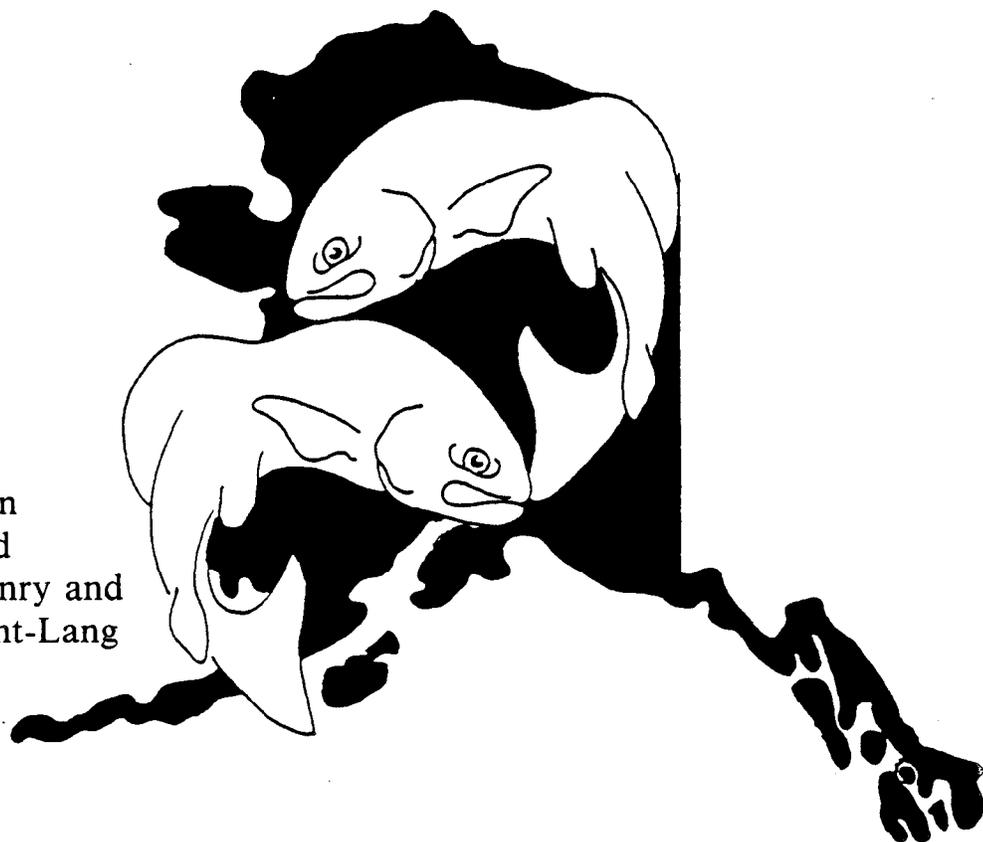


FISHERY DATA SERIES NO.4

SPORT HARVEST OF COHO SALMON
(*Oncorhynchus kisutch*) IN RESURRECTION BAY,
ALASKA DURING 1986

By: Sandra Sonnichsen
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ABSTRACT

There were an estimated 5,950 boat-trips of effort in the Resurrection Bay boat fishery from 23 June through 14 September. This fishery harvested 13,107 coho salmon (*Oncorhynchus kisutch* Walbaum). About half the effort (46 percent) and coho salmon harvest (52 percent) occurred during the eleven-day Seward Silver Salmon Derby. In the Resurrection Bay beach fisheries, estimated effort and harvest were 16,708 angler-hours and 2,084 coho salmon, respectively. The majority of harvested coho salmon were age 1.1 (93 percent) and chinook salmon were age 0.1 males (68 percent).

KEY WORDS: Coho salmon (*Oncorhynchus kisutch*), Resurrection Bay, sport harvest, sport effort

INTRODUCTION

The recreational fishery for coho salmon, (*Oncorhynchus kisutch* Walbaum), in Resurrection Bay is one of the largest fisheries in effort and harvest for this species in Alaska (Mills 1986). The sport harvest of coho salmon by the boat fishery in Resurrection Bay averaged 15,349 coho salmon annually during the 18 years since 1968 that the fishery has been monitored (Table 1). Annual harvests have ranged from 8,861 in 1976 to 22,932 in 1968. A major portion of the effort and harvest occurs during the annual Seward Silver Salmon Derby.

Historically, most of the effort in Resurrection Bay and surrounding waters has been by private boats. Many charter boats have recently begun to operate out of Seward, however, and their number has been increasing annually. Both the U.S. Army and Air Force maintain recreation camps in Seward for military personnel and their dependents. Boats are made available to military personnel at these camps. Anglers also fish from shore for salmon both during and after the Salmon Derby.

In 1962, an enhancement program was begun at Bear Lake (Figure 1) to increase the number of coho salmon available for sport harvest. Bear Lake has been rehabilitated to eradicate competing threespine stickleback, (*Gasterosteus aculeatus* Linnaeus), and is stocked annually with coho salmon fingerlings. Hatchery-reared coho salmon smolts are also planted in Resurrection Bay. Since 1983, hatchery-reared chinook salmon,

Table 1. Harvest and effort statistics for the Resurrection Bay boat fishery for coho salmon, 1968-1985. ¹

Year	Effort		Harvest		
	Boat-Trips	Standard Error	Number	Standard Error	95% Confidence Interval
1968	8,518	89.3	22,932	744.7	21,473 - 24,392
1969	7,717	160.6	14,444	585.2	13,297 - 15,591
1970	8,921	133.9	15,027	555.8	13,938 - 16,116
1971	8,041	110.8	19,264	754.3	17,786 - 20,743
1972	9,297	183.1	15,383	760.0	13,894 - 16,873
1973	7,730	117.6	13,931	579.8	12,795 - 15,068
1974	7,520	141.3	17,550	839.0	15,906 - 19,195
1975	5,351	108.1	16,817	892.2	15,068 - 18,566
1976	5,953	87.7	8,861	441.7	7,995 - 9,727
1977	7,113	131.6	16,003	601.8	14,824 - 17,182
1978	6,280	124.0	15,819	617.0	14,610 - 17,029
1979	7,163	151.0	16,532	779.9	15,003 - 18,060
1980	7,657	191.4	18,918	1,079.1	16,803 - 21,033
1981	6,682	134.4	14,087	785.6	12,548 - 15,627
1982	7,948	164.5	16,160	929.7	14,338 - 17,982
1983	8,479	139.9	13,780	897.1	12,022 - 15,538
1984	6,996	128.7	10,445	627.4	9,215 - 11,674
1985	6,848	209.6	10,332	765.7	8,832 - 11,833
Mean	7,456		15,349		

¹ Source: Vincent-Lang in preparation.

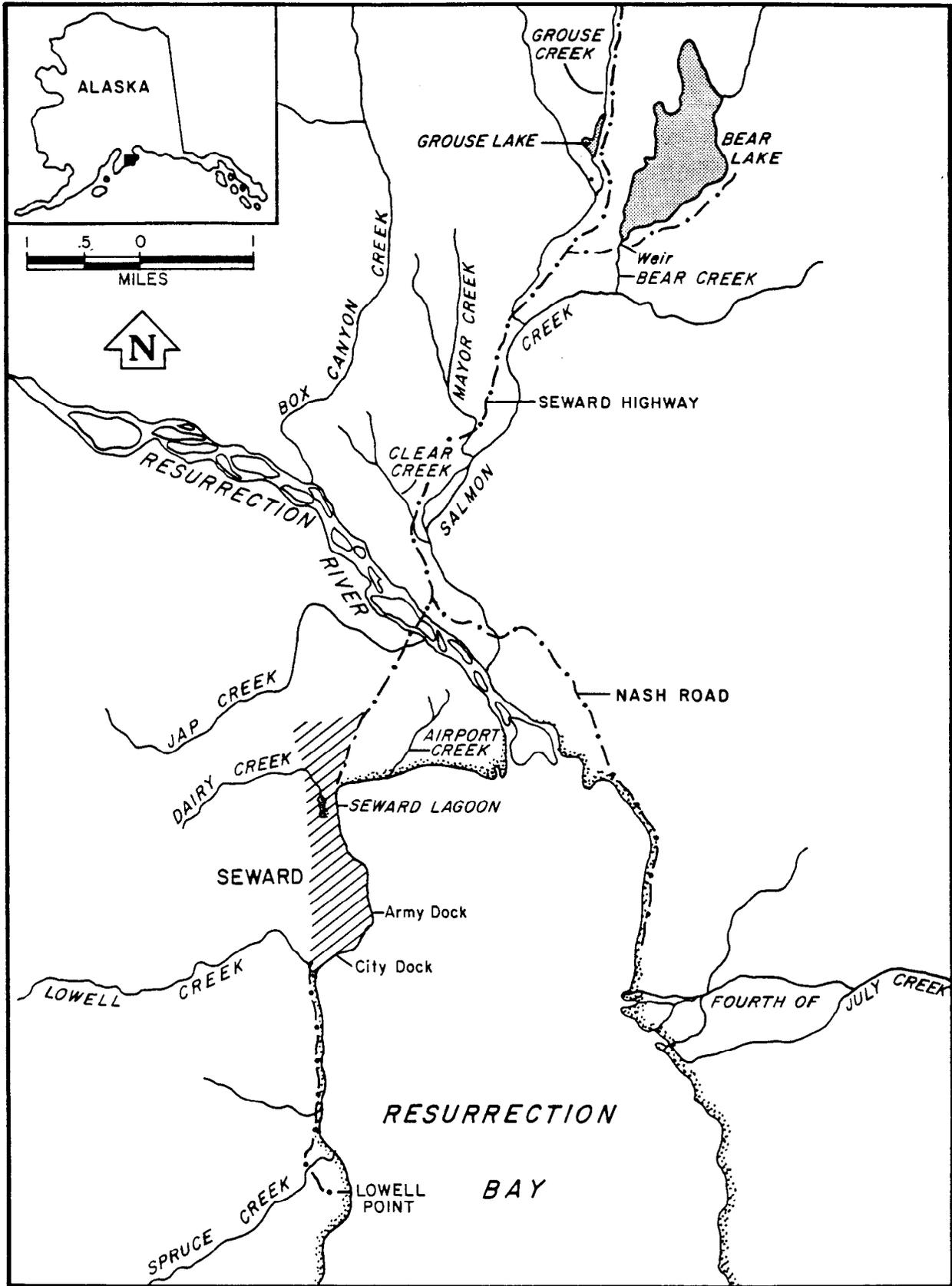


Figure 1. Map of Resurrection Bay, Alaska.

(*Oncorhynchus tshawytscha* Walbaum), smolts have also been released in an effort to diversify the Resurrection Bay sport fishery. A summary of all coho salmon enhancement activities in Resurrection Bay (including estimates of survival rates and contributions to the sport fishery) is being prepared (Vincent-Lang in preparation).

Evaluation of the enhancement efforts requires monitoring activities which address three major life history events of Resurrection Bay salmon: (1) freshwater residency of salmon; (2) harvest in the sport fishery; and (3) escapement from the sport fishery. Number (2) is accomplished by a creel survey designed to estimate the total coho salmon harvest and angler effort in the Resurrection Bay sport fishery, to estimate the biological characteristics of harvested salmon, and to estimate the enhanced contribution to the harvest. The creel survey is the subject of this report. Numbers (1) and (3) are largely accomplished through a weir program on Bear Creek. The weir program for 1986 and the enhanced contribution to the sport fishery are described in a separate report (Conrad et al. in preparation).

Sport Fishing Regulations

The bag limit for coho salmon in Resurrection Bay during 1986 was six per day, and six in possession. The bag limit for chinook salmon was two per day and two in possession, and for pink salmon (*Oncorhynchus gorbuscha* Walbaum) six per day and six in possession. Ten rockfish (*Sebastes spp.*) could be taken per day, with ten in possession, and there was no bag or possession limit for ling cod (*Ophiodon elongatus* Girard). Anglers may use conventional sport fishing methods, however snagging, which is now illegal in many marine areas of Southcentral Alaska, is still legal in marine waters in the Resurrection Bay area.

METHODS

Boat Fishery Creel Survey

The boat fishery in Resurrection Bay was surveyed from 23 June through 14 September. The fishery was divided into four temporal segments:

- (1) early boat fishery 23 June - 6 July,
- (2) pre-Derby boat fishery 7 July - 8 August,
- (3) Derby boat fishery 9 August - 17 August, and
- (4) post Derby boat fishery 18 August - 14 September.

Each segment was further stratified by weekdays and weekends/holidays.

The boat creel survey used a stratified random sampling design to collect the data necessary to estimate sport fishing effort and coho salmon harvest. The fishing day was defined to be 14 hours long, (from 0800 to 2200). Each day was divided into four 3.5 hour time periods: (A) 0800 - 1129, (B) 1130 - 1459, (C) 1500 - 1829, and (D) 1830 - 2200.

Sample units to be surveyed within each period were randomly selected without replacement subject to the constraint that a maximum of two sample units could be surveyed on any day (except during the Derby). Sampling effort was allocated approximately equally among time periods.

Two people usually conducted the creel survey during each sampled time period. One person counted all sport fishing boats entering the Seward boat harbor and conducted boat interviews at two docking sites. The second person conducted boat interviews at the three remaining docking sites. If possible, all returning boats were interviewed. An equal amount of time was spent conducting interviews at each docking site if it was not possible to interview all returning boats.

All boat interviews were completed-trip interviews. Interviews for angler and harvest information were party interviews for all anglers in a returning boat. For each boat, the following information was collected: the number of anglers in the boat; the number of hours fished; the total number of fish in possession by species; the total number of fish released by species; and whether the boat was a chartered fishing boat, a boat from the military recreation camps, or a private boat.

Military boats were interviewed, but were not included in the boat count. Counts of boats from the military recreation camps were obtained from dispatch officers at the camps. These counts were obtained every day and represented tallies for the entire day.

From 23 June through 30 July, only boats harvesting or targeting on salmon were counted and interviewed. Beginning on 31 July, boats targeting on bottomfish were included in the boat interviews. This occurred due to concern about an increase in the harvest of ling cod.

For each fishery segment (early, pre-Derby, Derby, and post Derby) and stratum (weekday and weekend/holiday), the mean number of boats returning during each period (A, B, C, or D) was calculated. The number of boat-

-trips of effort in fishery stratum i (\hat{B}_i) was estimated by:

$$\hat{B}_i = \sum_{j=1}^4 N_{ij} \bar{b}_{ij},$$

where: \bar{b}_{ij} = the mean number of boats returning during period j in stratum i;

N_{ij} = the total number of sample units (3.5 hour time units) possible during period j in stratum i.

The variance of \hat{B}_i was estimated in the following manner (Scheaffer et al. 1979):

$$V(\hat{B}_i) = \sum_{j=1}^4 N_{ij}^2 [s_{ij}^2/n_{ij}][1 - (n_{ij}/N_{ij})],$$

where: N_{ij} is defined as above;

n_{ij} = the total number of sample units surveyed during time period j in fishery stratum i;

s_{ij}^2 = the sample variance for the mean number of boats returning during period j in fishery stratum i.

The total number of boat-trips for the Resurrection Bay fishery was estimated by summing the estimates for each stratum for all segments of the fishery. These are considered independent estimates and the estimated variance of the total is the sum of the variances.

Catch per unit effort (CPUE) was estimated as mean catch per boat-trip for each stratum in each fishery segment. Mean CPUE for stratum i (\overline{CPB}_i) was calculated by:

$$\overline{CPB}_i = (\sum_{k=1}^{t_i} c_{ik})/t_i,$$

where: t_i = the total number of boats interviewed during stratum i;

c_{ik} = the catch of coho salmon by boat k interviewed during stratum i.

\overline{CPB}_i was estimated by a two-stage sample design with days being the first stage sample unit (of which there are a finite number available to be sampled), and boats being the second stage sample unit (of which there are an unknown number available to be sampled on any given day).

The variance of \overline{CPB}_i was estimated in the following manner (Von Geldern and Tomlinson 1973):

$$V(\overline{CPB}_i) = [1 - (d_i/D_i)] s_B^2/d_i + (\sum_{j=1}^{d_i} s_{ij}^2/m_{ij})/d_i D_i ,$$

where: d_i = the number of days in stratum i during which boat interviews were collected;
 D_i = the total number of days in stratum i ;
 s_B^2 = the between-day variance of \overline{CPB}_i in stratum i ;
 s_{ij}^2 = the within-day variance of \overline{CPB}_{ij} on day j in stratum i ;
 m_{ij} = the number of boats interviewed during day j of stratum i .

Between-day variance was calculated as:

$$s_B^2 = [\sum_{i=1}^{d_i} (\overline{CPB}_{ij} - \overline{CPB}_i)^2] / (d_i - 1), \text{ and,}$$

within-day variance was the sample variance for the mean catch of coho salmon for boats interviewed during day j in stratum i .

The number of coho salmon harvested during the weekday or weekend/holiday stratum of each fishery segment (\hat{C}_i) was calculated as follows:

$$\hat{C}_i = \hat{B}_i \overline{CPB}_i .$$

The variance of \hat{C}_i was estimated using the formula for the product of two independent random variables (Goodman 1960):

$$V(\hat{C}_i) = [\hat{B}_i^2 V(\overline{CPB}_i)] + [\overline{CPB}_i^2 V(\hat{B}_i)] - [V(\hat{B}_i) V(\overline{CPB}_i)] .$$

The total coho salmon harvest by all segments of the boat fishery (\hat{C}_T) was estimated as follows:

$$\hat{C}_T = \sum_{i=1}^8 \hat{C}_i$$

where i is one of eight fishery strata. Because these are independent estimates, the estimated variance of the total is the sum of the variances. Harvests of other species were estimated using these same procedures.

Assumptions necessary for the boat creel survey analyses include:

1. Interviewed boats were representative of the total population.
2. No significant fishing effort occurred between 10 p.m. (2200) and 8 a.m. (0800).
3. Boat counts and catch per boat were normally distributed random variables.

Beach Fishery Creel Survey

A creel survey was conducted at three Resurrection Bay beaches: Lowell Point Beach, Seward Beach, and Fourth of July Creek Beach (Figure 1). A roving creel survey (Neuhold and Lu 1957) was used to count anglers and conduct angler interviews. The creel survey followed a stratified random sampling design. Angler counts were used to estimate fishing effort in units of angler-hours. Angler interviews were used to estimate the harvest rate of coho salmon.

The beach fisheries were surveyed from 9 August through 14 September. The fisheries were divided into two temporal segments:

- | | |
|------------------------------|---------------------------|
| (1) Derby beach fishery | 9 August - 17 August; |
| (2) post Derby beach fishery | 18 August - 14 September. |

These segments were further stratified by weekdays and weekends/holidays. The fishing day was defined to be 14 hours long (0800 to 2200) and was stratified into the same daily time periods used for the boat fishery. Periods to be surveyed were selected using the procedure described previously for the boat creel survey.

One hour was spent at each beach during each sampled time period. The beaches were surveyed in a random order determined prior to each sampled time period. The angler count was conducted during a randomly selected 10 minute interval during the hour spent at each beach.

Interviews were conducted for individual anglers. For each angler contacted, the following information was collected: the number of hours fished; the number of fish in the angler's possession by species; the number of fish released by species; and whether the interview was a completed-trip interview or not. The majority of the interviews were incomplete-trip interviews.

The total number of angler-hours (\hat{E}_i) for fishery stratum i in any fishery segment was calculated in the following manner:

$$\hat{E}_i = \sum_{j=1}^4 H_{ij} \bar{x}_{ij},$$

where: \bar{x}_{ij} = the mean number of anglers for counts during period j of stratum i ;

H_{ij} = the total number of hours possible for fishing in period j of stratum i .

The variance for the estimate of total effort was calculated in the following manner:

$$V(\hat{E}_i) = \sum_{j=1}^4 H_{ij}^2 s_{ij}^2 / n_{ij},$$

where: s_{ij}^2 = the sample variance for \bar{x}_{ij} ;

n_{ij} = the number of angler counts during period j of fishery stratum i .

Catch per unit effort (catch per angler-hour) was estimated for each stratum at each beach in the following manner:

$$CPUE_i = \frac{\sum_{k=1}^{m_i} c_{ik}}{\sum_{k=1}^{m_i} e_{ik}},$$

where: m_i = the number of anglers interviewed during stratum i ;
 c_{ik} = the catch of coho salmon by angler k interviewed during stratum i ;
 e_{ik} = the effort (number of hours expended) by angler k at the time of the interview.

Omitting the finite population correction factor, the variance of $CPUE_i$ was approximated in the following manner (Jessen 1978):

$$\hat{V}(CPUE_i) = (\bar{C}_i/\bar{E}_i)^2 [s_C^2/\bar{C}_i^2 + s_E^2/\bar{E}_i^2 - (2r_i s_C s_E / \bar{C}_i \bar{E}_i)] ,$$

where: \bar{C}_i = the mean catch of coho salmon by anglers in stratum i
 \bar{E}_i = the mean effort by anglers in stratum i ;
 s_C^2 = the variance of the mean catch (\bar{C}_i);
 s_E^2 = the variance of the mean effort (\bar{E}_i);
 r_i = the correlation coefficient for the c_{ik} and e_{ik} .

The variances for catch (s_C^2) and effort (s_E^2) were estimated using the two stage variance formula from Von Geldern and Tomlinson (1973).

The total coho salmon harvest (\hat{C}_i) for each stratum of each segment of the beach fisheries was calculated by:

$$\hat{C}_i = \hat{E}_i CPUE_i .$$

The variance of \hat{C}_i was estimated using the formula for the product of two random variables from Goodman (1960).

The harvest was estimated for all strata and segments of each beach fishery and then summed to estimate the total season harvest. These are considered independent estimates, therefore, the estimated variance of the total was the sum of the variances.

The major assumptions for the beach creel survey analyses were:

1. Incomplete-trip angler interviews provided an unbiased estimate of completed-trip CPUE.
2. Catch rate and length of fishing trip were independent.

3. Interviewed anglers were representative of the total angler population and anglers were interviewed in proportion to their abundance.
4. No significant fishing effort occurred between 10 p.m. and 8 a.m.
5. For the angler interview data, effort and catch were normally distributed random variables.

Biological Data

Biological data were collected from coho salmon harvested by the boat and beach fisheries. The objective was to sample about 300 coho salmon during the pre-Derby and Derby fishery segments of the boat fishery. As many samples as possible were collected from the beach fisheries. Sampled fish were measured from mid-eye to fork-of-tail and the length recorded to the nearest mm. Scales were taken for aging from the preferred area (Clutter and Whitesel 1956) and mounted on adhesive-backed cards. Acetate impressions of the scales were made and these impressions were read for aging on a microfiche reader.

The proportional age composition of the sport harvest was estimated for each fishery stratum. Letting \hat{p}_{hi} equal the estimated proportion of age group h in stratum i, the variance of \hat{p}_{hi} was estimated using the normal approximation to the binomial (Scheaffer et al. 1979):

$$V(\hat{p}_{hi}) = [\hat{p}_{hi}(1-\hat{p}_{hi})/(n_{Ti}-1)] ,$$

where: n_{Ti} = the total number of coho salmon sampled during stratum i.

The total number harvested during a stratum was multiplied by the estimated age composition to estimate the total number of fish harvested by age group. The variance of the number harvested by age group was estimated using Goodman's (1960) formula. Mean length at age by sex and its variance were estimated using standard normal procedures.

Beach Fishery Angler Survey

Beach fishery anglers were asked during creel survey interviews whether they approved, disapproved, or had no opinion regarding the use of snagging to catch salmon in Resurrection Bay. Angler responses were

tallied and analyzed by Derby and post Derby periods for the Lowell Point, Seward Lagoon, and Fourth of July beaches. The objective of this questionnaire was to obtain baseline data on angling method preference by Resurrection Bay beach fishermen due to recent snagging closures imposed in other Cook Inlet saltwater fisheries.

RESULTS

Boat Fishery Creel Survey

Most effort by private and charter boats in the Resurrection Bay fishery occurred during weekends of the Salmon Derby (Table 2). The effort by private and charter boats for combined weekends and weekdays of the Derby segment of the fishery was 2,726 boat-trips, which is 46% of the total private and charter boat effort during the entire Resurrection Bay boat fishery (Table 3). In each segment of the fishery, the mean count for period C (1500 - 1829) was the largest (Table 2). For the entire fishery, 48.2% of the boat-trips were estimated for period C, 26.7% for period D, 20.7% for period B, and only 4.4% for period A. Boats from the military recreation camps accounted for only 369 boat-trips during the entire fishery (Appendix Table 1).

Mean coho salmon harvest per boat-trip for all civilian boat anglers (private and charter boats combined) ranged from 0.8571 coho salmon per boat-trip during weekends of the early segment of the fishery to 3.4665 coho salmon per boat-trip during weekdays of the Derby (Table 4). Only two coho were recorded as being released during the Resurrection Bay boat fishery.

Estimates of mean harvest per boat-trip for charter boat anglers were larger in all segments of the fishery than estimates for private boat anglers. Very few charter boat anglers were interviewed, however, and the precision of the estimates for their mean harvests were correspondingly poor (Table 4).

Daily summary statistics for angler effort and coho salmon harvest per boat-trip for interviewed anglers are presented in Appendix Tables 2 through 5. Daily summary statistics for catch per boat-trip of other species harvested during the Resurrection Bay fishery are presented in Appendix Tables 6 and 7.

Table 2. Estimated number of boat-trips by private and charter boat anglers by period for each segment of the Resurrection Bay boat fishery, 1986.

Segment	Period				Total
	A	B	C	D	
<u>EARLY FISHERY</u>					
Weekdays:					
Number of counts	2	2	2	2	8
Effort	27.0	31.5	153.0	45.0	256.5
St. Error.	7.9	19.8	0.0	7.9	22.8
Weekends:					
Number of counts	2	2	2	2	8
Effort	42.5	57.5	167.5	40.0	307.5
St. Error.	13.6	25.2	25.2	0.0	38.1
<u>PRE-DERBY FISHERY</u>					
Weekdays:					
Number of counts	8	7	7	7	29
Effort	25.0	139.3	496.4	207.1	867.8
St. Error.	11.7	31.7	79.3	53.1	101.2
Weekends:					
Number of counts	4	4	4	4	16
Effort	30.0	148.0	406.0	176.0	760.0
St. Error.	10.9	22.9	73.9	58.2	97.5
<u>DERBY FISHERY</u>					
Weekdays:					
Number of counts	4	5	4	4	17
Effort	28.8	133.0	510.0	353.8	1,025.6
St. Error.	1.9	0.0	33.0	17.2	37.2
Weekends:					
Number of counts	3	3	2	2	10
Effort	61.3	325.3	732.0	582.0	1,700.6
St. Error.	16.0	75.8	178.2	4.2	194.3
<u>POST DERBY FISHERY</u>					
Weekdays:					
Number of counts	4	4	4	4	16
Effort	33.3	133.0	147.3	104.5	418.1
St. Error.	17.4	45.2	34.0	60.3	84.5
Weekends:					
Number of counts	4	4	4	4	16
Effort	13.5	265.5	256.5	78.8	614.3
St. Error.	6.4	62.8	55.4	19.2	86.2

Table 3. Summary of the number of boat-trips of effort by private and charter boat anglers during the Resurrection Bay boat fishery, 1986.

Segment	Estimated Effort	Standard Error	95% Con. Int.		Relative Precision
<u>EARLY FISHERY</u>					
Weekdays	256.5	22.8	211.8	- 301.3	17.4%
Weekends	307.5	38.1	232.8	- 382.2	24.2%
Total	564.0	44.3	477.2	- 650.8	15.4%
<u>PRE-DERBY FISHERY</u>					
Weekdays	867.8	101.2	669.4	- 1,066.2	22.9%
Weekends	760.0	97.5	568.9	- 951.1	25.1%
Total	1,627.8	140.5	1,352.4	- 1,903.2	16.9%
<u>DERBY FISHERY</u>					
Weekdays	1,025.6	37.2	952.7	- 1,098.5	7.1%
Weekends	1,700.6	194.3	1,319.8	- 2,081.4	22.4%
Total	2,726.2	197.9	2,338.3	- 3,114.1	14.2%
<u>POST DERBY FISHERY</u>					
Weekdays	418.1	84.5	252.5	- 583.7	39.6%
Weekends	614.3	86.2	445.3	- 783.2	27.5%
Total	1,032.4	120.7	795.9	- 1,268.9	22.9%
GRAND TOTAL	5,950.4	274.7	5,412.1	- 6,488.7	9.0%

Table 4. Estimated mean harvest of coho salmon per boat-trip for each segment of the Resurrection Bay boat fishery, 1986.

Segment	Days		Number of Interviews	Mean Harvest ³	Standard Error
	d ¹	D ²			
<u>EARLY FISHERY</u>					
Weekdays:					
Private boat anglers	3	9	7	0.8571	0.629
Charter boat anglers	0	9	0		
All civilian anglers ⁴	3	9	7	0.8571	0.629
Military anglers	0	9	0		
Weekends:					
Private boat anglers	3	5	19	2.0526	0.710
Charter boat anglers	0	5	0		
All civilian anglers ⁴	3	5	19	2.0526	0.710
Military anglers	0	5	0		
<u>PRE-DERBY FISHERY</u>					
Weekdays:					
Private boat anglers	16	25	124	1.8306	0.336
Charter boat anglers	5	25	21	5.6667	1.081
All civilian anglers ⁴	16	25	147	2.4218	0.350
Military anglers	2	25	5	0.2000	0.255
Weekends:					
Private boat anglers	8	8	213	1.6948	0.188
Charter boat anglers	2	8	5	4.2000	2.567
All civilian anglers ⁴	8	8	221	1.7647	0.199
Military anglers	3	8	13	0.0000	0.000
<u>DERBY FISHERY</u>					
Weekdays:					
Private boat anglers	5	5	317	3.3028	0.194
Charter boat anglers	2	5	8	8.7500	3.754
All civilian anglers ⁴	5	5	328	3.4665	0.203
Military anglers	3	5	11	1.3636	0.546
Weekends:					
Private boat anglers	4	4	224	1.8750	0.150
Charter boat anglers	2	4	4	3.2500	1.436
All civilian anglers ⁴	4	4	229	1.8908	0.149
Military anglers	3	4	9	0.0000	0.000

-Continued-

Table 4. Estimated mean harvest of coho salmon per boat-trip for each segment of the Resurrection Bay boat fishery, 1986 (continued).

Segment	Days		Number of Interviews	Mean Harvest ³	Standard Error
	d ¹	D ²			
<u>POST DERBY FISHERY</u>					
Weekdays:					
Private boat anglers	8	19	48	1.9167	0.437
Charter boat anglers	2	19	5	2.8000	1.782
All civilian anglers ⁴	9	19	56	1.9821	0.346
Military anglers	1	19	2	0.0000	0.000
Weekends:					
Private boat anglers	9	9	132	1.9470	0.126
Charter boat anglers	1	9	3	3.3333	0.111
All civilian anglers ⁴	9	9	138	1.9710	0.121
Military anglers	0	9	0		

¹ Number of days on which interviews were collected.

² Number of days possible for collecting interviews.

³ Mean harvest includes fish reported as kept only, however, only one angler reported releasing any coho salmon.

⁴ Includes private and charter boat anglers, plus anglers who were not specified as private, charter, or military.

The estimated coho salmon harvest by anglers fishing on private and charter boats from 23 June through 14 September is 13,107 (Table 5). The harvest by anglers fishing on boats from the military recreation camps is estimated to be only 83 coho salmon (Table 6). The largest harvest of coho salmon occurred during the Derby fishery, when private and charter boat anglers harvested 6,773 coho salmon. The Derby harvest was approximately 52% of the total coho salmon harvest (Figure 2). Harvest of coho salmon in each segment of the boat fishery approximately corresponds to the amount of effort expended in the segment (Figure 2).

Pink salmon, chinook salmon, ling cod, and rockfish were also harvested by anglers during the Resurrection Bay boat fishery (Table 7). Of these species, the harvest of pink salmon was the largest, with 2,133 harvested by private and charter boat anglers and 1,447 harvested by anglers on boats from the military recreation camps.

Beach Fishery Creel Survey

At Seward Beach and Fourth of July Beach, the Derby weekend and post Derby weekday strata of the fishery received the largest amount of effort (Table 8). At Lowell Point Beach the Derby weekend segment received the largest amount of effort, followed by Derby weekdays. Of the three beaches, Seward Beach received the largest amount of angler effort, with a total estimate of 9,307 angler-hours (Table 9). Fourth of July Beach received 5,691 angler-hours of effort, and 1,710 angler-hours were expended at Lowell Point Beach (Table 9). Daily angler counts at each beach are summarized in Appendix Table 8.

The estimated coho salmon harvest per angler-hour was highest at Seward Beach during every segment of the fishery except weekdays during the Derby when the Fourth of July Beach harvest per angler-hour was higher (Table 10). The harvest rate at Seward Beach was highest during post Derby weekdays (0.4019 coho salmon harvested per angler-hour). No coho salmon were reported released by beach anglers.

Daily summary statistics of mean effort, mean harvest per angler, and catch per angler-hour for coho salmon at each of the three beaches are presented in Appendix Tables 9 to 11. Daily statistics for mean harvest and catch per angler-hour of pink salmon are presented in Appendix Table 12.

Table 5. Estimated number of coho salmon harvested by private and charter boat anglers during each segment of the Resurrection Bay boat fishery, 1986.

Segment	Harvest ¹	Standard Error	95% Con. Int.	Relative Precision
<u>EARLY FISHERY</u>				
Weekdays	220	162.1	0 - 538	144.5%
Weekends	632	79.5	476 - 788	24.7%
<u>PRE-DERBY FISHERY</u>				
Weekdays	2,102	389.2	1,339 - 2,865	36.3%
Weekends	1,341	228.3	894 - 1,778	33.4%
<u>DERBY FISHERY</u>				
Weekdays	3,557	245.0	3,077 - 4,037	13.5%
Weekends	3,216	445.2	2,343 - 4,089	27.1%
<u>POST DERBY FISHERY</u>				
Weekdays	829	219.5	399 - 1,259	51.9%
Weekends	1,210	185.0	847 - 1,573	30.0%
Weekday Total	6,708	534.7	5,660 - 7,756	15.6%
Weekend Total	6,399	539.3	5,342 - 7,456	16.5%
GRAND TOTAL	13,107	759.4	11,618 - 14,596	11.4%

¹ Harvest includes only those fish reported as kept, however, only one angler reported releasing any coho salmon.

Table 6. Estimated number of coho salmon harvested by military personnel and dependents during each segment of the Resurrection Bay boat fishery, 1986.

Component	Harvest ¹	Standard Error	95% Con. Int.	Relative Precision
<u>PRE-DERBY FISHERY</u>				
Weekdays	8	10.2	0 - 28	249.5%
Weekends	0			
<u>DERBY FISHERY</u>				
Weekdays	75	30.1	16 - 134	78.6%
Weekends	0			
<u>POST DERBY FISHERY²</u>				
Weekdays	0			
Weekday Total	83	31.7	21 - 145	74.9%
Weekend Total	0			
GRAND TOTAL	83	31.7	21 - 145	74.9%

¹ Harvest includes only those fish reported as kept, however, none of the interviewed military anglers had released any coho salmon.

² Too few military anglers were interviewed to generate estimates of harvest by military anglers on weekends during the post Derby period.

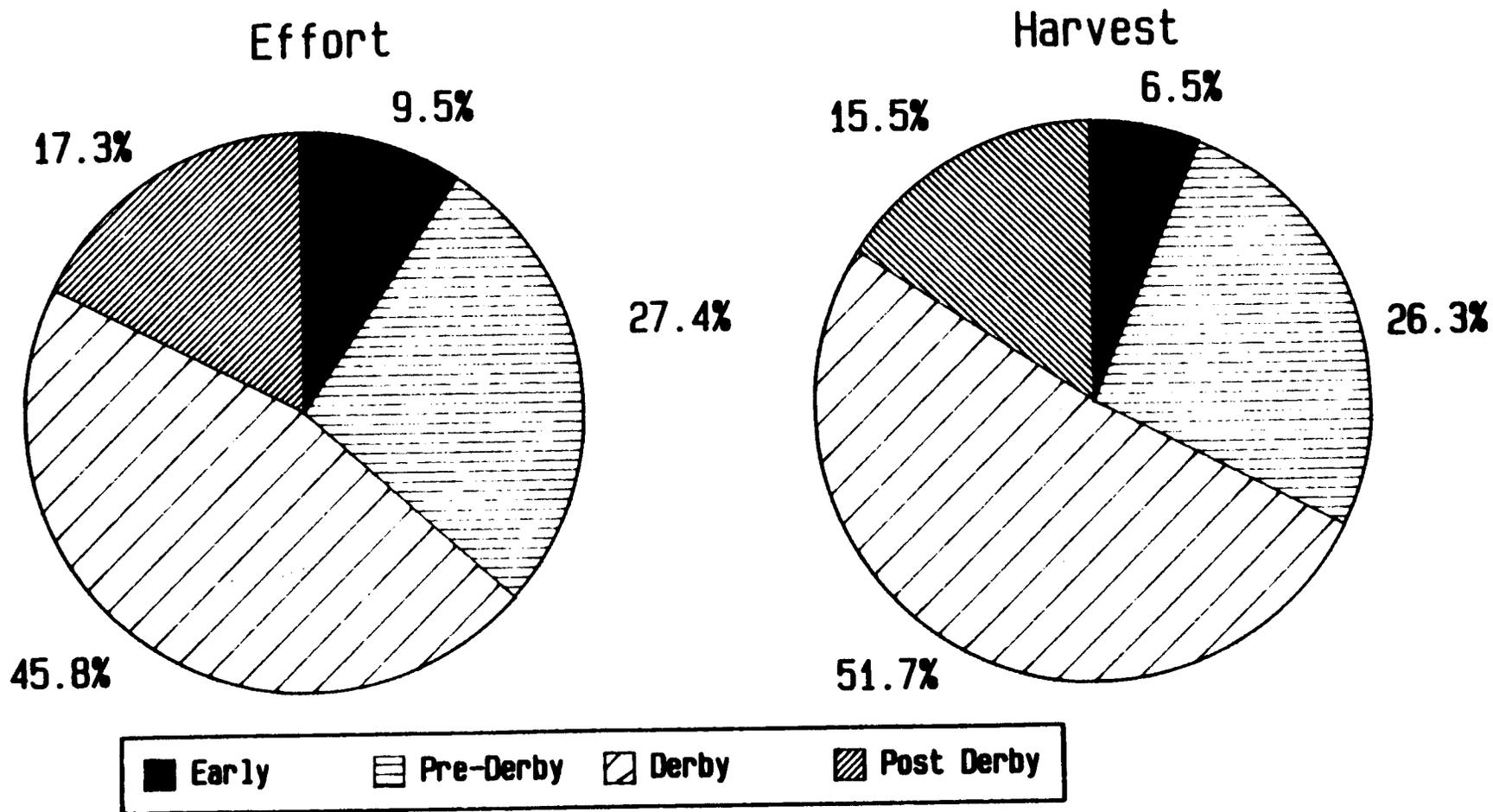


Figure 2. Percentage of effort and coho salmon harvest by private and charter boat anglers during each segment of the Resurrection Bay boat fishery, 1986.

Table 7. Estimated number of pink salmon, chinook salmon, ling cod, and rockfish harvested and caught by anglers during the Resurrection Bay boat fishery, 1986.¹

Segment and Species	Private and Charter Boat Anglers				Military Anglers				Total			
	Harvest ²	St. Err. ³	Catch ⁴	St. Err.	Harv.	St. Err.	Catch	St. Err.	Harv.	St. Err.	Catch	St. Err.
<u>EARLY FISHERY</u>												
Pink salmon	314	138.7	314	138.7	0		0		314	138.7	314	138.7
Chinook salmon	236	162.8	236	162.8	0		0		236	162.8	236	162.8
<u>PRE-DERBY FISHERY</u>												
Pink salmon	1,143	234.2	1,257	253.5	28	30.3	28	30.3	1,171	236.1	1,285	255.3
Chinook salmon	193	74.8	223	79.1	0		0		193	74.8	223	79.1
Ling cod ⁵	271	135.5	271	135.5	20	13.3	20	13.3	291	136.2	291	136.2
Rockfish ⁵	700	351.9	700	351.9	207	107.6	207	107.6	907	368.0	907	368.0
<u>DERBY FISHERY</u>												
Pink salmon	521	315.3	837	430.3	1,166	327.1	1,166	327.1	1,687	454.3	2,003	540.5
Chinook salmon	34	16.3	46	16.4	0		0		34	16.3	46	16.4
Ling cod	0		0		0		0		0		0	
Rockfish	0		0		0		0		0		0	
<u>POST DERBY FISHERY⁶</u>												
Pink salmon	155	127.4	181	129.0	253	57.9	253	57.9	408	140.0	434	141.4
Chinook salmon	25	8.5	29	9.2	0		0		25	8.5	29	9.2
Ling cod	163	100.1	163	100.1	0		0		163	100.1	163	100.1
Rockfish	368	164.3	368	164.3	0		0		368	164.3	368	164.3
<u>TOTALS</u>												
Pink salmon	2,133	435.6	2,589	534.1	1,447	333.6	1,447	333.6	3,580	548.7	4,036	629.7
Chinook salmon	488	180.1	534	182.0	0		0		488	180.1	534	182.0
Ling cod	434	168.5	434	168.5	20	13.3	20	13.3	454	169.0	454	169.0
Rockfish	1,068	388.4	1,068	388.4	207	107.6	207	107.6	1,275	403.0	1,275	403.0

¹ Information on ling cod and rockfish was not collected until 31 July, so no estimates of harvest or catch are available for the early fishery.

² Harvest includes fish reported as kept only.

³ Standard error.

⁴ Catch includes fish reported as kept and fish reported as released.

⁵ Pre-Derby estimates are for the period from 31 July - 8 August.

⁶ Too few military anglers were interviewed to generate estimates of catch and harvest by military anglers on weekends during the post Derby period. Harvest and catch estimates for military anglers are for weekdays only.

Table 8. Estimated number of angler-hours of effort by period for each segment of the Resurrection Bay beach fisheries, 1986.

Segment	Period				Total
	A	B	C	D	
<u>LOWELL POINT BEACH</u>					
Derby weekdays:					
Number of counts	2	2	2	2	8
Effort	26.3	87.5	87.5	183.8	385.0
St. Error.	8.8	35.0	87.5	8.8	95.0
Derby weekends:					
Number of counts	2	2	2	2	8
Effort	119.0	203.0	280.0	182.0	784.0
St. Error.	35.0	133.0	42.0	70.0	159.9
Post Derby weekdays:					
Number of counts	4	4	4	4	16
Effort	99.8	66.5	83.1	49.9	299.3
St. Error.	99.8	38.4	83.1	49.9	144.3
Post Derby weekends:					
Number of counts	3	3	3	3	12
Effort	31.5	10.5	199.5	0.0	241.5
St. Error.	31.5	10.5	141.3	0.0	145.1
<u>SEWARD BEACH</u>					
Derby weekdays:					
Number of counts	2	2	2	2	8
Effort	253.8	393.8	306.3	437.5	1,391.3
St. Error.	78.8	183.8	43.8	105.0	230.0
Derby weekends:					
Number of counts	2	2	2	2	8
Effort	672.0	679.0	742.0	511.0	2,604.0
St. Error.	462.0	245.0	28.0	329.0	618.5
Post Derby weekdays:					
Number of counts	4	4	4	4	16
Effort	448.9	465.5	1,413.1	631.8	2,959.3
St. Error.	342.7	238.2	190.8	386.3	599.9
Post Derby weekends:					
Number of counts	3	3	3	3	12
Effort	588.0	735.0	819.0	210.0	2,352.0
St. Error.	250.9	263.8	257.8	179.4	480.8

-Continued-

Table 8. Estimated number of angler-hours of effort by period for each segment of the Resurrection Bay beach fisheries, 1986 (continued).

Segment	Period				Total
	A	B	C	D	
<u>4TH OF JULY BEACH</u>					
Derby weekdays:					
Number of counts	2	2	2	2	8
Effort	227.5	175.0	542.5	411.3	1,356.3
St. Error.	17.5	52.5	52.5	61.3	97.8
Derby weekends:					
Number of counts	2	2	2	2	8
Effort	154.0	602.0	371.0	567.0	1,694.0
St. Error.	42.0	266.0	147.0	63.0	313.2
Post Derby weekdays:					
Number of counts	4	4	4	4	16
Effort	133.0	465.5	465.5	631.8	1,695.8
St. Error.	76.8	156.0	465.5	166.3	524.0
Post Derby weekends:					
Number of counts	3	3	3	3	12
Effort	210.0	388.5	283.5	63.0	945.0
St. Error.	111.1	237.4	144.4	36.4	301.4

Table 9. Summary of the number of angler-hours of effort during each segment of the Resurrection Bay beach fisheries, 1986.

Component	Estimated Effort	Standard Error	95% Con. Int.		Relative Precision
<u>LOWELL POINT BEACH</u>					
Derby weekdays	385.0	95.0	198.8	- 571.2	48.4%
Derby weekends	784.0	159.9	470.6	- 1,097.4	40.0%
Post Derby weekdays	299.3	144.3	16.4	- 582.1	94.5%
Post Derby weekends	241.5	145.1	0	- 525.9	117.8%
Derby total	1,169.0	186.0	804.4	- 1,533.6	31.2%
Post Derby total	540.8	204.6	139.7	- 941.9	74.2%
Total	1,709.8	276.6	1,167.7	- 2,251.9	31.7%
<u>SEWARD BEACH</u>					
Derby weekdays	1,391.3	230.0	940.5	- 1,842.1	32.4%
Derby weekends	2,604.0	618.5	1,391.7	- 3,816.3	46.5%
Post Derby weekdays	2,959.3	599.9	1,783.5	- 4,135.1	39.7%
Post Derby weekends	2,352.0	480.8	1,409.6	- 3,294.4	40.1%
Derby total	3,995.3	659.8	2,702.0	- 5,288.6	32.4%
Post Derby total	5,311.3	768.8	3,804.5	- 6,818.1	28.4%
Total	9,306.6	1,013.1	7,320.8	- 11,292.4	21.3%
<u>4TH OF JULY BEACH</u>					
Derby weekdays	1,356.3	97.8	1,164.6	- 1,548.0	14.1%
Derby weekends	1,694.0	313.2	1,080.1	- 2,307.9	36.2%
Post Derby weekdays	1,695.8	524.0	668.8	- 2,722.8	60.6%
Post Derby weekends	945.0	301.4	354.3	- 1,535.7	62.5%
Derby total	3,050.3	328.1	2,407.2	- 3,693.4	21.1%
Post Derby total	2,640.8	604.5	1,456.0	- 3,825.6	44.9%
Total	5,691.1	687.8	4,343.0	- 7,039.2	23.7%
GRAND TOTAL	16,707.5	1,255.4	14,246.9	- 19,169.1	14.7%

Table 10. Estimated harvest of coho salmon per angler-hour (CPUE) for each segment of the Resurrection Bay beach fisheries, 1986.

Segment	d ¹	Days D ²	Number of Interviews	Harvest ³ CPUE	Standard Error
<u>LOWELL POINT BEACH</u>					
Derby weekdays	4	5	43	0.0000	0.0
Derby weekends	4	4	92	0.0055	0.000609
Post Derby weekdays	6	19	20	0.0000	0.0
Post Derby weekends	3	9	18	0.0000	0.0
<u>SEWARD BEACH</u>					
Derby weekdays	5	5	114	0.0064	0.000458
Derby weekends	4	4	204	0.0480	0.000698
Post Derby weekdays	9	19	131	0.4019	0.007660
Post Derby weekends	8	9	165	0.2561	0.003090
<u>4TH OF JULY BEACH</u>					
Derby weekdays	5	5	133	0.0263	0.001330
Derby weekends	4	4	135	0.0225	0.000858
Post Derby weekdays	7	19	84	0.0093	0.000597
Post Derby weekends	6	9	75	0.0691	0.003020

¹ Number of days on which interviews were collected.

² Number of days possible for collecting interviews.

³ Harvest CPUE includes fish reported as kept only, however, no coho salmon were reported as released.

Of the three beaches surveyed, the largest harvest of coho salmon (1,925) occurred at Seward Beach. There was a small harvest at Fourth of July Beach (155), but an estimated harvest of only four coho salmon occurred at Lowell Point Beach (Table 11). Nearly 43% of the total season effort at Seward Beach occurred during the Salmon Derby, however, only 7% of the coho salmon harvest from this site occurred during the Derby (Figure 3).

Fourth of July Beach produced a large catch of pink salmon (2,956). A smaller number of pink salmon were also taken at the other beaches (Table 12). Dolly Varden char was the only other species reported caught at the three beaches.

Biological Data

For the boat fishery, 93% of the coho salmon in the harvest were estimated to be age 1.1 (Table 13). Only seventeen coho salmon were sampled from the beach fisheries and all were age 1.1. The mean length for age 1.1 males in the boat fishery was 622 mm, for age 1.1 females mean length was 602 mm (Table 14). Age 2.1 coho were approximately the same size as age 1.1, 625 mm and 594 mm mean length for males and females, respectively (Table 14).

Most chinook salmon sampled were age 0.1 males (Table 15). The mean length for age 0.1 males was 411 mm, and for age 0.2 males 661 mm (Table 16).

Beach Fishery Angler Survey

A total of 1,054 anglers responded to the question regarding salmon snagging in Resurrection Bay beach fisheries (Table 17). For all interviews, 603 (57.2%) favored snagging, 371 (35.2%) disapproved, and 80 (7.6%) had no opinion on this angling method.

During the Derby, most coho salmon were not available to the beach fisheries. Only at Fourth of July Beach, where anglers were targeting on the abundant pink salmon, were the majority of anglers in favor of snagging. After the Derby, the coho salmon moved inshore along Seward and Fourth of July beaches prior to their upstream spawning runs. The majority of anglers fishing off these beaches during this period favored snagging (68.2% and 71.9% for Seward and Fourth of July beaches, respectively). This is probably due to the increased availability of coho

Table 11. Estimated number of coho salmon harvested during each segment of the Resurrection Bay beach fisheries, 1986.

Segment	Harvest ¹	Standard Error	95% Con. Int.		Relative Precision
<u>LOWELL POINT BEACH</u>					
Derby weekdays	0	0.0	0 -	0	
Derby weekends	4	1.0	2 -	6	48.8%
Post derby weekdays	0	0.0	0 -	0	
Post derby weekends	0	0.0	0 -	0	
Derby total	4	1.0	2 -	6	48.8%
Post Derby total	0	0.0	0 -	0	
Total	4	1.0	2 -	6	48.8%
<u>SEWARD BEACH</u>					
Derby weekdays	9	1.6	6 -	12	34.9%
Derby weekends	125	29.7	67 -	183	46.6%
Post Derby weekdays	1,189	242.1	714 -	1,664	39.9%
Post Derby weekends	602	123.3	360 -	844	40.2%
Derby total	134	29.8	76 -	192	43.6%
Post Derby total	1,791	271.7	1,258 -	2,324	29.7%
Total	1,925	273.3	1,389 -	2,461	27.8%
<u>4TH OF JULY BEACH</u>					
Derby weekdays	36	3.1	30 -	42	17.1%
Derby weekends	38	7.2	24 -	52	37.1%
Post Derby weekdays	16	5.0	6 -	26	60.8%
Post Derby weekends	65	21.0	24 -	106	63.3%
Derby total	74	7.8	59 -	89	20.8%
Post Derby total	81	21.6	39 -	123	52.2%
Total	155	23.0	110 -	200	29.0%
GRAND TOTAL	2,084	274.3	1,546 -	2,622	25.8%

¹ Harvest includes only those fish reported as kept, however, no coho salmon were reported as released.

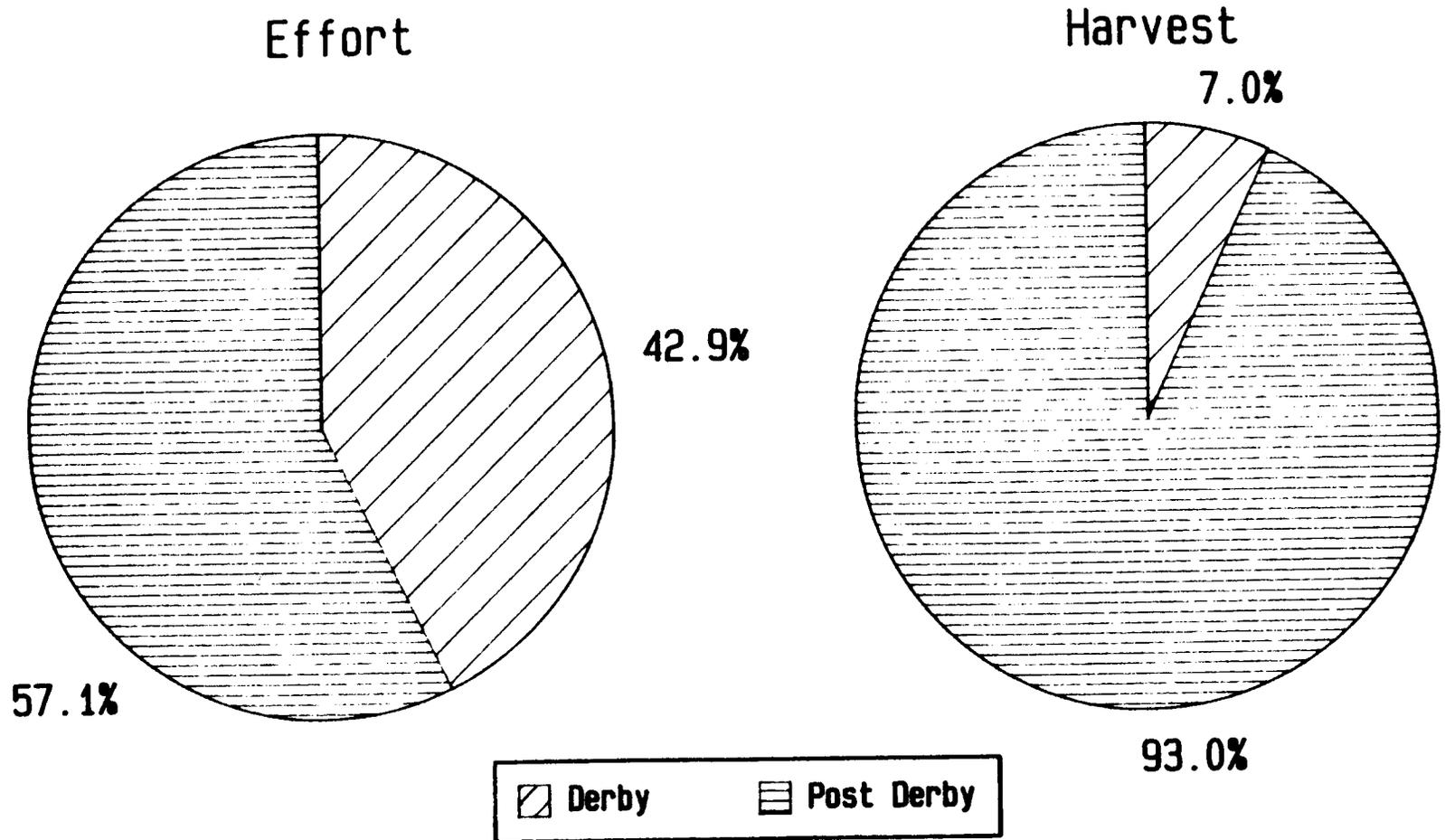


Figure 3. Percentage of effort and coho salmon harvest at Seward Beach during the Derby and post Derby segments of the Resurrection Bay beach fishery, 1986.

Table 12. Estimated number of pink salmon harvested and caught during the Resurrection Bay beach fisheries, 1986.

Component	Lowell Point Beach				Seward Beach				4th of July Beach			
	Harvest ¹	St. Err. ²	Catch ³	St. Err.	Harv.	St. Err.	Catch	St. Err.	Harv.	St. Err.	Catch	St. Err.
<u>DERBY FISHERY</u>												
Weekdays	210	52.9	225	56.5	18	3.4	22	4.1	806	59.3	1,177	86.5
Weekends	194	39.6	215	44.0	83	19.9	94	22.3	330	61.2	387	71.8
Total	404	66.1	440	71.7	101	20.1	116	22.7	1,136	85.2	1,564	112.4
<u>POST DERBY FISHERY</u>												
Weekdays	94	46.8	94	46.8	136	27.8	146	30.0	691	213.7	1,083	335.3
Weekends	43	26.4	60	36.6	5	1.1	87	20.1	243	78.1	309	98.9
Total	137	53.7	154	59.4	141	27.8	233	36.1	934	227.5	1,392	349.6
GRAND TOTAL	541	85.2	594	93.1	242	34.4	349	42.7	2,070	242.9	2,956	367.2

¹ Harvest includes fish reported as kept only.

² Standard error.

³ Catch includes fish reported as kept and fish reported as released.

Table 13. Estimated age composition and estimated numbers by sex of the coho salmon sport harvest in Resurrection Bay, 1986.

Fishery and Time Period ¹	Sex		Age Group		Total
			1.1	2.1	
Boat 6/23 - 8/08 (n = 313)	Male	Percent	52.1	5.1	57.2
		Number	2,242	219	2,461
	Female	Percent	36.7	6.1	42.8
		Number	1,579	263	1,842
	Combined	Percent	88.8	11.2	100.0
		Number St. Error	3,821 438	482 94	4,303
Boat 8/09 - 8/17 (n = 279)	Male	Percent	58.4	3.2	61.6
		Number	5,190	284	5,474
	Female	Percent	36.6	1.8	38.4
		Number	3,253	160	3,413
	Combined	Percent	95.0	5.0	100.0
		Number St. Error	8,443 567	444 120	8,887
Boat SEASON TOTAL 6/23 - 8/17	Male	Percent	56.4	3.8	60.2
		Number	7,428	503	7,931
	Female	Percent	36.6	3.2	39.8
		Number	4,829	422	5,251
	Combined	Percent	93.0	7.0	100.0
		Number St. Error	12,257 716	925 152	13,182
Beach 8/09 - 9/17 (n = 17)	Male	Percent	58.8	0	58.8
		Number	1,225	0	1,225
	Female	Percent	41.2	0	41.2
		Number	859	0	859
	Combined	Percent	100.0	0	100.0
		Number St. Error	2,084 274	0 0	2,084

¹ n = sample size.

Table 14. Mean length by sex and age group of the coho salmon sampled from the sport harvest in the Resurrection Bay boat fishery, 1986.

Fishery and Time Period	Sex		Age Group	
			1.1	2.1
Boat 6/17 - 8/08	Male	Length ¹	615	619
		Standard Error	4	11
		Sample Size	163	16
	Female	Length	580	585
		Standard Error	5	10
		Sample Size	115	19
Boat 8/09 - 8/17	Male	Length	632	635
		Standard Error	5	16
		Sample Size	173	9
	Female	Length	618	628
		Standard Error	7	23
		Sample Size	110	5
Boat SEASON TOTAL 6/17 - 8/17	Male	Length	622	625
		Standard Error	4	9
		Sample Size	336	25
	Female	Length	602	594
		Standard Error	4	10
		Sample Size	225	24

¹ Length measured from mid-eye to fork-of-tail in millimeters.

Table 15. Estimated age composition by sex of enhanced chinook salmon harvested in the Resurrection Bay sport fishery, 1986.

		Brood Year and Age Group			Total
		1984	1983	1982	
Sex		0.1	0.2	0.3	
Male	Percent	67.8	25.0		92.8
	Standard Error ¹	0.090	0.083		0.050
Female	Percent		3.6	3.6	7.2
	Standard Error		0.36	0.36	0.050
Total (n = 28) ²	Percent Standard Error	67.8 0.090	28.6 0.087	3.6 0.36	100.0

¹ Standard error of proportional estimate.

² n = sample size.

Table 16. Mean length by sex and age group of enhanced chinook salmon harvested in the Resurrection Bay sport fishery, 1986.

		Brood Year and Age Group		
		1984	1983	1982
Sex		0.1	0.2	0.3
Male	Length ¹	411	661	
	Standard Error	8	11	
	Sample Size	18	7	
Female	Length		635	860
	Standard Error			
	Sample Size		1	1
Total	Length	411	657	860
	Standard Error	8	10	
	Sample Size	18	8	1

¹ Length measured in millimeters from mid-eye to fork-of-tail.

Table 17. Summary of responses to the question on snagging in the Resurrection Bay beach fishery.

Fishery Period	Fishery Location	Anglers Responding	Anglers Approved		Anglers Disapproved		Anglers No Opinion	
			Number	Percent	Number	Percent	Number	Percent
Derby	Seward Lagoon	251	107	42.6	117	46.6	27	10.8
	Fourth of July	254	146	57.5	86	33.8	22	8.7
	Lowell Point	119	55	46.2	56	47.1	8	6.7
Post Derby	Seward Lagoon	242	174	71.9	61	25.2	7	2.9
	Fourth of July	151	103	68.2	34	22.5	14	9.3
	Lowell Point	37	18	48.7	17	45.9	2	5.4
Derby	Total	624	308	49.4	259	41.5	57	9.1
Post Derby	Total	430	295	68.6	112	26.0	23	5.4
GRAND TOTAL	Total	1,054	603	57.2	371	35.2	80	7.6

salmon within casting range. Due to the few coho salmon remaining near Lowell Point after the Derby, angler opinions toward snagging remained essentially unchanged.

DISCUSSION

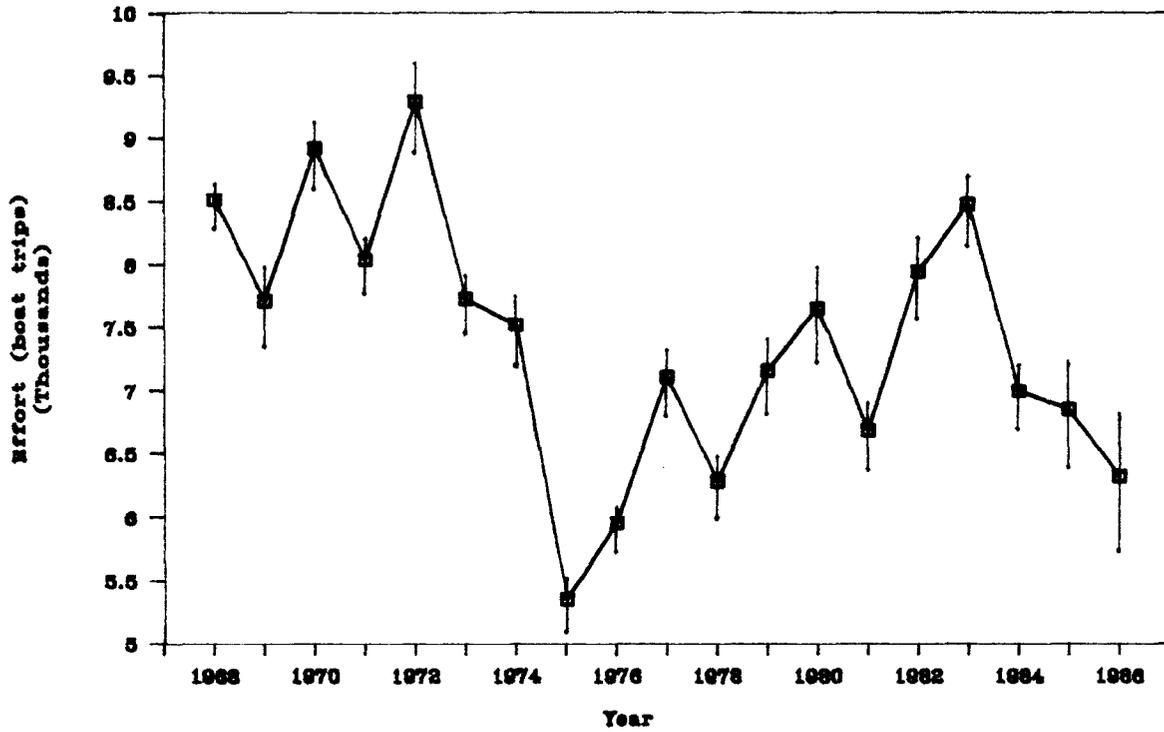
The 1986 harvest of 13,193 coho salmon in the marine boat fishery is less than the 18-year average annual harvest of 15,349 coho salmon from 1968 through 1985, but is within the range of harvests taken in recent years (Figure 4). The number of boat trips in 1986 was also similar to the number of trips in recent years (Figure 4).

The harvest of coho salmon in the beach fishery was relatively small, with a total of only 2,084 harvested. Since nearly all of this harvest was taken from Seward Beach, we recommend that Fourth of July and Lowell Point beaches not be monitored for coho salmon harvest in the future. The fishery at Fourth of July Beach yields mainly pink salmon, and relatively little fishing effort is expended at Lowell Point Beach.

Coho salmon in the recreational harvest were mainly age group 1.1. McHenry (1986) has documented a trend in the wild coho salmon harvest toward an increasing proportion of age 1.1 fish and a steady decline in the percent of age 2.1 and 3.1 fish. The 1986 data for all coho salmon in the harvest indicate that this trend has continued.

Beach angler's opinions about the desirability of snagging as a harvest method varied with the fishing conditions available to them. At times when fish were abundant and readily visible from shore, anglers tended to be more in favor of snagging. This is evident at Fourth of July Beach, where pink salmon were abundant throughout the season, and at Fourth of July and Seward beaches after the Derby, when coho salmon were schooling near shore. It should be noted that Resurrection Bay coho salmon become increasingly less likely to take a lure as the season progresses. Due to this behavioral change and the dense schools that form near shore, anglers often became frustrated and resorted to snagging gear. Snagging is probably the most efficient capture method employed during this period. If snagging were made illegal, full use of enhanced coho and chinook salmon returns may not be realized in future years.

Effort



Harvest

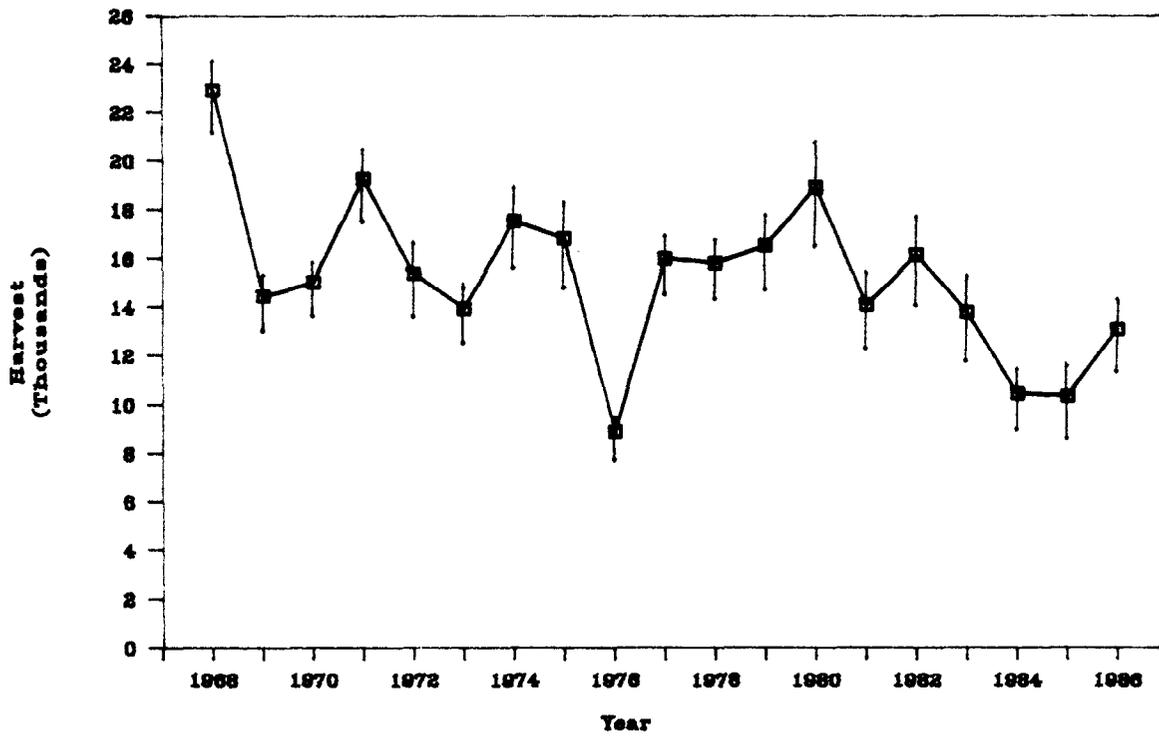


Figure 4. Effort and harvest in the Resurrection Bay boat coho salmon sport fishery, 1968-1986. Bars represent 95% confidence intervals.

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APPENDIX

Appendix Table 1. Boat counts during the Resurrection Bay
boat fishery, 1986.¹

Date	Wd/ ² We	Private and Charter by Period				Military ³
		A	B	C	D	
6/23	Wd					
6/24	Wd					
6/25	Wd	2			6	
6/26	Wd			17		
6/27	Wd	4				
6/28	We	12				
6/29	We			40	8	
6/30	Wd		6			
7/01	Wd					
7/02	Wd		1		4	
7/03	Wd			17		
7/04	We	5	5			
7/05	We		18			
7/06	We			27	8	
7/07	Wd	3	6			
7/08	Wd		0		1	
7/09	Wd					
7/10	Wd			15		
7/11	Wd			25		
7/12	We			29	12	
7/13	We	6	26			
7/14	Wd	0				
7/15	Wd					
7/16	Wd				10	
7/17	Wd		1		11	
7/18	Wd					
7/19	We			33	52	2
7/20	We		12		18	0
7/21	Wd					0
7/22	Wd			7	1	2
7/23	Wd					0
7/24	Wd		5	18		0
7/25	Wd	1	8			0
7/26	We	1	11			0
7/27	We	8		55		3
7/28	Wd		11			0
7/29	Wd	0		14		2
7/30	Wd	4				0
7/31	Wd			22		1
8/01	Wd	0			12	11
8/02	We	0		86		15

-Continued-

Appendix Table 1. Boat counts during the Resurrection Bay
boat fishery, 1986 (continued).¹

Date	Wd/ ² We	Private and Charter by Period				Military ³
		A	B	C	D	
8/03	We		25		6	13
8/04	Wd					0
8/05	Wd	0			19	13
8/06	Wd	0				5
8/07	Wd			38		6
8/08	Wd		8		4	0
8/09	We		40	120	144	16
8/10	We	0	47			14
8/11	Wd	8	18	110	59	11
8/12	Wd	5	27	60	85	13
8/13	Wd	4	22		83	9
8/14	Wd		47	129	56	7
8/15	Wd	6	19	109		15
8/16	We	19		246	147	20
8/17	We	27	157			9
8/18	Wd			8		9
8/19	Wd				15	0
8/20	Wd		15	10		5
8/21	Wd	4			7	8
8/22	Wd					0
8/23	We	4	35			13
8/24	We		53	52		8
8/25	Wd	3	5			10
8/26	Wd			2	0	0
8/27	Wd					0
8/28	Wd					7
8/29	Wd		4			14
8/30	We				14	16
8/31	We	2		28		13
9/01	We		20			10
9/02	Wd					6
9/03	Wd		4			3
9/04	Wd	0				10
9/05	Wd			11		9
9/06	We	0	10			5
9/07	We			17	1	6
9/08	Wd					5
9/09	Wd					5
9/10	Wd					5

-Continued-

Appendix Table 1. Boat counts during the Resurrection Bay boat fishery, 1986 (continued).¹

Date	Wd/ ² We	Private and Charter by Period				Military ³
		A	B	C	D	
9/11	Wd	0			0	5
9/12	Wd					0
9/13	We	0			12	7
9/14	We			17		3
Total		128	666	1,362	795	369

¹ Boat counts from 23 June through 30 July are for salmon fishing boats only. Counts from 31 July through 14 September include boats targeting on bottomfish.

² Weekday (Wd) or weekend-holiday (We).

³ Military counts are tallies of the number of military boats returning for the entire day.

Appendix Table 2. Daily mean effort and coho salmon harvest per boat-trip for anglers fishing from private boats during the Resurrection Bay boat fishery, 1986.

Date	We/ ¹ Wd	No. Boats Interviewed	Mean Effort (hrs/trip)	St. Err. Effort	Mean Harvest (harvest/trip)	St. Err. Harvest
6/25	Wd	2	2.5	0.500	0.00	0.000
6/29	We	2	4.0	2.000	1.00	1.000
6/30	Wd	2	4.3	2.250	0.50	0.500
7/03	Wd	3	3.0	0.577	0.67	0.667
7/05	We	7	3.6	0.602	0.43	0.297
7/06	We	10	5.1	0.581	3.40	0.957
7/07	Wd	2	3.0	1.000	0.00	0.000
7/10	Wd	8	5.8	0.959	5.13	1.552
7/11	Wd	6	5.8	0.642	4.67	1.022
7/12	We	27	6.4	0.636	2.59	0.600
7/13	We	16	3.4	0.390	2.06	0.649
7/16	Wd	4	7.0	1.958	3.50	1.323
7/17	Wd	5	4.2	0.970	2.60	2.112
7/19	We	41	6.3	0.477	2.73	0.449
7/20	We	12	4.5	0.838	2.08	0.830
7/22	Wd	2	6.3	2.250	4.00	3.000
7/24	Wd	12	5.3	0.449	1.00	0.444
7/25	Wd	7	3.4	0.762	0.29	0.184
7/26	We	5	2.3	0.800	1.00	0.632
7/27	We	31	5.4	0.334	1.03	0.280
7/28	Wd	5	4.9	0.678	1.20	0.490
7/29	Wd	10	4.2	0.533	1.20	0.663
7/30	Wd	4	2.5	0.289	0.00	0.000
7/31	Wd	15	5.5	0.710	1.67	0.475
8/01	Wd	10	4.3	0.793	0.80	0.593
8/02	We	61	5.6	0.256	1.15	0.231
8/03	We	20	3.7	0.348	0.70	0.242
8/05	Wd	7	3.6	0.317	0.86	0.595
8/07	Wd	20	5.7	0.422	2.00	0.453
8/08	Wd	7	5.1	1.026	1.71	0.837
8/09	We	31	5.5	0.442	1.06	0.324
8/10	We	29	5.1	0.370	1.10	0.334
8/11	Wd	86	6.8	0.267	3.49	0.370
8/12	Wd	57	6.7	0.374	3.72	0.483
8/13	Wd	44	6.9	0.403	3.39	0.503
8/14	Wd	84	6.6	0.273	3.01	0.359
8/15	Wd	46	6.2	0.352	2.89	0.439
8/16	We	109	6.5	0.309	2.34	0.259
8/17	We	55	4.3	0.213	1.82	0.276
8/18	Wd	3	4.0	0.577	1.33	0.333
8/19	Wd	8	4.1	0.549	1.63	0.498

-Continued-

Appendix Table 2. Daily mean effort and coho salmon harvest per boat-trip for anglers fishing from private boats during the Resurrection Bay boat fishery, 1986 (continued).

Date	We/ ¹ Wd	No. Boats Interviewed	Mean Effort (hrs/trip)	St. Err. Effort	Mean Harvest (harvest/trip)	St. Err. Harvest
8/20	Wd	17	3.9	0.394	2.18	0.530
8/21	Wd	5	3.7	1.241	3.00	2.510
8/23	We	20	3.7	0.427	2.80	0.717
8/24	We	42	4.7	0.293	3.88	0.552
8/25	Wd	4	3.8	1.031	3.00	2.345
8/29	Wd	2	4.0	1.000	0.00	0.000
8/30	We	8	7.3	1.082	1.00	0.267
8/31	We	18	3.8	0.369	0.83	0.259
9/01	We	14	3.1	0.316	0.50	0.251
9/03	Wd	2	2.0	1.000	0.00	0.000
9/05	Wd	7	4.0	0.794	1.57	0.571
9/06	We	6	3.2	0.601	0.00	0.000
9/07	We	10	3.7	0.651	0.50	0.342
9/13	We	8	4.1	0.549	0.38	0.375
9/14	We	6	4.5	0.957	0.00	0.000

¹ Weekend-Holiday (We) or weekday (Wd).

Appendix Table 3. Daily mean effort and coho salmon harvest per boat-trip for anglers fishing from charter boats during the Resurrection Bay boat fishery, 1986.

Date	We/ ¹ Wd	No. Boats Interviewed	Mean Effort (hrs/trip)	St. Err. Effort	Mean Harvest (harvest/trip)	St. Err. Harvest
7/22	Wd	3	7.3	0.882	7.67	2.963
7/24	Wd	6	6.3	0.558	8.17	1.887
7/31	Wd	3	3.7	1.691	2.67	2.667
8/02	We	3	6.8	0.441	2.33	1.202
8/03	We	2	5.5	2.500	7.00	6.000
8/05	Wd	4	6.8	0.826	4.00	1.683
8/07	Wd	5	7.2	0.860	4.60	2.821
8/12	Wd	6	9.2	0.401	10.83	3.240
8/15	Wd	2	4.0	0.000	2.50	0.500
8/16	We	2	9.0	0.000	5.00	2.000
8/17	We	2	4.0	1.000	1.50	0.500
8/18	Wd	2	4.5	0.500	5.00	0.000
8/21	Wd	3	4.7	0.882	1.33	1.333
8/24	We	3	4.2	0.601	3.33	0.333

¹ Weekend-Holiday (We) or weekday (Wd).

Appendix Table 4. Daily mean effort and coho salmon harvest per boat-trip for anglers fishing from private and charter boats during the Resurrection Bay boat fishery, 1986.¹

Date	We/ ² Wd	No. Boats Interviewed	Mean Effort (hrs/trip)	St. Err. Effort	Mean Harvest (harvest/trip)	St. Err. Harvest
6/25	Wd	2	2.5	0.500	0.00	0.000
6/29	We	2	4.0	2.000	1.00	1.000
6/30	Wd	2	4.3	2.250	0.50	0.500
7/03	Wd	3	3.0	0.577	0.67	0.667
7/05	We	7	3.6	0.602	0.43	0.297
7/06	We	10	5.1	0.581	3.40	0.957
7/07	Wd	2	3.0	1.000	0.00	0.000
7/10	Wd	8	5.8	0.959	5.13	1.552
7/11	Wd	6	5.8	0.642	4.67	1.022
7/12	We	28	6.4	0.614	2.71	0.591
7/13	We	16	3.4	0.390	2.06	0.649
7/16	Wd	4	7.0	1.958	3.50	1.323
7/17	Wd	5	4.2	0.970	2.60	2.112
7/19	We	42	6.3	0.466	2.71	0.438
7/20	We	12	4.5	0.838	2.08	0.830
7/22	Wd	5	6.9	0.900	6.20	2.083
7/24	Wd	18	5.7	0.362	3.39	1.051
7/25	Wd	7	3.4	0.762	0.29	0.184
7/26	We	5	2.3	0.800	1.00	0.632
7/27	We	32	5.4	0.328	1.00	0.273
7/28	Wd	5	4.9	0.678	1.20	0.490
7/29	Wd	11	4.5	0.545	2.00	1.000
7/30	Wd	4	2.5	0.289	0.00	0.000
7/31	Wd	18	5.2	0.656	1.83	0.550
8/01	Wd	11	4.0	0.746	0.73	0.541
8/02	We	64	5.7	0.247	1.20	0.227
8/03	We	22	3.8	0.374	1.27	0.600
8/05	Wd	11	4.7	0.594	2.00	0.820
8/07	Wd	25	6.0	0.390	2.52	0.664
8/08	Wd	7	5.1	1.026	1.71	0.837
8/09	We	31	5.5	0.442	1.06	0.324
8/10	We	29	5.1	0.370	1.10	0.334
8/11	Wd	88	6.8	0.261	3.61	0.372
8/12	Wd	63	6.9	0.352	4.40	0.585
8/13	Wd	44	6.9	0.403	3.39	0.503
8/14	Wd	84	6.6	0.273	3.01	0.359
8/15	Wd	49	6.1	0.339	2.86	0.412
8/16	We	112	6.6	0.303	2.37	0.257
8/17	We	57	4.3	0.208	1.81	0.267

-Continued-

Appendix Table 4. Daily mean effort and coho salmon harvest per boat-trip for anglers fishing from private and charter boats during the Resurrection Bay fishery, 1986 (continued).¹

Date	We/ ² Wd	No. Boats Interviewed	Mean Effort (hrs/trip)	St. Err. Effort	Mean Harvest (harvest/trip)	St. Err. Harvest
8/18	Wd	5	4.2	0.374	2.80	0.917
8/19	Wd	8	4.1	0.549	1.63	0.498
8/20	Wd	17	3.9	0.394	2.18	0.530
8/21	Wd	8	4.1	0.815	2.38	1.592
8/23	We	21	3.8	0.411	2.81	0.682
8/24	We	45	4.7	0.276	3.84	0.515
8/25	Wd	4	3.8	1.031	3.00	2.345
8/26	Wd	2	5.0	0.000	1.50	0.500
8/29	Wd	3	4.3	0.667	0.67	0.667
8/30	We	8	7.3	1.082	1.00	0.267
8/31	We	19	4.0	0.414	0.89	0.252
9/01	We	15	3.5	0.438	0.47	0.236
9/03	Wd	2	2.0	1.000	0.00	0.000
9/05	Wd	7	4.0	0.794	1.57	0.571
9/06	We	6	3.2	0.601	0.00	0.000
9/07	We	10	3.7	0.651	0.50	0.342
9/13	We	8	4.1	0.549	0.38	0.375
9/14	We	6	4.5	0.957	0.00	0.000

¹ These numbers include anglers who were not recorded as private, charter, or military.

² Weekend-Holiday (We) or weekday (Wd).

Appendix Table 5. Daily mean effort and coho salmon harvest per boat-trip for anglers fishing from military boats during the Resurrection Bay boat fishery, 1986.

Date	We/ ¹ Wd	No. Boats Interviewed	Mean Effort (hrs/trip)	St. Err. Effort	Mean Harvest (harvest/trip)	St. Err. Harvest
7/27	We	3	2.7	0.333	0.00	0.000
7/29	Wd	2	2.0	0.000	0.50	0.500
8/02	We	6	5.0	0.365	0.00	0.000
8/03	We	4	2.5	0.289	0.00	0.000
8/07	Wd	3	4.7	0.882	0.00	0.000
8/09	We	3	5.0	1.000	0.00	0.000
8/10	We	4	4.5	0.500	0.00	0.000
8/12	Wd	5	6.3	0.970	2.60	0.980
8/14	Wd	2	3.0	0.000	1.00	0.000
8/15	Wd	4	3.8	0.250	0.00	0.000
8/16	We	2	3.5	1.500	0.00	0.000
8/25	Wd	2	4.0	0.000	0.00	0.000

¹ Weekend-Holiday (We) or weekday (Wd).

Appendix Table 6. Daily harvest of pink salmon, chinook salmon, ling cod, and rockfish per boat-trip for anglers fishing from private and charter boats during the Resurrection Bay boat fishery, 1986.¹

Date	We/ ³ Wd	Pink Salmon Harvest		Pink Salmon Catch		Chinook Salmon Harvest		Chinook Salmon Catch		Ling Cod ² Harvest		Rockfish ² Harvest	
		Mean	SE ⁴	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
6/25	Wd	0.00	0.000	0.00	0.000	2.00	2.000	2.00	2.000	0.00	0.000	0.00	0.000
6/29	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
6/30	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
7/03	Wd	1.67	0.882	1.67	0.882	0.67	0.667	0.67	0.667	0.00	0.000	0.00	0.000
7/05	We	0.71	0.286	0.71	0.286	0.14	0.143	0.14	0.143	0.00	0.000	0.00	0.000
7/06	We	0.30	0.300	0.30	0.300	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
7/07	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
7/10	Wd	1.38	0.498	1.38	0.498	0.13	0.125	0.13	0.125	0.00	0.000	0.00	0.000
7/11	Wd	1.17	0.980	1.17	0.980	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
7/12	We	0.68	0.337	0.68	0.337	0.04	0.036	0.04	0.036	0.00	0.000	0.00	0.000
7/13	We	1.00	0.342	1.00	0.342	0.06	0.063	0.06	0.063	0.00	0.000	0.00	0.000
7/16	Wd	0.75	0.479	1.75	1.436	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
7/17	Wd	2.40	1.288	2.40	1.288	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
7/19	We	1.43	0.344	1.48	0.343	0.17	0.076	0.17	0.076	0.00	0.000	0.00	0.000
7/20	We	0.33	0.256	0.33	0.256	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
7/22	Wd	0.60	0.400	0.60	0.400	0.60	0.400	0.60	0.400	0.00	0.000	0.00	0.000
7/24	Wd	0.44	0.246	0.44	0.246	0.11	0.111	0.11	0.111	0.00	0.000	0.00	0.000
7/25	Wd	0.00	0.000	0.00	0.000	0.14	0.143	0.14	0.143	0.00	0.000	0.00	0.000
7/26	We	0.00	0.000	0.00	0.000	0.60	0.600	0.60	0.600	0.00	0.000	0.00	0.000
7/27	We	1.13	0.418	1.13	0.418	0.06	0.063	0.09	0.069	0.00	0.000	0.00	0.000
7/28	Wd	2.80	2.083	2.80	2.083	0.60	0.400	0.60	0.400	0.00	0.000	0.00	0.000
7/29	Wd	0.00	0.000	0.00	0.000	0.55	0.455	0.73	0.634	0.00	0.000	0.00	0.000
7/30	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
7/31	Wd	0.11	0.076	0.17	0.090	0.17	0.121	0.17	0.121	0.94	0.688	0.00	0.000

-Continued-

Appendix Table 6. Daily harvest of pink salmon, chinook salmon, ling cod, and rockfish per boat-trip for anglers fishing from private and charter boats during the Resurrection Bay boat fishery, 1986 (continued).¹

Date	We/ ³ Wd	Pink Salmon Harvest		Pink Salmon Catch		Chinook Salmon Harvest		Chinook Salmon Catch		Ling Cod Harvest ²		Rockfish Harvest ²	
		Mean	SE ⁴	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
8/01	Wd	1.55	1.139	2.27	1.266	0.00	0.000	0.00	0.000	0.82	0.553	3.45	2.033
8/02	We	0.28	0.106	0.30	0.106	0.08	0.046	0.08	0.046	0.13	0.072	0.70	0.290
8/03	We	0.50	0.277	0.86	0.438	0.05	0.045	0.05	0.045	0.00	0.000	0.00	0.000
8/05	Wd	0.09	0.091	0.09	0.091	0.09	0.091	0.09	0.091	0.82	0.724	0.45	0.366
8/07	Wd	0.16	0.095	0.16	0.095	0.04	0.040	0.16	0.125	0.80	0.608	2.92	2.328
8/08	Wd	2.29	1.835	2.29	1.835	0.00	0.000	0.00	0.000	0.00	0.000	0.29	0.286
8/09	We	0.52	0.484	0.52	0.484	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/10	We	0.66	0.551	1.38	0.863	0.03	0.034	0.03	0.034	0.00	0.000	0.00	0.000
8/11	Wd	0.15	0.050	0.16	0.051	0.05	0.022	0.05	0.022	0.00	0.000	0.00	0.000
8/12	Wd	0.10	0.044	0.17	0.066	0.02	0.016	0.03	0.022	0.00	0.000	0.00	0.000
8/13	Wd	0.14	0.070	0.20	0.095	0.00	0.000	0.02	0.023	0.00	0.000	0.00	0.000
8/14	Wd	0.25	0.116	0.29	0.132	0.01	0.012	0.04	0.020	0.00	0.000	0.00	0.000
8/15	Wd	0.04	0.029	0.06	0.035	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/16	We	0.13	0.055	0.27	0.139	0.01	0.009	0.01	0.009	0.00	0.000	0.00	0.000
8/17	We	0.02	0.018	0.02	0.018	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/18	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/19	Wd	0.00	0.000	0.00	0.000	0.13	0.125	0.13	0.125	0.00	0.000	0.00	0.000
8/20	Wd	0.18	0.128	0.18	0.128	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/21	Wd	0.25	0.250	0.25	0.250	0.00	0.000	0.00	0.000	0.13	0.125	0.50	0.500
8/23	We	0.14	0.104	0.43	0.297	0.05	0.048	0.10	0.066	0.00	0.000	0.00	0.000
8/24	We	0.11	0.091	0.11	0.091	0.07	0.067	0.07	0.067	0.00	0.000	0.00	0.000
8/25	Wd	2.75	2.750	2.75	2.750	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/26	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/29	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000

-Continued-

Appendix Table 6. Daily harvest of pink salmon, chinook salmon, ling cod, and rockfish per boat-trip for anglers fishing from private and charter boats during the Resurrection Bay boat fishery, 1986 (continued).¹

Date	We/ ³ Wd	Pink Salmon Harvest		Pink Salmon Catch		Chinook Salmon Harvest		Chinook Salmon Catch		Ling Cod ² Harvest ²		Rockfish ² Harvest ²	
		Mean	SE ⁴	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
8/30	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/31	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
9/01	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.67	0.667	2.73	1.623
9/03	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
9/05	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
9/06	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
9/07	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.70	0.473	2.00	1.317
9/13	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	1.00	0.756	0.50	0.327
9/14	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	1.67	0.919	1.83	0.910

¹ Includes anglers who were not recorded as private, charter, or military.

² No ling cod or rockfish were recorded as released.

³ Weekend-Holiday (We) or weekday (Wd).

⁴ Standard error.

Appendix Table 7. Daily harvest of pink salmon, chinook salmon, ling cod, and rockfish per boat-trip for anglers fishing from military boats during the Resurrection Bay boat fishery, 1986.

Date	We/ ² Wd	Pink Salmon Harvest		Pink Salmon Catch		Chinook Salmon Harvest		Chinook Salmon Catch		Ling Cod Harvest ¹		Rockfish Harvest ¹	
		Mean	SE ³	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
7/27	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
7/29	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/02	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.33	0.211	6.17	3.038
8/03	We	2.75	2.750	2.75	2.750	0.00	0.000	0.00	0.000	0.00	0.000	1.00	1.000
8/07	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.67	0.667	0.33	0.333
8/09	We	9.00	8.021	9.00	8.021	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/10	We	28.75	7.250	28.75	7.250	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/12	Wd	5.60	2.482	5.60	2.482	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/14	Wd	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/15	Wd	4.75	1.702	4.75	1.702	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/16	We	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
8/25	Wd	2.50	2.500	2.50	2.500	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000

¹ No ling cod or rockfish were reported as released.

² Weekend-Holiday (We) or weekday (Wd).

³ Standard error.

Appendix Table 8. Angler counts during the Resurrection Bay beach fisheries creel survey, 1986.

Date	Wd/ ¹ We	Lowell Point Beach by Period				Seward Beach by Period				4th of July Beach by Period			
		A	B	C	D	A	B	C	D	A	B	C	D
<u>Derby Fishery</u>													
8/09	We			17	8			55	13			16	36
8/10	We	11	24			15	31			14	24		
8/11	Wd			10	11			20	19			28	20
8/12	Wd	2	7			10	12			14	13		
8/13	Wd	1	3			19	33			12	7		
8/14	Wd			0				15				34	
8/15	Wd				10				31				27
8/16	We			23	18			51	60			37	45
8/17	We	6	5			81	66			8	62		
<u>Post Derby Fishery</u>													
8/18	Wd				3				26				11
8/19	Wd												
8/20	Wd			5				16				28	
8/21	Wd	6			0	22			3	4			15
8/22	Wd												
8/23	We	0	1			24	23			8	11		
8/24	We			15				21				15	
8/25	Wd		2		0		5		9		9		9
8/26	Wd												
8/27	Wd	0	0			0	0			0	9		
8/28	Wd												
8/29	Wd		2				6				10		
8/30	We		0				9				26		
8/31	We			4				15				12	
9/01	We	3			0	3			2	12			2
9/02	Wd	0			0	1			0	4			3
9/03	Wd												
9/04	Wd												
9/05	Wd												
9/06	We				0				18				4
9/07	We				0				0				0
9/08	Wd			0				17				0	
9/09	Wd	0				4				0			
9/10	Wd												
9/11	Wd		0	0			17	24			0	0	
9/12	Wd			0				28				0	
9/13	We	0	0			29	38			0	0		
9/14	We			0				42					0

¹ Weekend-Holiday (We) or weekday (Wd).

Appendix Table 9. Daily mean effort, mean coho salmon harvest, and coho salmon harvest per angler-hour (CPUE) for anglers at Lowell Point Beach, 1986.

Date	We/ ¹ Wd	Sample Size	Mean Effort (Hours)	St. Err. Effort	Mean Harvest	St. Err. Harvest	Harvest CPUE
8/09	We	21	2.0	0.410	0.05	0.048	0.0241
8/10	We	40	1.4	0.178	0.00	0.000	0.0000
8/11	Wd	17	0.8	0.143	0.00	0.000	0.0000
8/12	Wd	11	1.8	0.213	0.00	0.000	0.0000
8/13	Wd	6	1.3	0.568	0.00	0.000	0.0000
8/15	Wd	9	1.1	0.139	0.00	0.000	0.0000
8/16	We	23	3.5	0.629	0.00	0.000	0.0000
8/17	We	8	0.7	0.208	0.00	0.000	0.0000
8/18	Wd	3	2.0	0.500	0.00	0.000	0.0000
8/20	Wd	5	1.6	0.453	0.00	0.000	0.0000
8/21	Wd	6	0.8	0.187	0.00	0.000	0.0000
8/24	We	12	3.4	0.480	0.00	0.000	0.0000
8/25	Wd	2	1.5	0.000	0.00	0.000	0.0000
8/29	Wd	2	2.5	0.000	0.00	0.000	0.0000
8/31	We	3	0.7	0.167	0.00	0.000	0.0000
9/01	We	3	0.5	0.000	0.00	0.000	0.0000
9/02	Wd	2	1.0	0.500	0.00	0.000	0.0000

¹ Weekend-Holiday (We) or weekday (Wd).

Appendix Table 10. Daily mean effort, mean coho salmon harvest, and coho salmon harvest per angler-hour (CPUE) for anglers at Seward Beach, 1986.

Date	We/ ¹ Wd	Sample Size	Mean Effort (Hours)	St. Err. Effort	Mean Harvest	St. Err. Harvest	Harvest CPUE
8/09	We	20	3.4	0.573	0.10	0.069	0.0296
8/10	We	35	1.9	0.242	0.00	0.000	0.0000
8/11	Wd	32	2.1	0.355	0.03	0.031	0.0149
8/12	Wd	18	1.8	0.249	0.00	0.000	0.0000
8/13	Wd	36	2.4	0.379	0.00	0.000	0.0000
8/14	Wd	17	4.4	0.894	0.06	0.059	0.0133
8/15	Wd	11	4.4	1.230	0.00	0.000	0.0000
8/16	We	53	3.3	0.388	0.15	0.063	0.0456
8/17	We	96	2.0	0.141	0.15	0.042	0.0738
8/18	Wd	14	1.9	0.519	0.07	0.071	0.0377
8/20	Wd	12	4.0	0.977	0.25	0.131	0.0627
8/21	Wd	16	1.8	0.209	0.44	0.273	0.2456
8/23	We	41	1.8	0.249	0.07	0.054	0.0408
8/24	We	14	3.3	0.521	0.14	0.097	0.0440
8/25	Wd	16	2.4	0.490	0.13	0.125	0.0522
8/29	Wd	6	1.2	0.105	0.00	0.000	0.0000
8/30	We	8	1.6	0.295	0.00	0.000	0.0000
8/31	We	9	3.7	1.275	0.00	0.000	0.0000
9/01	We	5	2.2	1.164	0.80	0.583	0.3721
9/06	We	14	4.3	0.773	1.14	0.345	0.2645
9/08	Wd	17	1.3	0.114	1.12	0.308	0.8636
9/09	Wd	4	1.8	0.323	0.50	0.289	0.2857
9/11	Wd	27	1.9	0.249	1.37	0.221	0.7048
9/12	Wd	19	2.8	0.377	2.26	0.464	0.7963
9/13	We	47	2.4	0.212	1.17	0.205	0.4955
9/14	We	27	4.2	0.434	1.41	0.240	0.3363

¹ Weekend-Holiday (We) or weekday (Wd).

Appendix Table 11. Daily mean effort, mean coho salmon harvest, and coho salmon harvest per angler-hour (CPUE) for anglers at 4th of July Beach, 1986.

Date	We/ ¹ Wd	Sample Size	Mean Effort (Hours)	St. Err. Effort	Mean Harvest	St. Err. Harvest	Harvest CPUE
8/09	We	28	2.5	0.387	0.04	0.036	0.0141
8/10	We	29	0.8	0.114	0.03	0.034	0.0415
8/11	Wd	41	1.1	0.171	0.00	0.000	0.0000
8/12	Wd	20	1.2	0.156	0.10	0.100	0.0833
8/13	Wd	19	1.1	0.203	0.00	0.000	0.0000
8/14	Wd	32	2.1	0.347	0.09	0.052	0.0452
8/15	Wd	21	1.6	0.181	0.00	0.000	0.0000
8/16	We	49	2.7	0.330	0.02	0.020	0.0076
8/17	We	29	1.4	0.187	0.10	0.058	0.0738
8/18	Wd	7	2.6	0.800	0.00	0.000	0.0000
8/20	Wd	25	3.3	0.519	0.00	0.000	0.0000
8/21	Wd	13	4.0	1.155	0.08	0.077	0.0191
8/23	We	18	1.4	0.242	0.22	0.129	0.1553
8/24	We	11	4.6	0.907	0.55	0.312	0.1177
8/25	Wd	14	1.5	0.219	0.07	0.071	0.0480
8/27	Wd	8	0.9	0.200	0.00	0.000	0.0000
8/29	Wd	10	2.4	0.576	0.00	0.000	0.0000
8/30	We	21	2.2	0.282	0.00	0.000	0.0000
8/31	We	10	1.5	0.157	0.00	0.000	0.0000
9/01	We	12	1.6	0.172	0.08	0.083	0.0526
9/02	Wd	7	1.4	0.230	0.00	0.000	0.0000
9/06	We	3	0.7	0.167	0.00	0.000	0.0000

¹ Weekend-Holiday (We) or weekday (Wd).

Appendix Table 12. Daily mean pink salmon catch and pink salmon catch per angler-hour (CPUE) for the Resurrection Bay beach fisheries, 1986.

Date	We/ Wd ³	Lowell Point Harvest ¹			Lowell Point Catch ²			Seward Beach Harvest			Seward Beach Catch			4th of July Harvest			4th of July Catch		
		Mean	SE	CPUE	Mean	SE	CPUE	Mean	SE	CPUE	Mean	SE	CPUE	Mean	SE	CPUE	Mean	SE	CPUE
8/09	We	0.38	0.129	0.1928	0.48	0.131	0.2410	0.10	0.069	0.0296	0.10	0.069	0.0296	0.32	0.090	0.1268	0.32	0.090	0.1268
8/10	We	0.20	0.064	0.1459	0.25	0.078	0.1823	0.00	0.000	0.0000	0.00	0.000	0.0000	0.45	0.190	0.5399	0.52	0.196	0.6229
8/11	Wd	0.12	0.081	0.1403	0.24	0.106	0.2805	0.00	0.000	0.0000	0.00	0.000	0.0000	0.71	0.168	0.6299	0.93	0.196	0.8254
8/12	Wd	1.82	0.685	1.0347	1.82	0.685	1.0347	0.17	0.167	0.0909	0.22	0.173	0.1212	0.75	0.298	0.6250	1.30	0.424	1.0833
8/13	Wd	0.17	0.167	0.1290	0.17	0.167	0.1290	0.03	0.028	0.0114	0.03	0.028	0.0114	1.11	0.439	1.0376	1.74	0.717	1.6304
8/14	Wd	...	...	...	...	...	...	0.00	0.000	0.0000	0.00	0.000	0.0000	0.72	0.247	0.3467	0.88	0.294	0.4221
8/15	Wd	0.56	0.294	0.5000	0.56	0.294	0.5000	0.00	0.000	0.0000	0.00	0.000	0.0000	1.19	0.363	0.7463	1.90	0.425	1.1940
8/16	We	1.22	0.274	0.3478	1.22	0.274	0.3478	0.17	0.059	0.0513	0.21	0.062	0.0627	0.45	0.137	0.1676	0.59	0.167	0.2209
8/17	We	0.13	0.125	0.1845	0.25	0.164	0.3690	0.05	0.027	0.0264	0.05	0.027	0.0264	0.28	0.130	0.1967	0.28	0.130	0.1967
8/18	Wd	2.00	0.577	1.0000	2.00	0.577	1.0000	0.29	0.163	0.1509	0.36	0.199	0.1887	0.86	0.340	0.3243	0.86	0.340	0.3243
8/20	Wd	0.20	0.200	0.1277	0.20	0.200	0.1277	0.17	0.167	0.0418	0.17	0.167	0.0418	1.76	0.348	0.5285	2.76	0.691	0.8288
8/21	Wd	0.00	0.000	0.0000	0.00	0.000	0.0000	0.19	0.136	0.1053	0.19	0.136	0.1053	0.92	0.329	0.2286	1.08	0.329	0.2667
8/23	We	...	...	...	...	...	...	0.02	0.024	0.0136	0.02	0.024	0.0136	0.06	0.056	0.0388	0.06	0.056	0.0388
8/24	We	0.58	0.288	0.1707	0.58	0.288	0.1707	0.00	0.000	0.0000	0.00	0.000	0.0000	1.36	0.636	0.2941	1.55	0.652	0.3333
8/25	Wd	1.00	1.000	0.6667	1.00	1.000	0.6667	0.25	0.144	0.1044	0.25	0.144	0.1044	0.64	0.225	0.4321	1.86	0.653	1.2482
8/27	Wd	...	...	...	...	...	...	...	...	...	...	...	...	0.25	0.164	0.2857	0.38	0.183	0.4286
8/29	Wd	0.00	0.000	0.0000	0.00	0.000	0.0000	0.00	0.000	0.0000	0.00	0.000	0.0000	1.10	0.407	0.4583	1.50	0.619	0.6250
8/30	We	...	...	...	...	...	...	0.00	0.000	0.0000	0.00	0.000	0.0000	0.71	0.250	0.3192	0.86	0.311	0.3830
8/31	We	0.33	0.333	0.5000	1.33	0.667	2.0000	0.00	0.000	0.0000	1.78	1.115	0.4776	0.00	0.000	0.0000	0.00	0.000	0.0000
9/01	We	0.00	0.000	0.0000	0.00	0.000	0.0000	0.00	0.000	0.0000	0.00	0.000	0.0000	0.83	0.441	0.5263	1.33	0.497	0.8421
9/02	Wd	0.00	0.000	0.0000	0.00	0.000	0.0000	...	...	...	...	...	...	0.57	0.297	0.4000	0.71	0.286	0.5000
9/06	We	...	...	...	...	...	...	0.00	0.000	0.0000	0.00	0.000	0.0000	0.00	0.000	0.0000	0.00	0.000	0.0000
9/08	Wd	...	...	...	...	...	...	0.00	0.000	0.0000	0.00	0.000	0.0000	...	...	...	...	...	...
9/09	Wd	...	...	...	...	...	...	0.00	0.000	0.0000	0.00	0.000	0.0000	...	...	...	...	...	...
9/11	Wd	...	...	...	...	...	...	0.00	0.000	0.0000	0.00	0.000	0.0000	...	...	...	...	...	...
9/12	Wd	...	...	...	...	...	...	0.00	0.000	0.0000	0.00	0.000	0.0000	...	...	...	...	...	...
9/13	We	...	...	...	...	...	...	0.00	0.000	0.0000	0.00	0.000	0.0000	...	...	...	...	...	...
9/14	We	...	...	...	...	...	...	0.00	0.000	0.0000	0.00	0.000	0.0000	...	...	...	...	...	...

¹ Harvest includes only fish kept.

² Catch includes both fish kept and fish reported as released.

³ Weekend-Holiday (We) or weekday (Wd).