution. Miles Lake sonar is typically shut down on August 15 each year, after most sockeye salmon have migrated through. At least some of the Long Lake sockeye salmon escapement enters the Copper River after the sonar counter has been pulled from the river.

Thirty-two years of weir data have documented annual variations in the abundance of Long Lake runs ranging from 4,400 to over 50,000 sockeye salmon (Table 1). This is the longest running data set of sockeye salmon weir counts in the Copper River drainage. The sockeye salmon stock that spawns within Long Lake is the largest salmon stock within the Chitina River drainage. The magnitude of escapement, and its contribution to the total Copper River inriver run, has been highly variable (Table 1). The largest measured escapement (50,000) into Long Lake occurred in 2002 and composed 6% of the estimated total inriver run to the entire Copper River. During the period 1978-1980, total inriver runs to the Copper River were very low, and Long Lake escapements comprised 14-19% of these total runs. Since 1981, escapements into Long Lake have comprised no more than 6% of total inriver runs, and there does not appear to be a relationship between the magnitude of total inriver run and escapement into Long Lake during this 25-year period. Lack of such a relationship demonstrates the need for stock specific monitoring sites in addition to broad scale monitoring of mixed stock total returns at Miles Lake.

Background

The Long Lake population has the longest known annual spawning duration (August through April) of any sockeye salmon population in North America. (Ken Roberson, retired, Alaska Department of Fish and Game, personal communications) Throughout the winter, sockeye spawn in the northwest corner of the lake, which rarely freezes (Figure 1).

Table 1. Long Lake weir and Miles Lake sonar sockeye salmon counts, 1974-2006. Miles Lake sonar counts obtained from Alaska Department of Fish and Game.

Year	Number of Sockeye Salmon		Long Lake % of Sonar Estimates
	Miles Lake Sonar	Long Lake Weir	
1974	-	4,684	-
1975	-	6,768	-
1976	-	24,689	-
1977	-	8,624	-
1978	107,011	15,458	14.4
1979	237,173	46,110	19.4
1980	276,538	39,038	14.1
1981	535,263	12,659	2.4
1982	467,306	28,047	6.0
1983	545,724	28,133	5.2
1984	536,806	10,637	2.0
1985	436,313	21,131	4.8
1986	509,275	16,997	3.3
1987	483,478	13,633	2.8
1988	488,398	7,543	1.5
1989	607,797	14,981	2.5
1990	581,895	21,664	3.7
1991	579,435	11,511	2.0
1992	601,952	10,091	1.7
1993	797,902	16,101	2.0
1994	715,181	18,289	2.6
1995	599,265	17,923	3.0
1996	906,867	6,309	0.7
1997	1,148,079	4,443	0.4
1998	866,957	8,441	1.0
1999	848,921	12,922	1.5
2000	587,592	8,645	1.5
2001	833,569	26,999	3.2
2002	819,000	49,747	6.1
2003	695,233	4,604	0.7
2004	669,646	19,215	2.9
2005	854,268	7,770	0.9
2006	959,731	9,239	1.0

The Alaska Department of Fish and Game (ADF&G), Commercial Fisheries Division, initially operated the Long Lake weir in 1974 and 1975. From 1976 through 2002, the weir was operated by Cliff Collins, owner of the land where the weir is located. Mr. Collins voluntarily took over operation of the weir in 1976 when ADF&G was no longer able to fund the project (Figure 2). In 2003 when Mr. Collins, at age 93, was no longer able to operate the weir, a cooperative agreement was formed between the Collins' Family Trust, Wrangell-St. Elias National



Figure 1. Salmon spawning in Long Lake in April, 2004.

Park/Preserve and the Copper River Watershed Project to keep the weir operating. Since 2004, funding has been provided under the Subsistence Fisheries Resource Monitoring Program¹.

The physical structure of the weir has changed little since 1974. A small sampling box was constructed on the upstream side of the middle of the weir in 2003. In 2004 a larger sampling box was constructed against the west bank of the creek on the upstream side of the weir. This larger box was also used in 2005 and 2006.

The escapement has varied from a low of 4,443 sockeye salmon in 1997 to a high of 49,747 sockeye salmon in 2001. The mean number of fish counted at the weir for this 30 year period was 17,226 (Table 1). The date of the migration of the first fish through the weir has ranged between July 26 in 1984 to August 15 in 1993; with an average date of around August 5.

Starting in 2003, the weir operators began sampling sockeye salmon for age, sex, and length composition information according to a sampling protocol established by ADFG.

¹ Administered by U.S. Fish and Wildlife Service, Office of Subsistence Management.

OBJECTIVES

- 1) Monitor annual abundance and timing of sockeye and other salmon in Long Lake.
- 2) Enumerate the number of sockeye salmon entering Long Lake from July 1 to mid-September, thereby continuing a data set initiated in 1974.
- 3) Measure the entry pattern of sockeye salmon into Long Lake and compare the entry pattern to the historic entry pattern data set to test for change in interannual run timing.
- 4) Estimate age-sex-length composition of the Long Lake sockeye salmon population.
- 5) Compare the number of sockeye salmon entering Long Lake with data from the Miles Lake sonar project.



Figure 2. Cliff Collins at the weir at age 93 with Karelian bear dog.

This report presents a summary of assessment results for sockeye salmon escapements into Long Lake during the period 2004-2006. During these years, escapement assessments were conducted by the National Park Service (NPS) through a weir, and were funded by the Office of Subsistence Management (OSM). This report serves as the final deliverable for funded work through 2006. Additionally, conclusions and recommendations for management and further assessment work are presented from synthesis of the entire data set.

METHODS

Site Description

Long Lake, located at 480 m above sea level, at latitude 61 deg 23' 1.68" N and longitude 143 degrees 17' 15.89" W, flows into the Lakina River, a tributary of the Chitina River in the Copper River drainage (Figure 2). Long Lake is located adjacent to the McCarthy Road and is 0.5 km wide and 8.5 km long. The outlet stream (referred to as Salmon Creek by the Collins family) runs 2.1 km through nearly level terrain into the Lakina River. Willows, alders, mosses and sedges dominate the vegetation. White spruce is the primary evergreen with stands of paper birch and quaking aspen interspersed. The soils are poorly drained. Annual precipitation in the area averages 40.11 cm, and the ambient temperature ranges from a high of 13.39° C to a low of -27.06° C. Average annual temperature is 22° C (USDA 1979).

The project uses a rigid picket weir to count the number of salmon migrating into Long Lake and to determine the age, sex and length of a portion of the salmon migrating through the weir. The weir site is on Collins Family Trust land and is located within a few hundred meters of the Collins family residence, at mile 45 on the McCarthy Road (Figure 3).



Figure 3. Long Lake weir site.

The rigid picket weir, with a picket spacing of 3.75 cm, is operated at the outlet of the lake (Figure 4). To count fish, one or two pickets are removed, which allows fish to swim through the opening and be counted. The weir is monitored daily and all pickets are kept in place when it is not being monitored.



Figure 4. Long Lake weir, 2006.

The site is extremely conducive to the operation of a rigid picket weir. Flows fluctuate only slightly, water velocity is always low, and the stream is shallow and easily waded. A walkway lays across the upstream side of the weir where a crew member can stand and count migrating salmon after removing one or two pickets from the weir.

In 2004, 2005 and 2006, a large sampling box with a funnel-shaped entry trap, approximately 2.1 m x 3.1 m in size, was erected, with the northwestern creek bank as one side of the box. A table constructed at one end was used by field technicians when collecting scales from and measuring salmon (Figure 5).

To allow salmon into the sampling box, one to two pickets on the west side of the weir were removed. After 20-50 salmon swam through into the entry trap into the sampling area, the weir



Figure 5. Sampling box and weir, 2006.

pickets were replaced, trapping the salmon within the box. Sampling was typically performed with a crew of three. In 2006, the weir and sampling box were installed on July 13. Work at the weir ended on October 11, when flooding caused damage to the weir.

Bears have frequently been a problem at the weir site. The Collins family has several Karelian bear dogs (Figure 2) that were staked out near the weir when salmon were being sampled or counted. An electric fence was installed around the weir and sampling box for the entire 2006 field season to prevent bears from damaging the weir and eating salmon captured in the sampling box.

A *HOBOTM* data logger was placed in a submersible case near the weir to collect water temperature data throughout the summer. Water levels were determined by reading a staff gauge daily (Figure 6).

Biological Data

All fish migrating through the weir were counted and identified to species. Sockeye salmon were sampled for biological data using sampling protocols obtained from ADF&G, Division of



Figure 6. Staff gauge at Long Lake weir, 2006.

Commercial Fisheries Division, Cordova, Alaska. Age, sex and length of the sockeye salmon population passing the weir was estimated by setting initial goals based on achieving a 10 percent sample of the average total run. During the season, a minimum of 100 sockeye salmon were sampled per week, with no more than 100 being sampled per day. When smaller numbers of sockeye salmon were present, all of them were sampled. In 2006, sampling occurred from August 16 through September 22. By the end of this period, 89% of the run had been counted.

Two lengths measurements, both recorded to the nearest mm, were made for each salmon: mid-eye to fork length (MEF) and mid-eye to posterior insertion of the anal fin (anal). Sockeye salmon were sexed using external characteristics, and a scale was removed from each salmon for determination of age. Scales were collected from the preferred area on the left side of each salmon, 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. Ages were determined from scales by the ADF&G Commercial Fisheries Division staff in Cordova. Ages were adjusted for reabsorbed scale margins using a length-at-age relationship developed for scales that were not reabsorbed.

To determine whether the 1978-2006 time series of sockeye salmon escapements into Long Lake showed linear trends over years, the coefficient of determination (R^2) was calculated to determine the amount of variation explained by the regression, and an F test was used to test the

null hypothesis that the slope of the fitted line was equal to zero. Similar statistical analyses were applied to 1978-2006 inriver runs at the Miles Lake sonar site. To determine whether sockeye salmon escapements into Long Lake were correlated with total inriver runs at Miles Lake, the correlation coefficient (R) for 1978-2006 paired estimates was calculated. All statistical significance testing was done at the 95% level.

RESULTS

Weir Operation

In 2006, daily staff gauge readings between July 31 and October 7 showed a maximum variation of 2.15 feet (Figure 7). The water level was normal throughout the summer until late September when rain and high temperatures melted snow and caused flooding throughout the Copper basin (Figure 8). Staff gauge data was lost² for October 8-10, but an undocumented report indicated the weir was completely submerged in over 4 feet of water.

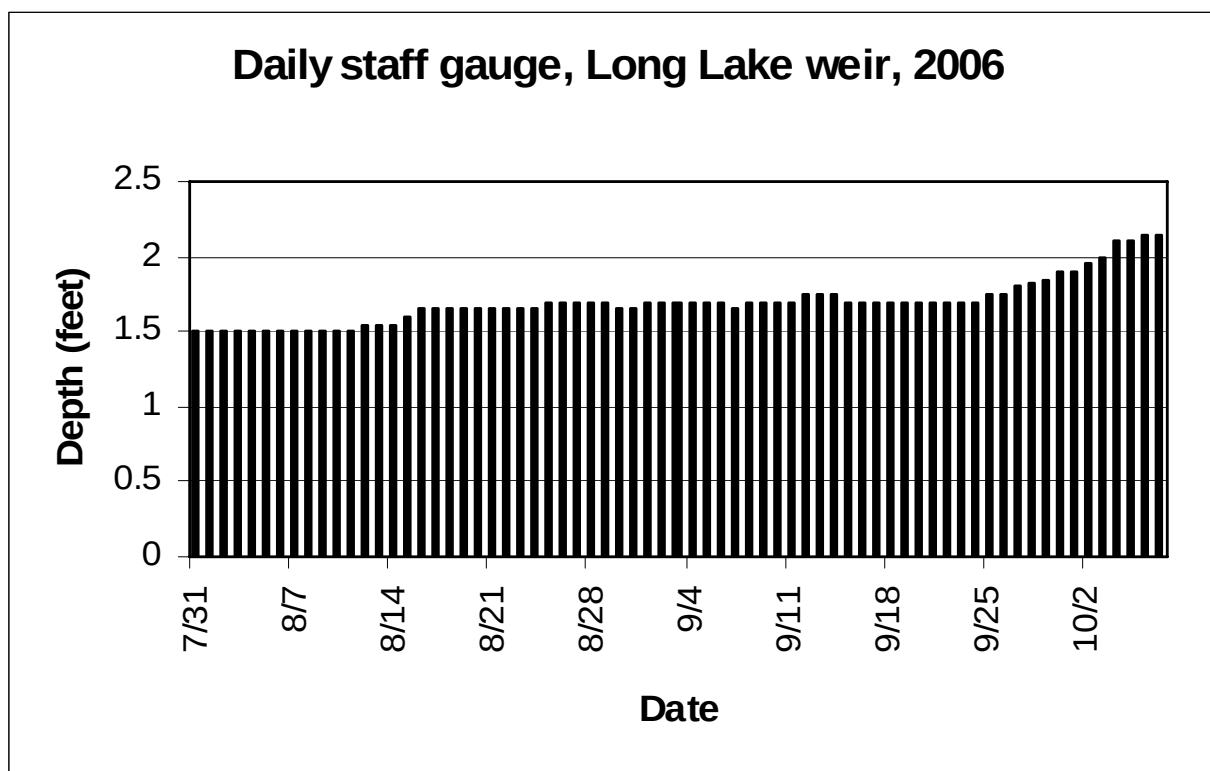


Figure 7. Daily staff gauge readings at Long Lake weir, 2006.

² The home of the crewmember working on the weir was lost down river in the flooding of the Lakina River and her field notes for the end of the season were in the house.

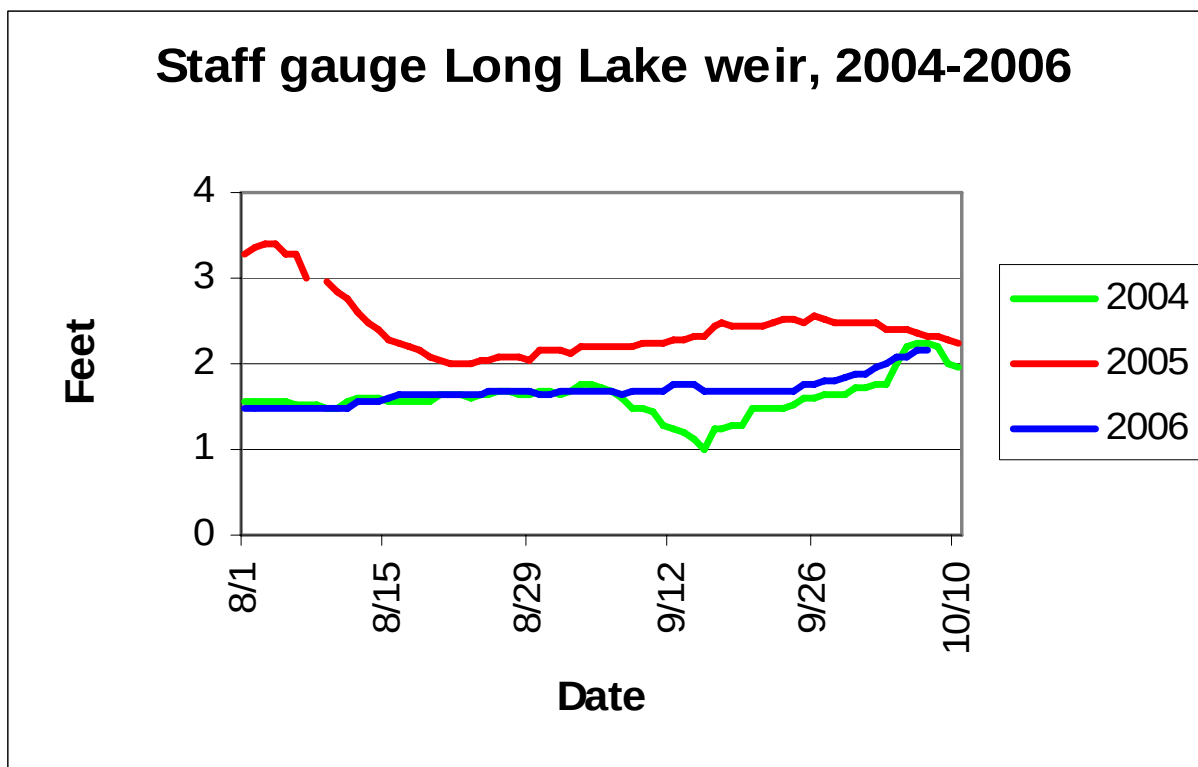


Figure 8. Comparison of 2004, 2005 and 2006 staff gauge readings.

In 2006, water temperatures at the weir site generally decreased by about 20 F° degrees during the counting season, ranging from about 65 F° to 45 F° (Figure 9). Water temperatures in 2005 were generally higher than those in 2006 during June through August, and similar to those in 2006 for the remainder of the season.

Biological Data

In 2006, 9,239 sockeye salmon were counted through the Long Lake weir (Figure 10 and Appendix C). Of these, 1,155 sockeye salmon were sampled for sex, length, and age, which represented 12.5% of the total escapement. Between September 20 and October 10, 316 coho salmon were counted.

Sockeye returns to Long Lake during the 33 year period of weir operations have been highly variable, ranging from a high of 50,000 in 2002 to a low of 4,443 in 1997 (Figure 11). The number of sockeye salmon counted through the weir in 2006 was approximately 55% of the 33 year average of 16,759 sockeye salmon.

During 1978-2006, Long Lake escapements counts represented an average of 3.9% of the total inriver run estimated by the Miles Lake sonar project, but ranged from 0.4% to 19.4% of the total inriver run (Table 1). Long Lake escapements showed no significant ($p > 0.05$) abundance trend during this time period ($R^2 = 0.100$), while Miles Lake estimates show a significant ($p < 0.05$) trend ($R^2 = 0.649$) of increasing abundance. A significant ($p < 0.05$) negative correlation ($R = 0.382$)

was found between Long Lake escapements and Miles Lake estimates for these years (Figure 12).

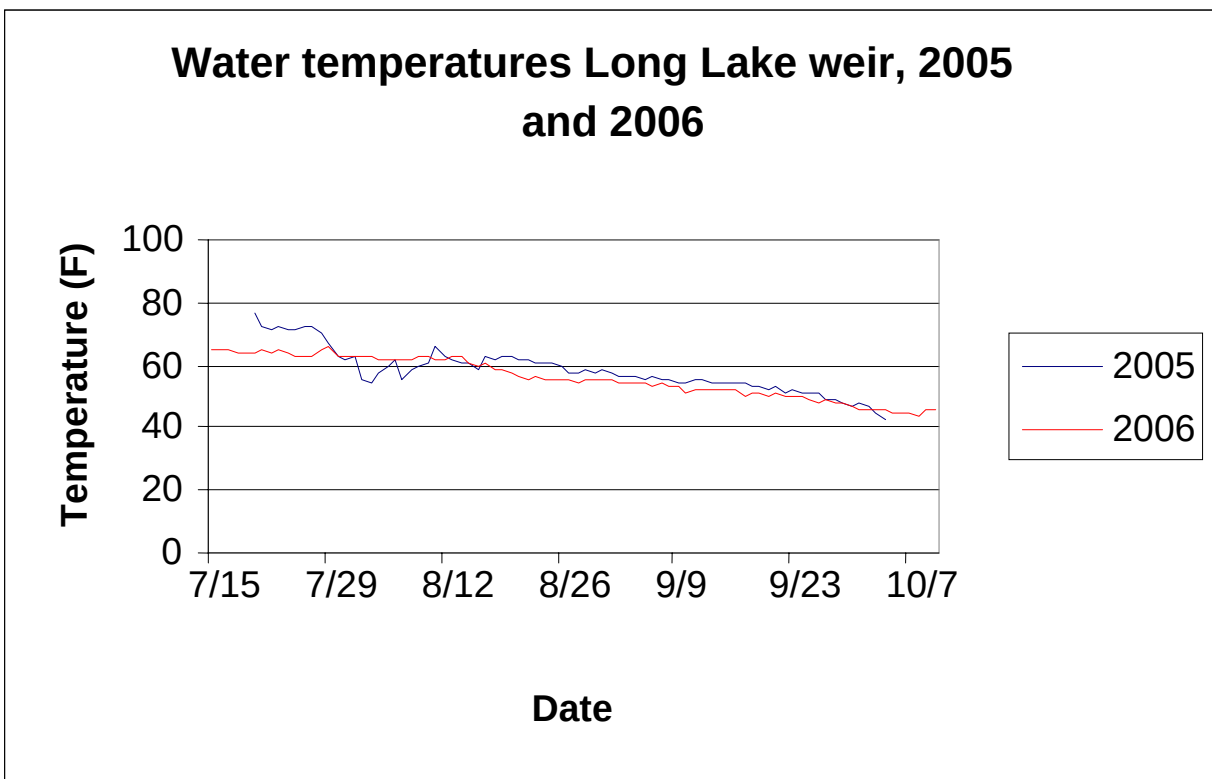


Figure 9. Daily water temperature, 2005 and 2006.

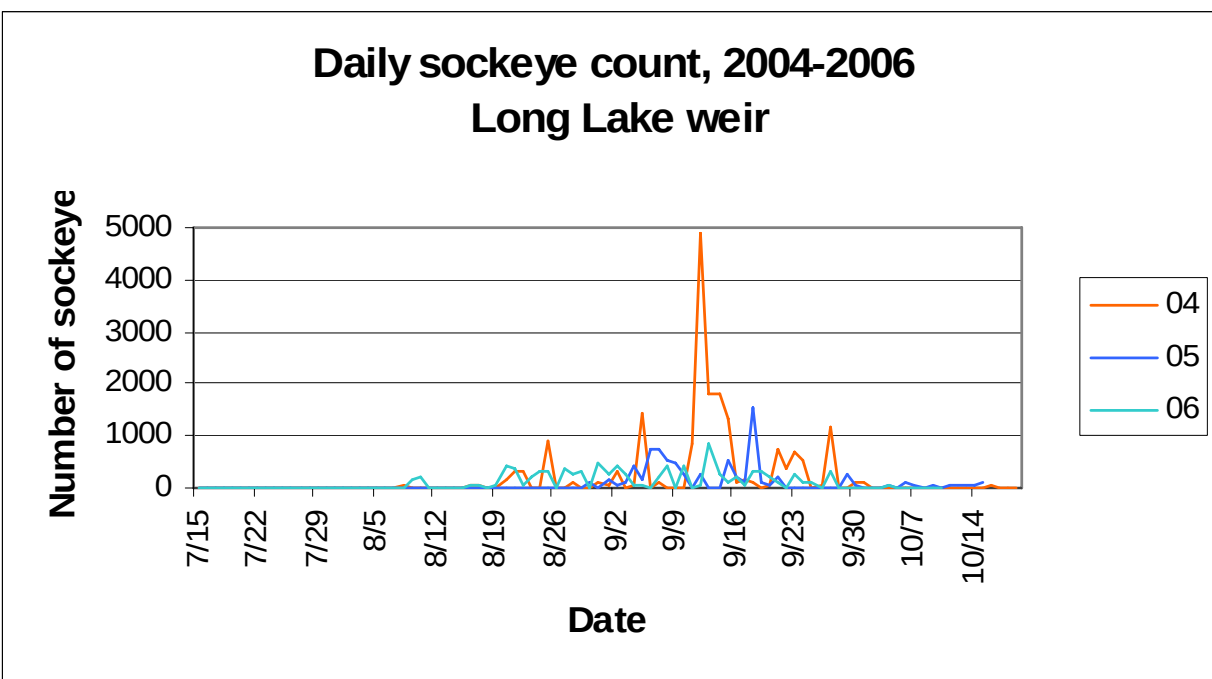


Figure 10. Daily sockeye salmon count, 2004-2006.

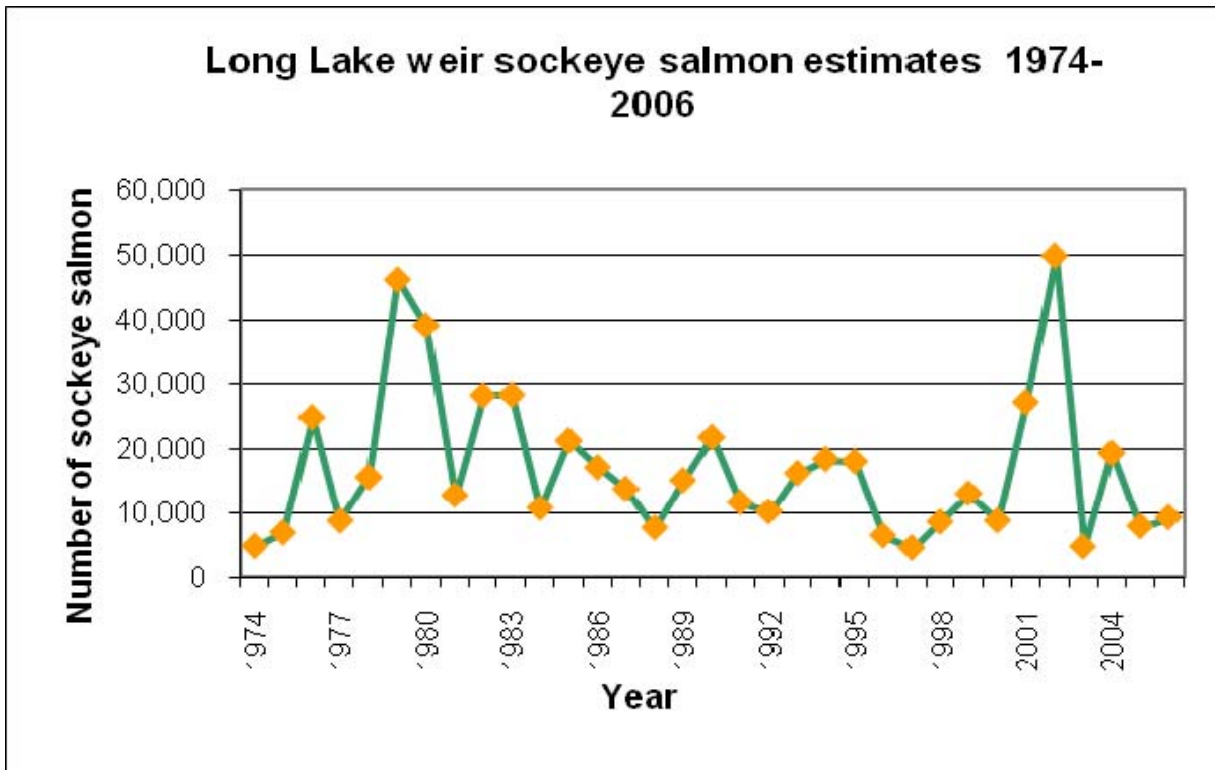


Figure 11. Long Lake weir sockeye salmon estimates, 1974-2006.

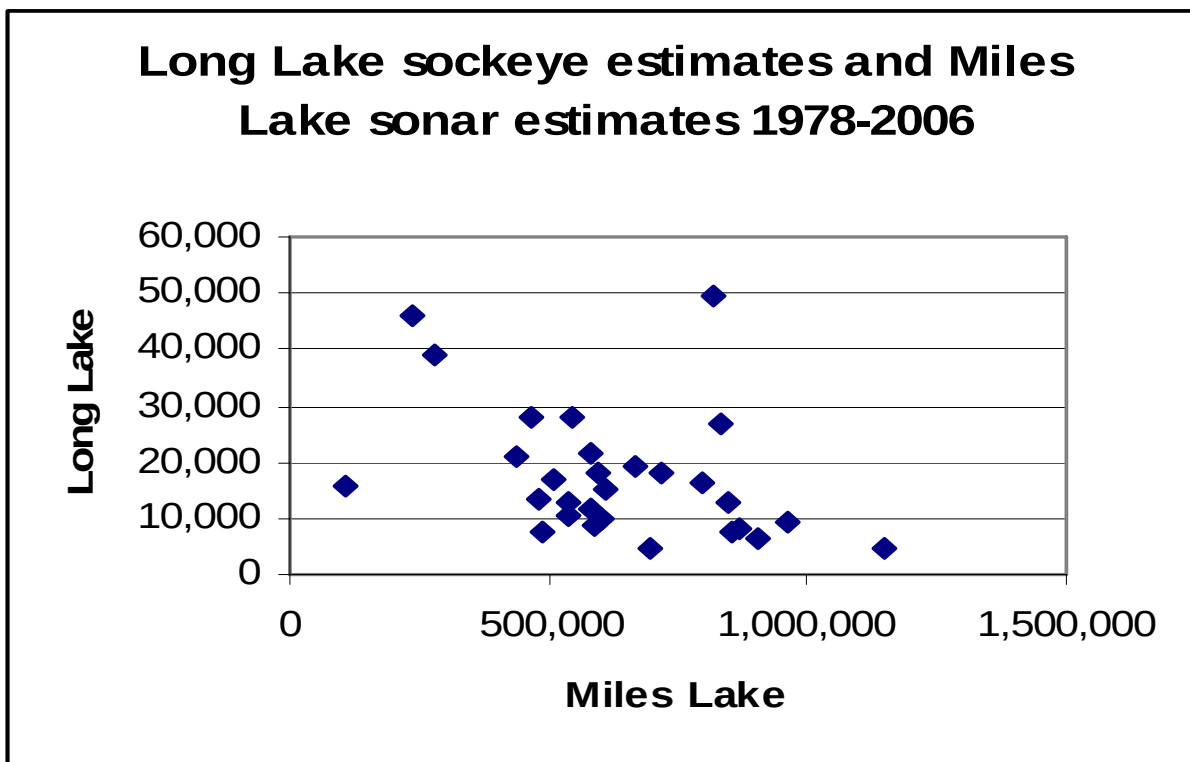


Figure 12. Comparison between Long Lake weir and Miles Lake sonar annual sockeye salmon estimates (1978-2006).

In 2006, sockeye salmon that were age 1.3 comprised 45.1% of the total sample taken (Table 2). The mean length of age-1.3 males was 570 mm, while the mean of age-1.3 females was 559 mm (Table 3).

Table 2. Numbers by sex and age, entire 2006 field season.

Sample dates: August 16 – September 22, 2006											
Sex		Age Class								Total Fish Counted	Number of fish sampled
		0.2	0.3	1.1	1.2	1.3	2.1	2.2	2.3		
Female	Percent	0	0	0	39.7	43	0	8.6	9.0	4,090	433
	Number	0	0	0	172	186	0	37	38		
	SE	0	0	0	.04	.04	0	.05	.05		
Male	Percent	0	0	0	42.2	46.8	0	3.2	7.7	5,149	545
	Number	0	0	1	230	255	0	17	42		
	SE	0	0	0	.03	.03	0	.04	.04		
Total	Percent	0	0	0	41.1	45.1	0	5.6	8.2	9,239	978
	Number	0	0	0	402	441	0	54	80		
	SE				.02	.02	0	.03	.03		

Table 3. Length by sex and age, August 16 – September 22, 2006.

Sample dates: August 16 - September 22, 2006										
Sex		Age Class								
		0.2	0.3	1.1	1.2	1.3	1.4	2.1	2.2	2.3
Female	Mean Length (mm)	0	0	380	512	570	0	0	519	567
	SE	0	0	0	1	1	0	0	2	3
	Sample Size	0	0	0	172	186	0	0	37	38
Male	Mean Length (mm)	0	0	0	502	559	0	0	507	554
	SE	0	0	0	1	1	0	0	4	3
	Sample Size	0	0	1	230	255	0	0	17	42
Total	Mean Length (mm)	0	0	308	508	565	0	0	511	561
	SE	0	0	0	1	1	0	0	2	2
	Sample Size	0	0	0	402	441	0	0	54	79

In 2005, sockeye salmon that were age 1.3 comprised 50.3% of the total sample taken (Table 4). The mean length of age-1.3 males was 588 mm, while the mean of age-1.3 females was 571 mm (Table 5).

Table 4. Numbers by sex and age, entire 2005 field season.

Stratum Dates: August 11 –September 25											
Sex		Age Class								Total Fish Counted	Number of fish sampled
		0.2	0.3	1.1	1.2	1.3	2.1	2.2	2.3		
Female	Percent	0	0	0	41.2	49.0	0	6.8	2.9	3,962	308
	Number	0	0	0	127	150	0	21	9		
	SE	0	0	0	.04	.04	0	.06	.06		
Male	Percent	0	0	0	36.9	51.9	0	5.8	5.4	3,795	295
	Number	0	0	0	109	153	0	17	16		
	SE	0	0	0	.05	.04	0	.06	.06		
Total	Percent	0	0	0	39.2	50.3	0	6.3	4.1	7,770	604
	Number	0	0	0	237	304	0	38	25		
	SE	0	0	0	.03	.03	0	.04	.04		

Table 5. Length by sex and age, August 11 – September 20, 2005.

Sample dates: August 11 - September 20, 2005										
Sex		Age Class								
		0.2	0.3	1.1	1.2	1.3	1.4	2.1	2.2	2.3
Female	Mean Length (mm)	0	0	0	517	571	0	0	519	564
	SE	0	0	0	2	1	0	0	4	5
	Sample Size	0	0	0	127	151	0	0	21	9
Male	Mean Length (mm)	0	0	0	527	588	0	0	529	591
	SE	0	0	0	3	1	0	0	6	3
	Sample Size	0	0	0	109	153	0	0	17	16
Total	Mean Length (mm)	0	0	0	521	580	0	0	523	582
	SE	0	0	0	2	1	0	0	3	4
	Sample Size	0	0	0	236	304	0	0	38	25

In 2004, sockeye salmon that were age 1.3 comprised 50.4% of the total sample taken (Table 6). The mean length of age-1.3 males was 596 mm, while the mean of age-1.3 females was 572 mm (Table 7).

Table 6. Numbers by sex and age, entire 2004 field season.

Stratum Dates: July 15-October 21, 2004												
Sex		Age Class									Total Fish Counted	N
		0.2	0.3	1.1	1.2	1.3	1.4	2.1	2.2	2.3		
Female	Percent	0	0	0	46.20	46.2	0	0	6.1	1.4	11,552	493
	Number	0	0	0	228	228	0	0	30	7		
	SE	0	0	0	.03	.03	0	0	.04	.05		
Male	Percent	0	0.	0	38.20	56.6	0	0	3.4	1.8	7,663	327
	Number	0	0	0	125	185	0	0	11	6		
	SE	0	0	0	.04	.04	0	0	.06	.06		
Total	Percent	0	0	0	43.00	50.4	0	0	5	1.6	19,215	820
	Number	0	0	0	353	413	0	0	41	13		
	SE	0	0	0	.03	.02	0	0	.03	.04		

Table 7. Length by sex and age, July 15-October 21, 2004.

July 15-October 21, 2004											
Sex		Age Class									
		0.2	0.3	1.1	1.2	1.3	1.4	2.1	2.2	2.3	
Female	Mean Length (mm)	0	0	0	520	572	0	0	510	563	
	SE	0	0	0	1	1	0	0	6	15	
	Sample Size	0	0	0	228	228	0	0	30	7	
Male	Mean Length (mm)	0	0	0	536.0	596	0	0	537	585	
	SE	0	0	0	2	1	0	0	6	10	
	Sample Size	0	0	0	125	185	0	0	11	6	
Total	Mean Length (mm)	0	0	0	525	583	0	0	518	573	
	SE	0	0	0	1	1	0	0	5	6	
	Sample Size	0	0	0	353	413	0	0	41	13	

Run Timing

The median date of the run in 2006, September 4, was eight days earlier than in 2004 and 2005, but about seven days later than the 1974-2006 average (Table 8 and Figure 13). In 2006, the first sockeye salmon passed the weir on August 7 when five were counted. By the median date of the

2006 run, the cumulative total count of sockeye salmon had reached 4,619. The greatest daily passage occurred on September 13 when 874 sockeye were counted. Sockeye salmon continued to be counted through October 10, the day before flooding caused operations to be terminated.

Table 8. Annual date of arrival of the first sockeye salmon, and median point of the sockeye migration past the Long Lake weir.

Year	First Fish	Median Date	Median Number
2004	August 8	September 12	9,608
2005	August 11	September 12	3,885
2006	August 7	September 4	4,620

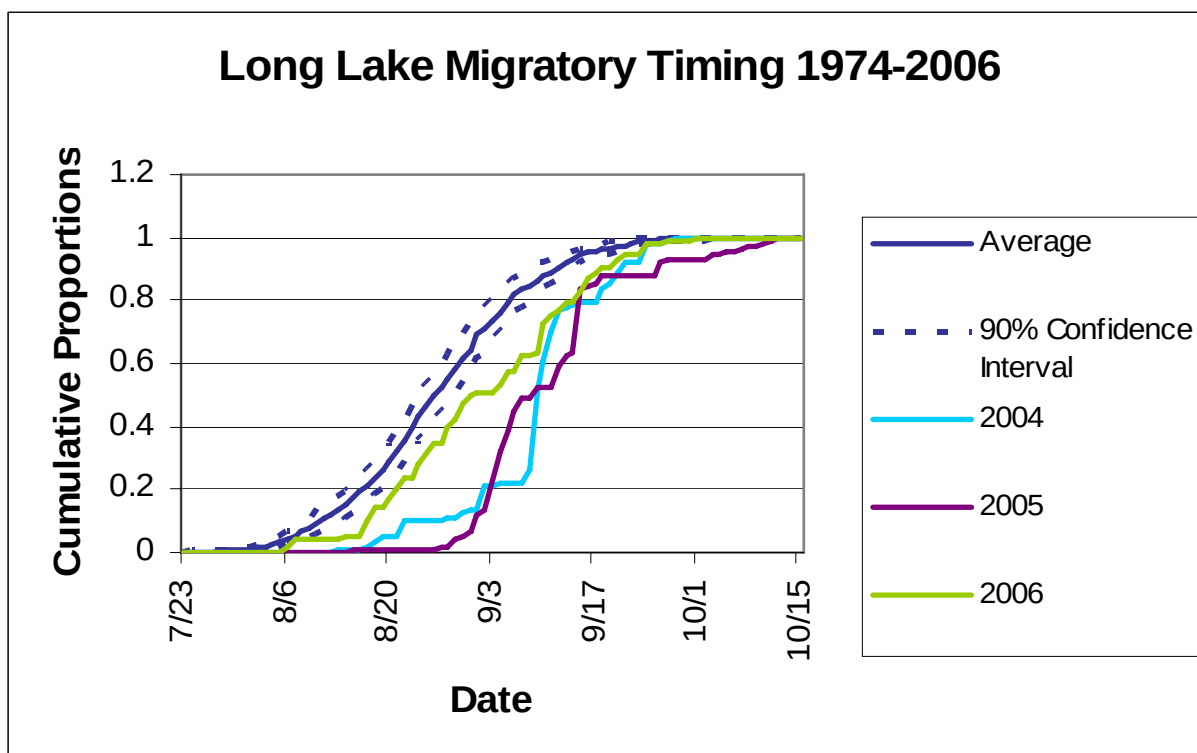


Figure 13. Average migratory run timing for 1974-2006, and annual run timing for 2004, 2005, and 2006.

DISCUSSION

The basic construction of the weir has changed very little since it was built in 1974 because the rigid picket design works well at this location. The flooding that occurred in October 2006 was the first time since 1974 that the weir was completely underwater. The introduction of the live box and table for sampling salmon, along with installation of an electric bear fence, has improved worker efficiency and safety at the site.

While the Long Lake sockeye salmon escapement during 2004 (19,215) was slightly above the 33 year average (16,756), escapements during 2005 (7,770) and 2006 (9,239) were some of the lowest recorded in the 33 year period the weir has been in place (Figure 11).

The presence of a statistically significant negative correlation between Long Lake escapements and corresponding total inriver run estimates at the Miles Lake sonar site was surprising. This negative correlation was reflected in abundance trends over time at these two locations. Miles Lake inriver runs showed a strong, statistically significant, increasing abundance trend during 1978-2006, while Long Lake escapements showed a weak, but statistically non-significant, decreasing abundance trend during these same years. In hindsight, however, it may not be surprising that the Long Lake population exhibited a different abundance trend than the total inriver run. There are more than 100 spawning populations within the Copper River drainage as well as hatchery-produced sockeye salmon, and the Long Lake spawning component, on average, only comprised about 4% of the total inriver run. Not all these populations would be expected to show similar abundance trends over time since they experience different freshwater spawning and rearing conditions, and have different run timings that can result in dissimilar exposures to food, predation, and fishing.

Run timing during 2006 was earlier than during 2005 and 2004, but still later than average. While this could have been due to water temperatures and flows, we have very little information to examine. Of the three years of staff gauge data, the greatest water flow at the weir site was recorded during 2005, while flows for 2004 and 2006 were very similar through early September of both years. Of the two years of water temperature data, 2005 was generally warmer than 2006. So it is possible that lower water flows and temperatures may have contributed to the earlier run timing observed during 2006 as compared to the previous two years.

Age class composition estimates for 2006, 2005, and 2004 samples was very similar. Age-1.3 sockeye salmon comprised the dominant age class in all three years and represented about half of the sampled escapements. This age class is also the dominant one in upper Copper River harvests, Tanada Creek escapements (where WRST has another salmon weir), and hatchery returns.

Unfortunately, the relationship between spawning abundance and resulting adult production cannot be fully determined for Long Lake without estimates of the number and age composition of Long Lake sockeye salmon harvested in the various fisheries. A rough approximation of harvest removals could be made for each year by assuming Long Lake sockeye salmon were harvested in direct proportion to their abundance in the total inriver run at Mile Lake. However, since Long Lake appears to represent only a small percentage of the total inriver run, such estimates could introduce large errors into Long Lake production estimates.

RECOMMENDATIONS

While Long Lake weir escapement counts cannot be used as an inseason management tool, this information is determine whether natural and healthy escapements into Long Lake are being

sustained. Therefore, we recommend continued monitoring and biological sampling of this run. While we cannot determine the escapement range that produces high average returns without estimates of the number of Long Lake sockeye salmon being harvested, the long term average escapement can be used as a guide to sustainable levels.

ACKNOWLEDGMENTS

The Collins family and the Copper River Watershed Project provided most of the labor for operating the weir. Tamara Harper, Renee Welty and Robin Lohse were instrumental in assuring that age, sex, length sampling was conducted properly. Steve Moffit and crew at the ADF&G, Commercial Fisheries Division in Cordova, Alaska proposed the sampling regime for the weir, read the scale samples, and provided the information in Tables 2 - 7. The U.S. Fish and Wildlife Service, Office of Subsistence Management, provided \$53,340 in funding support over the three year period through the Fisheries Resource Monitoring Program, under contract number FIS05-501. Doug McBride, Karen Hyer and Stephen Fried, FWS, provided statistical support.

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Appendix A. Daily and cumulative sockeye and coho salmon weir counts, Long Lake, 2004.

Date	Sockeye Count		Coho Count	
	Daily	Cumulative	Daily	Cumulative
7/13/2004				
7/14/2004				
7/15/2004	0	0	0	0
7/16/2004	0	0	0	0
7/17/2004	0	0	0	0
7/18/2004	0	0	0	0
7/19/2004	0	0	0	0
7/20/2004	0	0	0	0
7/21/2004	0	0	0	0
7/22/2004	0	0	0	0
7/23/2004	0	0	0	0
7/24/2004	0	0	0	0
7/25/2004	0	0	0	0
7/26/2004	0	0	0	0
7/27/2004	0	0	0	0
7/28/2004	0	0	0	0
7/29/2004	0	0	0	0
7/30/2004	0	0	0	0
7/31/2004	0	0	0	0
8/1/2004	0	0	0	0
8/2/2004	0	0	0	0
8/3/2004	0	0	0	0
8/4/2004	0	0	0	0
8/5/2004	0	0	0	0
8/6/2004	0	0	0	0
8/7/2004	0	0	0	0
8/8/2004	54	54	0	0
8/9/2004	13	67	0	0
8/10/2004	0	67	0	0
8/11/2004	2	69	0	0
8/12/2004	0	69	0	0
8/13/2004	0	69	0	0
8/14/2004	4	73	0	0
8/15/2004	0	73	0	0
8/16/2004	54	127	0	0
8/17/2004	63	190	0	0
8/18/2004	0	190	0	0
8/19/2004	22	212	0	0
8/20/2004	139	351	0	0
8/21/2004	325	676	0	0
8/22/2004	312	988	0	0
8/23/2004	0	988	0	0

-continued-

Appendix A. Continued.

Date	Sockeye Count		Coho Count	
	Daily	Cumulative	Daily	Cumulative
8/24/2004	0	988	0	0
8/25/2004	911	1899	0	0
8/26/2004	0	1899	0	0
8/27/2004	0	1899	0	0
8/28/2004	128	2027	0	0
8/29/2004	0	2027	0	0
8/30/2004	0	2027	0	0
8/31/2004	109	2136	0	0
9/1/2004	43	2179	0	0
9/2/2004	322	2501	0	0
9/3/2004	19	2520	0	0
9/4/2004	72	2592	0	0
9/5/2004	1452	4044	0	0
9/6/2004	0	4044	0	0
9/7/2004	116	4160	0	0
9/8/2004	0	4160	0	0
9/9/2004	14	4174	0	0
9/10/2004	0	4174	0	0
9/11/2004	828	5002	0	0
9/12/2004	4882	9884	0	0
9/13/2004	1802	11686	0	0
9/14/2004	1817	13503	3	3
9/15/2004	1343	14846	6	9
9/16/2004	84	14930	0	9
9/17/2004	154	15084	2	11
9/18/2004	120	15204	1	12
9/19/2004	22	15226	1	13
9/20/2004	66	15292	2	15
9/21/2004	735	16027	12	27
9/22/2004	386	16413	4	31
9/23/2004	698	17111	24	55
9/24/2004	519	17630	31	86
9/25/2004	0	17630	2	88
9/26/2004	69	17699	6	94
9/27/2004	1168	18867	102	196
9/28/2004	4	18871	4	200
9/29/2004	1	18872	2	202
9/30/2004	128	19000	23	225
10/1/2004	104	19104	34	259
10/2/2004	0	19104	3	262
10/3/2004	23	19127	3	265
10/4/2004	21	19148	3	268
10/5/2004	6	19154	1	269
10/6/2004	0	19154	1	270

-continued-

Appendix A. Continued.

Date	Sockeye Count		Coho Count	
	Daily	Cumulative	Daily	Cumulative
10/7/2004	4	19158	0	270
10/8/2004	0	19158	0	270
10/9/2004	6	19164	2	272
10/10/2004	0	19164	1	273
10/11/2004	0	19164	0	273
10/12/2004	0	19164	3	276
10/13/2004	0	19164	3	279
10/14/2004	3	19167	1	280
10/15/2004	0	19167	0	280
10/16/2004	27	19194	0	280
10/17/2004	0	19194	0	280
10/18/2004	0	19194	0	280
10/19/2004	21	19215	1	281
10/20/2004	0	19215	0	
10/21/2004	0	19215	0	281

Appendix B. Sockeye and coho salmon daily and cumulative weir counts, Long Lake, 2005.

Date	Sockeye Count		Coho Count	
	Daily	Cumulative	Daily	Cumulative
7/15	0	0		
7/16	0	0		
7/17	0	0		
7/18	0	0		
7/19	0	0		
7/20	0	0		
7/21	0	0		
7/22	0	0		
7/23	0	0		
7/24	0	0		
7/25	0	0		
7/26	0	0		
7/27	0	0		
7/28	0	0		
7/29	0	0		
7/30	0	0		
7/31	0	0		
8/1	0	0		
8/2	0	0		
8/3	0	0		
8/4	0	0		
8/5	0	0		
8/6	0	0		
8/7	0	0		
8/8	0	0		
8/9	0	0		
8/10	0	0		
8/11	8	8		
8/12	0	8		
8/13	5	13		
8/14	0	13		
8/15	7	20		
8/16	0	20		
8/17	3	23		
8/18	10	33		
8/19	0	33		
8/20	0	33		
8/21	0	33		
8/22	0	33		
8/23	0	33		
8/24	0	33		
8/25	0	33		
8/26	0	33		

-continued-

Appendix B. Continued.

Date	Sockeye Count		Coho Count	
	Daily	Cumulative	Daily	Cumulative
8/27	0	33		
8/28	0	33		
8/29	0	33		
8/30	105	138		
8/31	18	156		
9/1	185	341		
9/2	60	401		
9/3	102	503		
9/4	416	919		
9/5	133	1,052		
9/6	736	1,788		
9/7	739	2,527		
9/8	516	3,043		
9/9	465	3,508		
9/10	286	3,794		
9/11	0	3,794		
9/12	274	4,068		
9/13	0	4,068		
9/14	0	4,068		
9/15	553	4,621		
9/16	226	4,847		
9/17	103	4,950		
9/18	1,520	6,470		
9/19	83	6,553		
9/20	55	6,608		
9/21	217	6,825		
9/22	0	6,825		
9/23	0	6,825		
9/24	0	6,825		
9/25	0	6,825		
9/26	0	6,825		
9/27	10	6,835	3	3
9/28	26	6,861	4	7
9/29	268	7,129	13	20
9/30	62	7,191	15	35
10/1	15	7,206	4	39
10/2	14	7,220	5	44
10/3	0	7,220	0	44
10/4	30	7,250	3	47
10/5	5	7,255	2	49
10/6	87	7,342	78	127
10/7	41	7,383	22	149
10/8	15	7,398	11	160
10/9	47	7,445	49	209

-continued-

Appendix B. Continued.

Date	Sockeye Count		Coho Count	
	Daily	Cumulative	Daily	Cumulative
10/10	24	7,469	60	269
10/11	68	7,537	66	335
10/12	34	7,571	8	343
10/13	76	7,647	32	375
10/14	40	7,687	11	386
10/15	83	7,770	53	439

Appendix C. Daily and cumulative sockeye and coho salmon weir counts, Long Lake, 2006

Date	Sockeye			Coho Count	
	Count		Sampled		
	Daily	Cumulative		Daily	Cumulative
13-Jul					
14-Jul					
15-Jul					
16-Jul					
17-Jul					
18-Jul					
19-Jul					
20-Jul					
21-Jul					
22-Jul					
23-Jul					
24-Jul					
25-Jul					
26-Jul					
27-Jul					
28-Jul					
29-Jul					
30-Jul					
31-Jul					
1-Aug					
2-Aug					
3-Aug					
4-Aug					
5-Aug					
6-Aug					
7-Aug	5				
8-Aug	5	10			
9-Aug	147	157			
10-Aug	226	383			
11-Aug	3	386			
12-Aug	0	386			
13-Aug	0	386			
14-Aug	0	386			
15-Aug	1	387			
16-Aug	30	417	27		
17-Aug	57	474	47		
18-Aug	0	474	0		
19-Aug	33	507	33		
20-Aug	413	920	100		
21-Aug	381	1301	53		
22-Aug	55	1356	40		

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Appendix C. Continued.

Date	Sockeye			Coho Count	
	Count		Sampled		
	Daily	Cumulative		Daily	Cumulative
23-Aug	196	1552	79		
24-Aug	319	1871	93		
25-Aug	327	2198	100		
26-Aug	11	2209	0		
27-Aug	360	2569	0		
28-Aug	286	2855	0		
29-Aug	318	3173	0		
30-Aug	0	3173	0		
31-Aug	478	3651	79		
1-Sep	242	3893	0		
2-Sep	420	4313	40		
3-Sep	251	4564	0		
4-Sep	55	4619	0		
5-Sep	50	4669	0		
6-Sep	0	4669	0		
7-Sep	223	4892	0		
8-Sep	399	5291	0		
9-Sep	0	5291	0		
10-Sep	412	5703	0		
11-Sep	26	5729	16		
12-Sep	63	5792	63		
13-Sep	874	6666	100		
14-Sep	263	6929	79		
15-Sep	90	7019	80		
16-Sep	228	7247	0		
17-Sep	35	7282	0		
18-Sep	319	7601	40		
19-Sep	336	7937	74		
20-Sep	195	8132	2	87	
21-Sep	120	8252	0	0	87
22-Sep	10	8262	10	0	87
23-Sep	282	8544	0	36	123
24-Sep	92	8636	0	13	136
25-Sep	111	8747	0	3	139
26-Sep	1	8748	0	15	154
27-Sep	323	9071	0	61	215
28-Sep	13	9084	0	13	228
29-Sep	0	9084	0	0	228
30-Sep	19	9103	0	41	269
1-Oct	4	9107	0	9	278
2-Oct	23	9130	0	8	286

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Appendix C. Continued.

Date	Sockeye			Coho Count	
	Count		Sampled		
	Daily	Cumulative		Daily	Cumulative
3-Oct	5	9135	0	2	288
4-Oct	47	9182	0	4	292
5-Oct	0	9182	0	0	292
6-Oct	18	9200	0	5	297
7-Oct	5	9205	0	0	297
8-Oct	6	9211	0	2	299
9-Oct	15	9226	0	5	304
10-Oct	13	9239	0	12	316
11-Oct	Weir flooded				

Appendix D. Age, sex and length data for sockeye salmon, Long Lake weir, 2006. Ages reported in European notation, where first number is freshwater annuli and second is saltwater annuli.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/16/2006	1	8	1	560	NA
1	8/16/2006	1	12	1	600	NA
1	8/16/2006	1	18	1	585	NA
1	8/16/2006	1	22	2	540	NA
1	8/16/2006	1	23	1	570	NA
1	8/17/2006	2	5	1	610	NA
1	8/17/2006	2	7	2	550	NA
1	8/17/2006	2	10	1	530	NA
1	8/17/2006	2	23	2	565	NA
1	8/17/2006	2	34	1	490	NA
1	8/17/2006	3	5	1	500	NA
1	8/19/2006	4	1	2	500	NA
1	8/19/2006	4	7	2	525	NA
1	8/19/2006	4	16	1	520	NA
1	8/19/2006	4	25	1	570	NA
1	8/19/2006	4	28	1	570	NA
1	8/19/2006	4	29	2	495	NA
1	8/20/2006	5	6	2	550	NA
1	8/20/2006	5	9	2	540	NA
1	8/20/2006	5	11	2	505	NA
1	8/20/2006	5	33	1	530	NA
1	8/20/2006	5	39	1	550	NA
1	8/20/2006	5	40	1	490	NA
1	8/20/2006	6	15	1	580	NA
1	8/20/2006	6	21	2	510	NA
1	8/20/2006	6	28	2	565	NA
1	8/20/2006	6	33	1	600	NA
1	8/20/2006	7	13	2	520	NA
1	8/20/2006	7	15	2	510	NA
1	8/21/2006	8	4	2	590	NA
1	8/21/2006	8	16	2	520	NA
1	8/21/2006	8	17	2	520	NA
1	8/21/2006	8	22	1	600	NA
1	8/21/2006	8	23	1	600	NA
1	8/21/2006	8	24	2	540	NA
1	8/21/2006	8	30	1	540	NA
1	8/21/2006	8	33	1	510	NA
1	8/21/2006	9	3	2	520	NA
1	8/21/2006	9	6	1	500	NA
1	8/21/2006	9	7	1	550	NA
1	8/22/2006	10	12	2	490	NA
1	8/22/2006	10	13	1	600	NA
1	8/22/2006	10	39	1	455	NA

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/22/2006	10	40	1	525	NA
	8/23/2006	11	2	1	580	NA
1	8/23/2006	11	3	1	570	NA
1	8/23/2006	11	8	1	500	NA
1	8/23/2006	11	9	2	570	NA
1	8/23/2006	11	10	1	580	NA
1	8/23/2006	11	15	2	560	NA
1	8/23/2006	11	17	1	580	NA
1	8/23/2006	11	22	1	600	NA
1	8/23/2006	11	31	1	545	NA
1	8/23/2006	11	34	1	590	NA
1	8/23/2006	12	2	1	590	NA
1	8/23/2006	12	14	1	530	NA
1	8/23/2006	12	19	1	565	NA
1	8/23/2006	12	23	2	565	NA
1	8/23/2006	12	27	1	575	NA
1	8/23/2006	12	35	1	570	NA
1	8/23/2006	12	37	1	565	NA
1	8/23/2006	12	38	1	570	NA
1	8/24/2006	13	7	2	570	NA
1	8/24/2006	13	20	2	510	NA
1	8/24/2006	13	21	2	525	NA
1	8/24/2006	13	25	1	555	NA
1	8/24/2006	13	26	2	560	NA
1	8/24/2006	13	28	2	505	NA
1	8/24/2006	13	32	1	540	NA
1	8/24/2006	14	3	2	475	NA
1	8/24/2006	14	9	2	570	NA
1	8/24/2006	14	12	2	570	NA
1	8/24/2006	14	17	1	570	NA
1	8/24/2006	14	18	1	500	NA
1	8/24/2006	15	1	1	520	NA
1	8/24/2006	15	9	1	510	NA
1	8/25/2006	16	2	1	515	NA
1	8/25/2006	16	3	1	500	NA
1	8/25/2006	16	11	2	560	NA
1	8/25/2006	16	20	1	585	NA
1	8/25/2006	16	27	1	510	NA
1	8/25/2006	16	30	1	490	NA
1	8/25/2006	16	36	2	470	NA
1	8/25/2006	16	38	2	520	NA
1	8/25/2006	16	39	1	530	NA
1	8/25/2006	17	1	2	550	NA
1	8/25/2006	17	3	1	535	NA
1	8/25/2006	17	7	2	570	NA

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/25/2006	17	9	2	505	NA
1	8/25/2006	17	28	1	580	NA
1	8/25/2006	17	33	1	540	NA
1	8/25/2006	17	36	2	520	NA
1	8/25/2006	17	40	1	570	NA
1	8/25/2006	18	17	1	540	NA
1	8/31/2006	19	3	2	550	NA
1	8/31/2006	19	7	1	500	NA
1	8/31/2006	19	10	2	505	NA
1	8/31/2006	19	11	1	505	NA
1	8/31/2006	19	16	2	545	NA
1	8/31/2006	19	20	1	530	NA
1	8/31/2006	19	23	1	540	NA
1	8/31/2006	19	33	2	540	NA
1	8/31/2006	19	34	1	400	NA
1	8/31/2006	20	6	1	690	NA
1	8/31/2006	20	9	1	510	NA
1	8/31/2006	20	10	2	550	NA
1	8/31/2006	20	28	1	590	NA
1	8/31/2006	20	35	2	495	NA
1	9/2/2006	21	7	3		NA
1	9/2/2006	21	16	2	565	NA
1	9/2/2006	21	24	1	580	NA
1	9/2/2006	21	31	2	535	NA
1	9/2/2006	21	34	1	590	NA
1	9/11/2006	22	2	2	565	NA
1	9/11/2006	22	11	1	620	NA
1	9/12/2006	23	11	1	590	NA
1	9/12/2006	23	12	2	550	NA
1	9/12/2006	23	13	2	520	NA
1	9/12/2006	23	24	1	570	NA
1	9/12/2006	23	31	1	510	NA
1	9/12/2006	23	37	1	520	NA
1	9/12/2006	23	38	1	360	NA
1	9/12/2006	23	39	2	545	NA
1	9/12/2006	24	3	1	510	NA
1	9/12/2006	24	18	1	490	NA
1	9/12/2006	24	22	1	370	NA
1	9/13/2006	25	8	2	570	NA
1	9/13/2006	25	17	1	585	NA
1	9/13/2006	25	33	2	550	NA
1	9/13/2006	25	35	2	510	NA
1	9/13/2006	25	37	1	600	NA
1	9/13/2006	25	39	2	555	NA
1	9/13/2006	26	14	1	595	NA

-continued-

Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	9/13/2006	26	38	1	620	NA
1	9/13/2006	27	4	1	535	NA
1	9/13/2006	27	7	2	530	NA
1	9/13/2006	27	10	2	560	NA
1	9/13/2006	27	16	2	500	NA
1	9/14/2006	28	2	1	565	NA
1	9/14/2006	28	5	1	555	NA
1	9/14/2006	28	7	2	570	NA
1	9/14/2006	28	26	1	585	NA
1	9/14/2006	29	6	2	555	NA
1	9/14/2006	29	12	1	580	NA
1	9/14/2006	29	16	2	495	NA
1	9/14/2006	29	17	1	580	NA
1	9/14/2006	29	24	1	510	NA
1	9/14/2006	29	26	2	555	NA
1	9/14/2006	29	30	1	560	NA
1	9/15/2006	30	17	1	595	NA
1	9/15/2006	30	21	1	545	NA
1	9/15/2006	30	25	1	570	NA
1	9/15/2006	30	30	1	560	NA
1	9/15/2006	30	32	2	480	NA
1	9/15/2006	30	36	1	575	NA
1	9/15/2006	30	38	2	555	NA
1	9/15/2006	30	40	1	600	NA
1	9/15/2006	31	2	1	515	NA
1	9/15/2006	31	40	1	565	NA
1	9/18/2006	32	3	2	480	NA
1	9/18/2006	32	11	1	580	NA
1	9/18/2006	32	25	2	550	NA
1	9/18/2006	32	38	2	505	NA
1	9/18/2006	32	40	1	570	NA
1	9/19/2006	33	5	1	555	NA
1	9/19/2006	33	13	1	510	NA
1	9/19/2006	33	30	1	605	NA
1	9/19/2006	33	37	1	570	NA
1	9/19/2006	34	18	1	535	NA
1	9/19/2006	34	23	1	565	NA
1	9/19/2006	34	28	1	560	NA
1	9/19/2006	34	30	2	510	NA
1	9/19/2006	34	33	1	575	NA
1	9/22/2006	35	4	1	490	NA
1	9/12/2006	24	19	2	540	2.4
1	8/16/2006	1	16	1	545	2.3
1	8/19/2006	4	8	1	570	2.3
1	8/19/2006	4	18	2	530	2.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/19/2006	4	22	1	560	2.3
1	8/20/2006	5	28	1	550	2.3
1	8/20/2006	7	11	1	555	2.3
1	8/23/2006	12	13	1	570	2.3
1	8/23/2006	12	28	1	540	2.3
1	8/24/2006	13	5	2	540	2.3
1	8/24/2006	13	17	2	570	2.3
1	8/24/2006	13	36	1	540	2.3
1	8/24/2006	13	37	1	580	2.3
1	8/24/2006	14	22	1	600	2.3
1	8/24/2006	14	40	1	570	2.3
1	8/24/2006	15	12	1	570	2.3
1	8/25/2006	17	21	1	580	2.3
1	8/25/2006	17	26	1	550	2.3
1	8/25/2006	17	38	1	570	2.3
1	8/31/2006	19	36	2	545	2.3
1	8/31/2006	20	1	2	585	2.3
1	8/31/2006	20	2	2	540	2.3
1	8/31/2006	20	12	2	540	2.3
1	8/31/2006	20	37	2	540	2.3
1	9/2/2006	21	13	1	540	2.3
1	9/2/2006	21	15	1	585	2.3
1	9/2/2006	21	18	2	535	2.3
1	9/2/2006	21	26	2	570	2.3
1	9/2/2006	21	32	1	610	2.3
1	9/11/2006	22	10	1	545	2.3
1	9/11/2006	22	12	2	545	2.3
1	9/12/2006	23	27	1	575	2.3
1	9/12/2006	23	33	1	560	2.3
1	9/12/2006	23	35	2	555	2.3
1	9/12/2006	24	4	2	560	2.3
1	9/12/2006	24	8	1	540	2.3
1	9/13/2006	25	2	2	550	2.3
1	9/13/2006	25	15	2	590	2.3
1	9/13/2006	25	32	2	575	2.3
1	9/13/2006	26	1	1	540	2.3
1	9/13/2006	26	13	1	570	2.3
1	9/13/2006	26	29	1	555	2.3
1	9/13/2006	27	14	1	550	2.3
1	9/13/2006	27	19	1	555	2.3
1	9/14/2006	28	6	2	575	2.3
1	9/14/2006	28	19	2	560	2.3
1	9/14/2006	28	25	2	530	2.3
1	9/14/2006	28	34	1	590	2.3
1	9/14/2006	28	40	1	570	2.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	9/14/2006	29	2	2	580	2.3
1	9/14/2006	29	5	2	545	2.3
1	9/14/2006	29	7	2	545	2.3
1	9/14/2006	29	35	2	540	2.3
1	9/14/2006	29	36	2	580	2.3
1	9/15/2006	30	9	1	545	2.3
1	9/15/2006	30	33	2	560	2.3
1	9/15/2006	30	39	1	600	2.3
1	9/15/2006	31	6	2	530	2.3
1	9/15/2006	31	13	1	580	2.3
1	9/15/2006	31	32	2	580	2.3
1	9/15/2006	31	33	1	555	2.3
1	9/15/2006	31	37	2	580	2.3
1	9/18/2006	32	1	1	590	2.3
1	9/18/2006	32	24	2	535	2.3
1	9/19/2006	33	2	2	565	2.3
1	9/19/2006	33	4	2	535	2.3
1	9/19/2006	33	9	1	590	2.3
1	9/19/2006	33	15	2	530	2.3
1	9/19/2006	33	16	2	580	2.3
1	9/19/2006	33	18	1	555	2.3
1	9/19/2006	33	24	2	555	2.3
1	9/19/2006	33	34	2	530	2.3
1	9/19/2006	33	35	1	570	2.3
1	9/19/2006	34	1	1	570	2.3
1	9/19/2006	34	21	2	540	2.3
1	9/19/2006	34	26	1	560	2.3
1	9/19/2006	34	31	1	600	2.3
1	9/22/2006	35	3	1	600	2.3
1	9/22/2006	35	6	1	555	2.3
1	9/22/2006	35	7	2	570	2.3
1	8/17/2006	2	37	1	535	2.2
1	8/20/2006	6	5	2	495	2.2
1	8/21/2006	8	36	1	530	2.2
1	8/22/2006	10	33	2	490	2.2
1	8/23/2006	11	37	1	530	2.2
1	8/24/2006	13	14	2	510	2.2
1	8/24/2006	13	19	1	525	2.2
1	8/24/2006	13	39	2	490	2.2
1	8/24/2006	14	2	2	520	2.2
1	8/24/2006	15	7	1	520	2.2
1	8/25/2006	18	7	1	495	2.2
1	8/31/2006	19	9	2	515	2.2
1	8/31/2006	19	18	2	520	2.2
1	8/31/2006	20	16	2	500	2.2

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/31/2006	20	21	1	490	2.2
1	8/31/2006	20	26	2	510	2.2
1	8/31/2006	20	31	2	510	2.2
1	8/31/2006	20	32	2	485	2.2
1	9/2/2006	21	3	2	505	2.2
1	9/2/2006	21	20	1	530	2.2
1	9/2/2006	21	33	2	510	2.2
1	9/2/2006	21	37	2	490	2.2
1	9/11/2006	22	3	1	525	2.2
1	9/11/2006	22	6	1	530	2.2
1	9/12/2006	23	4	2	525	2.2
1	9/13/2006	25	5	1	525	2.2
1	9/13/2006	25	21	2	515	2.2
1	9/13/2006	25	23	2	510	2.2
1	9/13/2006	26	2	1	505	2.2
1	9/13/2006	26	5	2	515	2.2
1	9/13/2006	26	16	2	500	2.2
1	9/13/2006	26	25	2	475	2.2
1	9/13/2006	26	34	2	500	2.2
1	9/13/2006	27	15	2	505	2.2
1	9/13/2006	27	20	2	510	2.2
1	9/14/2006	28	3	2	505	2.2
1	9/14/2006	28	15	1	500	2.2
1	9/14/2006	28	17	2	510	2.2
1	9/14/2006	28	33	2	515	2.2
1	9/15/2006	30	4	2	515	2.2
1	9/15/2006	31	17	1	535	2.2
1	9/15/2006	31	20	2	525	2.2
1	9/15/2006	31	34	2	525	2.2
1	9/18/2006	32	5	2	505	2.2
1	9/18/2006	32	7	1	520	2.2
1	9/18/2006	32	21	1	495	2.2
1	9/18/2006	32	36	2	490	2.2
1	9/19/2006	33	10	2	495	2.2
1	9/19/2006	33	17	2	525	2.2
1	9/19/2006	33	21	1	530	2.2
1	9/19/2006	33	26	2	510	2.2
1	9/19/2006	34	10	2	520	2.2
1	9/19/2006	34	17	2	520	2.2
1	9/22/2006	35	10	2	510	2.2
1	8/16/2006	1	1	2	555	1.3
1	8/16/2006	1	2	1	540	1.3
1	8/16/2006	1	6	1	590	1.3
1	8/16/2006	1	11	1	545	1.3
1	8/16/2006	1	14	1	575	1.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/16/2006	1	15	1	550	1.3
1	8/16/2006	1	19	1	610	1.3
1	8/16/2006	1	26	2	555	1.3
1	8/16/2006	1	27	1	560	1.3
1	8/17/2006	2	6	1	550	1.3
1	8/17/2006	2	11	1	570	1.3
1	8/17/2006	2	14	2	550	1.3
1	8/17/2006	2	15	2	530	1.3
1	8/17/2006	2	16	2	540	1.3
1	8/17/2006	2	17	2	610	1.3
1	8/17/2006	2	20	1	580	1.3
1	8/17/2006	2	21	1	550	1.3
1	8/17/2006	2	25	1	550	1.3
1	8/17/2006	2	26	1	590	1.3
1	8/17/2006	2	29	2	570	1.3
1	8/17/2006	2	30	1	585	1.3
1	8/17/2006	2	35	2	530	1.3
1	8/17/2006	2	38	2	530	1.3
1	8/17/2006	2	39	1	600	1.3
1	8/17/2006	3	3	1	560	1.3
1	8/19/2006	4	4	1	540	1.3
1	8/19/2006	4	6	2	560	1.3
1	8/19/2006	4	14	2	535	1.3
1	8/19/2006	4	19	1	600	1.3
1	8/19/2006	4	23	2	560	1.3
1	8/19/2006	4	24	2	530	1.3
1	8/19/2006	4	31	1	540	1.3
1	8/19/2006	4	33	2	585	1.3
1	8/20/2006	5	3	1	570	1.3
1	8/20/2006	5	4	2	560	1.3
1	8/20/2006	5	14	1	540	1.3
1	8/20/2006	5	15	1	570	1.3
1	8/20/2006	5	17	1	540	1.3
1	8/20/2006	5	18	2	575	1.3
1	8/20/2006	5	20	2	530	1.3
1	8/20/2006	5	21	1	550	1.3
1	8/20/2006	5	27	2	530	1.3
1	8/20/2006	5	29	2	545	1.3
1	8/20/2006	5	38	2	540	1.3
1	8/20/2006	6	1	2	565	1.3
1	8/20/2006	6	7	2	580	1.3
1	8/20/2006	6	9	1	550	1.3
1	8/20/2006	6	13	2	570	1.3
1	8/20/2006	6	16	1	610	1.3
1	8/20/2006	6	18	2	530	1.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/20/2006	6	23	1	610	1.3
1	8/20/2006	6	24	2	555	1.3
1	8/20/2006	6	30	1	590	1.3
1	8/20/2006	6	39	2	530	1.3
1	8/20/2006	7	2	2	590	1.3
1	8/20/2006	7	3	2	530	1.3
1	8/20/2006	7	4	1	570	1.3
1	8/20/2006	7	5	2	590	1.3
1	8/20/2006	7	6	2	590	1.3
1	8/20/2006	7	7	1	550	1.3
1	8/20/2006	7	8	1	540	1.3
1	8/20/2006	7	10	1	585	1.3
1	8/20/2006	7	12	1	540	1.3
1	8/20/2006	7	17	1	580	1.3
1	8/21/2006	8	2	1	540	1.3
1	8/21/2006	8	6	2	550	1.3
1	8/21/2006	8	7	2	570	1.3
1	8/21/2006	8	9	2	550	1.3
1	8/21/2006	8	10	1	540	1.3
1	8/21/2006	8	11	1	540	1.3
1	8/21/2006	8	19	1	590	1.3
1	8/21/2006	8	21	1	610	1.3
1	8/21/2006	8	28	1	540	1.3
1	8/21/2006	8	29	2	550	1.3
1	8/21/2006	8	37	1	610	1.3
1	8/21/2006	8	39	2	540	1.3
1	8/21/2006	9	1	2	550	1.3
1	8/21/2006	9	2	1	590	1.3
1	8/21/2006	9	4	1	590	1.3
1	8/21/2006	9	5	2	580	1.3
1	8/21/2006	9	8	2	560	1.3
1	8/21/2006	9	9	1	610	1.3
1	8/21/2006	9	10	1	570	1.3
1	8/21/2006	9	12	1	550	1.3
1	8/22/2006	10	3	1	600	1.3
1	8/22/2006	10	11	2	560	1.3
1	8/22/2006	10	15	2	550	1.3
1	8/22/2006	10	17	1	570	1.3
1	8/22/2006	10	24	2	530	1.3
1	8/22/2006	10	25	2	535	1.3
1	8/22/2006	10	26	1	585	1.3
1	8/22/2006	10	27	2	605	1.3
1	8/22/2006	10	29	1	600	1.3
1	8/22/2006	10	31	1	570	1.3
1	8/22/2006	10	34	2	540	1.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/23/2006	11	1	1	580	1.3
1	8/23/2006	11	4	1	580	1.3
1	8/23/2006	11	5	2	555	1.3
1	8/23/2006	11	6	1	560	1.3
1	8/23/2006	11	7	2	580	1.3
1	8/23/2006	11	11	1	540	1.3
1	8/23/2006	11	12	2	550	1.3
1	8/23/2006	11	13	1	565	1.3
1	8/23/2006	11	14	1	570	1.3
1	8/23/2006	11	16	2	550	1.3
1	8/23/2006	11	18	1	575	1.3
1	8/23/2006	11	19	2	570	1.3
1	8/23/2006	11	20	1	545	1.3
1	8/23/2006	11	21	2	590	1.3
1	8/23/2006	11	23	1	540	1.3
1	8/23/2006	11	24	2	550	1.3
1	8/23/2006	11	25	1	540	1.3
1	8/23/2006	11	26	2	590	1.3
1	8/23/2006	11	27	2	600	1.3
1	8/23/2006	11	28	1	545	1.3
1	8/23/2006	11	29	1	570	1.3
1	8/23/2006	11	30	1	545	1.3
1	8/23/2006	11	32	1	550	1.3
1	8/23/2006	11	35	1	545	1.3
1	8/23/2006	11	36	2	550	1.3
1	8/23/2006	11	38	2	560	1.3
1	8/23/2006	11	39	2	550	1.3
1	8/23/2006	11	40	2	530	1.3
1	8/23/2006	12	1	2	570	1.3
1	8/23/2006	12	3	2	530	1.3
1	8/23/2006	12	4	1	550	1.3
1	8/23/2006	12	5	1	545	1.3
1	8/23/2006	12	6	2	580	1.3
1	8/23/2006	12	7	2	570	1.3
1	8/23/2006	12	8	1	580	1.3
1	8/23/2006	12	10	1	545	1.3
1	8/23/2006	12	11	1	540	1.3
1	8/23/2006	12	12	2	580	1.3
1	8/23/2006	12	15	1	540	1.3
1	8/23/2006	12	16	1	540	1.3
1	8/23/2006	12	17	1	540	1.3
1	8/23/2006	12	18	2	555	1.3
1	8/23/2006	12	22	1	565	1.3
1	8/23/2006	12	24	2	560	1.3
1	8/23/2006	12	25	1	600	1.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/23/2006	12	26	1	590	1.3
1	8/23/2006	12	29	1	570	1.3
1	8/23/2006	12	30	2	580	1.3
1	8/23/2006	12	31	1	600	1.3
1	8/23/2006	12	32	1	565	1.3
1	8/23/2006	12	33	2	570	1.3
1	8/23/2006	12	34	1	540	1.3
1	8/23/2006	12	36	2	570	1.3
1	8/23/2006	12	39	1	540	1.3
1	8/24/2006	13	1	2	570	1.3
1	8/24/2006	13	4	2	530	1.3
1	8/24/2006	13	10	1	545	1.3
1	8/24/2006	13	12	1	555	1.3
1	8/24/2006	13	13	2	560	1.3
1	8/24/2006	13	24	1	560	1.3
1	8/24/2006	13	31	2	540	1.3
1	8/24/2006	13	38	1	540	1.3
1	8/24/2006	13	40	2	550	1.3
1	8/24/2006	14	1	2	540	1.3
1	8/24/2006	14	5	1	560	1.3
1	8/24/2006	14	6	1	540	1.3
1	8/24/2006	14	7	1	560	1.3
1	8/24/2006	14	14	1	540	1.3
1	8/24/2006	14	19	1	600	1.3
1	8/24/2006	14	21	2	545	1.3
1	8/24/2006	14	24	1	545	1.3
1	8/24/2006	14	25	1	605	1.3
1	8/24/2006	14	27	1	595	1.3
1	8/24/2006	14	36	2	530	1.3
1	8/24/2006	14	37	1	580	1.3
1	8/24/2006	14	38	1	540	1.3
1	8/24/2006	15	10	2	570	1.3
1	8/24/2006	15	11	1	560	1.3
1	8/25/2006	16	7	1	590	1.3
1	8/25/2006	16	8	2	530	1.3
1	8/25/2006	16	9	2	550	1.3
1	8/25/2006	16	12	2	560	1.3
1	8/25/2006	16	18	1	600	1.3
1	8/25/2006	16	24	2	585	1.3
1	8/25/2006	16	25	1	540	1.3
1	8/25/2006	16	28	1	585	1.3
1	8/25/2006	16	31	1	550	1.3
1	8/25/2006	16	32	1	560	1.3
1	8/25/2006	16	33	1	600	1.3
1	8/25/2006	16	34	2	570	1.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/25/2006	16	35	2	570	1.3
1	8/25/2006	17	2	2	590	1.3
1	8/25/2006	17	4	1	540	1.3
1	8/25/2006	17	5	2	570	1.3
1	8/25/2006	17	6	1	560	1.3
1	8/25/2006	17	10	1	570	1.3
1	8/25/2006	17	11	1	595	1.3
1	8/25/2006	17	12	2	550	1.3
1	8/25/2006	17	13	2	570	1.3
1	8/25/2006	17	20	1	550	1.3
1	8/25/2006	17	23	1	560	1.3
1	8/25/2006	17	24	2	530	1.3
1	8/25/2006	17	27	1	550	1.3
1	8/25/2006	17	30	1	570	1.3
1	8/25/2006	17	34	1	560	1.3
1	8/25/2006	17	39	1	610	1.3
1	8/25/2006	18	1	1	580	1.3
1	8/25/2006	18	3	1	555	1.3
1	8/25/2006	18	4	1	580	1.3
1	8/25/2006	18	8	1	565	1.3
1	8/25/2006	18	11	1	560	1.3
1	8/25/2006	18	15	1	570	1.3
1	8/25/2006	18	16	2	555	1.3
1	8/25/2006	18	18	1	570	1.3
1	8/25/2006	18	19	1	545	1.3
1	8/25/2006	18	20	1	580	1.3
1	8/31/2006	19	1	1	585	1.3
1	8/31/2006	19	2	1	565	1.3
1	8/31/2006	19	5	1	590	1.3
1	8/31/2006	19	13	2	585	1.3
1	8/31/2006	19	14	1	585	1.3
1	8/31/2006	19	24	1	575	1.3
1	8/31/2006	19	25	1	560	1.3
1	8/31/2006	19	26	1	580	1.3
1	8/31/2006	19	30	1	590	1.3
1	8/31/2006	19	31	2	590	1.3
1	8/31/2006	19	32	2	560	1.3
1	8/31/2006	19	35	2	575	1.3
1	8/31/2006	19	37	2	550	1.3
1	8/31/2006	19	38	1	560	1.3
1	8/31/2006	19	40	2	545	1.3
1	8/31/2006	20	4	2	540	1.3
1	8/31/2006	20	5	1	540	1.3
1	8/31/2006	20	7	2	590	1.3
1	8/31/2006	20	8	2	590	1.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/31/2006	20	11	2	540	1.3
1	8/31/2006	20	14	2	580	1.3
1	8/31/2006	20	18	1	570	1.3
1	8/31/2006	20	20	1	580	1.3
1	8/31/2006	20	29	2	560	1.3
1	8/31/2006	20	34	2	570	1.3
1	8/31/2006	20	39	2	540	1.3
1	9/2/2006	21	1	2	570	1.3
1	9/2/2006	21	2	1	540	1.3
1	9/2/2006	21	6	2	595	1.3
1	9/2/2006	21	9	1	565	1.3
1	9/2/2006	21	10	1	555	1.3
1	9/2/2006	21	11	2	560	1.3
1	9/2/2006	21	12	1	575	1.3
1	9/2/2006	21	17	2	570	1.3
1	9/2/2006	21	19	1	590	1.3
1	9/2/2006	21	21	1	545	1.3
1	9/2/2006	21	22	2	585	1.3
1	9/2/2006	21	23	1	560	1.3
1	9/2/2006	21	25	1	610	1.3
1	9/2/2006	21	28	1	590	1.3
1	9/2/2006	21	35	2	590	1.3
1	9/2/2006	21	39	2	540	1.3
1	9/11/2006	22	5	1	575	1.3
1	9/11/2006	22	7	1	605	1.3
1	9/11/2006	22	13	1	605	1.3
1	9/11/2006	22	14	1	600	1.3
1	9/11/2006	22	15	1	560	1.3
1	9/11/2006	22	16	2	575	1.3
1	9/12/2006	23	5	2	570	1.3
1	9/12/2006	23	8	2	565	1.3
1	9/12/2006	23	9	2	555	1.3
1	9/12/2006	23	10	2	545	1.3
1	9/12/2006	23	14	1	590	1.3
1	9/12/2006	23	17	1	570	1.3
1	9/12/2006	23	18	2	550	1.3
1	9/12/2006	23	20	1	600	1.3
1	9/12/2006	23	21	1	560	1.3
1	9/12/2006	23	22	2	540	1.3
1	9/12/2006	23	25	1	540	1.3
1	9/12/2006	23	28	1	555	1.3
1	9/12/2006	23	29	1	580	1.3
1	9/12/2006	23	36	1	605	1.3
1	9/12/2006	24	1	2	550	1.3
1	9/12/2006	24	2	1	580	1.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	9/12/2006	24	7	2	560	1.3
1	9/12/2006	24	10	1	550	1.3
1	9/12/2006	24	12	2	575	1.3
1	9/12/2006	24	14	1	610	1.3
1	9/12/2006	24	20	1	540	1.3
1	9/12/2006	24	23	2	550	1.3
1	9/13/2006	25	1	2	590	1.3
1	9/13/2006	25	3	1	590	1.3
1	9/13/2006	25	4	1	555	1.3
1	9/13/2006	25	6	1	580	1.3
1	9/13/2006	25	11	1	550	1.3
1	9/13/2006	25	14	1	570	1.3
1	9/13/2006	25	20	1	580	1.3
1	9/13/2006	25	22	1	585	1.3
1	9/13/2006	25	24	1	575	1.3
1	9/13/2006	25	25	1	590	1.3
1	9/13/2006	25	29	2	560	1.3
1	9/13/2006	25	30	1	575	1.3
1	9/13/2006	25	34	1	545	1.3
1	9/13/2006	25	38	1	555	1.3
1	9/13/2006	25	40	2	570	1.3
1	9/13/2006	26	4	1	590	1.3
1	9/13/2006	26	6	1	555	1.3
1	9/13/2006	26	7	2	550	1.3
1	9/13/2006	26	11	2	540	1.3
1	9/13/2006	26	15	2	550	1.3
1	9/13/2006	26	17	1	570	1.3
1	9/13/2006	26	18	1	550	1.3
1	9/13/2006	26	20	1	550	1.3
1	9/13/2006	26	22	2	560	1.3
1	9/13/2006	26	23	1	550	1.3
1	9/13/2006	26	26	2	545	1.3
1	9/13/2006	26	27	2	545	1.3
1	9/13/2006	26	28	1	590	1.3
1	9/13/2006	26	30	1	585	1.3
1	9/13/2006	26	32	2	540	1.3
1	9/13/2006	26	33	1	570	1.3
1	9/13/2006	26	36	1	575	1.3
1	9/13/2006	26	37	1	590	1.3
1	9/13/2006	26	39	1	570	1.3
1	9/13/2006	27	2	1	550	1.3
1	9/13/2006	27	3	1	570	1.3
1	9/13/2006	27	6	2	570	1.3
1	9/13/2006	27	8	1	610	1.3
1	9/13/2006	27	11	2	550	1.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	9/13/2006	27	13	1	560	1.3
1	9/13/2006	27	17	1	570	1.3
1	9/14/2006	28	4	2	545	1.3
1	9/14/2006	28	8	1	580	1.3
1	9/14/2006	28	10	1	595	1.3
1	9/14/2006	28	11	2	570	1.3
1	9/14/2006	28	12	2	545	1.3
1	9/14/2006	28	16	2	555	1.3
1	9/14/2006	28	18	1	550	1.3
1	9/14/2006	28	20	2	560	1.3
1	9/14/2006	28	23	1	565	1.3
1	9/14/2006	28	24	2	535	1.3
1	9/14/2006	28	27	1	620	1.3
1	9/14/2006	28	29	2	570	1.3
1	9/14/2006	28	31	2	560	1.3
1	9/14/2006	28	32	2	600	1.3
1	9/14/2006	28	35	2	550	1.3
1	9/14/2006	28	36	2	575	1.3
1	9/14/2006	28	39	1	565	1.3
1	9/14/2006	29	1	1	570	1.3
1	9/14/2006	29	3	1	580	1.3
1	9/14/2006	29	4	1	555	1.3
1	9/14/2006	29	8	1	540	1.3
1	9/14/2006	29	9	2	535	1.3
1	9/14/2006	29	10	2	555	1.3
1	9/14/2006	29	14	2	530	1.3
1	9/14/2006	29	18	1	585	1.3
1	9/14/2006	29	21	1	585	1.3
1	9/14/2006	29	22	2	530	1.3
1	9/14/2006	29	23	1	575	1.3
1	9/14/2006	29	27	2	545	1.3
1	9/14/2006	29	28	2	560	1.3
1	9/14/2006	29	31	1	615	1.3
1	9/14/2006	29	34	1	590	1.3
1	9/14/2006	29	38	1	550	1.3
1	9/14/2006	29	39	1	595	1.3
1	9/15/2006	30	2	2	570	1.3
1	9/15/2006	30	3	2	570	1.3
1	9/15/2006	30	5	1	600	1.3
1	9/15/2006	30	6	2	535	1.3
1	9/15/2006	30	7	1	625	1.3
1	9/15/2006	30	8	1	570	1.3
1	9/15/2006	30	10	1	570	1.3
1	9/15/2006	30	11	2	580	1.3
1	9/15/2006	30	12	1	540	1.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	9/15/2006	30	13	1	570	1.3
1	9/15/2006	30	16	2	595	1.3
1	9/15/2006	30	19	2	595	1.3
1	9/15/2006	30	20	1	610	1.3
1	9/15/2006	30	22	2	550	1.3
1	9/15/2006	30	24	2	575	1.3
1	9/15/2006	30	26	1	600	1.3
1	9/15/2006	30	27	1	570	1.3
1	9/15/2006	30	34	1	595	1.3
1	9/15/2006	30	37	1	575	1.3
1	9/15/2006	31	1	2	585	1.3
1	9/15/2006	31	3	1	575	1.3
1	9/15/2006	31	5	2	570	1.3
1	9/15/2006	31	7	2	575	1.3
1	9/15/2006	31	8	1	565	1.3
1	9/15/2006	31	9	1	540	1.3
1	9/15/2006	31	10	1	620	1.3
1	9/15/2006	31	11	1	570	1.3
1	9/15/2006	31	12	2	575	1.3
1	9/15/2006	31	15	1	540	1.3
1	9/15/2006	31	18	2	560	1.3
1	9/15/2006	31	21	2	575	1.3
1	9/15/2006	31	25	2	575	1.3
1	9/15/2006	31	26	2	545	1.3
1	9/15/2006	31	27	1	565	1.3
1	9/15/2006	31	28	1	550	1.3
1	9/15/2006	31	29	1	575	1.3
1	9/15/2006	31	30	2	565	1.3
1	9/15/2006	31	35	2	560	1.3
1	9/15/2006	31	38	2	550	1.3
1	9/15/2006	31	39	1	580	1.3
1	9/18/2006	32	2	2	555	1.3
1	9/18/2006	32	4	2	545	1.3
1	9/18/2006	32	8	1	560	1.3
1	9/18/2006	32	9	1	570	1.3
1	9/18/2006	32	13	1	555	1.3
1	9/18/2006	32	15	2	550	1.3
1	9/18/2006	32	16	1	570	1.3
1	9/18/2006	32	17	2	550	1.3
1	9/18/2006	32	18	1	550	1.3
1	9/18/2006	32	19	1	590	1.3
1	9/18/2006	32	22	1	540	1.3
1	9/18/2006	32	23	2	570	1.3
1	9/18/2006	32	29	2	530	1.3
1	9/18/2006	32	30	1	580	1.3

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	9/18/2006	32	32	1	555	1.3
1	9/18/2006	32	34	2	535	1.3
1	9/18/2006	32	39	1	585	1.3
1	9/19/2006	33	3	2	560	1.3
1	9/19/2006	33	8	2	560	1.3
1	9/19/2006	33	12	1	545	1.3
1	9/19/2006	33	19	2	575	1.3
1	9/19/2006	33	20	1	555	1.3
1	9/19/2006	33	23	1	595	1.3
1	9/19/2006	33	27	1	550	1.3
1	9/19/2006	33	33	2	565	1.3
1	9/19/2006	33	38	1	555	1.3
1	9/19/2006	33	39	2	530	1.3
1	9/19/2006	33	40	1	550	1.3
1	9/19/2006	34	3	1	565	1.3
1	9/19/2006	34	4	2	550	1.3
1	9/19/2006	34	5	1	580	1.3
1	9/19/2006	34	6	2	565	1.3
1	9/19/2006	34	9	2	560	1.3
1	9/19/2006	34	11	1	590	1.3
1	9/19/2006	34	14	1	570	1.3
1	9/19/2006	34	15	2	530	1.3
1	9/19/2006	34	16	1	595	1.3
1	9/19/2006	34	19	1	560	1.3
1	9/19/2006	34	22	1	560	1.3
1	9/19/2006	34	24	1	600	1.3
1	9/19/2006	34	25	1	575	1.3
1	9/19/2006	34	34	2	560	1.3
1	9/22/2006	35	1	1	565	1.3
1	9/22/2006	35	5	2	560	1.3
1	9/22/2006	35	8	1	580	1.3
1	8/16/2006	1	3	2	510	1.2
1	8/16/2006	1	4	2	505	1.2
1	8/16/2006	1	5	1	520	1.2
1	8/16/2006	1	7	1	515	1.2
1	8/16/2006	1	9	2	520	1.2
1	8/16/2006	1	10	1	530	1.2
1	8/16/2006	1	13	1	535	1.2
1	8/16/2006	1	17	2	520	1.2
1	8/16/2006	1	20	1	530	1.2
1	8/16/2006	1	21	2	520	1.2
1	8/16/2006	1	24	1	520	1.2
1	8/16/2006	1	25	1	505	1.2
1	8/17/2006	2	1	1	525	1.2
1	8/17/2006	2	2	1	520	1.2

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/17/2006	2	3	1	530	1.2
1	8/17/2006	2	4	1	520	1.2
1	8/17/2006	2	8	2	520	1.2
1	8/17/2006	2	9	2	515	1.2
1	8/17/2006	2	12	1	530	1.2
1	8/17/2006	2	13	2	490	1.2
1	8/17/2006	2	18	2	500	1.2
1	8/17/2006	2	19	1	500	1.2
1	8/17/2006	2	22	2	515	1.2
1	8/17/2006	2	24	2	490	1.2
1	8/17/2006	2	27	1	520	1.2
1	8/17/2006	2	28	1	520	1.2
1	8/17/2006	2	31	1	515	1.2
1	8/17/2006	2	32	1	530	1.2
1	8/17/2006	2	33	2	510	1.2
1	8/17/2006	2	36	1	515	1.2
1	8/17/2006	2	40	2	515	1.2
1	8/17/2006	3	1	2	495	1.2
1	8/17/2006	3	2	2	520	1.2
1	8/17/2006	3	4	1	525	1.2
1	8/17/2006	3	6	2	510	1.2
1	8/19/2006	4	2	1	510	1.2
1	8/19/2006	4	3	1	485	1.2
1	8/19/2006	4	5	1	500	1.2
1	8/19/2006	4	9	2	470	1.2
1	8/19/2006	4	10	2	510	1.2
1	8/19/2006	4	11	2	485	1.2
1	8/19/2006	4	13	2	490	1.2
1	8/19/2006	4	15	1	470	1.2
1	8/19/2006	4	17	1	510	1.2
1	8/19/2006	4	20	1	510	1.2
1	8/19/2006	4	21	1	495	1.2
1	8/19/2006	4	26	2	510	1.2
1	8/19/2006	4	27	1	510	1.2
1	8/19/2006	4	30	1	530	1.2
1	8/19/2006	4	32	2	480	1.2
1	8/20/2006	5	1	1	530	1.2
1	8/20/2006	5	2	1	520	1.2
1	8/20/2006	5	5	2	485	1.2
1	8/20/2006	5	7	2	515	1.2
1	8/20/2006	5	8	1	520	1.2
1	8/20/2006	5	10	1	500	1.2
1	8/20/2006	5	12	1	490	1.2
1	8/20/2006	5	13	2	500	1.2
1	8/20/2006	5	16	1	515	1.2

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/20/2006	5	19	1	520	1.2
1	8/20/2006	5	22	1	490	1.2
1	8/20/2006	5	23	1	510	1.2
1	8/20/2006	5	24	1	530	1.2
1	8/20/2006	5	25	1	520	1.2
1	8/20/2006	5	26	1	505	1.2
1	8/20/2006	5	30	2	500	1.2
1	8/20/2006	5	31	2	500	1.2
1	8/20/2006	5	32	2	520	1.2
1	8/20/2006	5	34	1	530	1.2
1	8/20/2006	5	35	2	520	1.2
1	8/20/2006	5	36	2	525	1.2
1	8/20/2006	5	37	2	500	1.2
1	8/20/2006	6	2	2	490	1.2
1	8/20/2006	6	3	1	520	1.2
1	8/20/2006	6	4	1	510	1.2
1	8/20/2006	6	6	2	490	1.2
1	8/20/2006	6	8	1	520	1.2
1	8/20/2006	6	10	2	525	1.2
1	8/20/2006	6	11	2	515	1.2
1	8/20/2006	6	12	1	515	1.2
1	8/20/2006	6	14	2	500	1.2
1	8/20/2006	6	17	1	505	1.2
1	8/20/2006	6	19	2	490	1.2
1	8/20/2006	6	20	1	515	1.2
1	8/20/2006	6	22	2	495	1.2
1	8/20/2006	6	25	1	520	1.2
1	8/20/2006	6	26	2	520	1.2
1	8/20/2006	6	27	1	495	1.2
1	8/20/2006	6	29	1	520	1.2
1	8/20/2006	6	31	1	520	1.2
1	8/20/2006	6	32	1	500	1.2
1	8/20/2006	6	34	1	520	1.2
1	8/20/2006	6	35	1	510	1.2
1	8/20/2006	6	36	2	510	1.2
1	8/20/2006	6	37	1	525	1.2
1	8/20/2006	6	38	2	520	1.2
1	8/20/2006	6	40	1	520	1.2
1	8/20/2006	7	1	1	520	1.2
1	8/20/2006	7	9	1	520	1.2
1	8/20/2006	7	14	1	530	1.2
1	8/20/2006	7	16	1	520	1.2
1	8/20/2006	7	18	2	515	1.2
1	8/20/2006	7	19	1	510	1.2
1	8/20/2006	7	20	2	505	1.2

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/21/2006	8	1	2	520	1.2
1	8/21/2006	8	3	2	480	1.2
1	8/21/2006	8	5	1	490	1.2
1	8/21/2006	8	8	1	530	1.2
1	8/21/2006	8	12	1	530	1.2
1	8/21/2006	8	13	2	510	1.2
1	8/21/2006	8	14	2	520	1.2
1	8/21/2006	8	15	1	490	1.2
1	8/21/2006	8	18	1	490	1.2
1	8/21/2006	8	20	2	510	1.2
1	8/21/2006	8	25	1	490	1.2
1	8/21/2006	8	26	1	510	1.2
1	8/21/2006	8	27	1	510	1.2
1	8/21/2006	8	31	1	460	1.2
1	8/21/2006	8	32	2	490	1.2
1	8/21/2006	8	34	1	530	1.2
1	8/21/2006	8	35	1	480	1.2
1	8/21/2006	8	38	2	510	1.2
1	8/21/2006	8	40	2	510	1.2
1	8/21/2006	9	11	1	480	1.2
1	8/21/2006	9	13	1	510	1.2
1	8/22/2006	10	1	1	520	1.2
1	8/22/2006	10	2	1	520	1.2
1	8/22/2006	10	4	2	490	1.2
1	8/22/2006	10	5	2	490	1.2
1	8/22/2006	10	6	1	495	1.2
1	8/22/2006	10	7	2	490	1.2
1	8/22/2006	10	8	1	495	1.2
1	8/22/2006	10	9	1	500	1.2
1	8/22/2006	10	10	1	530	1.2
1	8/22/2006	10	14	2	525	1.2
1	8/22/2006	10	16	2	510	1.2
1	8/22/2006	10	18	2	515	1.2
1	8/22/2006	10	19	1	520	1.2
1	8/22/2006	10	20	2	470	1.2
1	8/22/2006	10	21	2	520	1.2
1	8/22/2006	10	22	1	520	1.2
1	8/22/2006	10	23	1	530	1.2
1	8/22/2006	10	28	1	530	1.2
1	8/22/2006	10	30	2	520	1.2
1	8/22/2006	10	32	1	515	1.2
1	8/22/2006	10	35	2	500	1.2
1	8/22/2006	10	36	1	510	1.2
1	8/22/2006	10	37	2	525	1.2
1	8/22/2006	10	38	1	535	1.2

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/23/2006	11	33	1	500	1.2
1	8/23/2006	12	9	1	535	1.2
1	8/23/2006	12	20	1	535	1.2
1	8/23/2006	12	21	1	525	1.2
1	8/24/2006	13	2	2	480	1.2
1	8/24/2006	13	3	2	470	1.2
1	8/24/2006	13	6	2	495	1.2
1	8/24/2006	13	8	1	495	1.2
1	8/24/2006	13	9	1	465	1.2
1	8/24/2006	13	11	1	490	1.2
1	8/24/2006	13	15	1	490	1.2
1	8/24/2006	13	16	1	505	1.2
1	8/24/2006	13	18	2	460	1.2
1	8/24/2006	13	22	1	530	1.2
1	8/24/2006	13	23	1	510	1.2
1	8/24/2006	13	27	2	510	1.2
1	8/24/2006	13	29	1	480	1.2
1	8/24/2006	13	30	2	525	1.2
1	8/24/2006	13	33	2	505	1.2
1	8/24/2006	13	34	1	500	1.2
1	8/24/2006	13	35	1	495	1.2
1	8/24/2006	14	4	1	520	1.2
1	8/24/2006	14	8	1	520	1.2
1	8/24/2006	14	10	1	510	1.2
1	8/24/2006	14	11	1	510	1.2
1	8/24/2006	14	13	1	485	1.2
1	8/24/2006	14	15	1	530	1.2
1	8/24/2006	14	16	1	500	1.2
1	8/24/2006	14	20	1	535	1.2
1	8/24/2006	14	23	2	505	1.2
1	8/24/2006	14	26	1	490	1.2
1	8/24/2006	14	28	2	505	1.2
1	8/24/2006	14	29	2	490	1.2
1	8/24/2006	14	30	1	500	1.2
1	8/24/2006	14	31	1	530	1.2
1	8/24/2006	14	32	1	475	1.2
1	8/24/2006	14	33	2	525	1.2
1	8/24/2006	14	34	2	510	1.2
1	8/24/2006	14	35	1	515	1.2
1	8/24/2006	14	39	2	520	1.2
1	8/24/2006	15	2	2	525	1.2
1	8/24/2006	15	3	1	495	1.2
1	8/24/2006	15	4	2	480	1.2
1	8/24/2006	15	5	2	500	1.2
1	8/24/2006	15	6	1	515	1.2

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/24/2006	15	8	1	500	1.2
1	8/24/2006	15	13	1	510	1.2
1	8/25/2006	16	1	2	495	1.2
1	8/25/2006	16	4	1	520	1.2
1	8/25/2006	16	5	1	475	1.2
1	8/25/2006	16	6	1	500	1.2
1	8/25/2006	16	10	1	500	1.2
1	8/25/2006	16	13	2	520	1.2
1	8/25/2006	16	14	2	490	1.2
1	8/25/2006	16	15	1	530	1.2
1	8/25/2006	16	16	1	530	1.2
1	8/25/2006	16	17	2	510	1.2
1	8/25/2006	16	19	1	530	1.2
1	8/25/2006	16	21	2	500	1.2
1	8/25/2006	16	22	2	515	1.2
1	8/25/2006	16	23	1	525	1.2
1	8/25/2006	16	26	1	500	1.2
1	8/25/2006	16	29	1	525	1.2
1	8/25/2006	16	37	1	520	1.2
1	8/25/2006	16	40	1	530	1.2
1	8/25/2006	17	8	1	525	1.2
1	8/25/2006	17	14	1	530	1.2
1	8/25/2006	17	15	1	520	1.2
1	8/25/2006	17	16	2	510	1.2
1	8/25/2006	17	17	1	500	1.2
1	8/25/2006	17	18	1	520	1.2
1	8/25/2006	17	19	2	510	1.2
1	8/25/2006	17	22	1	520	1.2
1	8/25/2006	17	25	1	525	1.2
1	8/25/2006	17	29	2	500	1.2
1	8/25/2006	17	31	1	505	1.2
1	8/25/2006	17	32	1	490	1.2
1	8/25/2006	17	35	1	530	1.2
1	8/25/2006	17	37	1	530	1.2
1	8/25/2006	18	2	1	515	1.2
1	8/25/2006	18	5	2	520	1.2
1	8/25/2006	18	6	1	505	1.2
1	8/25/2006	18	9	1	530	1.2
1	8/25/2006	18	10	2	500	1.2
1	8/25/2006	18	12	1	530	1.2
1	8/25/2006	18	13	2	485	1.2
1	8/25/2006	18	14	1	525	1.2
1	8/31/2006	19	4	1	510	1.2
1	8/31/2006	19	6	1	510	1.2
1	8/31/2006	19	8	2	490	1.2

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	8/31/2006	19	12	1	510	1.2
1	8/31/2006	19	15	2	495	1.2
1	8/31/2006	19	17	1	500	1.2
1	8/31/2006	19	19	1	525	1.2
1	8/31/2006	19	21	2	485	1.2
1	8/31/2006	19	22	2	520	1.2
1	8/31/2006	19	27	1	510	1.2
1	8/31/2006	19	28	1	500	1.2
1	8/31/2006	19	29	1	515	1.2
1	8/31/2006	19	39	2	470	1.2
1	8/31/2006	20	3	1	500	1.2
1	8/31/2006	20	13	1	510	1.2
1	8/31/2006	20	15	2	515	1.2
1	8/31/2006	20	17	2	475	1.2
1	8/31/2006	20	19	1	510	1.2
1	8/31/2006	20	22	2	500	1.2
1	8/31/2006	20	23	2	520	1.2
1	8/31/2006	20	24	2	520	1.2
1	8/31/2006	20	25	1	510	1.2
1	8/31/2006	20	27	1	530	1.2
1	8/31/2006	20	30	1	495	1.2
1	8/31/2006	20	33	1	525	1.2
1	8/31/2006	20	36	1	500	1.2
1	8/31/2006	20	38	2	520	1.2
1	9/2/2006	21	4	1	520	1.2
1	9/2/2006	21	5	2	495	1.2
1	9/2/2006	21	8	1	520	1.2
1	9/2/2006	21	14	1	520	1.2
1	9/2/2006	21	27	2	525	1.2
1	9/2/2006	21	29	1	515	1.2
1	9/2/2006	21	30	2	495	1.2
1	9/2/2006	21	36	1	510	1.2
1	9/2/2006	21	38	1	520	1.2
1	9/2/2006	21	40	2	500	1.2
1	9/11/2006	22	1	1	515	1.2
1	9/11/2006	22	4	1	510	1.2
1	9/11/2006	22	8	2	480	1.2
1	9/11/2006	22	9	1	510	1.2
1	9/12/2006	23	1	1	525	1.2
1	9/12/2006	23	2	2	490	1.2
1	9/12/2006	23	3	1	470	1.2
1	9/12/2006	23	6	2	510	1.2
1	9/12/2006	23	7	2	520	1.2
1	9/12/2006	23	15	2	500	1.2
1	9/12/2006	23	16	2	500	1.2

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	9/12/2006	23	19	1	535	1.2
1	9/12/2006	23	23	1	525	1.2
1	9/12/2006	23	26	2	500	1.2
1	9/12/2006	23	30	2	520	1.2
1	9/12/2006	23	32	2	500	1.2
1	9/12/2006	23	34	2	500	1.2
1	9/12/2006	23	40	1	520	1.2
1	9/12/2006	24	5	1	510	1.2
1	9/12/2006	24	6	1	520	1.2
1	9/12/2006	24	9	2	495	1.2
1	9/12/2006	24	11	2	475	1.2
1	9/12/2006	24	13	1	530	1.2
1	9/12/2006	24	15	2	480	1.2
1	9/12/2006	24	16	1	460	1.2
1	9/12/2006	24	17	1	485	1.2
1	9/12/2006	24	21	2	495	1.2
1	9/13/2006	25	7	1	530	1.2
1	9/13/2006	25	9	1	505	1.2
1	9/13/2006	25	10	2	505	1.2
1	9/13/2006	25	12	1	525	1.2
1	9/13/2006	25	13	1	535	1.2
1	9/13/2006	25	16	2	500	1.2
1	9/13/2006	25	18	2	525	1.2
1	9/13/2006	25	19	1	490	1.2
1	9/13/2006	25	26	1	520	1.2
1	9/13/2006	25	27	2	515	1.2
1	9/13/2006	25	28	1	510	1.2
1	9/13/2006	25	31	1	515	1.2
1	9/13/2006	25	36	1	500	1.2
1	9/13/2006	26	3	1	520	1.2
1	9/13/2006	26	8	1	510	1.2
1	9/13/2006	26	9	1	510	1.2
1	9/13/2006	26	10	2	500	1.2
1	9/13/2006	26	12	1	480	1.2
1	9/13/2006	26	19	1	535	1.2
1	9/13/2006	26	21	1	535	1.2
1	9/13/2006	26	24	2	515	1.2
1	9/13/2006	26	31	2	490	1.2
1	9/13/2006	26	35	1	525	1.2
1	9/13/2006	26	40	2	500	1.2
1	9/13/2006	27	1	2	465	1.2
1	9/13/2006	27	5	2	495	1.2
1	9/13/2006	27	9	1	505	1.2
1	9/13/2006	27	12	1	505	1.2
1	9/13/2006	27	18	2	520	1.2

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	9/14/2006	28	1	2	500	1.2
1	9/14/2006	28	9	2	495	1.2
1	9/14/2006	28	13	1	490	1.2
1	9/14/2006	28	14	2	505	1.2
1	9/14/2006	28	21	2	500	1.2
1	9/14/2006	28	22	1	480	1.2
1	9/14/2006	28	28	2	520	1.2
1	9/14/2006	28	30	2	525	1.2
1	9/14/2006	28	37	2	490	1.2
1	9/14/2006	28	38	2	500	1.2
1	9/14/2006	29	11	1	520	1.2
1	9/14/2006	29	13	2	490	1.2
1	9/14/2006	29	15	1	490	1.2
1	9/14/2006	29	19	1	505	1.2
1	9/14/2006	29	20	1	470	1.2
1	9/14/2006	29	25	1	530	1.2
1	9/14/2006	29	29	1	520	1.2
1	9/14/2006	29	32	2	500	1.2
1	9/14/2006	29	33	1	525	1.2
1	9/14/2006	29	37	1	525	1.2
1	9/15/2006	30	1	2	520	1.2
1	9/15/2006	30	14	2	520	1.2
1	9/15/2006	30	15	2	525	1.2
1	9/15/2006	30	18	1	530	1.2
1	9/15/2006	30	23	2	485	1.2
1	9/15/2006	30	28	2	485	1.2
1	9/15/2006	30	29	1	525	1.2
1	9/15/2006	30	31	2	490	1.2
1	9/15/2006	30	35	2	480	1.2
1	9/15/2006	31	4	2	485	1.2
1	9/15/2006	31	14	2	490	1.2
1	9/15/2006	31	16	2	490	1.2
1	9/15/2006	31	19	2	495	1.2
1	9/15/2006	31	22	2	480	1.2
1	9/15/2006	31	23	1	485	1.2
1	9/15/2006	31	24	1	460	1.2
1	9/15/2006	31	31	1	525	1.2
1	9/15/2006	31	36	2	495	1.2
1	9/18/2006	32	6	2	510	1.2
1	9/18/2006	32	10	2	470	1.2
1	9/18/2006	32	12	1	495	1.2
1	9/18/2006	32	14	1	520	1.2
1	9/18/2006	32	20	1	500	1.2
1	9/18/2006	32	26	2	505	1.2
1	9/18/2006	32	27	2	515	1.2

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Appendix D. Continued.

Strata	Date	Card#	Fish#	Sex	Length	Age
1	9/18/2006	32	28	2	470	1.2
1	9/18/2006	32	31	1	505	1.2
1	9/18/2006	32	33	1	515	1.2
1	9/18/2006	32	35	2	480	1.2
1	9/18/2006	32	37	1	525	1.2
1	9/19/2006	33	1	2	485	1.2
1	9/19/2006	33	6	1	525	1.2
1	9/19/2006	33	7	2	485	1.2
1	9/19/2006	33	11	2	505	1.2
1	9/19/2006	33	14	1	510	1.2
1	9/19/2006	33	22	1	525	1.2
1	9/19/2006	33	25	2	510	1.2
1	9/19/2006	33	28	1	515	1.2
1	9/19/2006	33	29	2	505	1.2
1	9/19/2006	33	31	2	520	1.2
1	9/19/2006	33	32	1	515	1.2
1	9/19/2006	33	36	2	510	1.2
1	9/19/2006	34	2	1	535	1.2
1	9/19/2006	34	7	1	500	1.2
1	9/19/2006	34	8	1	515	1.2
1	9/19/2006	34	12	1	485	1.2
1	9/19/2006	34	13	2	500	1.2
1	9/19/2006	34	20	2	515	1.2
1	9/19/2006	34	27	2	490	1.2
1	9/19/2006	34	29	2	520	1.2
1	9/19/2006	34	32	2	505	1.2
1	9/22/2006	35	2	1	495	1.2
1	9/22/2006	35	9	2	525	1.2
1	8/19/2006	4	12	1	380	1.1

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