

Alaska Fisheries Data Series Report Number 2004-4

**Estimation of Sockeye and Coho Salmon Escapement in Mortensens Creek,  
Izembek National Wildlife Refuge, 2003**

Kara K. Cornum  
Kellie S. Whitton  
Toby D. Auth

Key words: escapement, sockeye salmon, coho salmon, chum salmon, pink salmon,  
Dolly Varden char, fixed-picket weir, subsistence, Mortensens Creek,  
Izembek National Wildlife Refuge

U.S. Fish and Wildlife Service  
King Salmon Fish and Wildlife Field Office  
P.O. Box 277  
King Salmon, AK 99613-0277  
(907) 246-3442

April 2004

## Disclaimers

Disclaimer: The mention of trade names or commercial products in this report does not constitute endorsement or recommendation for use by the Federal government.

The U.S. Department of Interior prohibits discrimination in Department Federally Conducted Programs based on race, color, national origin, sex, age, or disability. If you believe that you have been discriminated against in any program, activity, or facility operated by the U.S. Fish and Wildlife Service or if you desire further information please write to:

U.S. Department of the Interior  
Office of Equal Opportunity  
1849 C. Street, N. W.  
Washington, D.C. 20240

The Alaska Fisheries Data Series was established in 1994 to provide public access to unpublished study results. These reports are intended to document short-term field studies limited in or lacking statistical interpretation. Reports in this series receive limited internal review prior to release and may be finalized in more formal literature in the future.

|  |
|--|
| <p>This is the 2003 Annual Report for study 01-206 funded by U.S. Fish and Wildlife Service, Office of Subsistence Management.</p> |
|--|

The correct citation for this report is:

Cornum, K. K., K. S. Whitton, and T. D. Auth. 2004. Estimation of sockeye and coho salmon escapement in Mortensens Creek, Izembek National Wildlife Refuge, 2003. U. S. Fish and Wildlife Service, King Salmon Fish and Wildlife Field Office, Alaska Fisheries Data Series Report Number 2004-4, King Salmon, Alaska.

## Table of Contents

|   | page |
|---|------|
| List of Tables .....                        | iv   |
| List of Figures .....                       | iv   |
| List of Appendices .....                    | v    |
| Abstract .....                              | 1    |
| Introduction.....                           | 1    |
| Study Area.....                             | 2    |
| Methods.....                                | 3    |
| Weir Operation.....                         | 3    |
| Escapement, Sex, Length, and Age Data ..... | 4    |
| Sport Fishing and Subsistence Harvest ..... | 7    |
| Results .....                               | 7    |
| Weir Operation.....                         | 7    |
| Escapement, Sex, Length, and Age Data ..... | 7    |
| Sockeye Salmon. ....                        | 7    |
| Coho Salmon. ....                           | 10   |
| Sport Fishing and Subsistence Harvest ..... | 10   |
| Discussion.....                             | 17   |
| Acknowledgements .....                      | 19   |
| Literature Cited .....                      | 20   |

## List of Tables

|   | page |
|---|------|
| 1. Estimated maximum weekly sample size goals..   | 4    |
| 2. Strata (time periods) used for analysis of Mortensens Creek coho and sockeye salmon biological data, 2003.   | 8    |
| 3. Estimated sex composition and standard error by stratum for sockeye salmon sampled at Mortensens Creek weir, 2003.   | 9    |
| 4. Estimated age composition (%), sample sizes, and standard error by stratum for sockeye salmon sampled at Mortensens Creek weir, 2003.  | 9    |
| 5. Mean length, standard error, range, and sample size by sex and age class of sockeye salmon sampled at Mortensens Creek weir, 2003.   | 11   |
| 6. Estimated sex composition and standard error by stratum for coho salmon sampled at Mortensens Creek weir, 2003.  | 13   |
| 7. Estimated age composition (%), sample sizes, and standard error by stratum for coho salmon sampled at Mortensens Creek weir, 2003.   | 14   |
| 8. Mean length, standard error, range, and sample size by sex and age class of coho salmon sampled at Mortensens Creek weir, 2003.  | 15   |
| 9. Comparison of residence, groups size, (mean, SE, and range), time spent fishing (mean, SE, and range), and gear type between sport and subsistence fishermen interviewed at Mortensens Lagoon, 2003. | 16   |
| 10. Estimated minimum sport fish and subsistence catch (C) and harvest (K) (mean, SE, range, and total harvest) of Pacific salmon from Mortensens Lagoon, 2003.   | 17   |

## List of Figures

|  | page |
|--|------|
| 1. Map of Mortensens Creek and the weir site.  | 3    |
| 2. Daily (upper) and cumulative escapement (lower) of sockeye salmon at Mortensens Creek weir, 2003.                               | 8    |
| 3. Length frequency (upper) and cumulative length frequency (lower) for sockeye salmon sampled at the Mortensens Creek weir, 2003. | 12   |
| 4. Daily (upper) and cumulative escapement (lower) of coho salmon at the Mortensens Creek weir, 2003.                              | 13   |
| 5. Length frequency (upper) and cumulative length frequency (lower) for coho salmon sampled at the Mortensens Creek weir, 2003.    | 14   |

## List of Appendices

|  | page |
|--|------|
| A. Minimum, maximum, and mean water temperatures at the Mortensens Creek weir, 2003.....   | 21   |
| B. Counts (daily and cumulative) and cumulative percent (Cum %) of sockeye, coho, pink and chum salmon escapement through the Mortensens weir, 2003..... | 22   |
| C. Summary of subsistence catch (C) and harvest (K) by hook and line (H), gillnet (G), and seine (S) at Mortensens Lagoon, 2003. ....                    | 25   |
| D. Summary of the sport fishing catch (C) and harvest (K) at Mortensens Lagoon, 2003.....  | 27   |



**Estimation of Sockeye and Coho Salmon Escapement in Mortensens Creek,  
Izembek National Wildlife Refuge, 2003**

Kara K. Cornum  
Kellie S. Whitton  
Toby D. Auth

*U. F. Fish and Wildlife Service, King Salmon Fish and Wildlife Field Office  
P. O. Box 277, King Salmon, Alaska 99613, (907)246-3442  
kara\_cornum@fws.gov*

*Abstract.* A fixed picket weir was operated 25 June to 14 October 2003 during the third year of an ongoing investigation to evaluate and provide subsistence management information for sockeye *Oncorhynchus nerka* and coho salmon *O. kisutch* in Mortensens Creek, Izembek National Wildlife Refuge. Sockeye salmon was the most abundant species counted through the weir (N=16,804) followed by coho salmon (N=8,184), pink salmon *O. gorbuscha* (N=40) and chum *O. keta* (N=18). Dolly Varden *Salvelinus malma* were also observed at the weir. Sockeye salmon sampled at the weir were 44% female, and represented nine age groups. Age 1.3 was estimated to be 70% and age 1.2 was 15% of the escapement. Mid-eye-to-fork lengths ranged from 400 to 634 mm for male and from 475 to 604 mm for female sockeye salmon. Coho salmon sampled at the weir were 53% female and represented seven age groups. The dominant coho salmon age groups were age 1.1 (21%), age 2.1 (64%), and age 3.1 (5%). Mid-eye-to-fork lengths of coho salmon ranged from 302 to 723 mm for male and from 405 to 691 mm for females.

### **Introduction**

The outlet of Mortensens Creek is one of the few areas where sockeye salmon *Oncorhynchus nerka* are available for harvest by subsistence users from King Cove and Cold Bay. An escapement goal of 3,200 to 6,400 (Nelson and Lloyd 2001) has been established for sockeye salmon, but currently there is no goal for coho salmon *O. kisutch*. In 1999, escapement of sockeye salmon in Mortensens Creek, based on aerial survey counts, was estimated to be 3,600 fish with an additional 1,378 sockeye salmon harvested in the subsistence and commercial fisheries (ADFG 2000). About 30% of the subsistence harvest of sockeye salmon was taken by Alaska residents living outside of Cold Bay and King Cove. Also in 1999, 279 coho salmon were harvested in the commercial and

subsistence fisheries (ADFG 2000). Management of both species was based on aerial surveys of escapements, but effectiveness of these surveys was limited by dark stream bottoms, turbid water, and inclement weather. The Alaska Department of Fish and Game (ADFG) was also concerned that lack of an in-season estimate of sockeye and coho salmon escapement into Mortensens Creek could jeopardize the continued health of these runs, as well as opportunities for subsistence and sport fishing (Arnold Shaul, ADFG, personal communication). Additionally, King Cove residents were concerned about sport fishing effects on coho salmon. No creel survey or harvest information was available since the State's annual mail out sport fish survey did not specifically estimate sport harvest for Mortensens Creek. However, the report did provide an estimate of sport harvest for the Cold Bay area, which primarily consists of Russell and Mortensens creeks. Average sport harvest for this area from 1996 to 1998 was 671 coho salmon (Howe et al. 1997, Howe et. al. 1998, and Howe et al. 1999).

In 2001, the U.S. Fish and Wildlife Service began operating a weir on Mortensens Creek to estimate escapement of sockeye and coho salmon (Whitton 2002 and 2003). These estimates have provided managers with data to address concerns about over harvest and help resolve the conflict between subsistence and sport users. Specific objectives of this study are:

1. Enumerate daily passage of sockeye and coho salmon through a weir on Mortensens Creek;
2. Describe the run-timing of sockeye and coho salmon through the weir;
3. Estimate the sex and age compositions of sockeye and coho salmon such that simultaneous 90% confidence intervals have a maximum width of 0.20;
4. Estimate the mean length of sockeye and coho salmon by sex and age;
5. From objective one, determine if the abundance of sockeye and coho salmon returns in Mortensens Creek are adequate to allow subsistence fishing, and;
6. From objective one, determine if the abundance of sockeye and coho salmon returns in Mortensens Creek are adequate to allow sport fishing.

### **Study Area**

Mortensens Creek originates in the foothills of Frosty Peak and flows north towards the town of Cold Bay, Alaska before eventually turning south and emptying into Mortensens Lagoon (Figure 1). The drainage consists of several small tributaries, ponds, and a lake. Mortensens Creek supports populations of sockeye, coho, chum *O. keta*, and pink *O. gorbuscha* salmon and Dolly Varden *Salvelinus malma*.

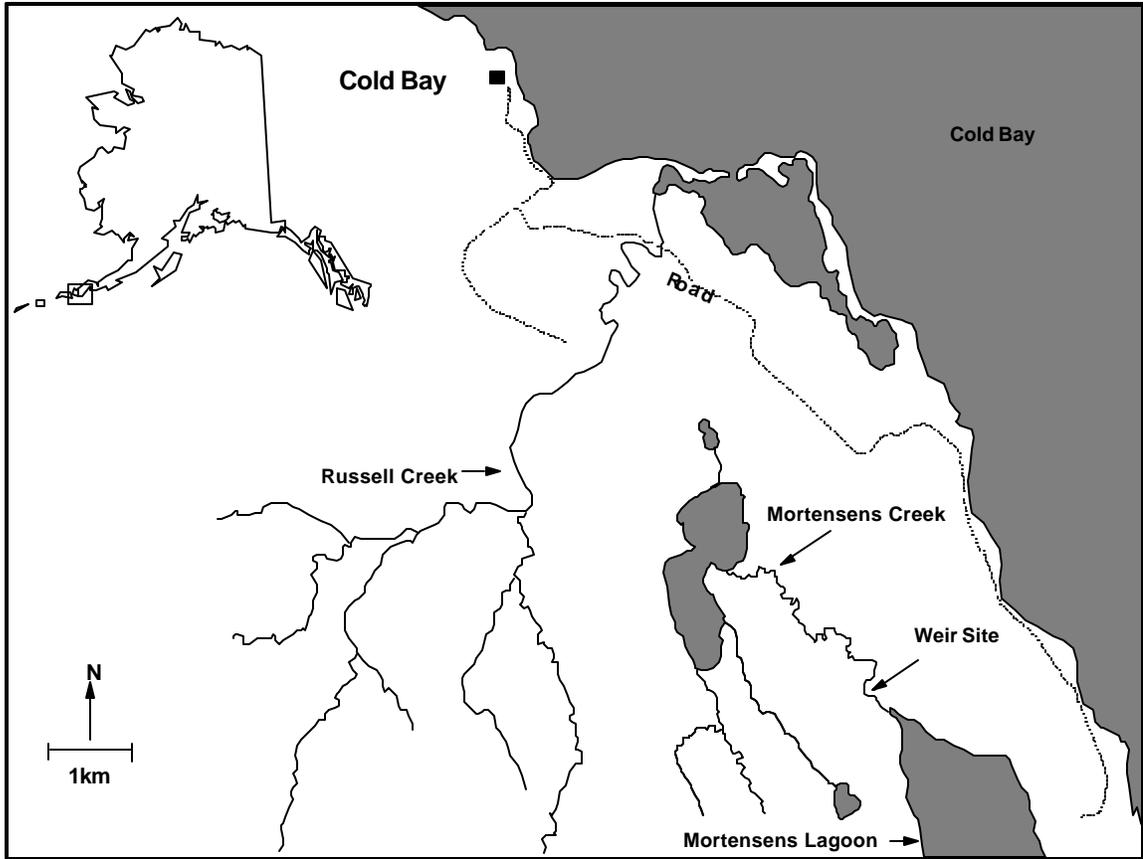


Figure 1. Map of Mortensens Creek and the weir site.

## Methods

### *Weir Operation*

The King Salmon Fish and Wildlife Field Office installed and operated a weir on Mortensens Creek from 29 June to 14 October 2003. The weir was constructed of 2 m aluminum pickets with 2 cm spacing between each picket. Each panel had a minimum of three cross pieces that were welded to the pickets. Weir panels were supported by fence posts and an 8 mm diameter galvanized aircraft cable stretched across the stream. The supporting cable was anchored to the stream banks using “dead men” buried vertically at a depth that allowed the cable to be suspended just above the water surface. Each “dead man” was buried far enough from the stream channel to reduce the chance it would fail during high water. Weir panels were hooked together and placed across the channel at an angle to direct upstream migrant fish to the trap box. The continuous panel was tilted downstream in relation to the stream bed to shunt debris to the water surface, thereby maintaining free-flow of water through the pickets. The tops of the panels were wired to the supporting cable.

A fyke was installed in the weir, leading to an upstream migrant holding pen (trap box). The fyke was located as close to the stream bank as adequate depth would allow. The

depth in the holding pen was greater than 0.5 m to help minimize fish escaping from the pens. The entire weir was inspected, cleaned, and maintained daily to insure integrity.

A dip net was used to remove fish from the holding pen for biological sampling at least once a day or more often as the number moving through the weir increased. Weekly samples of sockeye and coho salmon were measured, sexed, and scales were extracted for age analysis. Coho and sockeye salmon in excess of sampling needs were counted and identified as they were passed through an opening in the weir or trap box. Fish were not allowed to hold downstream of the weir. If this occurred, the trap box was closed and the counting panel was opened to facilitate upstream passage. A Hobo® thermograph (model number H08-001-02) was installed at the weir to monitor water temperatures. Water temperature was recorded every two hours and summarized as daily maximum, minimum, and mean (Appendix A).

*Escapement, Sex, Length, and Age Data*

Sockeye and coho salmon age, sex, and length (ASL) data were collected using a temporally stratified sampling design (Cochran 1977), with statistical weeks defining strata. Sockeye and coho salmon were sampled most weeks for ASL information, and to the extent logistically feasible, the sample was collected uniformly throughout each week (Sunday through Saturday). Coho and sockeye salmon were sampled primarily during high tides. During other times of the day, water depth often prevented upstream migration. To avoid potential bias caused by the selection or capture of individual fish, all sockeye and coho salmon within the trap were included in the sample even if the target number of fish was exceeded.

During each week, a sample of sockeye and coho salmon were measured from mid-eye-to-fork length (MEF), identified to sex using external characteristics, and had scales collected for age analysis. One scale from sockeye salmon and three scales from coho salmon were removed from the preferred area on the left side of adult salmon (Jearld 1983). Scale samples were cleaned and mounted on gummed scale cards. The ADFG in Kodiak pressed and aged the scales. Salmon ages are reported according to the European method (Koo 1962). For sample size determination, major age categories were defined from previous work (Whitton 2002 and 2003) as ages 1.2, 1.3, 2.2, and 2.3 for sockeye and ages 1.1, 1.2, and 1.3 for coho salmon (Table 1).

Maximum weekly sample size goals were established so that simultaneous 90% interval estimates of age composition for each week have maximum widths of 0.20 (Bromaghin

Table 1. Estimated maximum weekly sample size goals.

| Species        | Number of Age Categories | Sample Size | Estimated Unreadable Scales (10%) | Adjusted Sample Size |
|----------------|--------------------------|-------------|-----------------------------------|----------------------|
| Sockeye Salmon | 4                        | 121         | 14                                | 135                  |
| Coho Salmon    | 3                        | 109         | 12                                | 121                  |

1993) (Table 1). Sample sizes obtained using these methods were increased to account for the expected number of unreadable scales. Based on past scale reading, we estimated 10% of the scales would be unreadable. However, since we expected total escapement at Mortensens Creek to be less than 5,000 coho and 10,000 sockeye salmon during most years, we were concerned that these sample size goals would constitute a substantial fraction of the salmon passage during some weeks. Therefore, during weeks of low salmon passage we attempted to sample about 20% of the weekly escapement rather than trying to attain calculated sample size goals. This was still sufficient to describe the age composition and reduced the number of salmon handled at the weir.

Age and sex composition of salmon passing through the weir were estimated using standard stratified random sampling estimators (Cochran 1977). Within a given stratum  $m$ , the proportion of species  $i$  passing the weir that were of sex  $j$  and age  $k$  was estimated as:

$$\hat{p}_{ijkm} = \frac{n_{ijkm}}{n_{i++m}},$$

where  $n_{ijkm}$  denotes the number of fish of species  $i$ , sex  $j$ , and age  $k$  sampled during stratum  $m$  and a subscript of “+” represents summation over all possible values of the corresponding variable, e.g.,  $n_{i++m}$  denotes the total number of fish of species  $i$  sampled in stratum  $m$ . The variance of  $\hat{p}_{ijkm}$  was estimated as:

$$\hat{v}(\hat{p}_{ijkm}) = \left(1 - \frac{n_{i++m}}{N_{i++m}}\right) \frac{\hat{p}_{ijkm}(1 - \hat{p}_{ijkm})}{n_{i++m} - 1}$$

where  $N_{i++m}$  denotes the total number of species  $i$  fish passing the weir in stratum  $m$ . The estimated number of fish of species  $i$ , sex  $j$ , and age  $k$  passing the weir in stratum  $m$  ( $N_{ijkm}$ ) was:

$$\hat{N}_{ijkm} = N_{i++m} \hat{p}_{ijkm}$$

with estimated variance of:

$$\hat{v}(\hat{N}_{ijkm}) = N_{i++m}^2 \hat{v}(\hat{p}_{ijkm})$$

Estimates of proportions for the entire period of weir operation were computed as weighted sums of the stratum estimates, where:

$$\hat{p}_{ijk} = \sum_m \left\{ \frac{N_{i++m}}{N_{i+++}} \right\} \hat{p}_{ijkm}$$

and

$$\hat{v}(\hat{P}_{ijk}) = \sum_m \left( \frac{N_{i++m}}{N_{i+++}} \right)^2 \hat{v}(\hat{P}_{ijkm})$$

The total number of fish in a species and age category passing the weir during the entire period of operation was estimated as:

$$\hat{N}_{ij} = \sum_m \hat{N}_{ijm}$$

with estimated variance:

$$\hat{v}(\hat{N}_{ij}) = \sum_m \hat{v}(\hat{N}_{ijm}).$$

If the length of fish of species  $i$ , sex  $j$ , and age  $k$  sampled in stratum  $m$  is denoted  $x_{ijkm}$ , the sample mean length of fish of species  $i$ , sex  $j$ , and age  $k$  within stratum  $m$  was computed as:

$$\bar{x}_{ijkm} = \frac{\sum x_{ijkm}}{n_{ijkm}}$$

With corresponding sample variance:

$$s_{ijkm}^2 = \left( 1 - \frac{n_{ijkm}}{\hat{N}_{ijkm}} \right) \frac{\sum (x_{ijkm} - \bar{x}_{ijkm})^2}{n_{ijkm} - 1}$$

The mean length of all fish of species  $i$ , sex  $j$ , and age  $k$  was estimated as the sum of the stratum means:

$$\hat{\bar{x}}_{ijk} = \sum_m \left( \frac{\hat{N}_{ijkm}}{\hat{N}_{ijk}} \right) \bar{x}_{ijkm}$$

An approximate estimator of the variance of  $\hat{\bar{x}}_{ijk}$  was obtained using the delta method (Seber 1982),

$$\hat{v}(\hat{\bar{x}}_{ijk}) = \sum_m \left\{ \hat{v}(\hat{N}_{ijkm}) \left[ \frac{\bar{x}_{ijkm}}{\sum_x \hat{N}_{ijkx}} - \sum_y \frac{\hat{N}_{ijkym}}{\left( \sum_x \hat{N}_{ijkx} \right)^2} \bar{x}_{ijkym} \right]^2 + \left( \frac{\hat{N}_{ijkm}}{\sum_x \hat{N}_{ijkx}} \right)^2 s_{ijkm}^2 \right\}$$

While biological data were collected on a weekly basis, data strata were redefined for analysis to account for escapement during weeks when few or no salmon were sampled. After the season, sockeye and coho salmon escapement was divided into five strata (Table 2).

### *Sport Fishing and Subsistence Harvest*

To determine the minimum sport fish and subsistence harvest of sockeye and coho salmon in Mortensens Creek Lagoon, a harvest survey was conducted opportunistically from 5 July to 27 September. The fishery has a single access point allowing fishermen to be easily monitored. Fishers were visible from camp or the weir. When fishing parties were preparing to leave, the weir technicians would intercept the group and collect the following information: time of interview, party size (number of people fishing), hours fished, gear (hook and line, gillnet, or seine), residence (e.g., Cold Bay, King Cove, Alaska, and lower 48 states), reason (sport or subsistence), and the number caught and kept of each Pacific salmon species. Surveys were not conducted if the weir crew was not on site or if fishing parties left after dark. In addition, fishing parties that arrived and departed while the crew was working at the weir were not always interviewed.

## **Results**

### *Weir Operation*

Operation of the weir began 29 June and continued through 14 October 2003. On four occasions (15, 16, and 30 September, and 1 October) high tides associated with strong southeast winds resulted in water depth exceeding the weir height. On those days it is likely that some fish may have passed upstream of the weir without being counted. Additionally, the weir was down for modifications for about 30 minutes on 18 July and 1 October. Visibility in Mortensens Creek was poor during most of the season due to high turbidity, so some fish may have passed by the weir unobserved.

### *Escapement, Sex, Length, and Age Data*

Sockeye (N=16,804) and coho (N=8,184) salmon were the most abundant species counted through the weir (Appendix B). A few pink (N=40) and chum (N=18) salmon were also counted, and Dolly Varden were observed but not counted at the weir.

*Sockeye Salmon.* Cumulative escapement of sockeye salmon into Mortensens Creek in 2003 was estimated to be 16,804 (Figure 2; Appendix B). Sockeye salmon were first captured at the weir on 4 July 2003, and the peak daily escapement occurred on 5 August (1,995 fish; 12% of total run). Thirty eight percent of the total escapement (6,029 sockeye salmon) passed through the weir within a six day period (2-7 August). Sockeye salmon were still migrating past the weir in small numbers when it was removed. Average sex composition of the run was 44% female with little variation throughout the run (Table 3). Nine age classes were identified in the sample. Four age classes (ages 1.1, 1.4, 2.4, and 3.3) accounted for less than 2% of the total sample (Table 4). Two age classes dominated the run; age 1.3 comprised 70% and age 1.2 comprised 15% of the

Table 2. Strata (time periods) used for analysis of Mortensens Creek coho and sockeye salmon biological data, 2003.

| Stratum | Coho Salmon                 | Sockeye Salmon         |
|---------|-----------------------------|------------------------|
| 1       | 10 August - 6 September     | 29 June - 19 July      |
| 2       | 7 September - 13 September  | 20 July - 2 August     |
| 3       | 14 September - 20 September | 3 August - 16 August   |
| 4       | 21 September - 27 September | 17 August - 30 August  |
| 5       | 28 September - 14 October   | 31 August - 14 October |

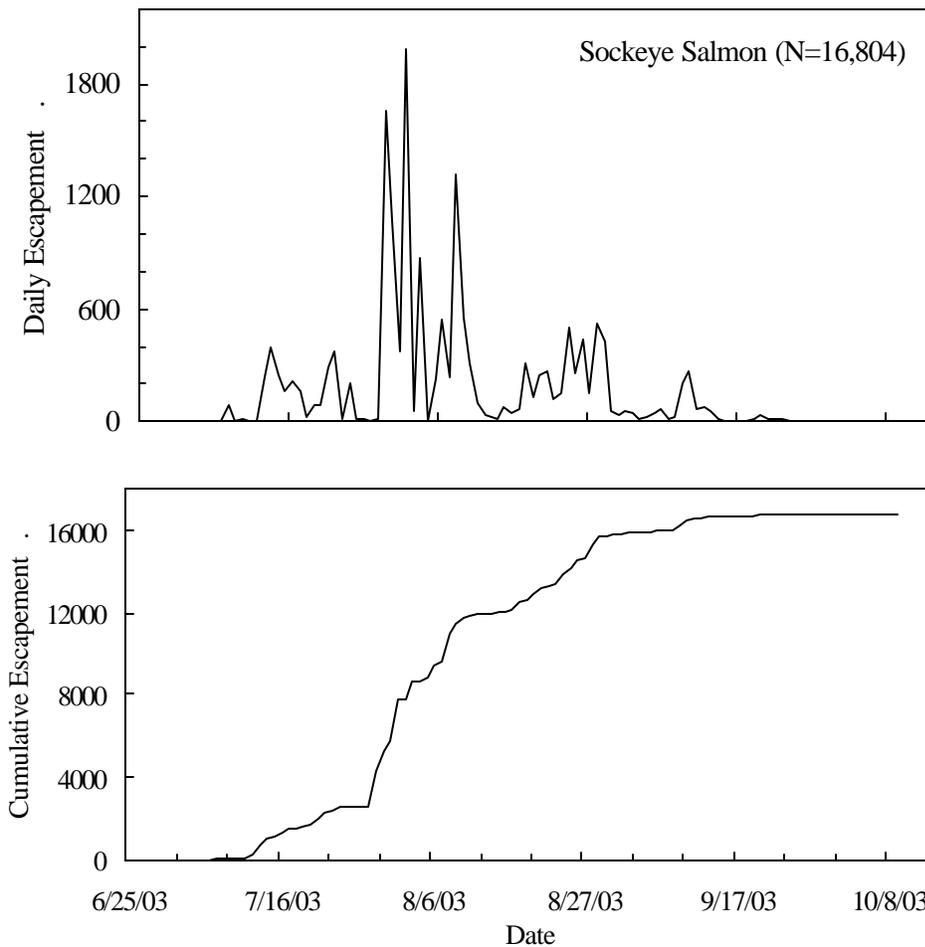


Figure 2. Daily (upper) and cumulative escapement (lower) of sockeye salmon at Mortensens Creek weir, 2003.

Table 3. Estimated sex composition and standard error by stratum for sockeye salmon sampled at Mortensens Creek weir, 2003.

| Stratum | Escapement |      |        |         |        |     |        |        |       |        |  |
|---------|------------|------|--------|---------|--------|-----|--------|--------|-------|--------|--|
|         | Sample     |      |        | Percent |        |     | Number |        |       |        |  |
|         | N          | Male | Female | Male    | Female | SE  | Male   | Female | SE    | Total  |  |
| 1       | 138        | 77   | 61     | 56      | 44     | 4.0 | 637    | 505    | 45.4  | 1,142  |  |
| 2       | 178        | 94   | 84     | 53      | 47     | 3.6 | 1,655  | 1,478  | 114.2 | 3,133  |  |
| 3       | 273        | 152  | 121    | 56      | 44     | 3.0 | 4,270  | 3,400  | 226.9 | 7,670  |  |
| 4       | 276        | 157  | 119    | 57      | 43     | 2.8 | 1,497  | 1,135  | 74.4  | 2,632  |  |
| 5       | 259        | 148  | 111    | 57      | 43     | 2.9 | 1,273  | 954    | 64.5  | 2,227  |  |
| Total   |            |      |        | 56      | 44     | 1.6 | 9,332  | 7,472  | 276.1 | 16,804 |  |

6

Table 4. Estimated age composition (%), sample sizes, and standard error by stratum for sockeye salmon sampled at Mortensens Creek weir, 2003.

| Strata | Escapement |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|--------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|        | Sample     |     |     |     |     |     | 0.3 |     | 1.2 |     | 1.3 |     | 2.2 |     | 2.3 |     |
|        | N          | 0.3 | 1.2 | 1.3 | 2.2 | 2.3 | %   | SE  |
| 1      | 115        | 1   | 5   | 64  | 2   | 38  | 1   | 0.8 | 4   | 1.8 | 56  | 4.4 | 2   | 1.2 | 33  | 4.2 |
| 2      | 151        | 4   | 18  | 108 | 4   | 13  | 3   | 1.3 | 12  | 2.6 | 72  | 3.6 | 3   | 1.3 | 9   | 2.2 |
| 3      | 222        | 3   | 28  | 160 | 8   | 19  | 1   | 0.8 | 13  | 2.2 | 72  | 3.0 | 4   | 1.2 | 9   | 1.9 |
| 4      | 225        | 4   | 58  | 141 | 6   | 14  | 2   | 0.8 | 26  | 2.8 | 63  | 3.1 | 3   | 1.0 | 6   | 1.5 |
| 5      | 194        | 2   | 39  | 135 | 7   | 9   | 1   | 0.7 | 20  | 2.8 | 70  | 3.2 | 4   | 1.3 | 5   | 1.4 |
| Total  | 907        | 14  | 148 | 608 | 27  | 93  | 2   | 0.5 | 15  | 1.3 | 69  | 1.7 | 3   | 0.7 | 9   | 1.0 |

<sup>a</sup> Sample sizes for listed age classes do not equal sample size because other ages 1.1, 1.4, 2.4, and 3.3 (N=16) were not included in the table since they were <2% of the total sample.

sockeye salmon escapement. Scales from 18% of all sockeye salmon sampled could not be aged. Mid-eye-to-fork length ranged from 400 to 634 mm for male and from 467 to 604 mm for females sockeye salmon (Table 5). The mean MEF at age was greater for males than for females. The mean MEF for all sockeye salmon was 563.4 mm (Figure 3)

*Coho Salmon.* Cumulative escapement of coho salmon into Mortensens Creek in 2003 was estimated to be 8,184 (Figure 4; Appendix B). The first coho salmon was captured at the weir on 10 August, and the peak daily escapement occurred on 15 September (2,826 fish; 35% of total run). Coho salmon were still migrating past the weir when it was removed. The sex composition of the run was 53% female and ranged from 65% to 44% among time strata (Table 6). Seven age classes were identified. Four age classes (ages 1.2, 2.0, 2.2, and 3.0) accounted for less than 2% of the total sample (Table 7). Two age classes dominated the run; age 2.1 comprised 70% and age 1.1 comprised 19% of the coho salmon escapement. Scales from 4% of all coho sampled could not be aged. The MEF ranged from 302 to 723 mm for male and from 402 to 691 mm for female coho salmon (Table 8). The mean MEF for all coho salmon was 629.7 mm (Figure 5)

#### *Sport Fishing and Subsistence Harvest*

In 2003, 26 subsistence and 96 sport fishing groups were interviewed at Mortensens Lagoon (Table 9; Appendix C and D). Ninety-six percent of the subsistence fishing groups were residents of either Cold Bay (58%) or King Cove (38%). Fifty-eight percent of the sport fishing groups were from either Cold Bay (55%) or King Cove (3%). The remaining 42% were Alaska residents from other areas of the state (25%), residents of the continental United States (14%), or international visitors (3%). The average group size for subsistence fishing groups was 3.5 people and ranged from 1 to 7. The average size for sport fishing groups was 2.8 people and ranged from 1 to 7. Subsistence groups spent an average of 2.2 h fishing (range 1-5 h); sport fishing groups spent an average of 2.0 h (range 0.5-5 h) fishing. While the majority of subsistence fishers used either a seine or gillnet to harvest fish, hook and line fishing gear was used by 16% of the subsistence fishing groups (Table 9; Appendix C and D). In 2003, the subsistence fishery harvested at least 1,627 sockeye and 196 coho salmon, and the sport fishery harvested at least 364 sockeye and 483 coho salmon (Table 10)

Table 5. Mean length, standard error, range, and sample size by sex and age class of sockeye salmon sampled at Mortensens Creek weir, 2003.

|                |  | Ages    |         |         |         |         |         |         |     |     |
|----------------|--|---------|---------|---------|---------|---------|---------|---------|-----|-----|
|                |  | 0.3     | 1.1     | 1.2     | 1.3     | 1.4     | 2.2     | 2.3     | 2.4 | 3.3 |
| <i>Females</i> |  |         |         |         |         |         |         |         |     |     |
| Mean Length    |  | 533     |         | 525     | 558     | 556     | 516     | 555     |     | 559 |
| SE             |  | 4.6     |         | 14.3    | 11.2    | 17.5    | 10.5    | 10.9    |     | --- |
| Range          |  | 515-550 |         | 467-581 | 492-604 | 475-585 | 489-551 | 506-581 |     |     |
| Sample Size    |  | 5       |         | 65      | 286     | 5       | 12      | 47      |     | 1   |
| <i>Males</i>   |  |         |         |         |         |         |         |         |     |     |
| Mean Length    |  | 578     | 413     | 540     | 584     | 593     | 540     | 584     | 555 |     |
| SE             |  | 6.8     | ---     | 16.2    | 10.7    | 20.2    | 21.3    | 11.0    | --- |     |
| Range          |  | 540-600 | 400-426 | 421-615 | 516-634 | 542-622 | 479-590 | 520-634 |     |     |
| Sample Size    |  | 9       | 2       | 84      | 322     | 6       | 15      | 46      | 1   |     |
| <i>All</i>     |  |         |         |         |         |         |         |         |     |     |
| Mean Length    |  | 560     | 413     | 534     | 571     | 574     | 532     | 569     | 555 | 559 |
| SE             |  | 14.7    | ---     | 15.9    | 13.3    | 20.1    | 20.2    | 13.1    | --- | --- |
| Range          |  | 515-600 | 400-426 | 421-615 | 492-634 | 475-622 | 479-590 | 506-634 |     |     |
| Sample Size    |  | 14      | 2       | 149     | 608     | 11      | 27      | 93      | 1   | 1   |

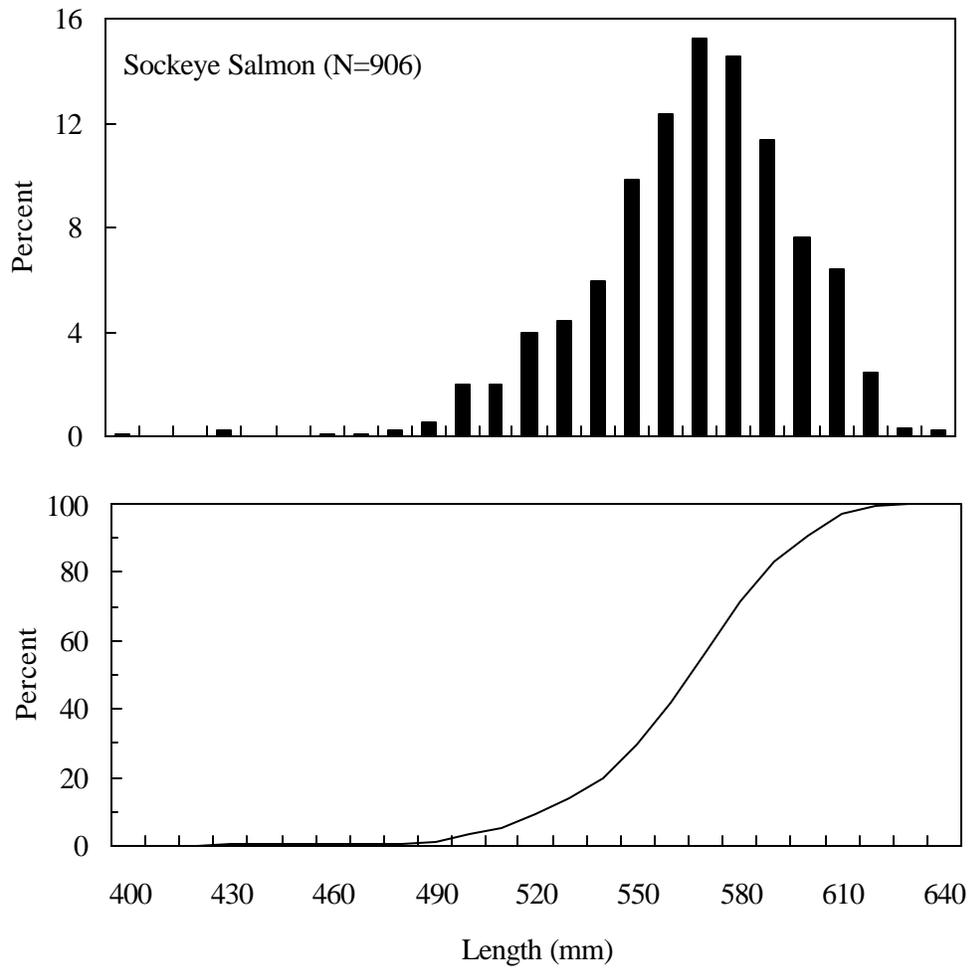


Figure 3. Length frequency (upper) and cumulative length frequency (lower) for sockeye salmon sampled at the Mortensens Creek weir, 2003.

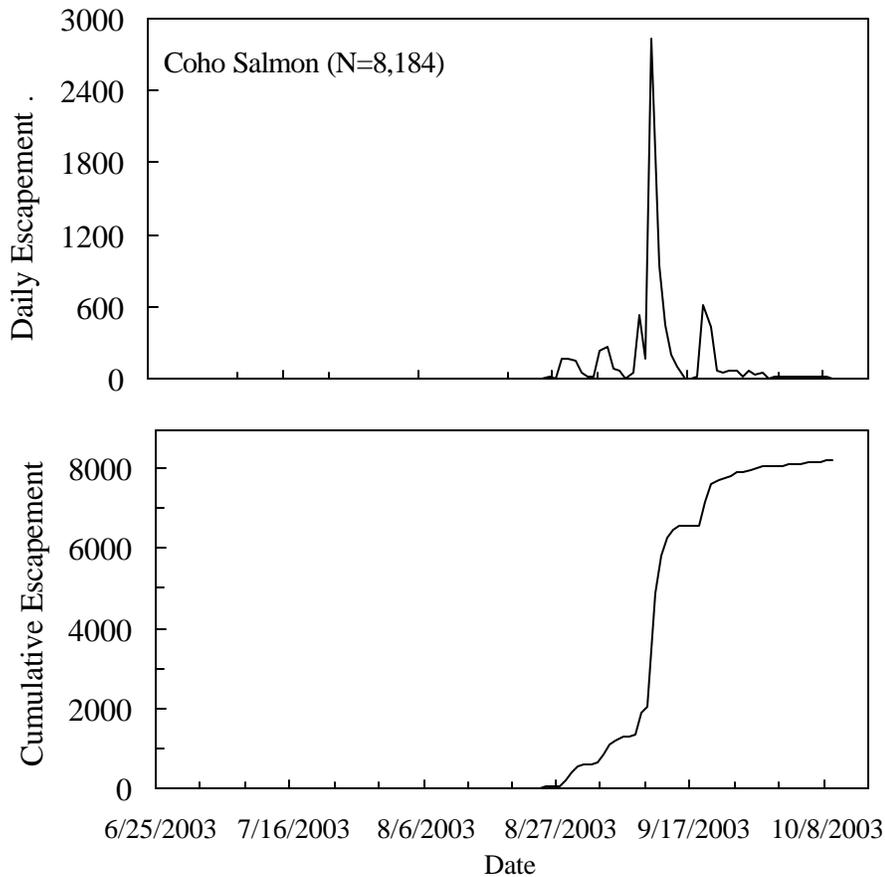


Figure 4. Daily (upper) and cumulative escapement (lower) of coho salmon at the Mortensens Creek weir, 2003.

Table 6. Estimated sex composition and standard error by stratum for coho salmon sampled at Mortensens Creek weir, 2003.

| Strata | Sample |      |        | Escapement |        |     |        |        |       |       |
|--------|--------|------|--------|------------|--------|-----|--------|--------|-------|-------|
|        |        |      |        | Percent    |        |     | Number |        |       |       |
|        | N      | Male | Female | Male       | Female | SE  | Male   | Female | SE    | Total |
| 1      | 51     | 18   | 33     | 35         | 65     | 6.6 | 300    | 550    | 55.7  | 850   |
| 2      | 136    | 61   | 75     | 45         | 55     | 4.0 | 455    | 560    | 40.4  | 1,015 |
| 3      | 140    | 78   | 62     | 56         | 44     | 4.1 | 2,617  | 2,081  | 195.0 | 4,698 |
| 4      | 136    | 63   | 73     | 46         | 54     | 4.1 | 578    | 670    | 50.6  | 1,248 |
| 5      | 71     | 29   | 42     | 41         | 59     | 5.3 | 153    | 220    | 19.3  | 373   |
| Total  |        |      |        | 50         | 50     | 2.6 | 4,103  | 4,081  | 213.7 | 8,184 |

Table 7. Estimated age composition (%), sample sizes, and standard error by stratum for coho salmon sampled at Mortensens Creek weir, 2003.

| Strata | Sample |     |     |     | Escapement |     |     |     |     |     |
|--------|--------|-----|-----|-----|------------|-----|-----|-----|-----|-----|
|        | N      | 1.1 | 2.1 | 3.1 | 1.1        |     | 2.1 |     | 3.1 |     |
|        |        |     |     |     | %          | SE  | %   | SE  | %   | SE  |
| 1      | 49     | 8   | 34  | 7   | 16         | 5.2 | 69  | 6.5 | 14  | 4.9 |
| 2      | 132    | 27  | 88  | 16  | 20         | 3.3 | 67  | 3.8 | 12  | 2.7 |
| 3      | 134    | 24  | 96  | 9   | 18         | 3.3 | 72  | 3.9 | 7   | 2.1 |
| 4      | 130    | 27  | 91  | 10  | 21         | 3.4 | 70  | 3.8 | 8   | 2.2 |
| 5      | 65     | 24  | 35  | 6   | 37         | 5.5 | 54  | 5.7 | 9   | 3.3 |
| Total  | 510    | 110 | 344 | 48  | 19         | 2.1 | 70  | 2.4 | 8   | 1.4 |

<sup>a</sup> Sample sizes for listed age classes do not equal sample size because ages 1.2, 2.0, 2.2, and 3.0 (N=8) were not included as they were <2% of the total sample. Fish not able to age (N=24).

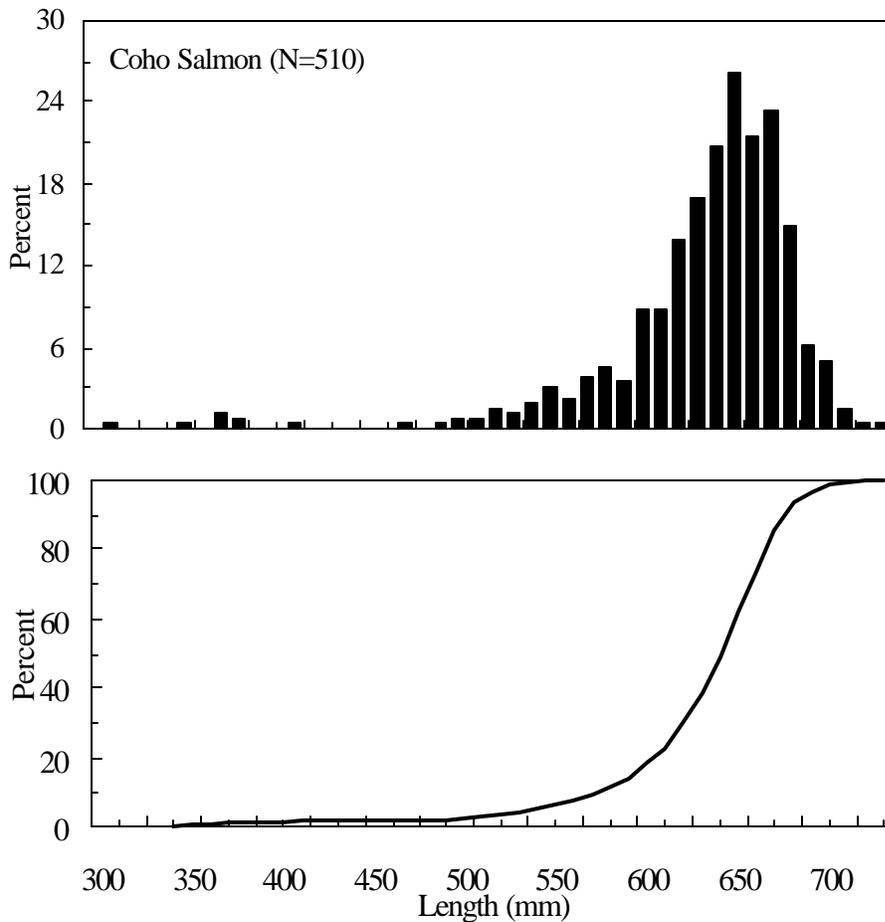


Figure 5. Length frequency (upper) and cumulative length frequency (lower) for coho salmon sampled at the Mortensens Creek weir, 2003.

Table 8. Mean length, standard error, range, and sample size by sex and age class of coho salmon sampled at Mortensens Creek weir, 2003.

|                | Ages    |     |         |         |     |         |         |
|----------------|---------|-----|---------|---------|-----|---------|---------|
|                | 1.1     | 1.2 | 2.0     | 2.1     | 2.2 | 3.0     | 3.1     |
| <i>Females</i> |         |     |         |         |     |         |         |
| Mean Length    | 618     | 570 |         | 639     | 614 |         | 650     |
| SE             | 21.2    | --- |         | 16.5    | --- |         | 18.0    |
| Range          | 495-685 |     |         | 405-691 |     |         | 594-682 |
| Sample Size    | 60      | 1   |         | 185     | 1   |         | 23      |
| <i>Males</i>   |         |     |         |         |     |         |         |
| Mean Length    | 596     |     | 349     | 643     |     | 412     | 639     |
| SE             | 48.1    |     | 34.2    | 28.8    |     | 70.7    | 19.2    |
| Range          | 366-680 |     | 302-378 | 493-723 |     | 362-462 | 539-691 |
| Sample Size    | 50      |     | 4       | 159     |     | 2       | 25      |
| <i>All</i>     |         |     |         |         |     |         |         |
| Mean Length    | 606     | 570 | 649     | 641     | 614 | 412     | 644     |
| SE             | 34.7    | --- | 34.2    | 22.9    | --- | 70.7    | 18.4    |
| Range          | 366-685 |     | 302-378 | 405-723 |     | 362-462 | 539-691 |
| Sample Size    | 110     | 1   | 4       | 344     | 1   | 2       | 48      |

Table 9. Comparison of residence, groups size, (mean, SE, and range), time spent fishing (mean, SE, and range), and gear type between sport and subsistence fishermen interviewed at Mortensens Lagoon, 2003.

|                           | Subsistence | Sport Fishing <sup>a</sup> |
|---------------------------|-------------|----------------------------|
| <b>Groups (N)</b>         |             |                            |
| <b>Residence of Group</b> |             |                            |
| Cold Bay                  | 15          | 53                         |
| King Cove                 | 10          | 3                          |
| Anchorage                 | 1           | 17                         |
| Alaska (other)            |             | 7                          |
| Lower 48 states           |             | 13                         |
| International             |             | 3                          |
| <b>Group Size (#)</b>     |             |                            |
| Mean                      | 3.5         | 2.8                        |
| SE                        | 0.3         | 0.2                        |
| Range                     | 1-7         | 1-7                        |
| <b>Effort (h)</b>         |             |                            |
| Mean                      | 2.2         | 1.8                        |
| SE                        | 0.2         | 0.1                        |
| Range                     | 1-5         | 0.5-5                      |
| Total                     | 51.5        | 175.5                      |
| <b>Gear Type</b>          |             |                            |
| Gillnet                   | 19          | 0                          |
| Hook and Line             | 4           | 98                         |
| Seine                     | 2           | 0                          |

<sup>a</sup>Total includes groups that residence was undetermined.

Table 10. Estimated minimum sport fish and subsistence catch (C) and harvest (K) (mean, SE, range, and total harvest) of Pacific salmon from Mortensens Lagoon, 2003.

|                      | Sockeye |       | Coho  |       | Chum |      | Pink |     |
|----------------------|---------|-------|-------|-------|------|------|------|-----|
|                      | C       | K     | C     | K     | C    | K    | C    | K   |
| <b>Subsistence</b>   |         |       |       |       |      |      |      |     |
| Mean                 | 65      | 65    | 7.8   | 7.8   | 0.3  | 0.08 | 0.04 | 0   |
| SE                   | 19.4    | 19.4  | 5.2   | 5.2   | 0.14 | 0.08 | 0    | 0   |
| Range                | 0-492   | 0-492 | 0-125 | 0-125 | 0-2  | 0-2  | 0-1  | 0-1 |
| Total                | 1,627   | 1,627 | 196   | 196   | 7    | 2    | 1    | 0   |
| <b>Sport Fishery</b> |         |       |       |       |      |      |      |     |
| Mean                 | 3.7     | 3.7   | 7.6   | 4.9   | 0.03 | 0    | 0    | 0   |
| SE                   | 0.5     | 0.5   | 1.33  | 0.78  | 0.02 | 0    | 0    | 0   |
| Range                | 0-25    | 0-25  | 0-55  | 0-30  | 0-2  | 0    | 0    | 0   |
| Total                | 367     | 364   | 741   | 483   | 3    | 0    | 0    | 0   |

### Discussion

We feel more confident with our sockeye than with our coho salmon estimates for several reasons. The weir was probably installed prior to the beginning of the sockeye salmon run since the first sockeye salmon, a single individual, was captured five days later (4 July). While both sockeye and coho salmon were still passing through the weir the day before counting ceased, 99% of the total sockeye salmon count was achieved 27 days before counting ceased and 99% of the coho salmon count was achieved six days before counting ceased. Our greatest concern with counting errors occurred during combined high tide and southeast wind events that caused water to overflow the weir. The four high tide-wind events that occurred in September and October probably had little effect on our estimate of sockeye salmon as most fish had passed the weir prior to these events. Some corroboration of the sockeye salmon estimate was provided by results of aerial surveys flown by the Alaska Department of Fish and Game (Joe Dinnocenzo, ADFG, personal communication). The area-under-the curve estimate, based on a series of aerial counts and a two-week stream life, was 15,500 sockeye salmon, which was very similar to the weir estimate of 16,804. In contrast, the high tide-wind events that occurred in September and October likely allowed coho salmon to pass upstream of the weir undetected since the peak daily escapement of coho salmon (2,826 fish) occurred on 15 September during a high tide-wind event. Unfortunately, we have no way to estimate how many fish we might have missed. No aerial surveys were conducted after 25

September, and, although about 94% of the coho salmon escapement had occurred prior to that date, no coho salmon were recorded during aerial surveys.

Turbidity may also have caused undercounting at the weir, but modifications to the counting areas were made to reduce this problem. When fish were passed through the trap box, the trap gate was raised so that fish had to swim up and over the panel to pass upstream. Raising fish in the water column improved our ability to accurately count fish. In 2004, we will make additional modifications to the weir by adding a video counting window. Even with the turbid conditions, we should be able to guide fish close enough to the camera to count and identify species. By keeping a passage way open during high water events, fish should be less inclined to try to go around or over the weir.

The age compositions of sockeye and coho salmon escapements were similar to previous years (Whitton 2002 and 2003). The sample size calculations based on 4 age categories for sockeye salmon and 3 for coho salmon are appropriate. However, the sample size for sockeye salmon should be increased based on the number of unreadable scales.

Although the subsistence and sport fishing harvest surveys provide useful information, they only estimate minimum harvest because not all subsistence and sport fish groups were surveyed. Sockeye salmon harvest surveys are more complete because one member of the three-person field crew was able to interview fishermen while the other two sampled fish at the weir. During the coho season, the weir crew was reduced to two, so it was not possible to interview fishermen when fish were being sampled at the weir. Since subsistence and sport fishing activity in the lagoon often coincided with sampling at the weir (high tides), estimates of coho salmon harvests surveys were not complete. To provide a statistically valid estimate, a crew dedicated to estimating catch and effort would need to be added to the project.

Both sockeye and coho salmon escapements in 2003 were greater than those documented at the weir in 2002 and 2001 (Whitton 2002 and 2003). Additionally, the 2003 sockeye salmon escapement was well in excess of the established sustainable escapement goal of 3,200 to 6,400 set by ADFG (Nelson and Lloyd 2001). While escapement numbers indicate sockeye and coho salmon returns to Mortensens Creek are adequate to allow subsistence and sport fishing and to sustain these runs, we recommend continuing monitoring for at least three more years. This will allow us to better judge abundance trends and to obtain some information on returns resulting from some of these escapements.

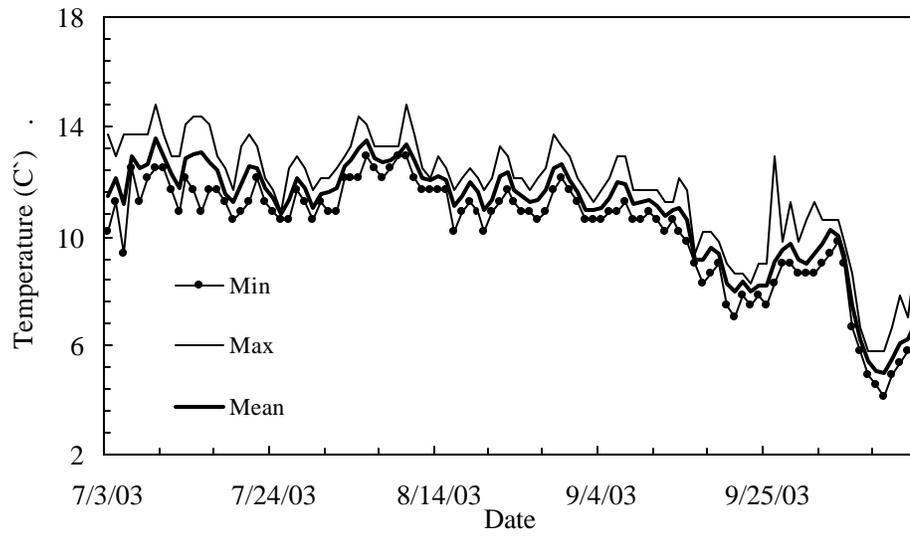
### **Acknowledgements**

The U.S. Fish and Wildlife Service, Office of Subsistence Management, provided funding support for this project through the Fisheries Resource Monitoring Program, project number 01-206. We wish to thank the many people who helped with field work and data entry including, Matt Abrahamse, John Bernsten, Anderson Berry and Dana Hoffmann. We also thank the staff at the Izembek National Wildlife Refuge for logistical support and the King Cove Corporation for land access and providing a local hire fishery technician.

### Literature Cited

- ADFG (Alaska Department of Fish and Game). 2000. Alaska Peninsula and Aleutian Islands management areas annual salmon management report, 1999. Division of Commercial Fisheries, Regional Information Report No.4K00-17.
- Bromaghin, J. F. 1993. Sample size determination for interval estimation of multinomial probabilities. *The American Statistician* 47: 203-206.
- Cochran, W. G. 1977. *Sampling Techniques*, 3<sup>rd</sup> edition. John Wiley & Sons, New York.
- Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 1997. Harvest, catch, and participation in Alaska sport fisheries during 1996. Alaska Department of Fish and Game, Fishery Data Series No. 97-29 revised.
- Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 1998. Harvest, catch, and participation in Alaska sport fisheries during 1997. Alaska Department of Fish and Game, Fishery Data Series No. 98-25 revised.
- Howe, A.L., R. J. Walker, C. Olnes, G. Heineman, and A. E. Bingham. 1999. Harvest, catch, and participation in Alaska sport fisheries during 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-41.
- Jearld, A. 1983. Age determination. Pages 301-324 *in* L. A. Nielsen and D. L. Johnson, editors. *Fisheries Techniques*. American Fisheries Society, Bethesda, MD.
- Koo, T. S. Y. 1962. Age determination in salmon. Pages 301-324 *in* T. S. Y. Koo, editor. *Studies of Alaska red salmon*. University of Washington Press, Seattle, Washington.
- Nelson, P. A. and D. S. Lloyd. 2001. Escapement goals for Pacific salmon in the Kodiak, Chignik, and Alaska Peninsula/Aleutian Islands areas of Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries Regional Information Report No. 4K01-66.
- Seber, G. A. F. 1982. *The estimation of animal abundance and related parameters*, 2<sup>nd</sup> edition. Maxmillan, New York.
- Whitton, K. S. 2002. Estimation of sockeye and coho salmon escapement in Mortensens Creek, Izembek National Wildlife Refuge, 2001. U.S. Fish and Wildlife Service, King Salmon Fishery Resources office, King Salmon, AK. Alaska Fisheries Data Series 2002-3.
- Whitton, K. S. 2003. Estimation of sockeye and coho salmon escapement in Mortensens Creek, Izembek National Wildlife Refuge, 2002. U.S. Fish and Wildlife Service, King Salmon Fishery Resources office, King Salmon, AK. Alaska Fisheries Data Series 2003-2.

Appendix A. Minimum, maximum, and mean water temperatures at the Mortensens Creek weir, 2003.



Appendix B. Counts (daily and cumulative) and cumulative percent (Cum %) of sockeye, coho, pink and chum salmon escapement through the Mortensens weir, 2003.

| Date   | Sockeye |       |       | Coho  |      |       | Pink  | Chum  |
|--------|---------|-------|-------|-------|------|-------|-------|-------|
|        | Daily   | Cum.  | Cum.% | Daily | Cum. | Cum.% | Daily | Daily |
| 4-Jul  | 1       | 1     | 0.01  | 0     | 0    | 0.00  | 0     | 0     |
| 7-Jul  | 1       | 2     | 0.01  | 0     | 0    | 0.00  | 0     | 0     |
| 10-Jul | 1       | 3     | 0.02  | 0     | 0    | 0.00  | 0     | 0     |
| 11-Jul | 87      | 90    | 0.54  | 0     | 0    | 0.00  | 0     | 0     |
| 12-Jul | 1       | 91    | 0.54  | 0     | 0    | 0.00  | 0     | 0     |
| 13-Jul | 6       | 97    | 0.58  | 0     | 0    | 0.00  | 0     | 0     |
| 14-Jul | 4       | 101   | 0.60  | 0     | 0    | 0.00  | 0     | 0     |
| 15-Jul | 3       | 104   | 0.62  | 0     | 0    | 0.00  | 0     | 0     |
| 16-Jul | 232     | 336   | 2.00  | 0     | 0    | 0.00  | 0     | 0     |
| 17-Jul | 403     | 739   | 4.40  | 0     | 0    | 0.00  | 0     | 0     |
| 18-Jul | 248     | 987   | 5.87  | 0     | 0    | 0.00  | 0     | 0     |
| 19-Jul | 155     | 1,142 | 6.80  | 0     | 0    | 0.00  | 0     | 0     |
| 20-Jul | 209     | 1,351 | 8.04  | 0     | 0    | 0.00  | 0     | 0     |
| 21-Jul | 150     | 1,501 | 8.93  | 0     | 0    | 0.00  | 0     | 0     |
| 22-Jul | 19      | 1,520 | 9.05  | 0     | 0    | 0.00  | 0     | 0     |
| 23-Jul | 83      | 1,603 | 9.54  | 0     | 0    | 0.00  | 0     | 0     |
| 24-Jul | 88      | 1,691 | 10.06 | 0     | 0    | 0.00  | 0     | 1     |
| 25-Jul | 289     | 1,980 | 11.78 | 0     | 0    | 0.00  | 0     | 1     |
| 26-Jul | 376     | 2,356 | 14.02 | 0     | 0    | 0.00  | 0     | 0     |
| 27-Jul | 12      | 2,368 | 14.09 | 0     | 0    | 0.00  | 1     | 0     |
| 28-Jul | 204     | 2,572 | 15.31 | 0     | 0    | 0.00  | 0     | 0     |
| 29-Jul | 13      | 2,585 | 15.38 | 0     | 0    | 0.00  | 0     | 0     |
| 30-Jul | 15      | 2,600 | 15.47 | 0     | 0    | 0.00  | 0     | 0     |
| 31-Jul | 1       | 2,601 | 15.48 | 0     | 0    | 0.00  | 0     | 0     |
| 1-Aug  | 12      | 2,613 | 15.55 | 0     | 0    | 0.00  | 0     | 0     |
| 2-Aug  | 1,662   | 4,275 | 25.44 | 0     | 0    | 0.00  | 0     | 2     |
| 3-Aug  | 1,072   | 5,347 | 31.82 | 0     | 0    | 0.00  | 0     | 0     |
| 4-Aug  | 380     | 5,727 | 34.08 | 0     | 0    | 0.00  | 0     | 1     |
| 5-Aug  | 1,995   | 7,722 | 45.95 | 0     | 0    | 0.00  | 0     | 2     |
| 6-Aug  | 52      | 7,774 | 46.26 | 0     | 0    | 0.00  | 0     | 0     |
| 7-Aug  | 868     | 8,642 | 51.43 | 0     | 0    | 0.00  | 1     | 0     |
| 8-Aug  | 0       | 8,642 | 51.43 | 0     | 0    | 0.00  | 0     | 0     |
| 9-Aug  | 223     | 8,865 | 52.76 | 0     | 0    | 0.00  | 0     | 0     |
| 10-Aug | 540     | 9,405 | 55.97 | 0     | 0    | 0.00  | 0     | 0     |

Appendix B.-Continued.

| Date                | Sockeye |        |       | Coho  |       |       | Pink  | Chum  |
|---------------------|---------|--------|-------|-------|-------|-------|-------|-------|
|                     | Daily   | Cum.   | Cum.% | Daily | Cum.  | Cum.% | Daily | Daily |
| 11-Aug              | 234     | 9,639  | 57.36 | 0     | 0     | 0.00  | 0     | 0     |
| 12-Aug              | 1,312   | 10,951 | 65.17 | 0     | 0     | 0.00  | 0     | 0     |
| 13-Aug              | 555     | 11,506 | 68.47 | 0     | 0     | 0.00  | 1     | 1     |
| 14-Aug              | 306     | 11,812 | 70.29 | 1     | 1     | 0.01  | 1     | 0     |
| 15-Aug              | 99      | 11,911 | 70.88 | 0     | 1     | 0.01  | 0     | 0     |
| 16-Aug              | 34      | 11,945 | 71.08 | 0     | 1     | 0.01  | 1     | 0     |
| 17-Aug              | 19      | 11,964 | 71.20 | 0     | 1     | 0.01  | 0     | 1     |
| 18-Aug <sup>b</sup> | 16      | 11,980 | 71.29 | 0     | 1     | 0.01  | 0     | 1     |
| 19-Aug              | 81      | 12,061 | 71.77 | 0     | 1     | 0.01  | 2     | 0     |
| 20-Aug              | 49      | 12,110 | 72.07 | 0     | 1     | 0.01  | 0     | 0     |
| 21-Aug              | 63      | 12,173 | 72.44 | 0     | 1     | 0.01  | 0     | 0     |
| 22-Aug              | 310     | 12,483 | 74.29 | 0     | 1     | 0.01  | 1     | 1     |
| 23-Aug              | 129     | 12,612 | 75.05 | 0     | 1     | 0.01  | 0     | 0     |
| 24-Aug              | 248     | 12,860 | 76.53 | 3     | 4     | 0.05  | 5     | 1     |
| 25-Aug              | 267     | 13,127 | 78.12 | 1     | 5     | 0.06  | 0     | 0     |
| 26-Aug              | 119     | 13,246 | 78.83 | 6     | 11    | 0.13  | 0     | 0     |
| 27-Aug              | 143     | 13,389 | 79.68 | 4     | 15    | 0.18  | 1     | 0     |
| 28-Aug              | 502     | 13,891 | 82.66 | 5     | 20    | 0.24  | 2     | 0     |
| 29-Aug              | 251     | 14,142 | 84.16 | 6     | 26    | 0.32  | 0     | 1     |
| 30-Aug              | 435     | 14,577 | 86.75 | 21    | 47    | 0.57  | 2     | 1     |
| 31-Aug              | 149     | 14,726 | 87.63 | 8     | 55    | 0.67  | 1     | 0     |
| 1-Sep               | 519     | 15,245 | 90.72 | 161   | 216   | 2.64  | 1     | 0     |
| 2-Sep               | 416     | 15,661 | 93.20 | 174   | 390   | 4.77  | 1     | 1     |
| 3-Sep               | 56      | 15,717 | 93.53 | 152   | 542   | 6.62  | 0     | 1     |
| 4-Sep               | 32      | 15,749 | 93.72 | 42    | 584   | 7.14  | 0     | 0     |
| 5-Sep               | 54      | 15,803 | 94.04 | 22    | 606   | 7.40  | 0     | 0     |
| 6-Sep               | 47      | 15,850 | 94.32 | 18    | 624   | 7.62  | 2     | 0     |
| 7-Sep               | 6       | 15,856 | 94.36 | 226   | 850   | 10.39 | 2     | 1     |
| 8-Sep               | 17      | 15,873 | 94.46 | 266   | 1,116 | 13.64 | 1     | 0     |
| 9-Sep               | 45      | 15,918 | 94.73 | 88    | 1,204 | 14.71 | 0     | 0     |
| 10-Sep              | 64      | 15,982 | 95.11 | 71    | 1,275 | 15.58 | 0     | 0     |
| 11-Sep              | 12      | 15,994 | 95.18 | 4     | 1,279 | 15.63 | 1     | 1     |
| 12-Sep              | 21      | 16,015 | 95.30 | 55    | 1,334 | 16.30 | 0     | 0     |
| 13-Sep              | 204     | 16,219 | 96.52 | 531   | 1,865 | 22.79 | 3     | 0     |
| 14-Sep              | 262     | 16,481 | 98.08 | 170   | 2,035 | 24.87 | 1     | 0     |

Appendix B.-Continued.

| Date                | Sockeye |        |        | Coho  |       |        | Pink  | Chum  |
|---------------------|---------|--------|--------|-------|-------|--------|-------|-------|
|                     | Daily   | Cum.   | Cum.%  | Daily | Cum.  | Cum.%  | Daily | Daily |
| 15-Sep <sup>a</sup> | 66      | 16,547 | 98.47  | 2,826 | 4,861 | 59.40  | 0     | 0     |
| 16-Sep <sup>a</sup> | 80      | 16,627 | 98.95  | 950   | 5,811 | 71.00  | 0     | 0     |
| 17-Sep              | 52      | 16,679 | 99.26  | 444   | 6,255 | 76.43  | 0     | 0     |
| 18-Sep              | 14      | 16,693 | 99.34  | 198   | 6,453 | 78.85  | 2     | 0     |
| 19-Sep              | 1       | 16,694 | 99.35  | 105   | 6,558 | 80.13  | 0     | 0     |
| 20-Sep              | 5       | 16,699 | 99.38  | 5     | 6,563 | 80.19  | 0     | 0     |
| 21-Sep              | 0       | 16,699 | 99.38  | 0     | 6,563 | 80.19  | 0     | 0     |
| 22-Sep              | 4       | 16,703 | 99.40  | 9     | 6,572 | 80.30  | 0     | 0     |
| 23-Sep              | 10      | 16,713 | 99.46  | 609   | 7,181 | 87.74  | 2     | 0     |
| 24-Sep              | 33      | 16,746 | 99.65  | 434   | 7,615 | 93.05  | 2     | 0     |
| 25-Sep              | 14      | 16,760 | 99.74  | 74    | 7,689 | 93.95  | 2     | 0     |
| 26-Sep              | 15      | 16,775 | 99.83  | 49    | 7,738 | 94.55  | 0     | 0     |
| 27-Sep              | 6       | 16,781 | 99.86  | 73    | 7,811 | 95.44  | 0     | 0     |
| 28-Sep              | 0       | 16,781 | 99.86  | 71    | 7,882 | 96.31  | 0     | 0     |
| 29-Sep              | 0       | 16,781 | 99.86  | 14    | 7,896 | 96.48  | 0     | 0     |
| 30-Sep <sup>a</sup> | 2       | 16,783 | 99.88  | 72    | 7,968 | 97.36  | 1     | 0     |
| 1-Oct <sup>ab</sup> | 0       | 16,783 | 99.88  | 31    | 7,999 | 97.74  | 0     | 0     |
| 2-Oct               | 0       | 16,783 | 99.88  | 43    | 8,042 | 98.26  | 0     | 0     |
| 3-Oct               | 0       | 16,783 | 99.88  | 6     | 8,048 | 98.34  | 0     | 0     |
| 4-Oct               | 1       | 16,784 | 99.88  | 16    | 8,064 | 98.53  | 0     | 0     |
| 5-Oct               | 1       | 16,785 | 99.89  | 12    | 8,076 | 98.68  | 0     | 0     |
| 6-Oct               | 0       | 16,785 | 99.89  | 16    | 8,092 | 98.88  | 0     | 0     |
| 7-Oct               | 0       | 16,785 | 99.89  | 10    | 8,102 | 99.00  | 0     | 0     |
| 8-Oct               | 4       | 16,789 | 99.91  | 23    | 8,125 | 99.28  | 0     | 0     |
| 9-Oct               | 1       | 16,790 | 99.92  | 11    | 8,136 | 99.41  | 0     | 0     |
| 10-Oct              | 3       | 16,793 | 99.93  | 18    | 8,154 | 99.63  | 0     | 0     |
| 11-Oct              | 2       | 16,795 | 99.95  | 11    | 8,165 | 99.77  | 0     | 0     |
| 12-Oct              | 5       | 16,800 | 99.98  | 16    | 8,181 | 99.96  | 0     | 0     |
| 13-Oct              | 4       | 16,804 | 100.00 | 3     | 8,184 | 100.00 | 40    | 18    |
| TOTALS              | 16,804  | 16,804 | 100.00 | 8184  | 8,184 | 100.00 | 40    | 18    |

<sup>a</sup> May be a partial count due to high tide-wind event.

<sup>b</sup> Partial count because weir went down.

Appendix C. Summary of subsistence catch (C) and harvest (K) by hook and line (H), gillnet (G), and seine (S) at Mortensens Lagoon, 2003. Residence include Cold Bay (CB), King Cove (KC), and Anchorage (AN).

| DATE      | PARTY # | HOURS | Sockeye |     | Coho |   | Chum |   | Pink |   | GEAR | RESIDENCE |
|-----------|---------|-------|---------|-----|------|---|------|---|------|---|------|-----------|
|           |         |       | C       | K   | C    | K | C    | K | C    | K |      |           |
| 7/6/2003  | 5       | 3     | 52      | 52  | 0    | 0 | 0    | 0 | 0    | 0 | G    | CB        |
| 7/9/2003  | 2       | 1.5   | 25      | 25  | 0    | 0 | 0    | 0 | 0    | 0 | G    | CB        |
| 7/16/2003 | 2       | 2     | 15      | 15  | 0    | 0 | 0    | 0 | 0    | 0 | H    | CB        |
| 7/17/2003 | 2       | 2     | 30      | 30  | 0    | 0 | 0    | 0 | 0    | 0 | G    | CB        |
| 7/25/2003 | 2       | 3     | 29      | 29  | 0    | 0 | 2    | 0 | 0    | 0 | G    | CB        |
| 7/25/2003 | 6       | 3     | 78      | 78  | 0    | 0 | 2    | 0 | 0    | 0 | S    | KC        |
| 7/26/2003 | 1       | 3     | 30      | 30  | 0    | 0 | 0    | 0 | 0    | 0 | G    | CB        |
| 7/26/2003 | 2       | 3     | 40      | 40  | 0    | 0 | 0    | 0 | 0    | 0 | G    | CB        |
| 7/26/2003 | 5       | 2.5   | 75      | 75  | 0    | 0 | 0    | 0 | 0    | 0 | S    | KC        |
| 7/27/2003 | 3       | 3     | 93      | 93  | 0    | 0 | 0    | 0 | 0    | 0 | G    | CB        |
| 7/27/2003 | 5       | 3     | 96      | 96  | 0    | 0 | 0    | 0 | 0    | 0 | G    | CB        |
| 7/29/2003 | 1       | 1     | 5       | 5   | 0    | 0 | 0    | 0 | 0    | 0 | H    | CB        |
| 8/1/2003  | 3       | 1     | 25      | 25  | 0    | 0 | 0    | 0 | 0    | 0 | H    | AN        |
| 8/1/2003  | 2       | 1     | 6       | 6   | 0    | 0 | 0    | 0 | 0    | 0 | G    | KC        |
| 8/2/2003  | 3       | 1.5   | 32      | 32  | 0    | 0 | 2    | 2 | 0    | 0 | G    | CB        |
| 8/2/2003  | 3       | 1.5   | 30      | 30  | 0    | 0 | 0    | 0 | 0    | 0 | H    | CB        |
| 8/8/2003  | 5       | 2.5   | 35      | 35  | 0    | 0 | 0    | 0 | 0    | 0 | G    | CB        |
| 8/10/2003 | 5       | 5     | 47      | 47  | 1    | 1 | 1    | 0 | 1    | 0 | G    | CB        |
| 8/15/2003 | 5       | 1     | 100     | 100 | 0    | 0 | 0    | 0 | 0    | 0 | G    | KC        |
| 8/17/2003 | 4       | 1     | 42      | 42  | 2    | 2 | 0    | 0 | 0    | 0 | G    | CB        |
| 8/19/2003 | 6       | 2.5   | 158     | 158 | 3    | 3 | 0    | 0 | 0    | 0 | G    | KC        |

Appendix C – Continued

| DATE      | PARTY # | HOURS | Sockeye |     | Coho |     | Chum |   | Pink |   | GEAR | RESIDENCE |
|-----------|---------|-------|---------|-----|------|-----|------|---|------|---|------|-----------|
|           |         |       | C       | K   | C    | K   | C    | K | C    | K |      |           |
| 8/20/2003 | 5       | 2     | 92      | 92  | 3    | 3   | 0    | 0 | 0    | 0 | G    | KC        |
| 8/21/2003 | 7       | 2.5   | 492     | 492 | 12   | 12  | 0    | 0 | 0    | 0 | G    | KC        |
| 9/3/2003  | 5       | ---   | 0       | 0   | 12   | 12  | 0    | 0 | 0    | 0 | H    | CB        |
| 9/10/2003 | ---     | ---   | 0       | 0   | 125  | 125 | 0    | 0 | 0    | 0 | G    | KC        |
| 9/13/2003 | 4       | ---   | 0       | 0   | 50   | 50  | 0    | 0 | 0    | 0 | G    | KC        |

Appendix D. Summary of the sport fishing catch (C) and harvest (K) at Mortensens Lagoon, 2003. Residence includes Cold Bay (CB), Anchorage (AN), King Cove (KC), Continental US (CONUS), and International (INT).

| DATE      | PARTY # | HOURS | Sockeye |    | Coho |   | Chum |   | Pink |   | RESIDENCE |
|-----------|---------|-------|---------|----|------|---|------|---|------|---|-----------|
|           |         |       | C       | K  | C    | K | C    | K | C    | K |           |
| 7/5/2003  | 1       | 2     | 1       | 1  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/5/2003  | 3       | 2.5   | 12      | 12 | 0    | 0 | 0    | 0 | 0    | 0 | AN        |
| 7/6/2003  | 1       | 1     | 3       | 3  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/6/2003  | 2       | 0.5   | 2       | 2  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/6/2003  | 2       | 2     | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/7/2003  | 2       | 1     | 10      | 10 | 0    | 0 | 1    | 0 | 0    | 0 | CB        |
| 7/8/2003  | 5       | 2     | 12      | 12 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/8/2003  | 2       | 2     | 2       | 2  | 0    | 0 | 2    | 0 | 0    | 0 | Other AK  |
| 7/9/2003  | 2       | 1     | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/9/2003  | 2       | 1     | 6       | 6  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/9/2003  | 2       | 1.5   | 8       | 8  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/9/2003  | 1       | 2     | 5       | 5  | 0    | 0 | 0    | 0 | 0    | 0 | AN        |
| 7/10/2003 | 3       | 1     | 6       | 6  | 0    | 0 | 0    | 0 | 0    | 0 | INT       |
| 7/10/2003 | 1       | 1     | 1       | 1  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/11/2003 | 2       | 2     | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/12/2003 | 2       | 1.5   | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/13/2003 | 2       | 2     | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/13/2003 | 3       | 1     | 15      | 15 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/13/2003 | 3       | 2     | 6       | 6  | 0    | 0 | 0    | 0 | 0    | 0 | INT       |
| 7/15/2003 | 2       | 1     | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | Other AK  |
| 7/15/2003 | 2       | 2     | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |

Appendix D – Continued

28

| DATE      | PARTY # | HOURS | Sockeye |    | Coho |   | Chum |   | Pink |   | RESIDENCE |
|-----------|---------|-------|---------|----|------|---|------|---|------|---|-----------|
|           |         |       | C       | K  | C    | K | C    | K | C    | K |           |
| 7/16/2003 | 2       | 2     | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/16/2003 | 3       | 1     | 4       | 4  | 0    | 0 | 0    | 0 | 0    | 0 | INT       |
| 7/16/2003 | 2       | 1.5   | 1       | 1  | 0    | 0 | 0    | 0 | 0    | 0 | AN        |
| 7/16/2003 | 2       | 2     | 2       | 2  | 0    | 0 | 0    | 0 | 0    | 0 | AN        |
| 7/17/2003 | 1       | 2     | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/17/2003 | 2       | 1     | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | AN        |
| 7/17/2003 | 1       | 0.5   | 5       | 5  | 0    | 0 | 0    | 0 | 0    | 0 | Other AK  |
| 7/17/2003 | 1       | 1     | 5       | 2  | 0    | 0 | 0    | 0 | 0    | 0 | KC        |
| 7/19/2003 | 1       | 0.5   | 1       | 1  | 0    | 0 | 0    | 0 | 0    | 0 | Other AK  |
| 7/19/2003 | 1       | 1     | 1       | 1  | 0    | 0 | 0    | 0 | 0    | 0 | KC        |
| 7/20/2003 | 3       | 1     | 15      | 15 | 0    | 0 | 0    | 0 | 0    | 0 | AN        |
| 7/21/2003 | 3       | ---   | 15      | 15 | 0    | 0 | 0    | 0 | 0    | 0 | AN        |
| 7/25/2003 | 1       | 1     | 5       | 5  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/26/2003 | 1       | 1     | 5       | 5  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/26/2003 | 4       | 2     | 20      | 20 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/27/2003 | 2       | 1     | 5       | 5  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/28/2003 | 2       | 1     | 3       | 3  | 0    | 0 | 0    | 0 | 0    | 0 | AN        |
| 7/29/2003 | 1       | 2     | 5       | 5  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 7/30/2003 | 5       | 1     | 5       | 5  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 8/1/2003  | 2       | 1     | 4       | 4  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 8/2/2003  | 1       | 1     | 5       | 5  | 0    | 0 | 0    | 0 | 0    | 0 | CB        |
| 8/2/2003  | 2       | 1     | 10      | 10 | 0    | 0 | 0    | 0 | 0    | 0 | CB        |

Appendix D – Continued

29

| DATE      | PARTY # | HOURS | Sockeye |    | Coho |    | Chum |   | Pink |   | RESIDENCE |
|-----------|---------|-------|---------|----|------|----|------|---|------|---|-----------|
|           |         |       | C       | K  | C    | K  | C    | K | C    | K |           |
| 8/2/2003  | 1       | 1     | 5       | 5  | 0    | 0  | 0    | 0 | 0    | 0 | CB        |
| 8/3/2003  | 5       | 1.5   | 25      | 25 | 0    | 0  | 0    | 0 | 0    | 0 | CB        |
| 8/3/2003  | 2       | 1.5   | 5       | 5  | 0    | 0  | 0    | 0 | 0    | 0 | CB        |
| 8/3/2003  | 3       | 2     | 13      | 13 | 2    | 2  | 0    | 0 | 0    | 0 | CB        |
| 8/8/2003  | 3       | 1     | 5       | 5  | 0    | 0  | 0    | 0 | 0    | 0 | CB        |
| 8/19/2003 | 3       | 1     | 3       | 3  | 0    | 0  | 0    | 0 | 0    | 0 | CB        |
| 8/20/2003 | 4       | 2     | 4       | 4  | 0    | 0  | 0    | 0 | 0    | 0 | CB        |
| 8/22/2003 | 2       | 0.75  | 1       | 1  | 0    | 0  | 0    | 0 | 0    | 0 | CB        |
| 8/23/2003 | 2       | 1.75  | 0       | 0  | 2    | 2  | 0    | 0 | 0    | 0 | CB        |
| 8/23/2003 | 3       | 2     | 1       | 1  | 8    | 8  | 0    | 0 | 0    | 0 | CB        |
| 8/25/2003 | 1       | 1     | 0       | 0  | 10   | 1  | 0    | 0 | 0    | 0 | AN        |
| 8/29/2003 | 1       | 2.5   | 0       | 0  | 3    | 3  | 0    | 0 | 0    | 0 | AN        |
| 8/30/2003 | 1       | 2     | 0       | 0  | 4    | 4  | 0    | 0 | 0    | 0 | CB        |
| 8/30/2003 | 3       | 2     | 0       | 0  | --   | 12 | 0    | 0 | 0    | 0 | CONUS     |
| 8/30/2003 | 2       | 2     | 0       | 0  | --   | 5  | 0    | 0 | 0    | 0 | CB        |
| 8/31/2003 | 7       | 3     | 0       | 0  | 10   | 10 | 0    | 0 | 0    | 0 | AN        |
| 8/31/2003 | 3       | 3.5   | 0       | 0  | 9    | 9  | 0    | 0 | 0    | 0 | AN        |
| 9/1/2003  | 2       | 1     | 0       | 0  | 1    | 1  | 0    | 0 | 0    | 0 | CB        |
| 9/1/2003  | 4       | 3     | 0       | 0  | 20   | 20 | 0    | 0 | 0    | 0 | AN        |
| 9/1/2003  | 2       | 2     | 0       | 0  | 2    | 2  | 0    | 0 | 0    | 0 | CONUS     |
| 9/1/2003  | 3       | 4.5   | 0       | 0  | 13   | 13 | 0    | 0 | 0    | 0 | CB        |
| 9/2/2003  | 6       | 3     | 0       | 0  | 27   | 27 | 0    | 0 | 0    | 0 | AN        |

Appendix D – Continued

30

| DATE      | PARTY # | HOURS | Sockeye |   | Coho |     | Chum |   | Pink |   | RESIDENCE |
|-----------|---------|-------|---------|---|------|-----|------|---|------|---|-----------|
|           |         |       | C       | K | C    | K   | C    | K | C    | K |           |
| 9/3/2003  | 7       | 2     | 0       | 0 | 30   | 30  | 0    | 0 | 0    | 0 | AN        |
| 9/3/2003  | 5       | 2     | 0       | 0 | 12   | 12  | 0    | 0 | 0    | 0 | AN        |
| 9/4/2003  | 6       | 5     | 0       | 0 | ---  | 11  | 0    | 0 | 0    | 0 | CB        |
| 9/5/2003  | 2       | 2     | 0       | 0 | 3    | 3   | 0    | 0 | 0    | 0 | CONUS     |
| 9/7/2003  | 6       | 2     | 0       | 0 | 17   | 17  | 0    | 0 | 0    | 0 | AN        |
| 9/7/2003  | 2       | 2     | 0       | 0 | 10   | 10  | 0    | 0 | 0    | 0 | Other AK  |
| 9/8/2003  | 5       | 2     | 0       | 0 | ---  | 25  | 0    | 0 | 0    | 0 | CB        |
| 9/9/2003  | 5       | 3     | 0       | 0 | 55   | 25  | 0    | 0 | 0    | 0 | CB        |
| 9/9/2003  | 2       | 3     | 0       | 0 | 30   | 10  | 0    | 0 | 0    | 0 | Other AK  |
| 9/9/2003  | 5       | 4     | 0       | 0 | 30   | 17  | 0    | 0 | 0    | 0 | CB        |
| 9/10/2003 | 4       | 3     | 0       | 0 | 50   | 20  | 0    | 0 | 0    | 0 | CB        |
| 9/11/2003 | 4       | 1     | 0       | 0 | 10   | 10  | 0    | 0 | 0    | 0 | CB        |
| 9/11/2003 | 2       | 2     | 0       | 0 | 10   | 10  | 0    | 0 | 0    | 0 | CB        |
| 9/11/2003 | 4       | 2     | 0       | 0 | 30   | 16  | 0    | 0 | 0    | 0 | CONUS     |
| 9/11/2003 | 3       | 3     | 0       | 0 | 30   | --- | 0    | 0 | 0    | 0 | Other AK  |
| 9/12/2003 | 2       | 1     | 0       | 0 | 3    | 3   | 0    | 0 | 0    | 0 | CONUS     |
| 9/12/2003 | 4       | 3     | 0       | 0 | 30   | 20  | 0    | 0 | 0    | 0 | CONUS     |
| 9/12/2003 | 3       | 3     | 0       | 0 | 30   | 6   | 0    | 0 | 0    | 0 | CB        |
| 9/13/2003 | 2       | 2.5   | 0       | 0 | 12   | 2   | 0    | 0 | 0    | 0 | CONUS     |
| 9/13/2003 | 4       | 3     | 0       | 0 | 30   | 20  | 0    | 0 | 0    | 0 | CB        |
| 9/13/2003 | 2       | 3     | 0       | 0 | ---  | 3   | 0    | 0 | 0    | 0 | CONUS     |
| 9/13/2003 | 4       | 2     | 0       | 0 | 30   | 18  | 0    | 0 | 0    | 0 | CONUS     |

Appendix D – Continued

| DATE      | PARTY # | HOURS | Sockeye |   | Coho |     | Chum |   | Pink |   | RESIDENCE |
|-----------|---------|-------|---------|---|------|-----|------|---|------|---|-----------|
|           |         |       | C       | K | C    | K   | C    | K | C    | K |           |
| 9/14/2003 | 4       | 2     | 0       | 0 | 30   | --- | 0    | 0 | 0    | 0 | CONUS     |
| 9/14/2003 | 3       | 2     | 0       | 0 | 13   | 3   | 0    | 0 | 0    | 0 | CONUS     |
| 9/14/2003 | 4       | 3     | 0       | 0 | 20   | 3   | 0    | 0 | 0    | 0 | CB        |
| 9/14/2003 | 4       | 2     | 0       | 0 | 4    | 2   | 0    | 0 | 0    | 0 | CONUS     |
| 9/14/2003 | 4       | ---   | 0       | 0 | 40   | 20  | 0    | 0 | 0    | 0 | CONUS     |
| 9/16/2003 | 3       | 4     | 0       | 0 | 30   | 11  | 0    | 0 | 0    | 0 | Other AK  |
| 9/20/2003 | 3       | 1     | 0       | 0 | ---  | 6   | 0    | 0 | 0    | 0 | ---       |
| 9/20/2003 | 6       | ---   | 0       | 0 | 16   | 16  | 0    | 0 | 0    | 0 | KC        |
| 9/20/2003 | 5       | 2     | 0       | 0 | 10   | --- | 0    | 0 | 0    | 0 | ---       |
| 9/24/2003 | 1       | 1     | 0       | 0 | 5    | 5   | 0    | 0 | 0    | 0 | CB        |
| 9/27/2003 | 2       | 1.5   | 0       | 0 | 10   | 10  | 0    | 0 | 0    | 0 | CB        |