

*Exxon Valdez* Oil Spill  
State/Federal Natural Resource Damage Assessment Annual Report

Prince William Sound and Gulf of Alaska Sport Fishery Harvest and Effort, 1989

Fish/Shellfish Study Number 6  
Annual Report

This annual report has been prepared for peer review as part of the *Exxon Valdez* Oil Spill Trustee Council restoration program for the purpose of assessing project progress. Peer review comments have not been addressed in this annual report.

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## Prince William Sound and Gulf of Alaska Sport Fishery Harvest and Effort, 1989

### Fish/Shellfish Study Number 6 Annual Report

**Study History:** Fish/Shellfish Study Number 6 was initiated as part of a detailed study plan in 1989. This study was fielded as part of the Natural Resource Damage Assessment (NRDA) program to provide a timely means by which to assess major impacts to the sport fisheries of Prince William Sound, Resurrection Bay, lower Kenai Peninsula, and Kodiak as a result of the oil spill from the *Exxon Valdez*.

**Abstract:** The sport fisheries of Prince William Sound (PWS), Resurrection Bay, lower Kenai Peninsula, and Kodiak were studied in 1989 as part of a plan to assess potential injury due to the *Exxon Valdez* oil spill. These potential impacts were measured by examination of the sport harvest for oil contamination and estimation of selected fishery parameters. In addition, this project provided the means by which information vital to other NRDA programs could be collected. No visibly discernable contamination was observed on any of the 12,597 salmon, halibut, and rockfish inspected at Valdez, Cordova, Kodiak, Seward, Whittier, and Homer. Demersal rockfish comprised up to 100% of the sport harvest of rockfish in the sampled ports. Mortality and subsequent hydrocarbon contamination of demersal rockfish were documented in Fish/Shellfish Study Number 17 (Injury to Rockfish in Prince William Sound). An unprecedented decline in sport fishing effort during 1989 was documented for Seward, a major marine sport fishing port and base of a large charter fleet. Sport fishing effort was significantly ( $\alpha = 0.05$ ) lower than any recorded level of fishing effort dating back to 1968. Also, seven of eight Anchorage air charter operators reported reduced charter flights to PWS during 1989 compared to 1988.

**Key Words:** Damage assessment, *Exxon Valdez* oil spill, Gulf of Alaska, Prince William Sound, recreational fisheries, sport fishing effort.

**Project Data:** There are no available data beyond that summarized in the report.

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## EXECUTIVE SUMMARY

The sport fisheries of Prince William Sound (PWS), Resurrection Bay, lower Kenai Peninsula, and Kodiak were studied in 1989 as part of a plan to assess potential injury due to the *Exxon Valdez* oil spill. These potential impacts were measured by examination of the sport harvest for oil contamination and estimation of selected fishery parameters. In addition, this project provided the means by which information vital to other natural resource damage assessment (NRDA) projects could be collected.

No visibly discernable contamination was observed on any of the 12,597 salmon, halibut, and rockfish inspected at Valdez, Cordova, Kodiak, Seward, Whittier, and Homer.

Demersal rockfish comprised up to 100% of the sport harvest of rockfish in the sampled ports. Mortality and subsequent hydrocarbon contamination of demersal rockfish were documented in Fish/Shellfish Study No. 17 (Injury to Rockfish in Prince William Sound).

An unprecedented decline in sport fishing effort during 1989 was documented for Seward, a major marine sport fishing port and base of a large charter fleet. Sport fishing effort was significantly ( $\alpha = 0.05$ ) lower than any recorded level of fishing effort dating back to 1968. Also, seven of eight Anchorage air charter operators reported reduced charter flights to PWS during 1989 compared to 1988.

## INTRODUCTION

This study was fielded as part of the Natural Resource Damage Assessment (NRDA) program to provide a timely means by which to assess major impacts to the sport fisheries of Prince William Sound (PWS), Resurrection Bay, lower Kenai Peninsula, and Kodiak as a result of the 24 March, 1989 oil spill from the T. V. *Exxon Valdez*. The recreational fishing industry is a vitally important component of the local economies of Valdez, Whittier, Seward, and Homer (Appendix A). Recreational fishing is also important to residents of and visitors to Cordova and Kodiak. Prior to the oil spill, sport fisheries in PWS, Homer, Seward, and Kodiak were expected to expand in both effort and harvest (Appendix Tables B1 through B19). A concurrent increase in the number of charter boats catering to sport fishermen was also anticipated. Decreases in fish abundance, major shifts in fish distribution, and loss of the pristine character of the area are means by which the oil spill could result in a substantial decrease in participation in the recreational fisheries. This could lead to a serious loss of revenue to the local communities.

The oil spill in Prince William Sound has impacted the groundfish stocks in PWS (Hepler et al. 1990), and also may have impacted stocks in the Homer, Seward, and Kodiak areas. Groundfish harvested by sport anglers include rockfish (*Sebastes* and *Sebastolobus* spp.), lingcod (*Ophiodon elongatus*), and Pacific halibut (*Hippoglossus stenolepis*). Oil contamination of benthic environments could kill these fish or chronically taint them due to persistence of oil in their environment or their food web. The presence of any oiled fish may cause a drop in fishing effort due to perceptions of unpalatable fish or may cause a drop in harvest due to both lethal and sub-lethal effects of ingested oil on fish. Therefore, one goal of this project was to determine the species composition of the groundfish harvest in the marine sport fisheries of PWS, Homer, and

Kodiak; and the incidence of oil contamination in these harvests.

In an attempt to document injury to the recreational fisheries, anglers were surveyed at major access points to the PWS, Homer, Seward, and Kodiak areas, and at Eshamy Lagoon in western PWS. Anglers were asked where they fished and how many fish they caught. In some cases, direct comparisons to historic data can be made. However, in most cases these data are intended to supplement NRDA postal sampling; notably, sampling for harvest and effort (Mills 1988) and economics. Addresses were collected from interviewed anglers if they were willing to respond to a follow-up mail questionnaire. In addition, Dolly Varden char (*Salvelinus malma*) and cutthroat trout (*Oncorhynchus clarki*) observed during the angler interviews were checked for tags (Fish/Shellfish Study Number 5). Anglers at Eyak River, near Cordova, and at Clear Creek and Alaganik River on the Copper River Delta were also interviewed to determine the tagged to untagged ratio of Dolly Varden char and cutthroat trout in the sport harvest.

## OBJECTIVES

This program was operational during the period from late June through September, 1989. Specific objectives of the investigations were:

1. to estimate recreational catch and harvest of salmon (*Oncorhynchus* spp.), rockfish, halibut, cutthroat trout, and Dolly Varden char. Specifically we attempted to:
  - a. estimate the species composition of the rockfish harvest in the PWS, Seward, Homer, and Kodiak marine sport fisheries. Objective criteria were such that the estimated proportional contribution was within  $\pm 5\%$  of the true proportion 95% of the time.
  - b. estimate catch and harvest per boat trip by species for anglers returning to major harbors in PWS, Homer, and Kodiak. Objective criteria were such that the estimated catch and harvest per angler day were within  $\pm 10\%$  of their true values 90% of the time.
  - c. estimate the number of fish caught and harvested, by species, by anglers at Eyak Lake and two streams on the Copper River Delta during the period 15 June through 1 October 1989 such that the estimated catch and harvest were within  $\pm 10\%$  of their true values 90% of the time.
  - d. estimate the number of fish caught and harvested, by species, by anglers fishing from boats or from shore in Eshamy Lagoon during the period 1 July through 4 September 1989 such that the estimated catch and harvest were within  $\pm 7.5\%$  of their true values 95% of the time.
2. to estimate fishing effort and identify the temporal and spatial distribution and location of origin of angling effort. Specifically we:
  - a. estimated fishing effort (in number of angler-hours) at Eyak Lake and two streams on

the Copper River Delta during the period 15 June through 1 October 1989 such that the estimated effort was within  $\pm 10\%$  of its true value 95% of the time.

- b. estimated fishing effort (in number of angler-hours) in Eshamy Lagoon by anglers fishing from boats or from shore during the period 1 July through 4 September 1989 such that the estimated effort was within  $\pm 7.5\%$  of its true value 95% of the time.
3. to inspect enough groundfish and salmon such that there will be a 95% chance of finding at least one contaminated animal when at least one fish in 500 (0.005) is tainted.
4. to identify potential alternative methods and strategies for restoration of lost use, populations, or habitat where injury is identified (to be accomplished upon completion of this project).

In addition to the objectives noted above, the following tasks were accomplished:

1. Collect names and addresses of all interviewed anglers who were willing to respond to a follow-up mail questionnaire.
2. Conduct a logbook survey of anglers who accessed PWS from the float-plane base in Anchorage.
3. Inspect harvests in PWS and Homer for Dolly Varden char and cutthroat trout tagged during population studies in PWS, Kodiak, and the Kenai Peninsula.
4. Collect age and length data from rockfish (by species), lingcod, and Pacific halibut harvested in the PWS, Homer and Kodiak marine sport fisheries.

## METHODS

### Marine Catch Sampling

Catch and harvest were sampled at Valdez, Cordova, Whittier, Seward, Homer, and Kodiak. Groundfish (rockfish, lingcod, and Pacific halibut) and salmon were examined for oil contamination. All examined fish were noted as to their species and area of harvest, and the total number of fish inspected by day and species was recorded. The gills and body of the fish were inspected for obvious signs of oil. The gills were further inspected for odor and visual signs of crude oil. The stomachs of rockfish, lingcod, and Pacific halibut were also inspected for ingested oil (tarballs). Otoliths were taken from subsamples of Pacific halibut and rockfish, and finrays were taken from subsamples of lingcod; these fish were also measured (total length). Proportions of each age class were estimated using the procedures outlined by Cochran (1977). Mean length at age with the associated standard errors was estimated using standard statistical procedures (Sokal and Rohlf 1981). Dolly Varden char and cutthroat trout were inspected for a missing adipose fin or a Floy anchor tag. These fish were marked as part of damage assessment studies in PWS, Homer, and Kodiak (Fish/Shellfish Project Number 5). The numbers of Dolly Varden char and cutthroat trout observed each day at each survey site were recorded.

## Marine Angler Surveys

Catch and harvest per boat-trip, and selected characteristics of anglers participating in the marine boat sport fisheries of PWS, Homer, and Kodiak were estimated using stratified two-stage surveys. The fishing day was stratified by type of day (i.e., weekend/holiday versus weekdays) and by period (for example 0900-1600 hrs. for period A and 1601-2300 hrs for period B). Days selected within any stratum represented the primary sampling units (of the two-stage design) and anglers interviewed represented the secondary sampling units. As opposed to the classic two-stage sampling design, we did not know *a priori* the size of our secondary sampling units (i.e., the number of anglers available to sample on a selected day-primary unit). Additionally, we were not able to count all anglers returning on a selected sample day throughout the season. Accordingly, the variance estimation procedures did not involve the use of the within sample (between secondary unit-angler) variance component. However, because we interviewed the vast majority of all anglers in each selected sample, the finite population correction factor (fpc) associated with the secondary stage is close to zero. The resulting within sample variance made an essentially ignorable contribution to the overall variance estimate. This means our estimation procedure collapsed to a stratified random procedure, in which sample means (across all anglers interviewed within a sample) were used as the stratum observation. In Seward, an on-going creel survey was used to collect information for this project (see Carlon and Vincent-Lang 1989 for further details on the Seward marine survey). At each harbor, returning boat anglers that exited each of the fisheries were interviewed. A single angler from each boat was asked how many days the party fished, the number of fish harvested for each species, the number released for each species, and where they fished. Rockfish were not segregated by species except in Seward. Individual anglers were also given a questionnaire requesting their name and address for a follow-up survey.

During each of the marine angler surveys, weekends and three of the five weekdays were sampled each week. The weekdays not sampled were selected by randomly choosing one weekday and then randomly choosing the day before or after it also (in order to allow for two contiguous days-off for staff within each week). This procedure resulted in a constrained random sample of the weekday stratum. The sampling effort allocation proportions were weighted as they actually occurred during each of the marine surveys.

The beginning sampling dates for some of the marine surveys were adjusted due to initial difficulties in finding personnel to fill the survey positions, and sampling schedules and survey ending dates were adjusted if necessary as effort and catch patterns became evident (Appendix Tables C1 through C5).

Catch and harvest per boat-trip were estimated for each day using the methods outlined by Cochran (1977). The catch per unit effort (CPUE) and harvest per unit effort (HPUE) for each harbor were estimated by:

$$\bar{y}_{hi} = \frac{\sum_{i=1}^{m_{hi}} y_{hij}}{m_{hi}} \quad \{1\}$$

where:

- $\bar{y}_{hi}$  = means CPUE or HPUE for the  $i$ th sampling period in stratum  $h$ ,
- $y_{hij}$  = number of fish caught or harvested by the  $j$ th angler interviewed during the  $i$ th sampling period in stratum  $h$ , and
- $m_{hi}$  = number of anglers interviewed in the  $i$ th sampling period in stratum  $h$ .

The variance was estimated by:

$$V[\bar{y}_{hi}] = s_{hi}^2 = \frac{\sum_{i=1}^{m_{hi}} (y_{hij} - \bar{y}_{hi})^2}{m_{hi}(m_{hi} - 1)} \quad \{2\}$$

The CPUE and HPUE for each stratum were estimated by:

$$\bar{y}_h = \frac{\sum_{i=1}^{n_h} \bar{y}_{hi}}{n_h} \quad \{3\}$$

where:

- $\bar{y}_h$  = means CPUE or HPUE for stratum  $h$ ,
- $y_{hi}$  = CPUE or HPUE for angler  $i$ , and
- $n_h$  = number of anglers interviewed in stratum  $h$ .

The variance was estimated by:

$$V[\bar{y}_h] = s_h^2 = \left(1 - \frac{n_h}{N_h}\right) \frac{s_{1h}^2}{n_h} + \frac{n_h}{N_h} \sum_{i=1}^{n_h} \frac{s_{2hi}^2}{n_h^2 m_{hi}} \quad \{4\}$$

where:

$$s_{1h}^2 = \frac{\sum_{i=1}^{m_h} (\bar{y}_{hi} - \bar{y}_h)^2}{n_h - 1} = \text{sample variance of } y_i \text{ in stratum } h \quad \{5\}$$

Because there was no significant difference in the CPUE and HPUE between stratum the overall CPUE and HPUE were estimated by:

$$\bar{Y} = \sum_{h=1}^L W_h \bar{y}_h \quad \{6\}$$

where:

$\bar{Y}$  = overall mean CPUE or HPUE estimate,

$h$  = number of stratum, and

$W_h$  =  $1/h$ .

The variance was estimated by:

$$\bar{V}[\bar{Y}] = \sum_{h=1}^L W_h^2 V[\bar{y}_h] \quad \{7\}$$

A description of the sampling dates and procedures specific to each of the marine surveys follows.

Valdez:

The survey of the marine sport fishery operating out of Valdez Harbor was conducted from 15 June through 17 September 1989. At Valdez, the fishing day was stratified into two 7.0 hour time periods defined as A (0900-1600 hrs) and B (1601-2300 hrs). Within each week, two-thirds of the B periods were randomly selected for sampling, without replacement. Days not selected using this process were allocated to the A period. Allocation of sampling effort between the survey periods was based on the assumption that more anglers would return during the evening than during the mornings within a day and that only one period could be sampled per day due to budget and personnel limits. The resultant sampling schedule for the survey is presented in Appendix Table C1.

Whittier:

A survey of the marine sport boat fishery operating out of Whittier was conducted from 24 June

through 28 August 1989. At Whittier, the fishing day was stratified into four 3.0 hour time periods defined as A (1000-1300 hrs), B (1301-1600 hrs), C (1601-1900 hrs), and D (1901-2200 hrs). On each day selected for sampling, one period was selected for conducting the survey given the constraint that 50% of the sampling effort was assigned to period C, 25% to period D, 15% to period B, and 10% to A in each strata (weekday or weekend/holiday). Periods were randomly selected for sampling, without replacement. Allocation of sampling effort between the survey periods was based on anticipated angler return patterns and constrained by the fact that only one period could be sampled per day due to budget and personnel limits. The resultant sampling schedule for the survey is presented in Appendix Table C2.

Most interviews were obtained at the rail station as anglers departed Whittier via the train. Additional interviews were obtained as anglers departed their boats at the docks.

#### Cordova:

A survey of the marine sport boat fishery operating out of the Cordova boat harbor was conducted from 24 June through 3 September 1989. The fishing day at Cordova was stratified into two 7.0 hour time periods defined as A (0800-1500) and B (1501-2200). Each 7 hour stratum was further subdivided into 3.5 hour sampling periods. On each day selected for sampling, anglers were interviewed for 7 hours, divided into two 3.5 hour segments. One quarter of the sampling effort was assigned to period A, and three quarters to period B. Periods were randomly selected for sampling without replacement. Allocation of sampling effort between the survey periods was based on the assumption that more anglers would return during the afternoon and evening than in the morning. The resultant sampling schedule for the survey is presented in Appendix Table C3.

#### Homer:

A survey of the marine sport boat fishery operating out of the Homer boat harbor was conducted from 1 July through 17 September 1989. The fishing day for Homer was stratified into four periods: A (0630-1000), B (1001-1330), C (1331-1700), and D (1701-2200). Ten percent of the sampling effort was assigned to period A, 25% to period B, 40% to period C, and 25% to period D. Periods were randomly selected for sampling without replacement. During period C, interviews of returning charter boat anglers and returning private boats were conducted. During all other periods, it was attempted to interview an equal proportion of charter boat and private boat anglers. Allocation of sampling effort between the survey periods was based on the assumption that most anglers would return during period C, with few returning in A and moderate numbers returning in B and D. Period D was discontinued beginning 1 September due to the reduced fall daylight hours. The resultant sampling schedule for the survey is presented in Appendix Table C4.

#### Kodiak:

The survey of the marine sport boat fishery operating out of the Kodiak boat harbor was conducted from 8 July through 17 September 1989. The fishing day for Kodiak was stratified into four periods: A (1000-1400), B (1401-1700), C (1701-2000), and D (2001-2300). Twenty

percent of the sampling effort was assigned to period A, 30% to period B, 30% to period C, and 20% to period D. The allocation of sampling effort between the survey periods was based on the best guess of the percent of anglers returning during each period. Period A was discontinued beginning 1 August due to the low number of boats returning during the A period. The resultant sampling schedule for the survey is presented in Appendix Table B5.

### Creel Surveys

Effort, catch and harvest rates (in angler-hours), and total catch and total harvest for sport anglers participating in three sport fisheries near Cordova and the sport fishery at Eshamy Lagoon were estimated using stratified two-stage creel surveys. The three creel surveys near Cordova were a survey of two roadside sport fisheries of the Copper River Delta (previously referred to as the Delta fishery): (1) Clear Creek and (2) Alaganik River; and (3) a survey of the sport fishery near Eyak Lake.

Similar to the marine surveys, all weekend/holiday days and three of the five weekday days were sampled each week during each of the creel surveys. The weekdays not sampled were selected by randomly choosing one weekday and then randomly choosing the day before or after it also (in order to allow for two contiguous days-off for staff within each week). Accordingly, weekday samples were weighted as outlined above for the marine surveys. Similarly, the beginning sampling dates for the creel surveys were adjusted due to initial difficulties in finding personnel to fill the survey positions, and in-season sampling schedules and survey ending dates were adjusted as necessary as effort and catch patterns became evident (Appendix Tables C6 through C8).

Angler counts were used to estimate fishing effort in units of angler-hours, and angler interviews were used to estimate catch and harvest rates (number of fish per hour). Angler counts of all anglers actively fishing were conducted during a randomly selected 15-minute interval during the daily sampling period. Counts were considered instantaneous and representative of the effort during that period (Neuhold and Lu 1957). For the purpose of these analyses, the number of anglers interviewed during a given period was substituted for the angler counts for that period when the angler count was zero.

The total number of angler-hours of fishing ( $\hat{E}_h$ ) for fishery stratum  $h$  in the fishery was calculated in the following manner:

$$\hat{E}_h = D_h H_h \bar{x}_h \quad \{8\}$$

where:

$D_h$  = number of sampling periods in stratum  $h$ ,

$H_h$  = length of a sampling period in hours in stratum  $h$ , and

$\bar{x}_h$  = mean angler count for stratum  $h$ .

The variance was estimated by:

$$V[\hat{E}_h] = (1 - f_n)(D_h H_h)^2 V[\bar{x}_h] \quad \{9\}$$

During the remaining time in the period, interviews of individual anglers were conducted. Individual anglers were asked how long they fished, the number of fish by species they caught, the number of fish by species they kept, and whether the interview was a completed-trip interview or not. All fish in their possession were inspected for tags. All interviewed anglers were given a questionnaire requesting their name and address for a follow-up survey.

A Wilcoxon paired-sample test (Zar 1984) was used to determine if there was a difference in catch and harvest rates between complete and incomplete interviews.

The mean CPUE and mean HPUE were estimated using the formulas from Sukhatme *et al.* (1984):

$$e'_{hij} = \frac{x_{hi}}{\bar{x}_h} e_{hij} \quad \{10\}$$

$$CPUE_{hij} = \frac{c_{hij}}{e'_{hij}} \quad \{11\}$$

$$\overline{CPUE}_h = \frac{\sum_{i=1}^{d_h} \sum_{j=1}^{m_{hi}} CPUE_{hij}}{d_h m_{hi}} \quad \{12\}$$

where:

$d_h$  = number of days (sampling periods) in stratum  $h$  that were sampled,

$x_{hi}$  = angler count for the  $i$ th sampling period in stratum  $h$ ,

$\bar{x}_h$  = mean angler count for stratum  $h$ ,

$c_{hij}$  = number of fish caught or harvested by the  $j$ th angler interviewed during the  $i$ th sampling period in stratum  $h$ ,

$e_{hij}$  = fishing effort (in hours) expended by the  $j$ th angler sampled during the  $i$ th sampling period in stratum  $h$ , and

$m_{hi}$  = number of anglers interviewed during the  $i$ th sampling period in stratum  $h$ .

The variance was estimated by:

$$V[\overline{CPUE}_h] = (1 - f_n) \frac{S_{1h}^2}{d_h} + f_n \sum_{i=1}^{d_h} \frac{S_{2hi}^2}{d_h^2 m_{hi}} \quad \{13\}$$

$$S_{1h}^2 = \frac{\sum_{i=1}^{d_h} (\overline{CPUE}_{hi} - \overline{CPUE}_h)^2}{d_h - 1} \quad \{14\}$$

$$S_{2hi}^2 = \frac{\sum_{j=1}^{m_{hi}} (\overline{CPUE}_{hij} - \overline{CPUE}_{hi})^2}{m_{hi} - 1} \quad \{15\}$$

The final CPUE and HPUE were calculated by:

$$\widehat{CPUE} = \sum_{h=1}^L W_h \overline{CPUE}_h \quad \{16\}$$

The variance was estimated by:

$$V\left[\widehat{CPUE}\right] = \sum_{h=1}^L W_h^2 V[\overline{CPUE}_h] \quad \{17\}$$

The  $W_h$  was calculated by:

$$\hat{A}_h = \frac{\hat{E}_h}{\sum_{i=1}^{d_h} \sum_{j=1}^{m_{hi}} e'_{hij}} \quad \{18\}$$

$$\hat{W}_h = \frac{\hat{A}_h}{\sum_{i=1}^L \hat{A}_i} \quad \{19\}$$

Because the total number of anglers fishing was unknown, the appropriate weight  $W_h$  needed to be estimated. By estimating  $W_h$ , we are adding some unknown amount of bias into our estimates of mean CPUE for the season. From Sukhatme *et al.* (1984):

$$\text{Bias}(\overline{CPUE}) = \sum_{h=1}^L (\hat{W}_h - W_h) \overline{CPUE}_h \quad \{20\}$$

Total catch and harvest estimates were estimated by:

$$\hat{C}_h = \overline{CPUE}_h^* \hat{E}_h$$

where  $\overline{CPUE}_h^*$  is the jackknife mean of the  $\overline{CPUE}_{hij}$  (Efron 1982) {21}

The variance was estimated by:

$$V[\hat{C}_h] = \hat{E}_h^2 V[\overline{CPUE}_h] + \overline{CPUE}_h^2 V[\hat{E}_h] - V[\overline{CPUE}_h] V[\hat{E}_h] \quad \{22\}$$

A description of the sampling dates and procedures specific to each of the creel surveys follows.

#### Clear Creek:

The creel survey of Clear Creek was conducted from 24 June through 17 September 1989. The fishing day was stratified into three unequal time periods defined as A (0600-0930 hrs), B (0931-1700 hrs), and C (1701-2030 hrs) based on anticipated angler use patterns. Within each stratum, periods were randomly selected for sampling, without replacement given the constraint that only one B period or one each A and C period could be sampled in a day. For the weekday strata, allocation of sampling effort between periods was as follows: 40% each of the available samples for periods A and C and 20% for period B. For the weekend/holiday strata, allocation of sampling effort between periods was as follows: 35% each for periods A and C and 30% for period B.

Allocation of sampling effort between the survey periods during the weekday strata was based on the assumption that more effort would occur during the mornings and evenings than during the midday period. Allocation of sampling effort between the survey periods during the weekend/holiday strata was based on the assumption that effort occurred regardless of time of day. An additional constraint was that only period B or periods A and C could be sampled each day due to budget and personnel limits. Beginning 1 August, the fishing day was stratified into two equal time periods defined as A (1000-1500 hrs) and B (1501-2000 hrs) due to logistical and personnel constraints. The resultant sampling schedule for the survey is presented in Appendix Table C6.

#### Eyak and Alaganik Rivers:

The creel survey of the sport fisheries on Eyak and Alaganik Rivers was conducted from 24 June through 30 September 1989. The fishing day was stratified into three unequal time periods defined as A (0600-0930 hrs), B (0931-1700 hrs), and C (1701-2030 hrs), based on anticipated

angler use patterns. Within each stratum, periods were randomly selected for sampling, without replacement, given the constraint that only one B period or one each A and C period could be sampled in a day. For the weekday strata, allocation of sampling effort between periods was as follows: 40% each for periods A and C and 20% for period B. For the weekend/holiday strata, allocation of sampling effort between periods was as follows: 35% each for periods A and C and 30% for period B.

Allocation of sampling effort between the survey periods during the weekday strata was based on the assumption that more effort would occur during the mornings and evenings than during the midday period. Allocation of sampling effort between the survey periods during the weekend/holiday strata was based on the assumption that effort would occur regardless of time of day. An additional constraint was that only period B or periods A and C could be sampled each day due to budget and personnel limits. The resultant sampling schedule for the survey is presented in Appendix Table C7.

#### Eshamy Lagoon:

A creel survey of the Eshamy sport fishery was conducted from 11 July through 4 September 1989. The fishing day was stratified into four 3.5 hour time periods defined as A (0800-1130 hrs), B (1131-1500 hrs), C (1501-1830 hrs), and D (1831-2200 hrs).

On each day selected for sampling, one period was selected for conducting the survey. Allocation of sampling effort between the survey periods was based on budget and personnel limits which allowed that only one period could be sampled per day. The resultant sampling schedule for the survey is presented in Appendix Table C8.

#### Anchorage Float-plane Logbook Survey

A logbook survey of anglers who accessed PWS from the float plane base in Anchorage was conducted from 15 June to 15 September 1989 to collect data on selected demographic characteristics and general catch and effort parameters. Days fished, area fished, catch, and harvest was asked of anglers. All major air charter operators out of Anchorage were asked to keep a log for each charter they conducted to PWS. Anglers contacted in this survey were also asked for their name and address if they were willing to respond to a follow-up questionnaire.

## STUDY RESULTS AND STATUS OF INJURY ASSESSMENT

### Objective 1a: Species Composition of the Rockfish Harvest

Of the 12 species of rockfish reported caught during the 1989 marine surveys, black and yelloweye rockfish comprised 88.2% of the sampled rockfish harvest (Table 1). Demersal species comprised 31.4% of the 1,087 rockfish sampled in the sport harvest (Table 1). As reported by Fish/Shellfish Study Number 17 (Hepler *et al.* 1990), the sampling to date has shown that all of the dead rockfish recovered have been demersal species and a significant portion of the demersal species sampled tested positive for oil contamination.

### Objective 1b: Marine Catch and Harvest Rates

#### Valdez:

A total of 11,008 fish was caught by anglers interviewed during the survey of the Valdez marine sport fishery of which coho and pink salmon made up 74.8% of the total catch (Table 2). The 1989 boat angler harvest rates for both coho (3.0 fish per boat trip) and pink salmon (4.3 fish per boat trip) were higher than the estimated harvest rates for 1988 (1.5 coho salmon per boat trip and 2.3 pink salmon per boat trip) (Roth and Delaney 1989), however different methods of estimating these rates were used during each of the surveys. To make valid comparisons of these estimates, the 1988 data would need to be reanalyzed according to the estimating procedures used during 1989.

Halibut catch and harvest rates were lower during 1989 (Table 2) than those estimated during 1988 (Roth and Delaney 1989). Halibut catch and harvest rates during 1989 were estimated at 0.6 and 0.4 fish per boat trip, respectively while catch and harvest rates during 1988 were 1.7 and 1.1 halibut per boat trip, respectively. Similar to the estimates of coho and pink salmon harvest, the 1988 data needs to be reanalyzed to allow direct comparisons between seasons.

#### Cordova:

Of the 250 fish counted during the interviews in the Cordova marine sport fishery during 1989, 59.2% (148 fish) were halibut or coho salmon (Table 3). Halibut and coho salmon catch rates were 1.5 and 0.4 fish per boat trip, respectively. No comparative marine survey data are available for this fishery. The low number of interviews (79) for the Cordova marine survey resulted in numerous strata having only a single interview so that no variance could be calculated. The small sample size also affected the CPUE and HPUE estimates such that the estimates may not reflect the actual catch and harvest rates in this fishery.

#### Kodiak:

A total of 2,208 fish was counted during interviews of anglers fishing the area waters near Kodiak of which 844 (38.2%) were halibut (Table 4). Halibut and coho salmon catch rates were 1.7 and 0.6 fish per boat trip, respectively. Mills (1985-1989) reported estimated average harvests of 9,012 halibut and 7,444 coho salmon annually for the period 1984 through 1988

(Appendix Tables B13 and B18). No comparative marine survey data are available for this fishery.

#### Whittier:

Salmon comprised 72.6% of the total fish counted during interviews conducted at Whittier during 1989 (Table 5). The highest estimated catch rates (3.7 fish per angler-hour) were for pink salmon. Anglers reported harvesting essentially all of the halibut; rockfish; and coho, sockeye, and king salmon they caught. Data on the Whittier sport fishery were also collected during 1986 (Delaney *et al.* 1987), however the rates reported were in boat-hours and are not directly comparable to the estimates for the 1989 survey in which rates were estimated in boat trips. Also, the 1989 survey was discontinued prior to the end of the coho salmon terminal fishery in Passage Canal. Reanalysis of the 1986 data over the same time period and in the same units of effort is necessary to allow direct comparison of the two season's data.

#### Homer:

A total of 33,231 fish was counted during interviews conducted during the 1989 marine survey in Homer of which 14,226 fish (42.8%) were harvested. Halibut comprised 85.9% of the total harvest with harvest rates averaging 8.3 halibut per boat trip (Table 6). Anglers harvested approximately 50% of the halibut they caught in Homer during 1989. Salmon made up only 2.5% of the total catch in Homer during the 1989 survey. No comparative marine survey data are available for this fishery.

#### Seward:

Seward is the only site surveyed during 1989 which is presently directly comparable to historic data. During 1989, angler effort decreased 25-49% compared to the levels recorded during 1988 (Table 7) (Carlson and Vincent-Lang 1989). This is a significant ( $\alpha = 0.05$ ) decrease compared to previous effort estimates for the Seward boat fishery. Only once in the past 22 years (1975) has the confidence interval around the effort estimate fallen within the intervals of the 1989 estimate (Table 8) (Carlson and Vincent-Lang 1989, Vincent-Lang *et al.* 1988, Vincent-Lang 1987). Similarly, estimates of total harvest were well below (38-46% decrease) the 1988 levels in all fisheries except the coho salmon and lingcod boat fisheries. However, the estimated harvest of coho salmon in the 1989 boat fishery (14,861 fish) is only slightly higher than the three year average for the period 1986 through 1988 (13,585 fish) (Mills 1987-1989) (Appendix Table B13).

### Objective 1c: Creel Survey Catch and Harvest

The Wilcoxon test (Zar 1984) showed that estimated catch and harvest for complete versus incomplete angler interviews during the 1989 creel surveys were not significantly different (overall  $\alpha = 0.05$ ), so the data were pooled for each of the creel survey sites for the analyses. As 1989 was the first year that these Cordova area roadside fisheries were open to sport fishing for salmon, no comparative catch and harvest rate data are available.

#### Alaganik River:

Anglers fishing Alaganik River during 1989 were targeting primarily on coho salmon. Catch and harvest rates were 1.1 and 0.7 coho salmon per angler-hour, respectively (Table 9). Anglers caught an estimated 2,556 coho salmon during the 1989 survey period of which they harvested (kept) 66% (1,697 fish). Anglers harvested from 45 to 58% of the pink salmon, Dolly Varden, and cutthroat trout they caught while no sockeye salmon were reported released during the survey period. Anglers harvested 59% of the total reported sport catch at Alaganik River during 1989. Alaganik River supported the largest cutthroat trout fishery of the three Cordova area streams surveyed during 1989 accounting for 90% of the cutthroat trout catch (Table 9, 10 and 11).

#### Clear Creek:

Sockeye salmon was the target species of most anglers fishing Clear Creek during the 1989 survey period. Anglers caught an estimated 2,211 sockeye salmon (CPUE = 1.3 fish per angler-hour) and harvested 785 sockeye salmon (HPUE = 0.2 fish per angler-hour) (Table 10). Of the remaining 1,429 fish caught by anglers fishing Clear Creek during 1989, coho salmon and Dolly Varden comprised 45% and 53%, respectively. Anglers harvested approximately 37% of the total catch reported during the 1989 survey. Clear Creek supported the largest Dolly Varden char fishery of the three Cordova area streams surveyed during 1989 accounting for 60% of the Dolly Varden char catch (Table 9, 10, and 11).

#### Eyak River:

Similar to Alaganik River, most anglers fishing Eyak River were targeting coho salmon. Catch and harvest rates for coho salmon were 0.3 coho per angler-hour, and the estimated total catch and harvest was 2,114 and 1,866 coho salmon, respectively (Table 11). Estimates of coho salmon harvest in Eyak River for the period from 1984 through 1988 have averaged 1,234 coho annually (Mills 1985-1989) (Appendix Table B3). Anglers harvested approximately 72% of the total catch of all species in Eyak River during 1989.

### Objective 1d: Eshamy Catch and Harvest

Catch and harvest rates for sockeye salmon during the 1989 sport fishery at Eshamy were 1.1 and 0.8 sockeye per angler-hour, respectively (Table 12). This is much higher than the catch and harvest rates recorded during 1988 (Roth and Delaney 1989). The higher rates during 1989 are possibly due to the high escapement into Eshamy because of the closure of the Eshamy district to

commercial fishing in 1989. Estimates of total sockeye salmon catch and harvest were also higher in 1989 compared to previous seasons. For the period from 1984 through 1987, the average estimated sockeye salmon harvest was 567 fish annually (Mills 1985-1988) (Appendix Table B4). During 1988, the estimated sockeye salmon harvest was 959 fish (Roth and Delaney 1989) while the estimated harvest was 1,170 sockeye during 1989 (Table 12).

Similar to 1988, anglers released most of the pink salmon they caught at Eshamy during 1989. Estimates of pink salmon catch and harvest rates and total catch and harvest were higher during 1989 than in 1988 (Table 12). Catch and harvest data were also collected on chum salmon at Eshamy during 1989 showing anglers released essentially all of the estimated 297 chum salmon they caught.

#### Objective 2a: Creel Survey Effort

The highest angler counts on Alaganik River were recorded during late August and early September during the peak of the coho salmon run (Appendix Table D1). At Clear Creek, most of the angling effort was recorded from mid-July through August during the peak of the sockeye salmon return (Appendix Table D2). Eyak River had the highest estimated effort (4,232 angler-hours) of the three Cordova area roadside sites surveyed during 1989 (Table 13). Most of the effort at this site was recorded during August during the peak of the coho salmon run (Appendix Table D3). After August, effort in Eyak River dropped off substantially due to heavy rains and high, turbid water conditions which reduced fishing success at this site. As these three roadside fisheries were first opened to sport fishing for salmon beginning in 1989, no comparative effort data are available.

#### Objective 2b: Eshamy Effort

The angler effort estimated for Eshamy for the 1989 survey period was 1,504 angler-hours (variance = 10,650; 95% C.I. = 1,302 - 1,706 angler-hours). This estimate is lower than the effort estimated for 1988 (2,572 angler-hours; variance = 205,209; 95% C.I. = 1,684 - 3,460 angler-hours), however the methods of estimating these effort data were different between the two seasons. Direct comparisons of these data will require the reanalyzing of the 1988 data using the techniques outlined for 1989.

#### Objective 3: Catch Inspection for Oil Contamination

A total of 12,597 fish comprised of salmon, halibut, rockfish, lingcod, and cod was examined for oil contamination during the marine surveys (Table 14). No visibly discernable contamination was observed on any of the samples inspected.

#### Task 1: Follow-Up Questionnaire

A total of 608 names and addresses of persons willing to participate in a follow-up survey was collected during the marine angler surveys, the creel surveys, and the Anchorage float plane logbook survey. These data were forwarded to the economic study group.

## Task 2: Anchorage Log Book Survey

Information was obtained from eight Anchorage area charter aircraft operators concerning the charters they conducted to PWS during 1989. Response to this survey was low although limited information was obtained from all of the charter operators surveyed. Only one of the eight operators (12.5%) reported 1989 charters to PWS at levels similar to those recorded during 1988. All other surveyed operators reported a decrease in the number of charters for fishing, hunting, or flightseeing trips to PWS during 1989 compared to previous seasons. One operator noted that a total of 36 foreign anglers who had chartered fishing trips to PWS cancelled their charters or changed their destinations to sites other than PWS because of the information they received about the oil spill.

The primary reasons given by the operators for reduced levels of charter flights to PWS during 1989 were: 1) bad weather during the peak of the sockeye and coho salmon fishing seasons, 2) air traffic patterns in PWS were too congested, and Coast Guard control of the airways in PWS made confirmation of flight clearance difficult, and 3) fishing was good at sites outside of PWS. Also, three of the operators noted that they were busy flying research or support crews and supplies or other contract work to PWS during 1989.

## Task 3: Dolly Varden and Cutthroat Tag Monitoring

Two hundred eighteen Dolly Varden char and 117 cutthroat trout were counted during the 1989 angler interviews (Table 15). Anglers kept 53.7% of the char and 70.1% of the trout they caught. No tags or adipose fin clips were observed on any of the harvested char or trout inspected.

## Task 4: Rockfish Age and Length Data

Age and length data collected at the marine survey sites for black rockfish, halibut, and lingcod are presented in Appendix Tables E1 through E11. 1987 and 1988 lingcod age and length data collected in Seward are also presented for any future comparisons of mean length at age and age composition. Age and length data for the remaining rockfish species will be presented after ages are determined.

## DISCUSSION

The goal of this study was to provide a timely means by which to assess major impacts to the sport fisheries of Prince William Sound, Resurrection Bay, lower Kenai Peninsula, and Kodiak as a result of the oil spill from the *Exxon Valdez*. Much of these data were not intended to stand on their own, but rather to supplement the annual statewide harvest survey, the results of other impact studies, and the results of the economic survey. Along with information on the 1989 sport fisheries at the selected sites, this program provided on-site inspection of the sport harvest of salmon and groundfish for visible signs of oil contamination.

A significant reduction in sport fishing effort was observed for the Seward sport fishery during 1989 compared to previous years. Effort in the boat fishery was less than any recorded level of

effort dating back to 1968. Seward is the only marine port where direct comparisons to historic data can presently be done and would be an important site to assess the duration of this decline and its resulting economic impact. Comparisons to historic data are possible at Eshamy, Whittier, and Valdez, but the historic data collected at these sites will have to be reanalyzed using the estimation techniques outlined for the 1989 data analysis. Most Anchorage air charter operators surveyed reported a decreased number of charter flights to PWS compared to previous seasons.

None of the 12,597 fish examined for oil contamination during the marine surveys showed visibly discernable contamination. However, Fish/Shellfish Study No. 17 documented mortality and subsequent hydrocarbon contamination of demersal rockfish. Species composition of the rockfish sport harvest showed that 31% of the harvest was comprised of demersal rockfish species. The duration of this contamination and the potential human health concerns should continue to be investigated.

Surveys of the marine sport fisheries in Valdez, Kodiak, Homer, Whittier, and Seward should continue during 1990 to maintain the sampling of marine species harvested in the respective fisheries. In addition, effort data for the Seward boat fisheries is needed to evaluate the magnitude of the impact to the sport fishery at this site. Continued histopathological sampling of rockfish is necessary to determine the extent of contamination. Also, surveys should continue to monitor the marine sport fisheries to compare the percent composition of demersal rockfish in the total rockfish harvest.

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Table 1. Percent species composition of the rockfish sport harvest by site for the marine surveys, 1989.

Survey Site (Sample Size)	Cordova (8)	Valdez (146)	Whittier (5)	Homer (48)	Kodiak (42)	Seward (838)	TOTAL (1,087)
<b>Species</b>							
Brown	0.0	0.7	0.0	0.0	0.0	0.0	0.1
Copper	62.5	22.6	0.0	0.0	0.0	0.2	3.7
Dusky	0.0	7.5	0.0	0.0	28.6 <sup>1</sup>	0.0	2.1
Quillback	0.0	13.0	0.0	0.0	0.0	1.9	3.2
Black	37.5	0.0	0.0	75.5	71.4	73.2	62.7
China	0.0	0.0	0.0	2.1	0.0	0.8	0.7
Yelloweye	0.0	56.2	100.0	22.9	0.0	21.4	25.5
Pacific Ocean Perch	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Silvergray	0.0	0.0	0.0	0.0	0.0	0.6	0.5
Vermilion	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Tiger	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Bocaccio	0.0	0.0	0.0	0.0	0.0	1.6	1.2
<hr/>							
Pelagic	100.0	30.1	0.0	75.0	100.0	73.5	68.6
Demersal	0.0	69.9	100.0	25.0	0.0	26.5	31.4

<sup>1</sup> Some of these fish may have been black rockfish.

Table 2. Estimated catch and harvest per boat-trip by species from 830 interviews in the Valdez marine sport fishery, 15 June through 17 September 1989.

Catch and Harvest From Interviewed Anglers						
Species	Catch	Harvest	CPUE	Variance	HPUE	Variance
Halibut	637	459	0.56	0.00753	0.44	0.00464
Coho Salmon	5,150	4,681	3.21	0.26398	3.00	0.21873
Pink Salmon	3,085	2,237	7.68	3.37880	4.29	0.42404
King Salmon	46	37	0.04	0.00010	0.03	0.00010
Sockeye Salmon	94	94	0.14	0.00590	0.14	0.00590
Chum Salmon	332	199	1.29	0.39613	0.32	0.00293
Rockfish	313	244	0.58	0.03391	0.36	0.00663
Cod/Pollock	1,066	282	0.92	0.03300	0.33	0.01357
Lingcod	15	7	0.01	0.00003	0.01	0.00002
Flounder	55	39	0.06	0.00022	0.04	0.00012
Sculpin	180	1	0.20	0.00414	0.00	0.00000
Skate	6	1	0.00	0.00000	0.00	0.00000
Dolly Varden Char	27	23	0.04	0.00017	0.03	0.00011
Octopus	2	2	0.00	0.00000	0.00	0.00000
ALL SPECIES COMBINED	11,008	8,305	14.72	1.92050	8.99	0.21166

Table 3. Estimated catch and harvest per boat-trip by species from 79 interviews in the Cordova marine sport fishery, 24 June through 3 September 1989.

Catch and Harvest From Interviewed Anglers						
Species	Catch	Harvest	CPUE	Variance	HPUE	Variance
Halibut	107	73	1.46	0.00901	1.00	0.00576
Coho Salmon	41	41	0.40	0.01763	0.40	0.01763
Pink Salmon	14	10	0.10	0.00794	0.05	0.00201
Rockfish	18	12	0.57	0.00044	0.29	0.00032
Cod/Pollock	50	7	0.40	0.00215	0.09	0.00051
Lingcod	2	1	0.01	0.00002	0.00	0.00001
Flounder	13	0	0.80	---	0.00	0.00000
Sculpin	5	0	0.01	0.00016	0.00	0.00000
ALL SPECIES COMBINED	250	144	3.75	0.03977	1.84	0.02368

Table 4. Estimated catch and harvest per boat-trip by species from 366 interviews in the Kodiak marine sport fishery, 8 July through 17 September 1989.

Catch and Harvest From Interviewed Anglers						
Species	Catch	Harvest	CPUE	Variance	HPUE	Variance
Halibut	844	515	1.67	0.06324	1.10	0.00903
Coho Salmon	165	157	0.60	0.02017	0.55	0.00957
Pink Salmon	103	52	0.55	0.00030	0.04	0.00027
King Salmon	1	1	0.00	0.00000	0.00	0.00000
Sockeye Salmon	18	18	0.20	0.00007	0.20	0.00007
Rockfish	333	163	0.25	0.00311	0.09	0.00056
Cod/Pollock	40	12	0.16	0.00505	0.04	0.00072
Lingcod	40	10	0.01	0.00002	0.00	0.00000
Flounder	72	31	0.14	0.00130	0.06	0.00021
Sculpin	523	2	1.18	0.02191	0.01	0.00006
Skate	13	0	0.01	0.00011	0.00	0.00000
Rainbow Trout	1	1	0.01	0.00006	0.01	0.00006
Cutthroat Trout <sup>1</sup>	27	27	0.04	0.00070	0.04	0.00070
Dolly Varden Char	28	16	0.19	0.00012	0.02	0.00012
ALL SPECIES COMBINED	2,208	1,005	5.00	0.12114	2.15	0.02705

<sup>1</sup>Misidentification. Cutthroat trout do not occur in Kodiak marine waters.

Table 5. Estimated catch and harvest per boat-trip by species from 244 interviews in the Whittier marine sport fishery, 1 July through 28 August 1989.

Catch and Harvest  
From Interviewed Anglers

Species	Catch	Harvest	CPUE	Variance	HPUE	Variance
Halibut	146	145	0.48	0.02307	0.47	0.02307
Coho Salmon	220	219	1.31	0.05332	1.30	0.05335
Pink Salmon	821	576	3.66	0.34550	2.64	0.06500
King Salmon	6	6	0.06	0.00254	0.06	0.00254
Sockeye Salmon	263	263	0.83	0.08138	0.83	0.08138
Chum Salmon	45	20	0.24	0.00418	0.11	0.00246
Rockfish	76	76	0.14	0.00158	0.14	0.00158
Cod/Pollock	179	17	0.52	0.01371	0.02	0.00011
Flounder	29	25	0.04	0.00047	0.03	0.00047
Sculpin	43	5	0.09	0.00071	0.00	0.00002
Dolly Varden Char	38	22	0.15	0.00958	0.15	0.00955
ALL SPECIES COMBINED	1,866	1,374	7.50	0.23673	5.74	0.23783

Table 6. Estimated catch and harvest per boat-trip by species from 1,313 interviews in the Homer marine sport fishery, 2 July through 17 September 1989.

Catch and Harvest  
From Interviewed Anglers

Species	Catch	Harvest	CPUE	Variance	HPUE	Variance
Halibut	24,844	12,222	16.09	0.26187	8.26	0.09075
Coho Salmon	132	125	0.14	0.00178	0.13	0.00139
Pink Salmon	262	172	0.11	0.00089	0.06	0.00044
King Salmon	9	9	0.00	0.00000	0.00	0.00000
Sockeye Salmon	429	377	0.73	0.02785	0.64	0.02335
Rockfish	297	143	0.15	0.00148	0.08	0.00030
Cod/Pollock	3,750	925	2.47	0.03902	0.50	0.00724
Lingcod	59	38	0.06	0.00158	0.05	0.00126
Flounder	344	63	0.19	0.00077	0.04	0.00007
Sculpin	2,962	137	1.74	0.03555	0.05	0.00012
Skate	127	5	0.08	0.00017	0.00	0.00000
Dolly Varden Char	4	2	0.00	0.00000	0.00	0.00000
Octopus	12	8	0.01	0.00003	0.01	0.00001
ALL SPECIES COMBINED	33,231	14,226	21.77	0.42574	9.82	0.10328

Table 7. Estimates of effort and harvest by fishery for the Seward marine sport fishery, 1989.

Fishery	Effort <sup>1</sup>	% Change from 1988	Harvest	% Change from 1988
Chinook Salmon Beach Fishery	6,963	-36%	826	-38%
Coho Salmon Beach Fishery	8,614	-49%	2,555	-46%
Coho Salmon Boat Fishery	5,022	-25%	14,861	+51%
Halibut Boat Fishery <sup>2</sup>	5,022	-25%	2,117	-45%
Lingcod Boat Fishery <sup>2</sup>	5,022	-25%	3,546	+21%
Rockfish Boat Fishery <sup>2</sup>	5,022	-25%	10,072	N/A <sup>3</sup>

<sup>1</sup> Effort for beach fisheries is in number of angler-hours; Effort for boat fisheries is in number of boat-trips.

<sup>2</sup> These data cover the period from 1 July through the end of the survey for both 1988 and 1989 as the period prior to 1 July was not sampled during 1988.

<sup>3</sup> Rockfish harvest was not estimated during 1988.

Table 8. Sport effort statistics for the Seward marine sport boat fisheries, 1968-1989

Year	Boat Trips	Standard Error	95% Confidence Interval	
1968	8,518	89.3	8,343	- 8,693
1969	7,717	160.6	7,402	- 8,032
1970	8,921	133.9	8,659	- 9,183
1971	8,041	110.8	7,824	- 8,258
1972	9,297	183.1	8,938	- 9,656
1973	7,730	117.6	7,500	- 7,960
1974	7,520	141.3	7,243	- 7,797
1975	5,351	108.1	5,139	- 5,563
1976	5,953	87.7	5,781	- 6,125
1977	7,113	131.6	6,855	- 7,371
1978	6,280	124.0	6,037	- 6,523
1979	7,163	151.0	6,867	- 7,459
1980	7,657	191.4	7,282	- 8,032
1981	6,682	134.4	6,419	- 6,945
1982	7,948	164.5	7,626	- 8,270
1983	8,479	139.9	8,205	- 8,753
1984	6,996	128.7	6,744	- 7,248
1985	6,848	209.6	6,437	- 7,259
1986	6,319	274.7	5,781	- 6,857
1987	7,661	352.4	6,970	- 8,352
1988	6,654	227.5	6,208	- 7,100
1989	5,022	123.0	4,781	- 5,263

Table 9. Estimates of sport catch and harvest rates (fish per angler-hour), total catch (fish kept plus fish released), and total harvest (fish kept only) of sockeye, coho, and pink salmon, Dolly Varden, and cutthroat trout in Alaganik River, 24 June through 30 September 1989.

Species	Catch						Harvest					
	Rate	Variance	95% C.I.	Total	Variance	95% C.I.	Rate	Variance	95% C.I.	Total	Variance	95% C.I.
Sockeye Salmon	0.01	0.0001	(0.01) - 0.03	30	418	(10) - 70	0.01	0.0001	(0.01) - 0.03	30	418	(10) - 70
Coho Salmon	1.13	0.0251	0.82 - 1.44	2,556	109,647	1,907 - 3,205	0.66	0.0141	0.43 - 0.89	1,697	64,435	1,199 - 2,195
Pink Salmon	0.04	0.0011	(0.02) - 0.10	72	3,910	(51) - 195	0.02	0.0004	(0.02) - 0.06	36	1,308	(35) - 107
Dolly Varden	0.07	0.0005	0.02 - 0.12	177	3,004	70 - 284	0.03	0.0002	0.00 - 0.06	79	1,742	(3) - 161
Cutthroat Trout	0.18	0.0018	0.10 - 0.26	466	11,447	256 - 676	0.10	0.0013	0.03 - 0.17	271	8,839	87 - 455

Table 10. Estimates of sport catch and harvest rates (fish per angler-hour), total catch (fish kept plus fish released), and total harvest (fish kept only) of sockeye and coho salmon, Dolly Varden, and cutthroat trout in Clear Creek, 24 June through 17 September 1989.

Species	Catch						Harvest					
	Rate	Variance	95% C.I.	Total	Variance	95% C.I.	Rate	Variance	95% C.I.	Total	Variance	95% C.I.
Sockeye Salmon	1.28	0.1060	0.64 - 1.92	2,211	1,386,439	(97) - 4,519	0.20	0.0183	(0.07) - 0.47	785	265,239	(224) - 1,794
Coho Salmon	0.23	0.0143	0.00 - 0.46	645	101,013	22 - 1,268	0.08	0.0009	0.02 - 0.14	255	8,372	76 - 434
Dolly Varden	0.23	0.0036	0.11 - 0.35	759	105,746	122 - 1,396	0.16	0.0017	0.08 - 0.24	397	68,590	(116) - 1,272
Cutthroat Trout	0.03	0.0009	(0.03) - 0.09	25	654	(25) - 75	0.00	0.0000	0.00 - 0.00	0	0	0 - 0

Table 11. Estimates of sport catch and harvest rates (fish per angler-hour), total catch (fish kept plus fish released), and total harvest (fish kept only) of sockeye, coho, and pink salmon, Dolly Varden, and cutthroat trout in Eyak River, 24 June through 30 September 1989.

Species	Catch						Harvest					
	Rate	Variance	95% C.I.	Total	Variance	95% C.I.	Rate	Variance	95% C.I.	Total	Variance	95% C.I.
Sockeye Salmon	0.00	0.0000	0.00 - 0.00	5	25	(5) - 15	0.00	0.0000	0.00 - 0.00	5	25	(5) - 15
Coho Salmon	0.34	0.0048	0.20 - 0.48	2,114	216,270	1,203 - 3,025	0.29	0.0040	0.17 - 0.42	1,866	179,404	1,036 - 2,696
Pink Salmon	0.02	0.0000	0.01 - 0.03	105	401	66 - 144	0.01	0.0001	0.01 - 0.01	66	29	56 - 76
Dolly Varden	0.05	0.0003	0.02 - 0.08	324	16,329	74 - 574	0.01	0.0000	0.00 - 0.02	60	770	6 - 114
Cutthroat Trout	0.01	0.000	0.00 - 0.02	28	175	2 - 54	0.01	0.0000	0.00 - 0.02	12	61	(3) - 27

Table 12. Estimates of sport catch and harvest rates (fish per angler-hour), total catch (fish kept plus fish released), and total harvest (fish kept only) of sockeye, pink, and chum salmon at Eshamy, 11 July through 4 September 1989.

Species	Catch						Harvest					
	Rate	Variance	95% C.I.	Total	Variance	95% C.I.	Rate	Variance	95% C.I.	Total	Variance	95% C.I.
Sockeye Salmon	1.08	0.0335	0.72 - 1.43	1,624	93,216	1,026 - 2,222	0.79	0.0050	0.65 - 0.93	1,170	22,899	873 - 1,467
Pink Salmon	0.88	0.0186	0.61 - 1.15	924	43,999	503 - 1,325	0.38	0.0009	0.33 - 0.44	194	1,650	114 - 274
Chum Salmon	0.19	0.0007	0.14 - 0.24	297	2,330	202 - 392	0.00	0.0000	0.00 - 0.00	2	2	(1) - 5

Table 13. Estimates of sport effort (angler-hours) for the Cordova area creel surveys, 1989.

Survey Site	Effort	Variance	95% C.I.
Alaganik River	1,995	31,524	1,647 - 2,343
Clear Creek	2,328	95,725	1,722 - 2,934
Eyak River	4,232	154,499	3,462 - 5,002

Table 14. Number of fish examined for oil contamination by survey area, 1989.

Location	Halibut	Salmon	Rockfish	Lingcod	Cod
Homer	1,020	64	53	30	81
Kodiak	210	336	45	4	0
Cordova	105	59	8	1	1
Whittier	0	52	5	0	0
Valdez	418	7,935	218	0	313
Seward	350	12	831	446	0
Total - All Sites	2,103	8,458	1,160	481	395

Table 15. Reported catch and harvest by survey site of Dolly Varden and cutthroat trout, 1989.

Site	Dolly Varden		Cutthroat Trout	
	Catch	Harvest	Catch	Harvest
Alaganik River	30	22	79	48
Clear Creek	51	19	1	0
Eyak River	40	13	10	7
Homer	4	2	0	0
Kodiak	28	16	27 <sup>1</sup>	27 <sup>1</sup>
Cordova	27	23	0	0
Whittier	38	22	0	0
Total - All Sites	218	117	117	82

<sup>1</sup> Misidentification. Cutthroat trout do not occur in Kodiak marine waters.

## **APPENDICES**

## Appendix A. Description of the Major Fisheries

This section describes the major sport fisheries in the Prince William Sound (PWS), Cook Inlet, and Kodiak areas.

During 1988, PWS supported approximately 85,000 angler-days of recreational fishing which was approximately 65% above the 1977 to 1984 average of 45,600 angler-days (Appendix Table B1) (Mills 1989, 1979-1985). The majority of this effort was concentrated in and adjacent to the communities of Valdez, Whittier, and Cordova, but an increasing number of recreational fishermen have been traveling to the remote waters of PWS (Appendix Figure F1).

Anglers access the sport fishing waters of PWS by road, boat, float equipped aircraft, and train. A substantial number of the anglers also use the service of charter boat operators or air taxi operators. Species sought by recreational fishermen include all five species of Pacific salmon *Oncorhynchus* spp., Pacific halibut *Hippoglossus stenolepis*, rockfish *Sebastes* and *Sebastolobus* spp., lingcod *Ophiodon elongatus*, Dolly Varden char *Salvelinus malma*, and cutthroat trout *Oncorhynchus clarki*. Wild and hatchery produced salmon contribute to the harvest in all major fisheries.

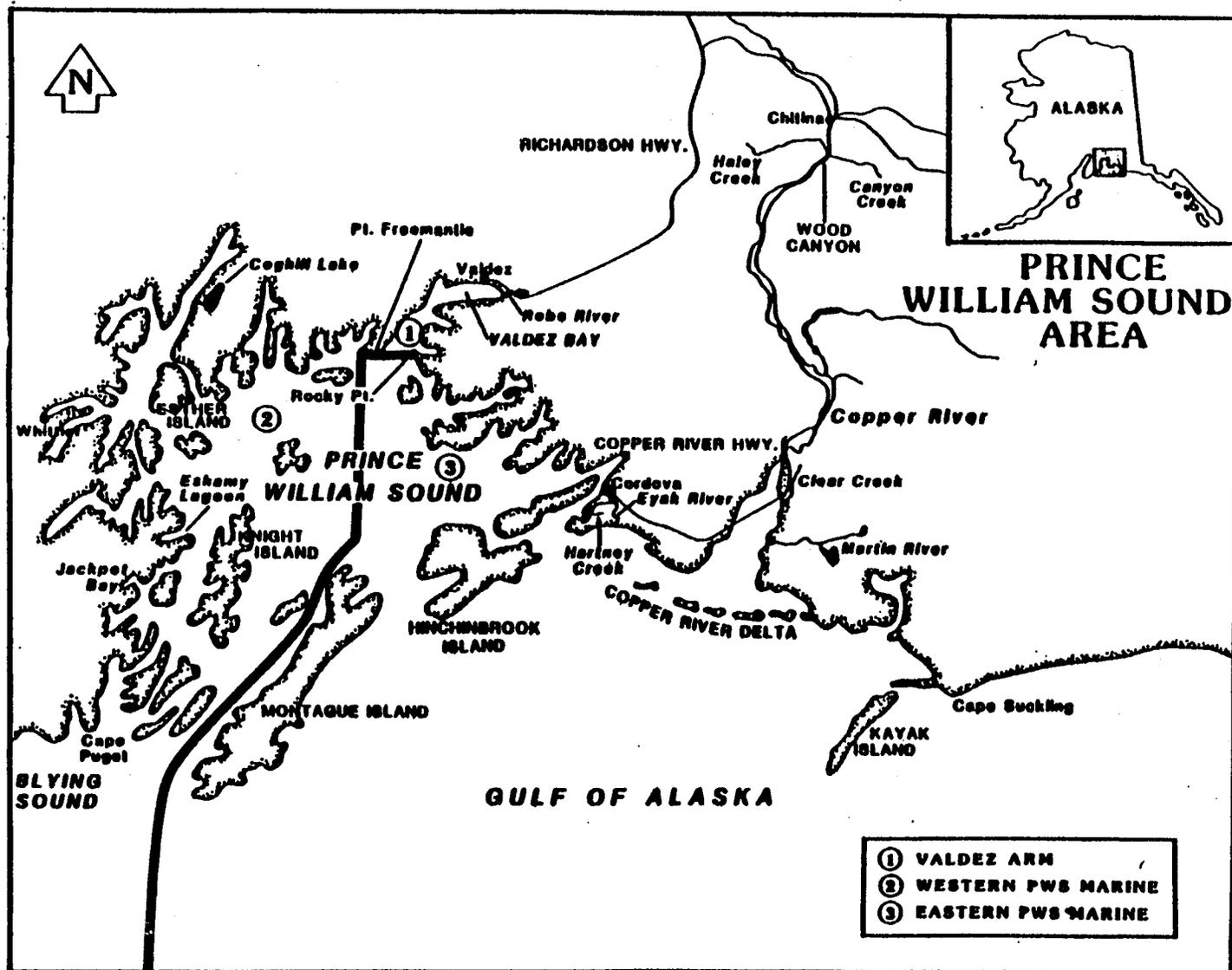
A description of the major fisheries of PWS and concerns regarding these fisheries follows.

### Valdez

Valdez, located on the north shore of Port Valdez (Appendix Figure F1), has the largest sport fishery in PWS and the largest sport fishery for pink salmon *O. gorbuscha* in Alaska.

Valdez Arm had an average of 17,111 angler-days of sport fishing effort annually during the years 1977 through 1984 (Appendix Table B1) (Mills 1979-1985). This effort increased to an average of 40,005 angler-days for 1985 through 1987, and to 51,096 angler-days during 1988 (Mills 1986-1989). Sport fishing effort during 1989 is expected to be similar to the 1988 level. The increase in angler effort during 1987 and 1988 can be attributed to successes in pink salmon production by the Valdez Fisheries Development Association's (VFDA) Solomon Gulch Hatchery, a private non-profit facility (Roth and Delaney 1989). Pink salmon harvest in Valdez Arm has increased from an average of 10,176 fish during 1977 through 1984 to 25,482 fish during 1985 through 1988 (Appendix Table B5). The sport fishery for pink salmon in Valdez Arm is the largest for that species in the state.

Valdez Arm also has the largest and most consistent sport fishery for coho salmon *O. kisutch* in PWS. An average 5,600 coho salmon were harvested annually during the years 1977 through 1987 (Mills 1984-1988). The sport harvest of 10,241 coho salmon during 1988 was the highest on record (Mills 1989). The Valdez Arm coho salmon fishery is supported by both natural and VFDA hatchery-produced coho salmon. Valdez Arm also has the largest fishery for Pacific halibut in PWS. The estimated sport harvest of Pacific halibut in Valdez Arm has increased from 339 in 1978 to 4,595 in 1988 (Mills 1980, 1989). The 1988 harvest of Pacific halibut in Valdez Arm accounted for 47 percent of the total PWS halibut harvest for that year (Mills 1987).



Appendix Figure F1. Map of Prince William Sound.

## Whittier

The community of Whittier provides access to Passage Canal and the waters of western PWS (Figure 1). Whittier is accessed primarily by railroad from Portage or by float plane from Anchorage. In recent years, it has become the home port for many privately owned pleasure boats and a growing charter fleet. Sport fishing effort in the Whittier/Passage Canal area has increased over 100% since 1984 (Mills 1985, 1989).

Western PWS produces numerous strong runs of pink salmon and chum salmon *O. keta*. No native chinook salmon are present, coho salmon are scarce, and sockeye salmon *O. nerka* are only present in select lake systems. In an effort to increase sport fishing opportunities in western PWS, coho salmon smolt have been stocked in Passage Canal annually since 1978, and chinook salmon smolt stocking began in 1981. The stocking programs have provided good angling opportunity in the Whittier Terminal area of Passage Canal. The coho salmon stocking program was expanded to include Culross Lake in 1983 and Surprise Cove Lakes in 1985. In 1986, juvenile chinook salmon were stocked into two Granite Bay lakes (Esther Island).

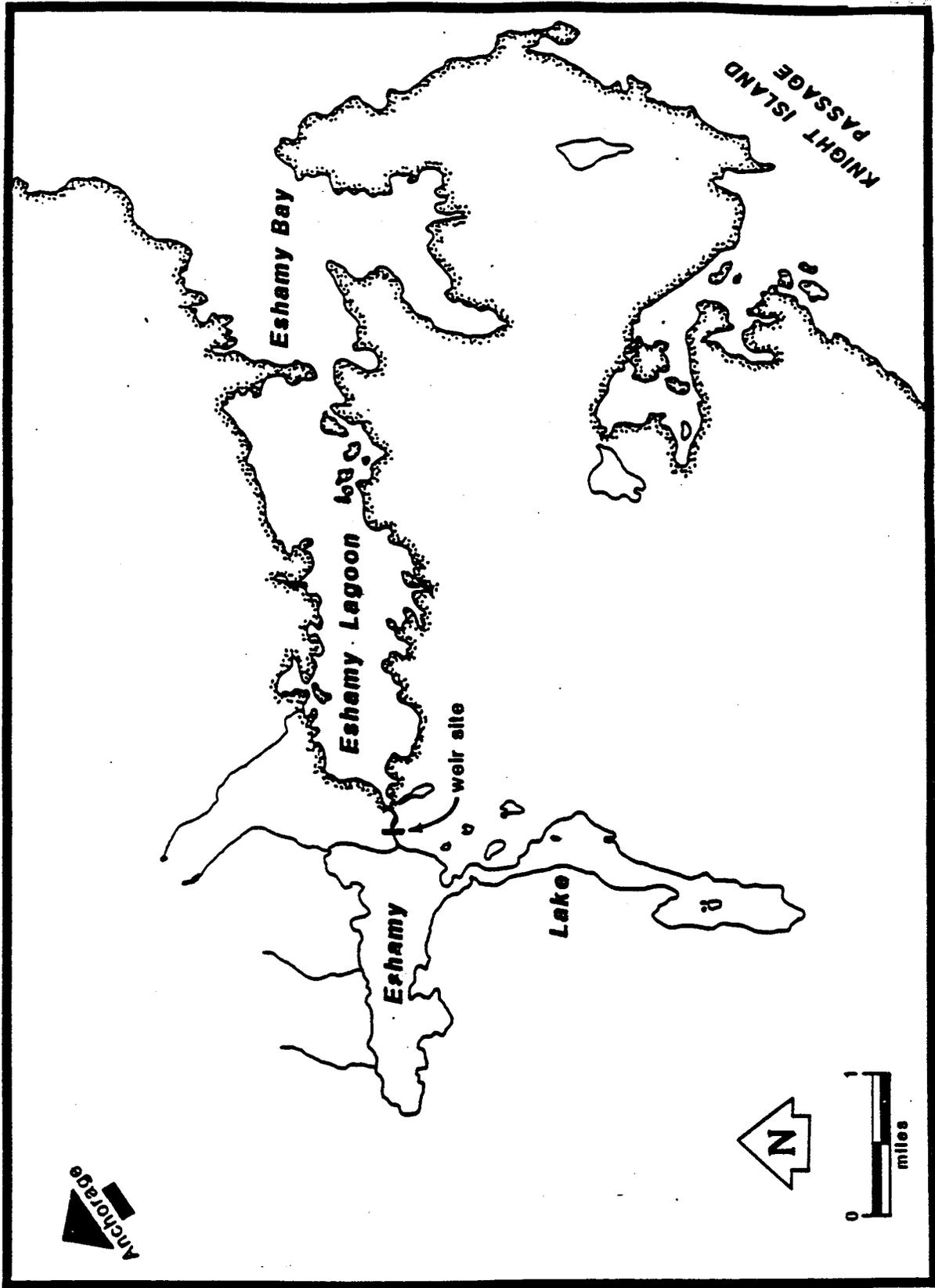
## Cordova

The community of Cordova provides access to the waters of eastern PWS (Figure 1). Cordova is primarily a commercial fishing community. Recreational fishing in the Cordova area is primarily conducted along the road system in the areas near Clear Creek, downstream of Eyak Lake, and from the beach near Flemming Spit. Beginning in 1989, freshwater drainages crossed by the Copper River highway were opened to sport fishing for salmon. Fishing effort in the Cordova area is directed toward sockeye salmon, pink salmon, cutthroat trout, Dolly Varden char, Pacific halibut, and rockfish. Additionally, boats and float equipped aircraft travel from Cordova to various locations in eastern PWS in pursuit of recreational fishing activities.

Harvest and effort data for these fisheries are limited to information gained from the statewide mail survey. These data indicate that both sport effort and harvest are increasing annually (Mills 1979-1989).

## Eshamy

The Eshamy system supports one of the most important sockeye salmon stocks of western PWS. The lagoon and lake areas of the Eshamy system (Figure 2) are one of the few locations where sport fishermen can harvest sockeye salmon in western PWS. Sport fishermen access the area either by boat out of Whittier or by float plane from Anchorage or the Kenai Peninsula. Oil from the *Exxon Valdez* has spread into the Eshamy area.



Appendix Figure F2. Map of Eshamy Lagoon.

## Seward

The recreational fishery in Resurrection Bay (Figure 3) is one of the largest marine sport fisheries in Alaska (Mills 1988). Most of the effort in this fishery is by private boat anglers, however there is also a large charter boat fleet. While most of the sport fishing effort is directed toward coho salmon, boat anglers also target Pacific halibut, rockfish, lingcod, and chinook salmon, and pink salmon. Shore anglers fish for coho salmon, chinook salmon, pink salmon, and a few Dolly Varden char. The coho salmon and chinook salmon populations are supplemented by an extensive stocking program.

Weather and water currents saved Resurrection Bay itself from heavy oil contamination, however isolated patches of oil washed ashore in Resurrection Bay on beaches as far north as Lowell Point near Seward. Areas frequented by anglers fishing for rockfish and halibut outside of Resurrection Bay were exposed to heavy contamination.

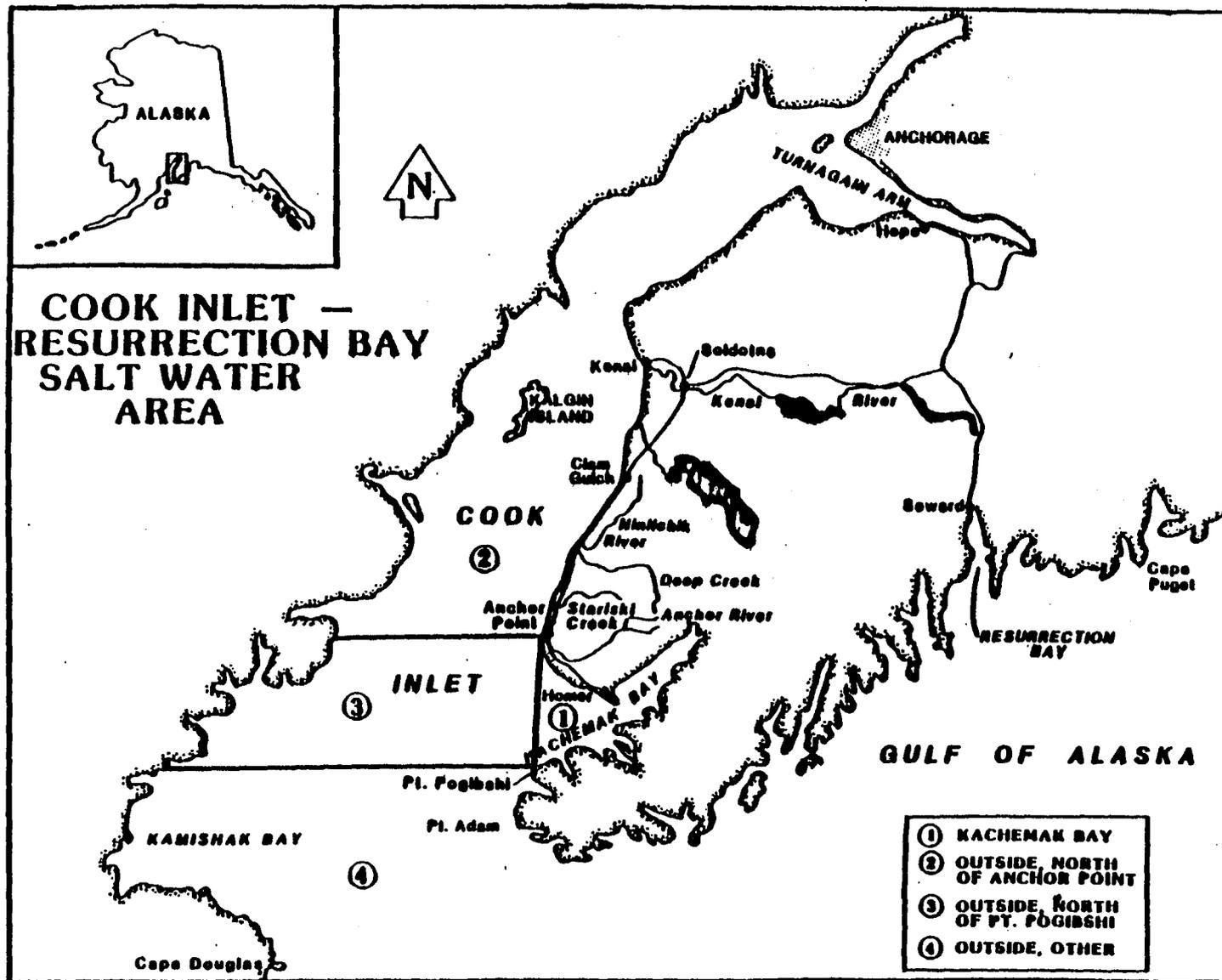
## Homer

Sport fishing and tourism are major components of the Homer area economy. Kachemak Bay and nearby waters (Figure 4) support the largest Pacific halibut recreational harvests in Alaska. In 1988, charter boats harvested an estimated 46,184 Pacific halibut in the Kachemak Bay area, and private boats harvested an additional 42,437 (Mills 1989). This is an increase of approximately 100% over the sport harvest levels estimated for 1987 (Mills 1988). In 1989, it is anticipated that there will be over 100 charter boats fishing for Pacific halibut out of Homer, along with an increasingly large fleet of private boats. The marine waters of Kachemak Bay also support major fisheries for stocked chinook salmon in Halibut Cove; for stocked pink salmon in Tutka Bay; and for stocked chinook salmon, coho salmon, and pink salmon near the Homer Spit. Oil from the *Exxon Valdez* reached the Kachemak Bay area nearly two months after the spill. Its impact in the area has been spotty, with weathered oil washing up in isolated locations. Many halibut boats from Homer, however, fish past Seldovia towards the outer waters of the Kenai Peninsula which were more heavily hit by oil.

## Kodiak

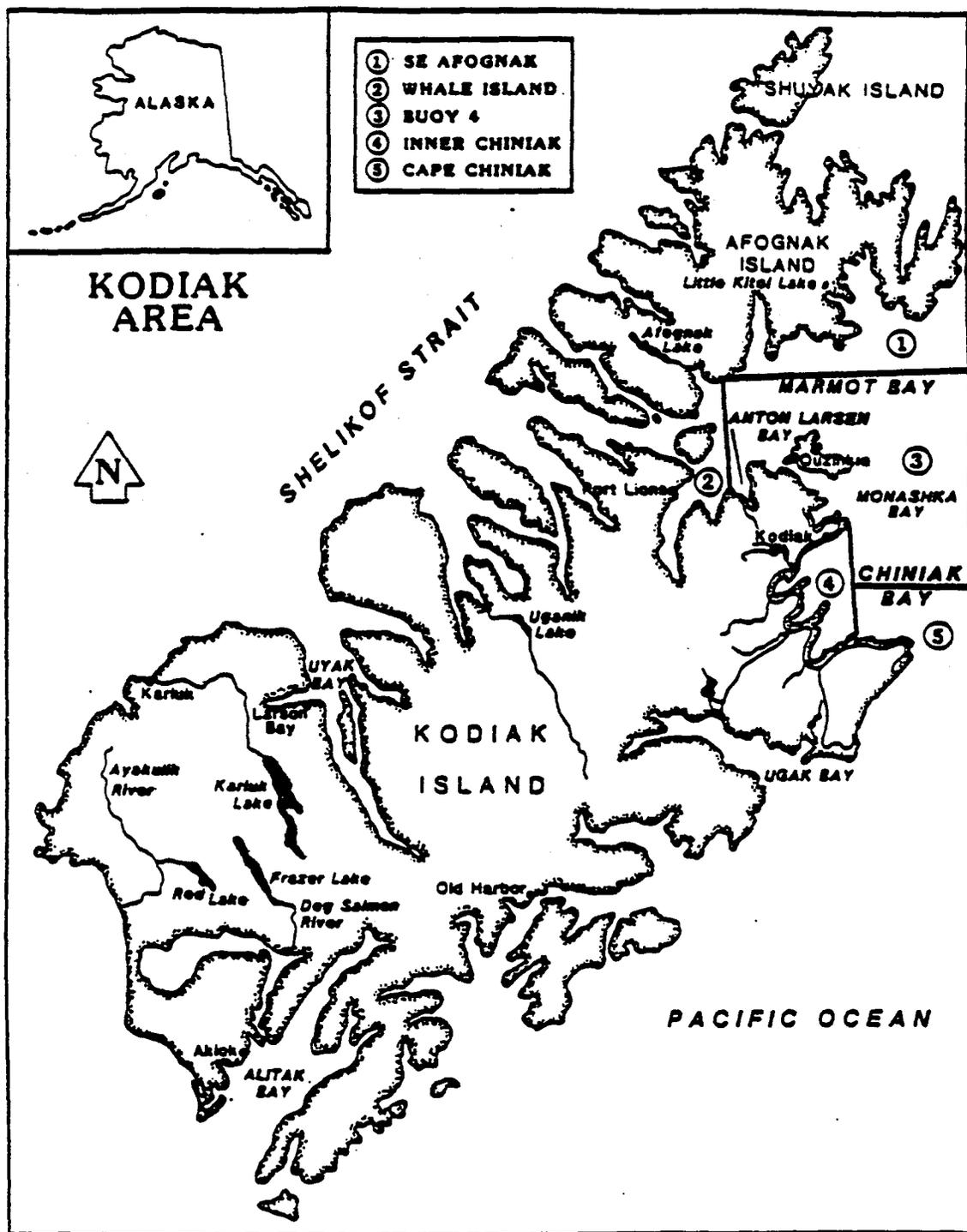
The city of Kodiak is a major commercial fishing port. The city also supports a large US Coast Guard base. Sport fishing is a relatively minor component of the local economy, but is an important recreational activity for local residents and Coast Guard personnel. There are estimated to be fewer than 15 charter boats operating out of the Kodiak harbors. Sport fishermen from the Kodiak area (Figure 5) harvest mainly Pacific halibut, pink salmon, coho salmon, and rockfish in marine waters. Anglers fished an estimated 30,522 days in marine waters of Kodiak in 1988 (Mills 1989). While the eastern side of Kodiak Island was not hit by the oil until over two months after the spill, storms at that time spread the oil in isolated locations all around Kodiak Island. Commercial salmon fisheries in the Kodiak area were delayed or curtailed





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Appendix Figure F4. Map of Homer and Kachemak Bay.



Appendix Figure F5. Map of Kodiak.

by the presence of oil in fishing areas, and these impacts have been given much attention in the press.

### Anchorage

Anchorage has the largest float plane base in Alaska and is the operation center of approximately 30 charter service companies that frequently provide transportation to PWS for recreational fishermen. Information regarding the extent of these operations, the areas and stocks they target, or the effort and harvest rates is currently unknown. However, it is believed that these operations may constitute a significant component of the sport fishery of PWS.

## Appendix B. Historical Effort and Harvest

Appendix Table B1. Prince William Sound (PWS) sport fishing effort (angler-days), 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>SALTWATER:</b>												
Valdez Arm												
Shoreline	*	*	*	*	*	*	*	*	12,498	9,419	25,100	21,173
Boat	*	*	*	*	*	*	*	*	33,174	19,449	20,645	29,923
Total	19,423	12,687	19,068	18,716	18,707	13,904	15,764	18,620	45,672	28,868	45,745	51,096
Passage Canal	*	*	4,134	4,875	3,756	4,520	6,103	4,166	7,281	9,556	9,725	9,568
Remainder of PWS												
Shoreline	*	*	*	*	*	*	3,945	7,529	5,323	4,648	7,358	4,189
Boat	*	*	*	*	*	*	10,251	10,355	8,015	8,609	6,597	13,514
Total	17,026	14,066	10,737	10,078	8,854	12,402	14,196	17,884	13,338	13,257	13,955	17,703
Saltwater Total	36,449	26,753	33,939	33,669	31,317	30,826	36,063	40,670	66,291	51,681	69,425	78,367
<b>FRESHWATER:</b>												
Cordova Area												
Eyak River	3,544	2,003	4,653	3,910	6,954	4,043	2,647	3,731	882	4,755	3,459	1,492
Valdez Area												
Robe River	*	*	*	*	*	*	*	2,995	*	1,712	*	*
Western PWS												
Eshamy Creek & Lagoon	*	2,305	1,038	868	714	1,007	1,180	1,740	688	1,022	739	*
Coghill River	5,842	1,745	1,273	1,734	1,371	1,621	809	786	897	847	985	*
Shrode Lake	1,209	1,314	424	426	657	307	371	*	*	*	*	*
Other Streams	1,325	926	3,569	1,358	4,355	2,047	2,834	5,435	3,006	2,351	4,670	3,760
Other Lakes	*	*	1,698	769	1,100	717	3,710	2,191	898	1,912	1,943	1,352
Freshwater Total	11,920	8,293	12,655	9,065	15,151	9,742	11,551	16,878	6,371	12,599	11,796	6,604
GRAND TOTAL	48,369	35,046	46,594	42,734	46,468	40,568	47,614	57,548	72,662	64,280	81,221	84,971

\* Data not available

Appendix Table B2. Prince William Sound (PWS) chinook salmon sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>SALTWATER:</b>												
Valdez Arm												
Shoreline	*	*	*	*	*	*	*	*	11	45	214	57
Boat	*	*	*	*	*	*	*	*	271	123	146	170
Total	247	58	88	121	76	210	241	125	282	168	360	227
Passage Canal	*	*	29	26	0	42	0	212	22	11	321	123
Remainder of PWS												
Shoreline	*	*	*	*	*	*	21	37	0	11	19	28
Boat	*	*	*	*	*	*	293	0	44	245	165	65
Total	181	35	215	121	248	147	314	37	44	256	184	93
Saltwater Total	428	93	332	268	324	399	555	374	348	435	865	443
<b>FRESHWATER:</b>												
Cordova Area												
Eyak River	0	0	0	0	0	0	0	0	0	0	0	0
Western PWS												
Eshamy Creek & Lagoon	*	0	0	0	0	0	0	0	0	0	0	0
Coghill River	0	0	0	0	0	0	0	0	0	0	0	0
Shrode Lake	0	0	0	0	0	0	0	*	*	*	*	*
Other Streams	0	0	10	34	0	0	21	37	0	0	0	0
Other Lakes	0	0	0	0	0	0	0	0	0	67	0	0
Freshwater Total	0	0	10	34	0	0	21	37	0	67	0	0
<b>GRAND TOTAL</b>	<b>428</b>	<b>93</b>	<b>342</b>	<b>302</b>	<b>324</b>	<b>399</b>	<b>576</b>	<b>411</b>	<b>348</b>	<b>502</b>	<b>865</b>	<b>443</b>

\* Data not available

Appendix Table B3. Prince William Sound (PWS) coho salmon sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>SALTWATER:</b>												
Valdez Arm												
Shoreline	*	*	*	*	*	*	*	*	1,530	1,040	3,729	3,784
Boat	*	*	*	*	*	*	*	*	5,848	5,749	5,010	6,457
Total	5,277	3,582	6,402	5,545	4,018	4,014	4,710	5,138	7,378	6,789	8,739	10,241
Passage Canal												
Total	*	*	761	1,541	32	1,635	294	549	1,280	1,437	2,137	728
Remainder of PWS												
Shoreline	*	*	*	*	*	*	1,280	674	988	2,476	2,359	1,782
Boat	*	*	*	*	*	*	1,636	861	1,000	1,177	747	2,146
Total	2,262	4,839	2,833	2,282	1,134	2,484	2,916	1,535	1,988	3,653	3,106	3,928
Saltwater Total	7,539	8,421	9,996	9,368	5,184	8,133	7,920	7,222	10,646	11,879	13,982	14,897
<b>FRESHWATER:</b>												
Cordova Area												
Eyak River	1,229	704	2,633	4,822	2,948	2,096	1,017	1,284	239	2,767	680	1,201
Western PWS												
Eshamy Creek & Lagoon	*	0	0	0	0	0	0	37	43	76	0	0
Coghill River	0	0	0	0	0	0	0	12	0	0	10	*
Shrode Lake	0	0	0	0	0	0	0	*	*	*	*	*
Other Streams	61	0	1,335	1,119	367	713	849	1,683	662	1,116	1,931	3,037
Other Lakes	*	0	0	0	0	52	619	125	43	260	77	127
Freshwater Total	1,290	704	3,968	5,941	3,315	2,861	2,485	3,141	987	4,219	2,698	4,365
GRAND TOTAL	8,829	9,125	13,964	15,309	8,499	10,994	10,405	10,363	11,633	16,098	16,680	19,262

\* Data not available

Appendix Table B4. Prince William Sound (PWS) sockeye salmon sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>SALTWATER:</b>												
Valdez Arm												
Shoreline	*	*	*	*	*	*	*	*	228	153	1,231	691
Boat	*	*	*	*	*	*	*	*	846	260	525	891
Total	557	78	141	568	367	241	343	786	1,074	413	1,756	1,582
Passage Canal	*	*	0	0	0	0	41	62	119	1,193	1,159	291
Remainder of PWS												
Shoreline	*	*	*	*	*	*	397	87	142	61	254	36
Boat	*	*	*	*	*	*	1,000	1,023	195	779	54	1,309
Total	2,529	352	1,210	861	562	1,603	1,397	1,110	337	840	308	1,345
<b>Saltwater Total</b>	<b>3,086</b>	<b>430</b>	<b>1,351</b>	<b>1,429</b>	<b>929</b>	<b>1,844</b>	<b>1,781</b>	<b>1,958</b>	<b>1,530</b>	<b>2,446</b>	<b>3,223</b>	<b>3,218</b>
<b>FRESHWATER:</b>												
Cordova Area												
Eyak River	209	127	362	69	43	0	192	75	87	92	36	0
Western PWS												
Eshamy Creek & Lagoon	*	2,099	990	138	465	671	1,315	736	467	612	453	*
Coghill River	2,898	690	629	1,524	572	1,520	781	249	456	321	417	*
Shrode Lake	319	1,229	94	95	33	105	41	*	*	*	*	*
Other Streams	*	*	346	594	140	52	561	286	129	1,178	398	1,310
Other Lakes	*	*	0	0	0	94	453	773	239	229	362	255
<b>Freshwater Total</b>	<b>3,426</b>	<b>4,145</b>	<b>2,421</b>	<b>2,420</b>	<b>1,253</b>	<b>2,442</b>	<b>3,343</b>	<b>2,119</b>	<b>1,378</b>	<b>2,432</b>	<b>1,666</b>	<b>1,565</b>
<b>GRAND TOTAL</b>	<b>6,512</b>	<b>4,575</b>	<b>3,772</b>	<b>3,849</b>	<b>2,182</b>	<b>4,286</b>	<b>5,124</b>	<b>4,077</b>	<b>2,908</b>	<b>4,878</b>	<b>4,889</b>	<b>4,783</b>

\* Data not available

Appendix Table B5. Prince William Sound (PWS) pink salmon sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>SALTWATER:</b>												
Valdez Arm												
Shoreline	*	*	*	*	*	*	*	*	11,805	9,312	17,303	16,117
Boat	*	*	*	*	*	*	*	*	15,223	12,858	8,652	10,659
Total	12,020	7,910	13,217	11,606	11,686	6,634	8,696	9,639	27,028	22,170	25,955	26,776
Passage Canal	*	*	573	1,343	691	2,065	2,014	935	1,573	1,437	2,039	1,019
Remainder of PWS												
Shoreline	*	*	*	*	*	*	1,353	1,134	2,440	718	1,913	1,637
Boat	*	*	*	*	*	*	1,951	1,172	912	458	581	1,783
Total	6,969	5,433	2,836	2,919	1,534	2,903	3,304	2,306	3,352	1,176	2,494	3,420
<b>Saltwater Total</b>	<b>8,989</b>	<b>13,343</b>	<b>16,626</b>	<b>15,868</b>	<b>13,911</b>	<b>11,602</b>	<b>14,014</b>	<b>12,880</b>	<b>31,953</b>	<b>24,783</b>	<b>30,488</b>	<b>31,215</b>
<b>FRESHWATER:</b>												
Cordova Area												
Eyak River	0	0	0	0	0	0	0	12	33	107	10	0
Western PWS												
Eshamy Creek & Lagoon	*	511	237	112	65	210	157	449	54	260	194	*
Coghill River	4,213	1,223	654	276	637	723	168	112	109	0	252	*
Shrode Lake	658	310	173	17	32	105	168	*	*	*	*	*
Other Streams	1,565	913	282	525	97	283	147	860	521	122	341	200
Other Lakes	0	0	0	9	32	0	42	175	0	0	97	55
<b>Freshwater Total</b>	<b>6,436</b>	<b>2,957</b>	<b>1,346</b>	<b>939</b>	<b>863</b>	<b>1,321</b>	<b>682</b>	<b>1,608</b>	<b>717</b>	<b>489</b>	<b>894</b>	<b>255</b>
<b>GRAND TOTAL</b>	<b>25,425</b>	<b>16,300</b>	<b>17,972</b>	<b>16,807</b>	<b>14,774</b>	<b>12,923</b>	<b>14,696</b>	<b>14,488</b>	<b>32,670</b>	<b>25,272</b>	<b>31,382</b>	<b>31,470</b>

\* Data not available

Appendix Table B6. Prince William Sound (PWS) chum salmon sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>SALTWATER:</b>												
Valdez Arm												
Shoreline	*	*	*	*	*	*	*	*	380	749	447	527
Boat	*	*	*	*	*	*	*	*	868	1,116	1,078	3,674
Total	219	1,444	845	913	572	639	976	1,397	1,248	1,865	1,525	4,201
Passage Canal	*	*	0	0	0	0	0	0	217	596	194	1,637
Remainder of PWS												
Shoreline	*	*	*	*	*	*	115	324	0	15	0	72
Boat	*	*	*	*	*	*	147	137	120	382	39	1,327
Total	224	273	573	34	324	440	262	461	120	397	39	1,399
<b>Saltwater Total</b>	<b>443</b>	<b>1,717</b>	<b>1,418</b>	<b>947</b>	<b>896</b>	<b>1,079</b>	<b>1,238</b>	<b>1,858</b>	<b>1,585</b>	<b>2,858</b>	<b>1,758</b>	<b>7,237</b>
<b>FRESHWATER:</b>												
Cordova Area												
Eyak River	0	0	0	0	0	0	0	0	0	0	0	0
Western PWS												
Eshamy Creek & Lagoon	*	0	0	0	0	0	0	0	0	0	0	0
Coghill River	158	1,034	64	0	11	63	21	12	0	0	0	0
Shrode Lake	25	0	0	0	22	52	0	*	*	*	*	0
Other Streams	114	234	45	292	43	10	94	25	43	0	136	0
Other Lakes	*	*	0	26	0	0	0	12	0	0	0	0
<b>Freshwater Total</b>	<b>297</b>	<b>1,268</b>	<b>109</b>	<b>318</b>	<b>76</b>	<b>125</b>	<b>115</b>	<b>49</b>	<b>43</b>	<b>0</b>	<b>136</b>	<b>0</b>
<b>GRAND TOTAL</b>	<b>740</b>	<b>2,985</b>	<b>1,527</b>	<b>1,265</b>	<b>972</b>	<b>1,204</b>	<b>1,353</b>	<b>1,907</b>	<b>1,628</b>	<b>2,858</b>	<b>1,894</b>	<b>7,237</b>

\* Data not available

Appendix Table B7. Prince William Sound (PWS) cutthroat trout sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>SALTWATER:</b>												
Valdez Arm												
Shoreline	*	*	*	*	*	*	*	*	0	0	0	0
Boat	*	*	*	*	*	*	*	*	0	61	0	0
Total	0	0	0	0	0	0	0	0	0	61	0	0
Passage Canal	*	*	0	0	0	0	0	0	0	0	0	0
Remainder of PWS												
Shoreline	*	*	*	*	*	*	94	274	0	76	127	0
Boat	*	*	*	*	*	*	0	212	0	0	0	0
Total	1,514	533	282	86	65	88	94	486	0	76	127	0
<b>Saltwater Total</b>	<b>1,514</b>	<b>533</b>	<b>282</b>	<b>86</b>	<b>65</b>	<b>88</b>	<b>94</b>	<b>486</b>	<b>0</b>	<b>137</b>	<b>127</b>	<b>0</b>
<b>FRESHWATER:</b>												
Cordova Area												
Eyak River	93	90	282	319	130	136	262	62	119	214	290	109
Western PWS												
Eshamy Creek & Lagoon	*	334	163	52	140	105	147	12	277	0	163	163
Coghill River	305	0	0	0	0	0	0	0	0	0	0	0
Shrode Lake	0	0	0	0	0	0	0	*	*	*	*	*
Other Streams	*	*	382	482	76	262	408	1,184	242	337	0	0
Other Lakes	*	*	382	0	475	63	913	798	277	932	778	778
<b>Freshwater Total</b>	<b>398</b>	<b>424</b>	<b>1,209</b>	<b>853</b>	<b>821</b>	<b>566</b>	<b>1,730</b>	<b>2,056</b>	<b>915</b>	<b>1,483</b>	<b>1,231</b>	<b>619</b>
<b>GRAND TOTAL</b>	<b>1,912</b>	<b>957</b>	<b>1,491</b>	<b>939</b>	<b>886</b>	<b>654</b>	<b>1,824</b>	<b>2,542</b>	<b>915</b>	<b>1,620</b>	<b>1,358</b>	<b>619</b>

\* Data not available

Appendix Table B8. Prince William Sound (PWS) dolly varden sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>SALTWATER:</b>												
Valdez Arm												
Shoreline	*	*	*	*	*	*	*	*	17	0	199	291
Boat	*	*	*	*	*	*	*	*	1,266	31	235	55
Total	594	877	691	1,128	97	356	262	811	1,283	31	434	346
Passage Canal	*	*	191	26	0	63	42	0	0	291	996	55
Remainder of PWS												
Shoreline	*	*	*	*	*	*	493	62	69	31	706	364
Boat	*	*	*	*	*	*	21	75	312	383	0	0
Total	4,673	886	464	250	162	210	514	137	381	414	706	364
Saltwater Total	5,267	1,763	1,346	1,404	259	629	818	948	1,664	736	2,136	765
<b>FRESHWATER:</b>												
Cordova Area												
Eyak River	854	866	2,863	3,057	1,577	2,348	430	636	575	642	290	800
Valdez Area												
Robe River	*	*	*	*	*	*	*	5,499	*	4,449	*	*
Western PWS												
Eshamy Creek												
And Lagoon	*	181	273	241	184	0	63	25	17	61	0	0
Coghill River	56	389	9	164	227	52	0	137	69	61	235	*
Shrode Lake	34	118	281	112	184	0	251	*	*	*	*	*
Other Streams	91	145	3,094	2,514	1,912	2,547	2,664	3,303	4,058	733	1,792	545
Other Lakes	0	*	1,654	594	875	660	471	1,159	121	613	145	509
Freshwater Total	1,035	1,699	8,174	6,682	4,959	5,607	3,879	10,759	4,840	6,559	2,462	1,854
GRAND TOTAL	6,302	3,462	9,520	8,086	5,218	6,236	4,697	11,707	6,504	7,295	4,598	2,619

\* Data not available

Appendix Table B9. Prince William Sound (PWS) halibut sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Valdez Arm												
Shoreline	*	*	*	*	*	*	*	*	315	153	107	132
Boat	*	*	*	*	*	*	*	1,322	2,832	3,241	1,961	4,467
Total	528	339	719	1,688	1,134	849	1,846	1,322	3,147	3,394	2,068	4,599
Passage Canal	*	*	78	69	216	199	284	387	575	1,040	495	1,023
Remainder of PWS												
Shoreline	*	*	*	*	*	*	136	724	98	305	20	156
Boat	*	*	*	*	*	*	1,227	1,995	707	3,592	1,796	4,067
Total	719	594	894	1,386	1,145	1,687	1,363	2,719	805	3,897	1,816	4,223
GRAND TOTAL	1,247	933	1,691	3,143	2,495	2,735	3,493	4,428	4,527	8,331	4,379	9,845

\* Data not available

Appendix Table B10. Prince William Sound rockfish sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Valdez Arm												
Shoreline	*	*	*	*	*	*	*	*	141	67	262	265
Boat	*	*	*	*	*	*	*	*	5,740	5,864	2,670	6,718
Total	1,895	1,103	2,782	3,272	6,534	2,810	3,703	4,340	5,881	5,931	2,932	6,983
Passage Canal	*	*	400	870	1,339	199	1,112	711	1,703	1,620	1,466	1,866
Remainder of PWS												
Shoreline	*	*	*	*	*	*	451	548	0	234	243	120
Boat	*	*	*	*	*	*	1,248	2,394	1,269	1,977	1,922	3,742
Total	5,913	3,932	7,836	2,032	3,737	2,599	1,699	2,942	1,269	2,211	2,165	3,862
GRAND TOTAL	7,808	5,035	11,018	6,174	11,610	5,608	6,514	7,993	8,853	9,762	6,563	12,711

\* Data not available

Appendix Table B11. Kodiak, Resurrection Bay, and Kachemak Bay sport fishing effort (angler-days), 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>KODIAK</b>												
Saltwater	14,957	19,063	23,124	27,646	29,857	41,113	40,217	34,213	33,032	31,762	38,761	30,522
Freshwater	26,606	25,439	35,921	37,261	36,582	40,125	46,237	48,447	51,809	45,404	36,979	38,803
Total	41,563	44,502	59,045	64,907	66,439	81,238	86,454	82,660	84,841	77,166	75,740	69,325
<b>RESURRECTION BAY</b>												
Boat	41,797	53,355	43,576	49,623	56,410	49,167	40,144	44,669	47,472	38,103	30,787	34,107
Shoreline	---	---	---	---	---	---	---	---	---	13,272	11,356	16,144
Total	41,797	53,355	43,576	49,623	56,410	49,167	40,144	44,669	47,472	51,375	42,143	50,251
<b>KACHEMAK BAY</b>												
Boat	38,498	47,259	52,442	51,080	60,336	52,631	63,056	63,390	56,771	62,307	88,063	98,180
Shoreline	---	---	---	---	---	---	---	---	---	7,461	11,367	21,264
Total	38,498	47,259	52,442	51,080	60,336	52,631	63,056	63,390	56,771	69,768	99,430	119,444

--- Data not separated between boat and shoreline

Appendix Table B12. Kodiak, Resurrection Bay, and Kachemak Bay chinook salmon sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>KODIAK</b>												
Saltwater	34	12	98	60	194	125	104	136	137	168	18	145
Freshwater	449	338	654	267	530	922	428	636	501	321	144	946
Total	483	350	752	327	724	1,047	532	772	638	489	162	1,091
<b>RESURRECTION BAY</b>												
Boat	515	501	156	198	137	293	189	12	75	52	308	764
Shoreline	---	---	---	---	---	---	---	---	---	26	235	1,110
Total	515	501	156	198	137	293	189	12	75	78	543	1,874
<b>KACHEMAK BAY</b>												
Boat	614	315	400	224	583	1,540	1,521	1,347	672	511	1,141	3,566
Shoreline	---	---	---	---	---	---	---	---	---	39	615	4,511
Total	614	315	400	224	583	1,540	1,521	1,347	672	550	1,756	8,077

--- Data not separated between boat and shoreline

Appendix Table B13. Kodiak, Resurrection Bay, and Kachemak Bay coho salmon sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>KODIAK</b>												
Saltwater	1,172	1,433	3,606	5,442	4,449	6,612	2,025	6,945	6,209	9,220	8,059	6,786
Freshwater	3,544	3,494	7,916	7,250	6,135	6,717	5,798	7,667	7,416	11,653	8,856	12,023
Total	4,716	4,927	11,522	12,692	10,584	13,329	7,823	14,612	13,625	20,873	16,915	18,809
<b>RESURRECTION BAY</b>												
Boat	14,528	16,731	14,315	19,665	14,721	18,518	11,277	9,727	11,227	10,489	18,861	11,405
Shoreline	---	---	---	---	---	---	---	---	---	3,929	5,359	6,221
Total	14,528	16,731	14,315	19,665	14,721	18,518	11,277	9,727	11,227	14,418	24,220	17,626
<b>KACHEMAK BAY</b>												
Boat	3,623	1,798	1,797	1,533	1,955	1,834	1,517	1,097	485	1,101	746	1,019
Shoreline	---	---	---	---	---	---	---	---	---	306	459	255
Total	3,623	1,798	1,797	1,533	1,955	1,834	1,517	1,097	485	1,407	1,205	1,274

--- Data not separated between boat and shoreline

Appendix Table B14. Kodiak, Resurrection Bay, and Kachemak Bay sockeye salmon sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>KODIAK</b>												
Saltwater	102	479	330	809	669	1,079	986	1,272	1,714	1,590	1,106	1,019
Freshwater	1,153	1,297	2,106	1,369	951	1,976	2,164	4,113	5,822	3,669	3,059	5,203
Total	1,255	1,776	2,436	2,178	1,620	3,055	3,150	5,385	7,536	5,259	4,165	6,222
<b>RESURRECTION BAY</b>												
Boat	6	0	0	0	0	0	0	1,305	1,335	123	308	254
Shoreline	---	---	---	---	---	---	---	---	---	214	507	164
Total	6	0	0	0	0	0	0	1,305	1,335	337	815	418
<b>KACHEMAK BAY</b>												
Boat	122	70	252	52	151	373	472	2,426	1,596	596	253	401
Shoreline	---	---	---	---	---	---	---	---	---	0	54	164
Total	122	70	252	52	151	373	472	2,426	1,596	596	307	565

--- Data not separated between boat and shoreline

Appendix Table B15. Kodiak, Resurrection Bay, and Kachemak Bay pink salmon sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>KODIAK</b>												
Saltwater	5,074	6,424	8,853	8,223	4,677	8,153	2,780	4,314	5,739	4,769	5,252	10,040
Freshwater	9,445	10,046	7,018	10,746	7,582	10,697	6,156	8,465	13,423	9,740	6,410	9,004
Total	14,519	16,470	15,871	18,969	12,259	18,850	8,936	12,779	19,162	14,509	11,662	19,044
<b>RESURRECTION BAY</b>												
Boat	1,595	6,610	2,100	12,614	7,776	9,328	4,909	11,510	5,262	4,449	1,974	1,601
Shoreline	---	---	---	---	---	---	---	---	---	6,559	1,394	400
Total	1,595	6,610	2,100	12,614	7,776	9,328	4,909	11,510	5,262	11,008	3,368	2,001
<b>KACHEMAK BAY</b>												
Boat	6,921	6,238	6,218	6,604	6,772	2,368	2,927	2,220	2,687	1,254	2,192	3,111
Shoreline	---	---	---	---	---	---	---	---	---	505	0	1,855
Total	6,921	6,238	6,218	6,604	6,772	2,368	2,927	2,220	2,687	1,759	2,192	4,966

--- Data not separated between boat and shoreline

Appendix Table B16. Kodiak, Resurrection Bay, and Kachemak Bay chum salmon sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>KODIAK</b>												
Saltwater	633	624	382	405	151	639	462	799	167	122	198	73
Freshwater	1,012	663	118	120	486	685	354	522	698	214	362	1,473
Total	1,645	1,287	500	525	637	1,324	816	1,321	865	336	560	1,546
<b>RESURRECTION BAY</b>												
Boat	63	39	100	276	194	458	923	2,569	634	474	525	1,910
Shoreline	---	---	---	---	---	---	---	---	---	1,484	1,449	2,037
Total	63	39	100	276	194	458	923	2,569	634	1,958	1,974	3,947
<b>KACHEMAK BAY</b>												
Boat	126	39	18	95	11	10	273	0	0	31	18	73
Shoreline	---	---	---	---	---	---	---	---	---	31	0	18
Total	126	39	18	95	11	10	273	0	0	62	18	91

--- Data not separated between boat and shoreline

Appendix Table B17. Kodiak, Resurrection Bay, and Kachemak Bay dolly varden sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>KODIAK</b>												
Saltwater	1,084	2,830	5,281	2,979	2,441	5,931	3,934	4,814	2,291	6,375	2,299	8,004
Freshwater	13,452	12,975	20,140	17,684	17,075	17,840	15,505	18,278	15,225	14,282	6,464	10,659
Total	14,536	15,805	25,421	20,663	19,516	23,771	19,439	23,092	17,516	20,657	8,763	18,663
<b>RESURRECTION BAY</b>												
Boat	1,720	1,248	973	878	5,335	1,562	5,811	1,771	191	505	453	473
Shoreline		---	---	---	---	---	---	---	---	566	362	255
Total	1,720	1,248	973	878	5,335	1,562	5,811	1,771	191	1,071	815	728
<b>KACHEMAK BAY</b>												
Boat	3,676	1,248	2,018	3,685	3,434	2,862	3,053	1,559	1,283	719	344	1,219
Shoreline	---	---	---	---	---	---	---	---	---	1,453	580	746
Total	3,676	2,007	2,018	3,685	3,434	2,862	3,053	1,559	1,283	2,172	924	1,965

--- Data not separated between boat and shoreline

Appendix Table B18. Kodiak, Resurrection Bay, and Kachemak Bay halibut sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>KODIAK</b>												
Saltwater	994	1,721	3,013	3,651	6,858	9,180	8,545	8,179	7,303	10,960	9,869	7,749
Freshwater	0	0	0	0	0	0	0	0	0	0	0	0
Total	994	1,721	3,013	3,651	6,858	9,180	8,545	8,179	7,303	10,960	9,869	7,749
<b>RESURRECTION BAY</b>												
Boat	1,674	2,642	2,838	2,936	3,337	2,809	2,225	3,242	5,486	9,220	6,321	10,586
Shoreline	---	---	---	---	---	---	---	---	---	428	199	837
Total	1,674	2,642	2,838	2,936	3,337	2,809	2,225	3,242	5,486	9,648	6,520	11,423
<b>KACHEMAK BAY</b>												
Boat	9,291	20,422	20,218	21,473	28,858	28,254	35,007	36,113	40,716	40,917	41,688	88,621
Shoreline	---	---	---	---	---	---	---	---	---	474	616	909
Total	9,291	20,422	20,218	21,473	28,858	28,254	35,007	36,113	40,716	41,391	42,304	89,530

--- Data not separated between boat and shoreline

Appendix Table B19. Kodiak, Resurrection Bay, and Kachemak Bay rockfish sport harvest, 1977 through 1988.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>KODIAK</b>												
Saltwater	2,810	1,907	3,599	1,489	6,242	3,992	3,252	8,231	4,691	4,479	6,501	11,369
Freshwater	0	0	0	0	0	0	0	0	0	0	0	0
Total	2,810	1,907	3,599	1,489	6,242	3,992	3,252	8,231	4,691	4,479	6,501	11,369
<b>RESURRECTION BAY</b>												
Boat	12,783	17,438	21,752	27,948	19,516	22,878	17,990	22,845	17,068	34,464	10,793	33,360
Shoreline	---	---	---	---	---	---	---	---	---	3,110	1,540	1,546
Total	12,783	17,438	21,752	27,948	19,516	22,878	17,990	22,845	17,068	37,574	12,333	34,906
<b>KACHEMAK BAY</b>												
Boat	1,117	2,305	1,336	1,937	3,452	1,991	3,273	2,407	2,463	4,587	1,848	6,311
Shoreline	---	---	---	---	---	---	---	---	---	306	271	128
Total	1,117	2,305	1,336	1,937	3,452	1,991	3,273	2,407	2,463	4,893	2,119	6,439

--- Data not separated between boat and shoreline

## Appendix C. Creel Survey Schedules

Appendix Table C1. Sampling schedule for the Valdez Bay marine sport fishery, 1989.

Date	Strata <sup>1</sup>	Day	Period/Time	
			A:0900-1600	B:1601-2300
15-Jun	WD	Thur	X	
16-Jun	WD	Fri		X
17-Jun	WE	Sat		X
18-Jun	WE	Sun		X
19-Jun	WD	Mon	X	
20-Jun	WD	Tues	-----OFF-----	
21-Jun	WD	Wed	-----OFF-----	
22-Jun	WD	Thur		X
23-Jun	WD	Fri	X	
24-Jun	WE	Sat	X	
25-Jun	WE	Sun	X	
26-Jun	WD	Mon	X	
27-Jun	WD	Tues	X	
28-Jun	WD	Wed		X
29-Jun	WD	Thur	-----OFF-----	
30-Jun	WD	Fri	-----OFF-----	
01-Jul	WE	Sat	X	
02-Jul	WE	Sun		X
03-Jul	WE	Mon		X
04-Jul	WE	Tues	X	
05-Jul	WD	Wed	-----OFF-----	
06-Jul	WD	Thur	-----OFF-----	
07-Jul	WD	Fri		X
08-Jul	WE	Sat		X
09-Jul	WE	Sun		X
10-Jul	WD	Mon		X
11-Jul	WD	Tues	X	
12-Jul	WD	Wed		X
13-Jul	WD	Thur	-----OFF-----	
14-Jul	WD	Fri	-----OFF-----	
15-Jul	WE	Sat	X	
16-Jul	WE	Sun		X
17-Jul	WD	Mon		X
18-Jul	WD	Tues		X
19-Jul	WD	Wed		X
20-Jul	WD	Thur	-----OFF-----	
21-Jul	WD	Fri	-----OFF-----	
22-Jul	WE	Sat		X
23-Jul	WE	Sun	X	
24-Jul	WD	Mon		X
25-Jul	WD	Tues	X	

-Continued-

Appendix Table C1. Sampling schedule for the Valdez Bay marine sport fishery, 1989  
(continued)

Date	Strata <sup>1</sup>	Day	Period/Time	
			A:0900-1600	B:1601-2300
26-Jul	WD	Wed	-----OFF-----	
27-Jul	WD	Thur	-----OFF-----	
28-Jul	WD	Fri	X	
29-Jul	WE	Sat	X	
30-Jul	WE	Sun		X
31-Jul	WD	Mon	-----OFF-----	
01-Aug	WD	Tues	-----OFF-----	
02-Aug	WD	Wed		X
03-Aug	WD	Thur		X
04-Aug	WD	Fri		X
05-Aug	WE	Sat		X
06-Aug	WE	Sun		X
07-Aug	WD	Mon		X
08-Aug	WD	Tues	X	
09-Aug	WD	Wed	-----OFF-----	
10-Aug	WD	Thur	-----OFF-----	
11-Aug	WD	Fri		X
12-Aug	WE	Sat	X	
13-Aug	WE	Sun		X
14-Aug	WD	Mon	X	
15-Aug	WD	Tues		X
16-Aug	WD	Wed	-----OFF-----	
17-Aug	WD	Thur	-----OFF-----	
18-Aug	WD	Fri		X
19-Aug	WE	Sat	X	
20-Aug	WE	Sun		X
21-Aug	WD	Mon	X	
22-Aug	WD	Tues		X
23-Aug	WD	Wed	-----OFF-----	
24-Aug	WD	Thur	-----OFF-----	
25-Aug	WD	Fri		X
26-Aug	WE	Sat		X
27-Aug	WE	Sun		X
28-Aug	WD	Mon		X
29-Aug	WD	Tues	X	
30-Aug	WD	Wed		X
31-Aug	WD	Thur	-----OFF-----	
01-Sep	WD	Fri	-----OFF-----	
02-Sep	WE	Sat		X
03-Sep	WE	Sun		X

-Continued-

Appendix Table C1. Sampling schedule for the Valdez Bay marine sport fishery, 1989  
(continued)

Date	Strata <sup>1</sup>	Day	Period/Time	
			A:0900-1600	B:1601-2300
04-Sep	WE	Mon		X
05-Sep	WD	Tues		X
06-Sep	WD	Wed	X	
07-Sep	WD	Thur	-----OFF-----	
08-Sep	WD	Fri	-----OFF-----	
09-Sep	WE	Sat		X
10-Sep	WE	Sun	X	
11-Sep	WD	Mon	-----OFF-----	
12-Sep	WD	Tues	-----OFF-----	
13-Sep	WD	Wed		X
14-Sep	WD	Thur		X
15-Sep	WD	Fri		X
16-Sep	WE	Sat		X
17-Sep	WE	Sun		X

1 WD=Weekday, WE=Weekend/Holiday.

Appendix Table C2. Sampling schedule for the Whittier sport fishery, 1989.

Date	Strata <sup>1</sup>	Day	Period/Time			
			A (1000-1300)	B (1301-1600)	C (1601-1900)	D (1901-2200)
24-Jun	WE	Sat			X	X
25-Jun	WE	Sun		X	X	
26-Jun	WD	Mon			X	X
27-Jun	WD	Tues			X	X
28-Jun	WD	Wed	X		X	
29-Jun	WD	Thur	-----OFF-----			
30-Jun	WD	Fri	-----OFF-----			
01-Jul	WE	Sat			X	X
02-Jul	WE	Sun			X	X
03-Jul	WD	Mon		X	X	
04-Jul	WE	Tues			X	X
05-Jul	WD	Wed	-----OFF-----			
06-Jul	WD	Thur	-----OFF-----			
07-Jul	WD	Fri	-----OFF-----			
08-Jul	WE	Sat		X	X	
09-Jul	WE	Sun			X	X
10-Jul	WD	Mon	-----OFF-----			
11-Jul	WD	Tues	-----OFF-----			
12-Jul	WD	Wed		X	X	
13-Jul	WD	Thur		X	X	
14-Jul	WD	Fri			X	X
15-Jul	WE	Sat	X		X	
16-Jul	WE	Sun			X	X
17-Jul	WD	Mon	-----OFF-----			
18-Jul	WD	Tues	-----OFF-----			
19-Jul	WD	Wed		X	X	
20-Jul	WD	Thur	X		X	
21-Jul	WD	Fri	X		X	
22-Jul	WE	Sat		X	X	
23-Jul	WE	Sun		X	X	
24-Jul	WD	Mon	-----OFF-----			
25-Jul	WD	Tues	-----OFF-----			
26-Jul	WD	Wed			X	X
27-Jul	WD	Thur			X	X
28-Jul	WD	Fri			X	X
29-Jul	WE	Sat	X		X	
30-Jul	WE	Sun	X		X	
31-Jul	WD	Mon		X	X	
01-Aug	WD	Tues		X	X	
02-Aug	WD	Wed			X	X
03-Aug	WD	Thur	-----OFF-----			

-Continued-

Appendix Table C2. Sampling schedule for the Whittier sport fishery, 1989 (continued).

Date	Strata <sup>1</sup>	Day	Period/Time			
			A (1000-1300)	B (1301-1600)	C (1601-1900)	D (1901-2200)
04-Aug	WD	Fri	-----OFF-----			
05-Aug	WE	Sat			X	X
06-Aug	WE	Sun		X	X	
07-Aug	WD	Mon	-----OFF-----			
08-Aug	WD	Tues	-----OFF-----			
09-Aug	WD	Wed			X	X
10-Aug	WD	Thur		X	X	
11-Aug	WD	Fri		X	X	
12-Aug	WE	Sat		X	X	
13-Aug	WE	Sun			X	X
14-Aug	WD	Mon	X		X	
15-Aug	WD	Tues			X	X
16-Aug	WD	Wed	-----OFF-----			
17-Aug	WD	Thur	-----OFF-----			
18-Aug	WD	Fri			X	X
19-Aug	WE	Sat			X	X
20-Aug	WE	Sun		X	X	
21-Aug	WD	Mon	X		X	
22-Aug	WD	Tues	X		X	
23-Aug	WD	Wed			X	X
24-Aug	WD	Thur	-----OFF-----			
25-Aug	WD	Fri	-----OFF-----			
26-Aug	WE	Sat			X	X
27-Aug	WE	Sun	X		X	
28-Aug	WD	Mon			X	X

<sup>1</sup> WD=Weekday, WE=Weekend/Holiday.

Appendix Table C3. Sampling schedule for the Cordova marine sport fishery, 1989.

Date	Strata <sup>1</sup>	Day	Period/Time			
			(0800-1130)	(1131-1500)	(1501-1830)	(1831-2200)
24-Jun	WE	Sat			X	X
25-Jun	WE	Sun			X	X
26-Jun	WD	Mon	X		X	
27-Jun	WD	Tues		X	X	
28-Jun	WD	Wed			X	X
29-Jun	WD	Thur	-----OFF-----			
30-Jun	WD	Fri	-----OFF-----			
01-Jul	WE	Sat	X		X	
02-Jul	WE	Sun			X	X
03-Jul	WD	Mon	-----OFF-----			
04-Jul	WE	Tues	X		X	
05-Jul	WD	Wed	-----OFF-----			
06-Jul	WD	Thur	-----OFF-----			
07-Jul	WD	Fri			X	X
08-Jul	WE	Sat			X	X
09-Jul	WE	Sun			X	X
10-Jul	WD	Mon	-----OFF-----			
11-Jul	WD	Tues	-----OFF-----			
12-Jul	WD	Wed		X	X	
13-Jul	WD	Thur		X	X	
14-Jul	WD	Fri			X	X
15-Jul	WE	Sat	X	X		
16-Jul	WE	Sun			X	X
17-Jul	WD	Mon			X	X
18-Jul	WD	Tues		X	X	
19-Jul	WD	Wed	-----OFF-----			
20-Jul	WD	Thur	-----OFF-----			
21-Jul	WD	Fri			X	X
22-Jul	WE	Sat			X	X
23-Jul	WE	Sun	X	X		
24-Jul	WD	Mon			X	X
25-Jul	WD	Tues			X	X
26-Jul	WD	Wed	-----OFF-----			
27-Jul	WD	Thur	-----OFF-----			
28-Jul	WD	Fri		X		X
29-Jul	WE	Sat	X		X	
30-Jul	WE	Sun	X			X
31-Jul	WD	Mon		X	X	

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Appendix Table C3. Sampling schedule for the Cordova marine sport fishery, 1989 (continued).

Date	Strata <sup>1</sup> Day		Period/Time			
			(0800-1130)	(1131-1500)	(1501-1830)	(1831-2200)
01-Aug	WD	Tues			X	X
02-Aug	WD	Wed	X			X
03-Aug	WD	Thur	-----OFF-----			
04-Aug	WD	Fri	-----OFF-----			
05-Aug	WE	Sat			X	X
06-Aug	WE	Sun			X	X
07-Aug	WD	Mon			X	X
08-Aug	WD	Tues		X		X
09-Aug	WD	Wed			X	X
10-Aug	WD	Thur	-----OFF-----			
11-Aug	WD	Fri	-----OFF-----			
12-Aug	WE	Sat			X	X
13-Aug	WE	Sun			X	X
14-Aug	WD	Mon			X	X
15-Aug	WD	Tues	-----OFF-----			
16-Aug	WD	Wed	-----OFF-----			
17-Aug	WD	Thur	X	X		
18-Aug	WD	Fri	X			X
19-Aug	WE	Sat	X	X		
20-Aug	WE	Sun		X	X	
21-Aug	WD	Mon			X	X
22-Aug	WD	Tues			X	X
23-Aug	WD	Wed	-----OFF-----			
24-Aug	WD	Thur	-----OFF-----			
25-Aug	WD	Fri	X		X	
26-Aug	WE	Sat	X		X	
27-Aug	WE	Sun		X		X
28-Aug	WD	Mon			X	X
29-Aug	WD	Tues	-----OFF-----			
30-Aug	WD	Wed	-----OFF-----			
31-Aug	WD	Thur			X	X
01-Sep	WD	Fri	X		X	
02-Sep	WE	Sat			X	X
03-Sep	WE	Sun			X	X

<sup>1</sup> WD=Weekday, WE=Weekend/Holiday.

Appendix Table C4. Sampling schedule for the Homer marine sport fishery, 1989.

Date	Strata <sup>1</sup>	Day	Period/Time			
			(1000-1300)	(1301-1600)	(1601-1900)	(1901-2200)
01-Jul	WE	Sat	X	X		
02-Jul	WE	Sun	X		X	
03-Jul	WD	Mon			X	X
04-Jul	WE	Tues		X		X
05-Jul	WD	Wed	-----OFF-----			
06-Jul	WD	Thur	-----OFF-----			
07-Jul	WD	Fri	-----OFF-----			
08-Jul	WE	Sat			X	X
09-Jul	WE	Sun		X		X
10-Jul	WD	Mon	X			X
11-Jul	WD	Tues		X	X	
12-Jul	WD	Wed	X		X	
13-Jul	WD	Thur	-----OFF-----			
14-Jul	WD	Fri	-----OFF-----			
15-Jul	WE	Sat			X	X
16-Jul	WE	Sun		X	X	
17-Jul	WD	Mon		X	X	
18-Jul	WD	Tues	-----OFF-----			
19-Jul	WD	Wed	-----OFF-----			
20-Jul	WD	Thur	X	X		
21-Jul	WD	Fri		X		X
22-Jul	WE	Sat	X	X		
23-Jul	WE	Sun			X	X
24-Jul	WD	Mon	-----OFF-----			
25-Jul	WD	Tues	-----OFF-----			
26-Jul	WD	Wed		X	X	
27-Jul	WD	Thur			X	X
28-Jul	WD	Fri			X	X
29-Jul	WE	Sat		X	X	
30-Jul	WE	Sun	X			X
31-Jul	WD	Mon		X		X

-Continued-

Appendix Table C4. Sampling schedule for the Homer marine sport fishery, 1989 (continued).

Date	Strata <sup>1</sup>	Day	Period/Time			
			(1000-1300)	(1301-1600)	(1601-1900)	(1901-2200)
01-Aug	WD	Tues	X			X
02-Aug	WD	Wed		X	X	
03-Aug	WD	Thur	-----OFF-----			
04-Aug	WD	Fri	-----OFF-----			
05-Aug	WE	Sat	X		X	
06-Aug	WE	Sun		X	X	
07-Aug	WD	Mon	-----OFF-----			
08-Aug	WD	Tues	-----OFF-----			
09-Aug	WD	Wed		X	X	
10-Aug	WD	Thur		X	X	
11-Aug	WD	Fri			X	X
12-Aug	WE	Sat	X			X
13-Aug	WE	Sun			X	X
14-Aug	WD	Mon	-----OFF-----			
15-Aug	WD	Tues	-----OFF-----			
16-Aug	WD	Wed		X	X	
17-Aug	WD	Thur			X	X
18-Aug	WD	Fri		X	X	
19-Aug	WE	Sat	X	X		
20-Aug	WE	Sun		X	X	
21-Aug	WD	Mon	X			X
22-Aug	WD	Tues	X			X
23-Aug	WD	Wed	-----OFF-----			
24-Aug	WD	Thur	-----OFF-----			
25-Aug	WD	Fri	X			X
26-Aug	WE	Sat			X	X
27-Aug	WE	Sun	X		X	
28-Aug	WD	Mon		X	X	
29-Aug	WD	Tues	-----OFF-----			
30-Aug	WD	Wed	-----OFF-----			
31-Aug	WD	Thur		X	X	

-Continued-

Appendix Table C4. Sampling schedule for the Homer marine sport fishery, 1989 (continued).

Date	Strata <sup>1</sup>	Day	Period/Time		
			(1000-1300)	(1301-1600)	(1601-1900)
01-Sep	WD	Fri	X		X
02-Sep	WE	Sat	X		X
03-Sep	WE	Sun		X	X
04-Sep	WE	Mon		X	X
05-Sep	WD	Tues	-----OFF-----		
06-Sep	WD	Wed	-----OFF-----		
07-Sep	WD	Thur		X	X
08-Sep	WD	Fri		X	X
09-Sep	WE	Sat		X	X
10-Sep	WE	Sun	X		X
11-Sep	WD	Mon	-----OFF-----		
12-Sep	WD	Tues	-----OFF-----		
13-Sep	WD	Wed		X	X
14-Sep	WD	Thur		X	X
15-Sep	WD	Fri	X		X
16-Sep	WE	Sat		X	X
17-Sep	WE	Sun		X	X

<sup>1</sup> WD=Weekday, WE=Weekend/Holiday.

Appendix Table C5. Sampling schedule for the Kodiak marine sport fishery, 1989

Date	Strata <sup>1</sup>	Day	A (1000-1400)	B (1401-1700)	C (1700-2000)	D (2001-2300)	
08-Jul	WE	Sat		X	X		
09-Jul	WE	Sun	X		X		
10-Jul	WD	Mon		X	X		
11-Jul	WD	Tues			X	X	
12-Jul	WD	Wed	X			X	
13-Jul	WD	Thur	-----OFF-----				
14-Jul	WD	Fri	-----OFF-----				
15-Jul	WE	Sat		X	X		
16-Jul	WE	Sun	X		X		
17-Jul	WD	Mon	X			X	
18-Jul	WD	Tues		X	X		
19-Jul	WD	Wed	-----OFF-----				
20-Jul	WD	Thur	-----OFF-----				
21-Jul	WD	Fri		X	X		
22-Jul	WE	Sat			X	X	
23-Jul	WE	Sun		X	X		
24-Jul	WD	Mon	X	X			
25-Jul	WD	Tues			X	X	
26-Jul	WD	Wed	X	X			
27-Jul	WD	Thur	-----OFF-----				
28-Jul	WD	Fri	-----OFF-----				
29-Jul	WE	Sat	X		X		
30-Jul	WE	Sun		X	X		
31-Jul	WD	Mon		X	X		

-Continued-

Appendix Table C5. Sampling schedule for the Kodiak marine sport fishery, 1989 (continued).

Date	Strata <sup>1</sup>	Day	B (1400-1700)	C (1701-2000)	D (2001-2300)
01-Aug	WD	Tues		X	X
02-Aug	WD	Wed		X	X
03-Aug	WD	Thur	-----	OFF-----	
04-Aug	WD	Fri	-----	OFF-----	
05-Aug	WE	Sat	X	X	
06-Aug	WE	Sun	X	X	
07-Aug	WD	Mon		X	X
08-Aug	WD	Tues	X	X	
09-Aug	WD	Wed	-----	OFF-----	
10-Aug	WD	Thur	-----	OFF-----	
11-Aug	WD	Fri	X	X	
12-Aug	WE	Sat	X	X	
13-Aug	WE	Sun	X	X	
14-Aug	WD	Mon		X	X
15-Aug	WD	Tues	X		X
16-Aug	WD	Wed		X	X
17-Aug	WD	Thur	-----	OFF-----	
18-Aug	WD	Fri	-----	OFF-----	
19-Aug	WE	Sat	X	X	
20-Aug	WE	Sun	X	X	
21-Aug	WD	Mon	X		X
22-Aug	WD	Tues	-----	OFF-----	
23-Aug	WD	Wed	-----	OFF-----	
24-Aug	WD	Thur	X		X
25-Aug	WD	Fri	X		X
26-Aug	WE	Sat		X	X
27-Aug	WE	Sun	X	X	
28-Aug	WD	Mon	X	X	
29-Aug	WD	Tues	-----	OFF-----	
30-Aug	WD	Wed	-----	OFF-----	
31-Aug	WD	Thur	X	X	

-Continued-

Appendix Table C5. Sampling schedule for the Kodiak marine sport fishery, 1989 (continued).

Date	Strata <sup>1</sup>	Day	B (1401-1700)	C (1701-2000)	D (2001-2300)
01-Sep	WD	Fri		X	X
02-Sep	WE	Sat	X	X	
03-Sep	WE	Sun	X		X
04-Sep	WE	Mon	X		X
05-Sep	WD	Tues		<del>OFF</del>	
06-Sep	WD	Wed		<del>OFF</del>	
07-Sep	WD	Thur		<del>OFF</del>	
08-Sep	WD	Fri	X	X	
09-Sep	WE	Sat		X	X
10-Sep	WE	Sun		X	X
11-Sep	WD	Mon		<del>OFF</del>	
12-Sep	WD	Tues		<del>OFF</del>	
13-Sep	WD	Wed	X	X	
14-Sep	WD	Thur		X	X
15-Sep	WD	Fri	X	X	
16-Sep	WE	Sat	X	X	
17-Sep	WE	Sun	X	X	

1 WD=Weekday, WE=Weekend/Holiday.

Appendix Table C6. Sampling schedule for the Clear Creek sport fishery, 1989.

Date	Strata <sup>1</sup>	Day	A (0600-0930)	B (0931-1700)	C (1701-2030)
24-Jun	WE	Sat		X	
25-Jun	WE	Sun	X		X
26-Jun	WD	Mon	-----	OFF-----	-----
27-Jun	WD	Tues	-----	OFF-----	-----
28-Jun	WD	Wed	X		X
29-Jun	WD	Thur	X		X
30-Jun	WD	Fri	X		X
01-Jul	WE	Sat	X		X
02-Jul	WE	Sun		X	
03-Jul	WE	Mon	X		X
04-Jul	WE	Tues		X	
05-Jul	WD	Wed	X		X
06-Jul	WD	Thur	-----	OFF-----	-----
07-Jul	WD	Fri	-----	OFF-----	-----
08-Jul	WE	Sat	X		X
09-Jul	WE	Sun	X		X
10-Jul	WD	Mon	X		X
11-Jul	WD	Tues	X		X
12-Jul	WD	Wed	-----	OFF-----	-----
13-Jul	WD	Thur	-----	OFF-----	-----
14-Jul	WD	Fri	X		X
15-Jul	WE	Sat	X		X
16-Jul	WE	Sun	X		X
17-Jul	WD	Mon	-----	OFF-----	-----
18-Jul	WD	Tues	-----	OFF-----	-----
19-Jul	WD	Wed	X		X
20-Jul	WD	Thur	X		X
21-Jul	WD	Fri	X		X
22-Jul	WE	Sat		X	
23-Jul	WE	Sun	X		X
24-Jul	WD	Mon	X		X
25-Jul	WD	Tues	X		X
26-Jul	WD	Wed	-----	OFF-----	-----
27-Jul	WD	Thur	-----	OFF-----	-----
28-Jul	WD	Fri	X		X
29-Jul	WE	Sat	X		X
30-Jul	WE	Sun	X		X
31-Jul	WD	Mon	X		X

-Continued-

Appendix Table C7. Sampling schedule for the Eyak and Alaganik River sport fisheries, 1989.

Date	Strata <sup>1</sup>	Day	Period/Time		
			(0600-0930)	(0931-1700)	(1701-2030)
24-Jun	WE	Sat	X		X
25-Jun	WE	Sun		X	
26-Jun	WD	Mon	-----OFF-----		
27-Jun	WD	Tues	-----OFF-----		
28-Jun	WD	Wed		X	
29-Jun	WD	Thur	X		X
30-Jun	WD	Fri	X		X
01-Jul	WE	Sat	X		X
02-Jul	WE	Sun	X		X
03-Jul	WE	Mon	X		X
04-Jul	WE	Tues	X	X	
05-Jul	WD	Wed		X	
06-Jul	WD	Thur	-----OFF-----		
07-Jul	WD	Fri	-----OFF-----		
08-Jul	WE	Sat		X	
09-Jul	WE	Sun	X		X
10-Jul	WD	Mon	-----OFF-----		
11-Jul	WD	Tues	-----OFF-----		
12-Jul	WD	Wed	X		X
13-Jul	WD	Thur	X		X
14-Jul	WD	Fri	X		X
15-Jul	WE	Sat		X	
16-Jul	WE	Sun	X		X
17-Jul	WD	Mon		X	
18-Jul	WD	Tues	X		X
19-Jul	WD	Wed	-----OFF-----		
20-Jul	WD	Thur	-----OFF-----		
21-Jul	WD	Fri	X		X
22-Jul	WE	Sat	X		X
23-Jul	WE	Sun		X	
24-Jul	WD	Mon	-----OFF-----		
25-Jul	WD	Tues	-----OFF-----		

-Continued-

Appendix Table C6. Sampling schedule for the Clear Creek sport fishery, 1989 (continued).

Date	Strata <sup>1</sup>	Day	Period/Time	
			A:1000-1500	B:1501-2000
01-Sep	WD	Fri	X	
02-Sep	WE	Sat		X
03-Sep	WE	Sun	X	
04-Sep	WE	Mon	X	
05-Sep	WD	Tues	-----OFF-----	
06-Sep	WD	Wed	-----OFF-----	
07-Sep	WD	Thur	X	
08-Sep	WD	Fri		X
09-Sep	WE	Sat		X
10-Sep	WE	Sun		X
11-Sep	WD	Mon		X
12-Sep	WD	Tues	X	
13-Sep	WD	Wed	-----OFF-----	
14-Sep	WD	Thur	-----OFF-----	
15-Sep	WD	Fri	X	
16-Sep	WE	Sat	X	
17-Sep	WE	Sun		X

<sup>1</sup> WD=Weekday, WE=Weekend/Holiday.

Appendix Table C7. Sampling schedule for the Eyak and Alaganik River sport fisheries, 1989.  
(continued)

Date	Strata <sup>1</sup>	Day	Period/Time		
			(0600-0930)	(0931-1700)	(1701-2030)
26-Jul	WD	Wed		X	
27-Jul	WD	Thur		X	
28-Jul	WD	Fri	X		X
29-Jul	WE	Sat	X		X
30-Jul	WE	Sun	X		X
31-Jul	WD	Mon	X		X
01-Aug	WD	Tues	X		X
02-Aug	WD	Wed	X		X
03-Aug	WD	Thur	-----OFF-----		
04-Aug	WD	Fri	-----OFF-----		
05-Aug	WE	Sat		X	
06-Aug	WE	Sun	X		X
07-Aug	WD	Mon	X		X
08-Aug	WD	Tues	-----OFF-----		
09-Aug	WD	Wed	-----OFF-----		
10-Aug	WD	Thur	X		X
11-Aug	WD	Fri		X	
12-Aug	WE	Sat	X		X
13-Aug	WE	Sun	X		X
14-Aug	WD	Mon	-----OFF-----		
15-Aug	WD	Tues	-----OFF-----		
16-Aug	WD	Wed	X		X
17-Aug	WD	Thur	X		X
18-Aug	WD	Fri	X		X
19-Aug	WE	Sat	X		X
20-Aug	WE	Sun	X		X
21-Aug	WD	Mon	X		X
22-Aug	WD	Tues	-----OFF-----		
23-Aug	WD	Wed	-----OFF-----		
24-Aug	WD	Thur	X		X
25-Aug	WD	Fri		X	
26-Aug	WE	Sat	X		X
27-Aug	WE	Sun		X	
28-Aug	WD	Mon	X		X
29-Aug	WD	Tues	X		X
30-Aug	WD	Wed	X		X
31-Aug	WD	Thur	-----OFF-----		
01-Sep	WD	Fri	-----OFF-----		
02-Sep	WE	Sat	X		X
03-Sep	WE	Sun	X		X

-Continued-

Appendix Table C7. Sampling schedule for the Eyak and Alaganik River sport fisheries, 1989 (continued).

Date	Strata <sup>1</sup>	Day	Period/Time		
			(0600-0930)	(0931-1700)	(1701-2030)
04-Sep	WE	Mon		X	
05-Sep	WD	Tues	X		X
06-Sep	WD	Wed	X		X
07-Sep	WD	Thur		-----OFF-----	
08-Sep	WD	Fri		-----OFF-----	
09-Sep	WE	Sat	X		X
10-Sep	WE	Sun	X		X
11-Sep	WD	Mon	X		X
12-Sep	WD	Tues	X		X
13-Sep	WD	Wed	X		X
14-Sep	WD	Thur		-----OFF-----	
15-Sep	WD	Fri		-----OFF-----	
16-Sep	WE	Sat		X	
17-Sep	WE	Sun		X	
18-Sep	WD	Mon	X		X
19-Sep	WD	Tues		X	
20-Sep	WD	Wed	X		X
21-Sep	WD	Thur		-----OFF-----	
22-Sep	WD	Fri		-----OFF-----	
23-Sep	WE	Sat		X	
24-Sep	WE	Sun	X		X
25-Sep	WD	Mon	X		X
26-Sep	WD	Tues		-----OFF-----	
27-Sep	WD	Wed		-----OFF-----	
28-Sep	WD	Thur	X		X
29-Sep	WD	Fri	X		X
30-Sep	WE	Sat	X		X

<sup>1</sup> WD=Weekday, WE=Weekend/Holiday.

Appendix Table C8. Sampling schedule for the Eshamy sport fishery, 1989

Date	Strata <sup>1</sup>	Day	Period/Time			
			(0800-1130)	(1131-1500)	(1501-1830)	(1831-2200)
11-Jul	WD	Tues				X
12-Jul	WD	Wed	-----OFF-----			
13-Jul	WD	Thur	-----OFF-----			
14-Jul	WD	Fri		X		
15-Jul	WE	Sat		X		
16-Jul	WE	Sun			X	
17-Jul	WD	Mon	-----OFF-----			
18-Jul	WD	Tues	-----OFF-----			
19-Jul	WD	Wed		X		
20-Jul	WD	Thur	X			
21-Jul	WD	Fri			X	
22-Jul	WE	Sat			X	
23-Jul	WE	Sun			X	
24-Jul	WD	Mon		X		
25-Jul	WD	Tues			X	
26-Jul	WD	Wed	X			
27-Jul	WD	Thur	-----OFF-----			
28-Jul	WD	Fri	-----OFF-----			
29-Jul	WE	Sat				X
30-Jul	WE	Sun		X		
31-Jul	WD	Mon	-----OFF-----			
01-Aug	WD	Tues	-----OFF-----			
02-Aug	WD	Wed		X		
03-Aug	WD	Thur				X
04-Aug	WD	Fri			X	
05-Aug	WE	Sat			X	
06-Aug	WE	Sun			X	
07-Aug	WD	Mon			X	
08-Aug	WD	Tues				X
09-Aug	WD	Wed			X	
10-Aug	WD	Thur	-----OFF-----			

-Continued-

Appendix Table C8. Sampling schedule for the Eshamy sport fishery, 1989 (continued).

Date	Strata <sup>1</sup>	Day	Period/Time			
			(0800-1130)	(1131-1500)	(1501-1830)	(1831-2200)
11-Aug	WD	Fri	-----OFF-----			
12-Aug	WE	Sat	X			
13-Aug	WE	Sun		X		
14-Aug	WD	Mon		X		
15-Aug	WD	Tues			X	
16-Aug	WD	Wed		X		
17-Aug	WD	Thur	-----OFF-----			
18-Aug	WD	Fri	-----OFF-----			
19-Aug	WE	Sat			X	
20-Aug	WE	Sun			X	
21-Aug	WD	Mon			X	
22-Aug	WD	Tues			X	
23-Aug	WD	Wed	-----OFF-----			
24-Aug	WD	Thur	-----OFF-----			
25-Aug	WD	Fri				X
26-Aug	WE	Sat				X
27-Aug	WE	Sun		X		
28-Aug	WD	Mon		X		
29-Aug	WD	Tues		X		
30-Aug	WD	Wed	-----OFF-----			
31-Aug	WD	Thur	-----OFF-----			
01-Sep	WD	Fri			X	
02-Sep	WE	Sat		X		
03-Sep	WE	Sun		X		
04-Sep	WE	Mon			X	

<sup>1</sup> WD=Weekday, WE=Weekend/Holiday.

## Appendix D. Creel Survey Angler Counts

Appendix Table D1. Angler counts for Alaganik River, 24 June through 30 September 1989.

Survey Date	Period A	Period B	Period C
06/24/89	0		2
06/25/89		2	
06/26/89	-----	OFF-----	
06/27/89	-----	OFF-----	
06/28/89		1	
06/29/89	0		0
06/30/89	0		1
07/01/89	0		1
07/02/89	0		1
07/03/89	0		0
07/04/89	0		0
07/05/89		0	
07/06/89	-----	OFF-----	
07/07/89	-----	OFF-----	
07/08/89		0	
07/09/89	0		4
07/10/89	-----	OFF-----	
07/11/89	-----	OFF-----	
07/12/89	0		2
07/13/89	0		0
07/14/89	0		0
07/15/89		0	
07/16/89	0		2
07/17/89		2	
07/18/89	2		0
07/19/89	-----	OFF-----	
07/20/89	-----	OFF-----	
07/21/89	0		0
07/22/89	0		0
07/23/89		0	
07/24/89	-----	OFF-----	
07/25/89	-----	OFF-----	
07/26/89		0	
07/27/89		0	
07/28/89	0		0
07/29/89	0		0
07/30/89	0		0
07/31/89	0		2
08/01/89	0		0
08/02/89	0		0
08/03/89	-----	OFF-----	
08/04/89	-----	OFF-----	
08/05/89		0	

-Continued-

Appendix Table D1. Angler counts for Alaganik River, 24 June through 30 September 1989 (continued).

Survey Date	Period A	Period B	Period C
08/06/89	0		0
08/07/89	0		0
08/08/89	-----	OFF-----	
08/09/89	-----	OFF-----	
08/10/89	0		0
08/11/89		0	
08/12/89	0		6
08/13/89	0		4
08/14/89	-----	OFF-----	
08/15/89	-----	OFF-----	
08/16/89	---		0
08/17/89	0		3
08/18/89	0		0
08/19/89	0		4
08/20/89	---		0
08/21/89	0		0
08/22/89	-----	OFF-----	
08/23/89	-----	OFF-----	
08/24/89	0		0
08/25/89		0	
08/26/89	---		0
08/27/89		11	
08/28/89	0		0
08/29/89	0		1
08/30/89	0		6
08/31/89	-----	OFF-----	
09/01/89	-----	OFF-----	
09/02/89	2		7
09/03/89	3		11
09/04/89		6	
09/05/89	0		2
09/06/89	0		1
09/07/89	-----	OFF-----	
09/08/89	-----	OFF-----	
09/09/89	5		11
09/10/89	2		2
09/11/89	8		11
09/12/89	6		12
09/13/89	0		13
09/14/89	-----	OFF-----	
09/15/89	-----	OFF-----	
09/16/89		6	
09/17/89		15	
09/18/89	0		11
09/19/89		0	

-Continued-

Appendix Table D1. Angler counts for Alaganik River, 24 June through 30 September 1989 (continued).

Survey Date	Period A	Period B	Period C
09/20/89	1		2
09/21/89	-----	OFF-----	-----
09/22/89	-----	OFF-----	-----
09/23/89		4	
09/24/89	3		0
09/25/89	0		5
09/26/89	-----	OFF-----	-----
09/27/89	-----	OFF-----	-----
09/28/89	0		4
09/29/89	0		5
09/30/89	0		3
	32	47	139

--- No count conducted

Appendix Table D2. Angler counts for Clear Creek, 24 June through 17 September 1989.

Survey Date	Period A	Period B	Period C
06/24/89		0	
06/25/89	---		0
06/26/89	-----	OFF-----	
06/27/89	-----	OFF-----	
06/28/89	0		0
06/29/89	0		0
06/30/89	0		0
07/01/89	0		0
07/02/89		0	
07/03/89	0		1
07/04/89		1	
07/05/89	0		0
07/06/89	-----	OFF-----	
07/07/89	-----	OFF-----	
07/08/89	0		0
07/09/89	1		0
07/10/89	0		1
07/11/89	1		1
07/12/89	-----	OFF-----	
07/13/89	-----	OFF-----	
07/14/89	0		0
07/15/89	--		2
07/16/89	0		8
07/17/89	-----	OFF-----	
07/18/89	-----	OFF-----	
07/19/89	2		
07/20/89	0		0
07/21/89	0		0
07/22/89		12	
07/23/89	0		6
07/24/89	0		0
07/25/89	0		2
07/26/89	-----	OFF-----	
07/27/89	-----	OFF-----	
07/28/89	0		0
07/29/89	0		0
07/30/89	0		3
07/31/89	0		2
08/01/89		0	
08/02/89	-----	OFF-----	
08/03/89	-----	OFF-----	
08/04/89	0		
08/05/89		0	

-Continued-

Appendix Table D2. Angler counts for Clear Creek, 24 June through 17 September 1989 (continued).

Survey Date	Period A	Period B	Period C
08/06/89	3		
08/07/89		OFF	
08/08/89		OFF	
08/09/89		1	
08/10/89		5	
08/11/89	0		
08/12/89		4	
08/13/89		2	
08/14/89		OFF	
08/15/89		OFF	
08/16/89		1	
08/17/89	0		
08/18/89	0		
08/19/89	2		
08/20/89		2	
08/21/89		5	
08/22/89		OFF	
08/23/89		OFF	
08/24/89		1	
08/25/89	0		
08/26/89	4		
08/27/89	5		
08/28/89		OFF	
08/29/89		OFF	
08/30/89	7		
08/31/89	12		
09/01/89	0		
09/02/89		0	
09/03/89	0		
09/04/89	0		
09/05/89		OFF	
09/06/89		OFF	
09/07/89	0		
09/08/89		0	
09/09/89		---	
09/10/89		---	
09/11/89		0	
09/12/89	0		
09/13/89		OFF	
09/14/89		OFF	
09/15/89	0		
09/16/89	0		
09/17/89		0	
	4	46	48

--- No count conducted

Appendix Table D3. Angler counts for Eyak River, 24 June through 30 September 1989.

Survey Date	Period A	Period B	Period C
06/24/89	0		2
06/25/89		0	
06/26/89		-----OFF-----	
06/27/89		-----OFF-----	
06/28/89		0	
06/29/89	0		0
06/30/89	0		2
07/01/89	0		3
07/02/89	2		1
07/03/89	0		8
07/04/89	1		5
07/05/89		0	
07/06/89		-----OFF-----	
07/07/89		-----OFF-----	
07/08/89		3	
07/09/89	0		2
07/10/89		-----OFF-----	
07/11/89		-----OFF-----	
07/12/89	0		1
07/13/89	0		0
07/14/89	0		0
07/15/89		2	
07/16/89	0		1
07/17/89		0	
07/18/89	1		6
07/19/89		-----OFF-----	
07/20/89		-----OFF-----	
07/21/89	0		0
07/22/89	0		0
07/23/89		0	
07/24/89		-----OFF-----	
07/25/89		-----OFF-----	
07/26/89		1	
07/27/89		0	
07/28/89	0		2
07/29/89	2		0
07/30/89	0		2
07/31/89	0		1
08/01/89	0		0
08/02/89	0		5
08/03/89		-----OFF-----	
08/04/89		-----OFF-----	
08/05/89		5	

-Continued-

Appendix Table D3. Angler counts for Eyak River, 24 June through 30 September, 1989 (continued).

Survey Date	Period A	Period B	Period C
08/06/89	7		15
08/07/89	6		10
08/08/89	-----	OFF-----	
08/09/89	-----	OFF-----	
08/10/89	0		9
08/11/89		8	
08/12/89	5		7
08/13/89	9		12
08/14/89	-----	OFF-----	
08/15/89	-----	OFF-----	
08/16/89	14		31
08/17/89	18		21
08/18/89	17		3
08/19/89	2		10
08/20/89	---		16
08/21/89	12		13
08/22/89	-----	OFF-----	
08/23/89	-----	OFF-----	
08/24/89	20		18
08/25/89		9	
08/26/89	3		20
08/27/89		12	
08/28/89	2		0
08/29/89	0		0
08/30/89	0		0
08/31/89	-----	OFF-----	
09/01/89	-----	OFF-----	
09/02/89	0		0
09/03/89	0		2
09/04/89		0	
09/05/89	0		0
09/06/89	0		2
09/07/89	-----	OFF-----	
09/08/89	-----	OFF-----	
09/09/89	0		0
09/10/89	0		8
09/11/89	0		0
09/12/89	0		0
09/13/89	0		0
09/14/89	-----	OFF-----	
09/15/89	-----	OFF-----	
09/16/89		1	
09/17/89		2	
09/18/89	2		0
09/19/89		0	

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Appendix Table D3. Angler counts for Eyak River, 24 June through 30 September 1989 (continued).

Survey Date	Period A	Period B	Period C
09/20/89	0		0
09/21/89	-----	OFF-----	-----
09/22/89	-----	OFF-----	-----
09/23/89		3	
09/24/89	0		0
09/25/89	---		0
09/26/89	-----	OFF-----	-----
09/27/89	-----	OFF-----	-----
09/28/89	0		0
09/29/89	0		0
09/30/89	0		5
	123	46	243

--- No count conducted

Appendix Table D4. Angler counts for Eshamy, 11 July through 4 September 1989.

Survey Date	Period A	Period B	Period C	Period D
07/11/89				6
07/12/89			-----OFF-----	
07/13/89			-----OFF-----	
07/14/89		0		
07/15/89		3		
07/16/89			6	
07/17/89			-----OFF-----	
07/18/89			-----OFF-----	
07/19/89		0		
07/20/89	0			
07/21/89			2	
07/22/89			4	
07/23/89			2	
07/24/89		0		
07/25/89			0	
07/26/89	4			
07/27/89			-----OFF-----	
07/28/89			-----OFF-----	
07/29/89				2
07/30/89		2		
07/31/89			-----OFF-----	
08/01/89			-----OFF-----	
08/02/89	0			
08/03/89				2
08/04/89			0	
08/05/89			3	
08/06/89			2	
08/07/89			4	
08/08/89				6
08/09/89			4	
08/10/89			-----OFF-----	
08/11/89			-----OFF-----	
08/12/89	0			
08/13/89		8		
08/14/89		14		
08/15/89			5	
08/16/89		1		
08/17/89			-----OFF-----	
08/18/89			-----OFF-----	
08/19/89			4	
08/20/89			4	

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Appendix Table D4. Angler counts for Eshamy, 11 July through 4 September 1989 (continued).

Survey Date	Period A	Period B	Period C	Period D
08/21/89			2	
08/22/89			5	
08/23/89			-----OFF-----	
08/24/89			-----OFF-----	
08/25/89				2
08/26/89				0
08/27/89		4		
08/28/89		4		
08/29/89		2		
08/30/89			-----OFF-----	
08/31/89			-----OFF-----	
09/01/89			0	
09/02/89		0		
09/03/89		0		
09/04/89			0	
	4	38	7	18

--- No count conducted

**Appendix E. Age and Length Data for Halibut, Lingcod, and Rockfish**

Appendix Table E1. Mean length (in millimeters) by age class for Pacific halibut sampled in the Cordova marine sport fishery, 1989.

Parameter	Age Class												TOTAL	
	:3	:4	:5	:6	:7	:8	:9	:10	:11	:12	:14	:16		
<u>Age Composition</u>														
Female														
Sample Number	:	:	4:	4:	3:	3:	2:	2:	4:	3:	2:	2:	:	29
% of Sample	:	:	4.1:	4.1:	3.1:	3.1:	2.0:	2.0:	4.1:	3.1:	2.0:	2.0:	:	29.6
Std. Error	:	:	2.01:	2.01:	1.75:	1.75:	1.44:	1.44:	2.01:	1.75:	1.44:	1.44:	:	4.63
Male														
Sample Number	:	1:	8:	12:	8:	7:	4:	2:	2:	3:	:	:	1:	48
% of Sample	:	1.0:	8.2:	12.2:	8.2:	7.1:	4.1:	2.0:	2.0:	3.1:	:	:	1.0:	49.0
Std. Error	:	1.02:	2.78:	3.33:	2.78:	2.61:	2.01:	1.44:	1.44:	1.75:	:	:	1.02:	5.08
All <sup>1</sup>														
Sample Number	:	2:	14:	21:	20:	12:	6:	4:	7:	7:	2:	2:	1:	98
% of Sample	:	2.0:	14.3:	21.4:	20.4:	12.2:	6.1:	4.1:	7.1:	7.1:	2.0:	2.0:	1.0:	100.0
Std. Error	:	1.44:	3.55:	4.17:	4.09:	3.33:	2.43:	2.01:	2.61:	2.61:	1.44:	1.44:	1.02:	
<u>Length Composition</u>														
Female														
Average	:	:	578:	675:	835:	1063:	1067:	1108:	1144:	1236:	1121:	1371:	:	977
Std. Error	:	:	42.50:	28.94:	53.88:	97.35:	37.00:	4.00:	52.50:	114.54:	8.50:	254.50:	:	51.46
Sample Size	:	:	4:	4:	3:	3:	2:	2:	4:	3:	2:	2:	:	29
Male														
Average	:	630:	620:	671:	783:	897:	904:	1113:	1123:	1133:	:	:	1340:	813
Std. Error	:	:	31.21:	29.98:	46.62:	46.38:	61.28:	10.00:	7.00:	14.53:	:	:	:	30.15
Sample Size	:	1:	8:	12:	8:	7:	4:	2:	2:	3:	:	:	1:	48
All <sup>1</sup>														
Average	:	600:	617:	660:	781:	929:	958:	1110.50:	1103:	1223:	1121:	1371:	1340:	850
Std. Error	:	30.00:	24.16:	20.22:	26.82:	41.53:	52.71:	4.63:	44.14:	60.98:	8.50:	254.50:	:	24.55
Sample Size	:	2:	14:	21:	20:	12:	6:	4:	7:	7:	2:	2:	1:	98

<sup>1</sup> Includes fish which were not sexed.

Appendix Table E2. Mean length (in millimeters) by age class for Pacific halibut sampled in the Valdez marine sport fishery, 1989.

Parameter	Age Class																TOTAL
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
<u>Age Composition</u>																	
Female																	
Sample Number :	:	9 :	10 :	5 :	5 :	9 :	9 :	4 :	:	3 :	2 :	1 :	:	1 :	:	:	58
% of Sample:	:	3.2 :	3.6 :	1.8 :	1.8 :	3.2 :	3.2 :	1.4 :	:	1.1 :	0.7 :	0.4 :	:	0.4 :	:	:	20.7
Std. Error:	:	1 :	1 :	1 :	1 :	1 :	1 :	1 :	:	1 :	1 :	<1 :	:	<1 :	:	:	2
Male																	
Sample Number:	1 :	1 :	8 :	6 :	8 :	3 :	1 :	5 :	:	1 :	:	:	:	:	:	:	34
% of Sample:	0.4 :	0.4 :	2.9 :	2.1 :	2.9 :	1.1 :	0.4 :	1.8 :	:	0.4 :	:	:	:	:	:	:	12.1
Std. Error:	<1 :	<1 :	1 :	1 :	1 :	1 :	<1 :	1 :	:	<1 :	:	:	:	:	:	:	2
All <sup>1</sup>																	
Sample Number:	5 :	40 :	42 :	42 :	33 :	38 :	25 :	28 :	5 :	8 :	5 :	3 :	1 :	2 :	2 :	1 :	280
% of Sample:	1.8 :	14.3 :	15.0 :	15.0 :	11.8 :	13.6 :	8.9 :	10.0 :	1.8 :	2.9 :	1.8 :	1.1 :	0.4 :	0.7 :	0.7 :	0.4 :	100.0
Std. Error:	1 :	2 :	2 :	2 :	2 :	2 :	2 :	2 :	1 :	1 :	1 :	1 :	<1 :	1 :	1 :	<1 :	
<u>Length Composition</u>																	
Female																	
Average:	:	584 :	627 :	732 :	655 :	892 :	999 :	1166 :	:	1423 :	1437 :	1370 :	:	1880 :	:	:	871
Std. Error:	:	20 :	33 :	50 :	93 :	40 :	76 :	102 :	:	69 :	92 :	:	:	:	:	:	43
Sample Size:	:	9 :	10 :	5 :	5 :	9 :	9 :	4 :	:	3 :	2 :	1 :	:	1 :	:	:	58
Male																	
Average:	550 :	510 :	626 :	624 :	738 :	937 :	860 :	913 :	:	890 :	:	:	:	:	:	:	730
Std. Error:	:	:	13 :	40 :	26 :	59 :	:	73 :	:	:	:	:	:	:	:	:	27
Sample Size:	1 :	1 :	8 :	6 :	8 :	3 :	1 :	5 :	:	1 :	:	:	:	:	:	:	34
All <sup>1</sup>																	
Average:	492 :	529 :	616 :	687 :	737 :	883 :	983 :	1059 :	1246 :	1221 :	1401 :	1393 :	1580 :	1690 :	1868 :	1690 :	814
Std. Error:	26 :	10 :	13 :	18 :	26 :	23 :	38 :	37 :	111 :	73 :	69 :	34 :	:	190 :	13 :	:	18
Sample Size:	5 :	40 :	42 :	42 :	33 :	38 :	25 :	28 :	5 :	8 :	5 :	3 :	1 :	2 :	2 :	1 :	280

<sup>1</sup> Includes fish which were not sexed

Appendix Table E3. Mean length (in millimeters) by age class for Pacific halibut sampled in the Kodiak sport fishery, 1989.

	-----Age Class-----												
	3	4	5	6	7	8	9	10	11	12	13	15	Total
<u>Age Composition</u>													
Female													
Sample Number	1:	6:	17:	36:	20:	21:	29:	12:	15:	11:	3:	1:	172
% of Sample	: 0.5:	3.0:	8.6:	18.3:	10.2:	10.7:	14.7:	6.1:	7.6:	5.6:	1.5:	0.5:	87.3
Std. Error	: 1:	1:	2:	3:	2:	2:	3:	2:	2:	2:	1:	1:	2
Male													
Sample Number	:	1:	3:	3:	4:	5:	2:	4:	2:	:	1:	:	25
% of Sample	:	0.5:	1.5:	1.5:	2.0:	2.5:	1.0:	2.0:	1.0:	:	0.5:	:	12.7
Std. Error	:	1:	1:	1:	1:	1:	1:	1:	1:	:	1:	:	2
All													
Sample Number	: 1:	7:	20:	39:	24:	26:	31:	16:	17:	11:	4:	1:	197
% of Sample	: 0.5:	3.6:	10.2:	19.8:	12.2:	13.2:	15.7:	8.1:	8.6:	5.6:	2.0:	0.5:	100.0
Std. Error	: 1:	1:	2:	3:	2:	2:	3:	2:	2:	2:	1:	1	
<u>Length Composition</u>													
Female													
Average	: 560:	666:	677:	787:	884:	1044:	1156:	1239:	1372:	1489:	1612:	1510:	1023
Std. Error	: :	43:	19:	18:	31:	42:	38:	38:	69:	68:	52:	:	24
Sample Size	: 1:	6:	17:	35:	20:	21:	29:	12:	15:	11:	3:	1:	171
Male													
Average	: :	665:	530:	809:	727:	811:	935:	971:	685:	:	810:	:	783
Std. Error	: :	:	147:	162:	49:	20:	185:	134:	125:	:	:	:	42
Sample Size	: :	1:	3:	3:	4:	5:	2:	4:	2:	:	1:	:	25
All													
Average	: 560:	665:	655:	788:	858:	1000:	1142:	1172:	1291:	1489:	1411:	1510:	992
Std. Error	: :	36:	27:	20:	29:	38:	38:	51:	83:	68:	204:	:	22
Sample Size	: 1:	7:	20:	38:	24:	26:	31:	16:	17:	11:	4:	1:	196

Appendix Table E4. Mean length (in millimeters) by age class for Pacific halibut sampled in the Homer marine sport fishery, 1989.

	-----Age Class-----												
	5	6	7	8	9	10	11	12	13	14	15	16	Total
<u>Age Composition</u>													
Female													
Sample Number :	9 :	27 :	30 :	31 :	43 :	30 :	16 :	11 :	3 :	6 :	2 :	:	208
% of Sample :	2.6 :	7.8 :	8.6 :	8.9 :	12.4 :	8.6 :	4.6 :	3.2 :	0.9 :	1.7 :	0.6 :	:	59.8
Std. Error :	1 :	1 :	2 :	2 :	2 :	2 :	1 :	1 :	1 :	1 :	<1 :	:	3
Male													
Sample Number :	7 :	17 :	17 :	21 :	24 :	22 :	18 :	6 :	4 :	1 :	2 :	1 :	140
% of Sample :	2.0 :	4.9 :	4.9 :	6.0 :	6.9 :	6.3 :	5.2 :	1.7 :	1.1 :	0.3 :	0.6 :	0.3 :	40.2
Std. Error :	1 :	1 :	1 :	1 :	1 :	1 :	1 :	1 :	1 :	<1 :	<1 :	<1 :	3
All													
Sample Number :	16 :	44 :	47 :	52 :	67 :	52 :	34 :	17 :	7 :	7 :	4 :	1 :	348
% of Sample :	4.6 :	12.6 :	13.5 :	14.9 :	19.3 :	14.9 :	9.8 :	4.9 :	2.0 :	2.0 :	1.1 :	0.3 :	100.0
Std. Error :	1 :	2 :	2 :	2 :	2 :	2 :	2 :	1 :	1 :	1 :	1 :	<1 :	
<u>Length Composition</u>													
Female													
Average :	709 :	759 :	872 :	1067 :	1069 :	1165 :	1220 :	1281 :	1078 :	1336 :	1383 :	:	1032
Std. Error :	30 :	16 :	23 :	34 :	21 :	31 :	58 :	64 :	44 :	60 :	103 :	:	16
Sample Size :	9 :	27 :	30 :	31 :	43 :	30 :	16 :	11 :	3 :	6 :	2 :	:	208
Male													
Average :	708 :	782 :	765 :	840 :	915 :	1099 :	1021 :	1088 :	1061 :	1060 :	1030 :	1500 :	920
Std. Error :	56 :	31 :	23 :	28 :	25 :	25 :	45 :	130 :	34 :	:	160 :	:	17
Sample Size :	7 :	17 :	17 :	21 :	24 :	22 :	18 :	6 :	4 :	1 :	2 :	1 :	140
All													
Average :	708 :	768 :	833 :	975 :	1014 :	1137 :	1115 :	1213 :	1069 :	1296 :	1206 :	1500 :	987
Std. Error :	29 :	15 :	19 :	28 :	19 :	21 :	40 :	64 :	25 :	64 :	128 :	:	12
Sample Size :	16 :	44 :	47 :	52 :	67 :	52 :	34 :	17 :	7 :	7 :	4 :	1 :	348

Appendix Table E5. Mean length (in millimeters) by age class for Pacific halibut sampled in the Seward marine sport fishery, 1989.

Parameter :	-----Age Class-----																	
	3 :	4 :	5 :	6 :	7 :	8 :	9 :	10 :	11 :	12 :	13 :	14 :	15 :	16 :	17 :	18 :	22 :	TOTAL
<u>Age Composition</u>																		
Sample Number :	1 :	9 :	14 :	42 :	43 :	36 :	40 :	54 :	27 :	29 :	15 :	9 :	5 :	6 :	3 :	2 :	1 :	336
% of Sample :	0.3 :	2.7 :	4.2 :	12.5 :	12.8 :	10.7 :	11.9 :	16.1 :	8.0 :	8.6 :	4.5 :	2.7 :	1.5 :	1.8 :	0.9 :	0.6 :	0.3 :	100.0
Std. Error :	0.30 :	0.88 :	1.09 :	1.81 :	1.83 :	1.69 :	1.77 :	2.01 :	1.49 :	1.53 :	1.13 :	0.88 :	0.66 :	0.72 :	0.51 :	0.42 :	0.30 :	
<u>Length Composition</u>																		
Average :	400 :	545 :	653 :	731 :	842 :	931 :	1062 :	1067 :	1068 :	1230 :	1456 :	1318 :	1164 :	1533 :	1495 :	1760 :	2030 :	1007
Std. Error :	13.51 :	23.37 :	25.31 :	26.16 :	32.47 :	27.46 :	25.88 :	27.37 :	33.39 :	47.32 :	65.98 :	45.56 :	87.86 :	28.43 :	145.00 :			15.90
Sample Size :	1 :	9 :	14 :	42 :	43 :	36 :	40 :	54 :	27 :	29 :	15 :	9 :	5 :	6 :	3 :	2 :	1 :	336

Appendix Table E6. Mean length (in millimeters) by age class for lingcod sampled in the Homer marine sport fishery, 1989.

	Age Class							Total
	6	7	8	10	11	12	13	
<u>Age Composition</u>								
Female								
Sample Number :	:	1 :	2 :	2 :	1 :	:	:	6
% of Sample :	:	4.2 :	8.3 :	8.3 :	4.2 :	:	:	25.0
Std. Error :	:	4 :	6 :	6 :	4 :	:	:	9
Male								
Sample Number :	2 :	5 :	2 :	4 :	3 :	1 :	1 :	18
% of Sample :	8.3 :	20.8 :	8.3 :	16.7 :	12.5 :	4.2 :	4.2 :	75.0
Std. Error :	6 :	8 :	6 :	8 :	7 :	4 :	4 :	9
All								
Sample Number :	2 :	6 :	4 :	6 :	4 :	1 :	1 :	24
% of Sample :	8.3 :	25.0 :	16.7 :	25.0 :	16.7 :	4.2 :	4.2 :	100.0
Std. Error :	6 :	9 :	7 :	9 :	7 :	4 :	4 :	
<u>Length Composition</u>								
Female								
Average :	:	935 :	990 :	1005 :	1130 :	:	:	1009
Std. Error :	:	:	30 :	105 :	:	:	:	39
Sample Size :	:	1 :	2 :	2 :	1 :	:	:	6
Male								
Average :	750 :	898 :	895 :	985 :	940 :	1230 :	1210 :	943
Std. Error :	10 :	30 :	65 :	77 :	60 :	:	:	35
Sample Size :	2 :	5 :	2 :	4 :	3 :	1 :	1 :	18
All								
Average :	750 :	904 :	943 :	992 :	988 :	1230 :	1210 :	960
Std. Error :	10 :	26 :	40 :	56 :	64 :	:	:	28
Sample Size :	2 :	6 :	4 :	6 :	4 :	1 :	1 :	24

Appendix Table E7. Mean length (in millimeters) by age class for lingcod sampled in the Seward marine sport fishery, 1989.

	-----Age Class-----																Total
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	21	Total
<u>Age Composition</u>																	
Sample Number :	6 :	28 :	54 :	74 :	112 :	54 :	32 :	22 :	25 :	3 :	2 :	4 :	2 :	4 :	1 :	1 :	424
% of Sample :	1.4 :	6.6 :	12.7 :	17.5 :	26.4 :	12.7 :	7.5 :	5.2 :	5.9 :	0.7 :	0.5 :	0.9 :	0.5 :	0.9 :	0.2 :	0.2 :	100.0
Std. Error :	1 :	1 :	2 :	2 :	2 :	2 :	1 :	1 :	1 :	<1 :	<1 :	<1 :	<1 :	<1 :	<1 :	<1 :	
<u>Length Composition</u>																	
Average :	623 :	692 :	737 :	817 :	856 :	873 :	942 :	968 :	975 :	968 :	840 :	1019 :	1140 :	1078 :	990 :	1295 :	849
Std. Error :	24 :	14 :	12 :	10 :	8 :	11 :	17 :	22 :	30 :	96 :	60 :	53 :	0 :	88 :	:	:	6
Sample Size :	6 :	28 :	54 :	74 :	112 :	54 :	32 :	22 :	25 :	3 :	2 :	4 :	2 :	4 :	1 :	1 :	424
Minimum :	565 :	540 :	590 :	640 :	710 :	750 :	790 :	795 :	575 :	840 :	780 :	940 :	1140 :	895 :	990 :	1295 :	540
Maximum :	730 :	885 :	1150 :	1020 :	1080 :	1050 :	1175 :	1115 :	1195 :	1155 :	900 :	1175 :	1140 :	1245 :	990 :	1295 :	1295

Appendix Table E8. Mean length (in millimeters) by age class for lingcod sampled in the Seward marine sport fishery, 1988.

Parameter	-----Age Class-----										Total
	5	6	7	8	9	10	11	12	14	21	
<u>Age Composition</u>											
Sample Number :	4 :	9 :	17 :	8 :	8 :	4 :	9 :	2 :	1 :	1 :	63
% of Sample :	6.3 :	14.3 :	27.0 :	12.7 :	12.7 :	6.3 :	14.3 :	3.2 :	1.6 :	1.6 :	100.0
Std. Error :	3 :	4 :	6 :	4 :	4 :	3 :	4 :	2 :	2 :	2 :	
<u>Length Composition</u>											
Average :	819 :	829 :	879 :	919 :	929 :	1056 :	991 :	798 :	1030 :	945 :	908
Std. Error :	81 :	29 :	24 :	45 :	32 :	27 :	49 :	93 :	:	:	16
Sample Size :	4 :	9 :	17 :	8 :	8 :	4 :	9 :	2 :	1 :	1 :	63
Minimum :	690 :	710 :	740 :	765 :	835 :	995 :	750 :	705 :	1030 :	945 :	690
Maximum :	1050 :	945 :	1145 :	1145 :	1095 :	1115 :	1165 :	890 :	1030 :	945 :	1165

Appendix Table E9. Mean length (in millimeters) by age class for lingcod sampled in the Seward marine sport fishery, 1987.

Parameter	Age Class																Total
	3	4	5	6	7	8	9	10	11	12	13	14	15	17	20	21	
<u>Age Composition</u>																	
Sample Number:	3	10	20	41	21	13	24	17	7	3	2	6	5	1	2	1	176
% of Sample :	1.7	5.7	11.4	23.3	11.9	7.4	13.6	9.7	4.0	1.7	1.1	3.4	2.8	0.6	1.1	0.6	100.0
Std. Error :	1	2	2	3	2	2	3	2	1	1	1	1	1	1	1	1	
<u>Length Composition</u>																	
Average :	545	662	715	735	796	872	904	925	949	1013	1076	1140	925	1130	1120	760	826
Std. Error :	58	48	21	16	21	29	23	24	51	80	160	28	23		45		12
Sample Size:	3	10	20	41	21	13	24	17	7	3	2	6	5	1	2	1	176
Minimum :	480	455	475	530	580	680	690	755	760	855	916	1060	860	1130	975	760	455
Maximum :	660	915	870	1055	985	1035	1060	1115	1095	1115	1235	1240	990	1130	1065	760	1240

<1 = less than 1

Appendix Table E10. Mean length (in millimeters) by age class for black rockfish sampled in the Homer marine sport fishery, 1989.

Parameter	Age Class																Total
	8	9	10	11	12	13	14	17	19	22	23	25	28	31	33	41	
<u>Age Composition</u>																	
Female																	
Sample Number :	1	1	5	4	1	3	:	:	:	:	:	:	:	:	:	:	15
% of Sample :	2.9	2.9	14.7	11.8	2.9	8.8	:	:	:	:	:	:	:	:	:	:	44.1
Std. Error :	2.94	2.94	6.17	5.61	2.94	4.94	:	:	:	:	:	:	:	:	:	:	8.64
Male																	
Sample Number :	1	:	6	:	1	1	1	1	1	1	1	1	1	1	1	1	19
% of Sample :	2.9	:	17.6	:	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	55.9
Std. Error :	2.94	:	6.64	:	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	8.64
All																	
Sample Number :	2	1	11	4	2	4	1	1	1	1	1	1	1	1	1	1	34
% of Sample :	5.9	2.9	32.4	11.8	5.9	11.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	100.0
Std. Error :	4.10	2.94	8.14	5.61	4.10	5.61	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	
<u>Length Composition</u>																	
Female																	
Average :	445	550	507	510	535	560	:	:	:	:	:	:	:	:	:	:	519
Std. Error :	:	:	12.90	19.58	:	16.07	:	:	:	:	:	:	:	:	:	:	10.30
Sample Size :	1	1	5	4	1	3	:	:	:	:	:	:	:	:	:	:	15
Male																	
Average :	430	:	489	:	545	560	530	530	545	530	550	530	510	520	550	495	514
Std. Error :	:	:	9.35	:	:	:	:	:	:	:	:	:	:	:	:	:	7.92
Sample Size :	1	:	6	:	1	1	1	1	1	1	1	1	1	1	1	1	19
All																	
Average :	438	550	497	510	540	560	530	530	545	530	550	530	510	520	550	495	516
Std. Error :	7.50	:	7.87	19.58	5.00	11.37	:	:	:	:	:	:	:	:	:	:	6.26
Sample Size :	2	1	11	4	2	4	1	1	1	1	1	1	1	1	1	1	34

Appendix Table E11. Mean length (in millimeters) by age class for black rockfish sampled in the Seward marine sport fishery, 1989.

Parameter	Age Class																			Total	
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	22	23	24		32
<u>Age Composition</u>																					
Sample Number	3	2	17	61	28	52	36	119	53	31	41	36	7	5	2	1	1	1	1	1	498
% of Sample	0.6	0.4	3.4	12.2	5.6	10.4	7.2	23.9	10.6	6.2	8.2	7.2	1.4	1.0	0.4	0.2	0.2	0.2	0.2	0.2	100.0
Std. Error	<1	<1	<1	1	1	1	1	2	1	1	1	1	1	<1	<1	<1	<1	<1	<1	<1	
<u>Length Composition</u>																					
Average	273	303	329	357	364	422	441	470	469	486	500	500	486	502	550	540	580	470	475	520	443
Std. Error	3	3	6	4	5	4	6	3	5	8	5	7	15	14	40						3
Sample Size	3	2	17	60	28	52	36	119	53	31	41	36	7	5	2	1	1	1	1	1	497
Minimum	270	300	285	290	310	370	340	350	400	355	420	410	430	465	510	540	580	470	475	520	270
Maximum	280	305	375	480	435	510	505	530	525	545	555	560	545	545	590	540	580	470	475	520	590

## Appendix F. Marine and Creel Survey Angler Demographics

Various information was obtained from anglers participating in the sport fisheries surveyed during 1989. Along with the catch sampling and catch and harvest information presented in this report, angler demographics information and data on area fished, boat type, target species, and number of rods fished were collected from interviewed anglers. These data are presented by survey area below.

### Marine Surveys

#### Kodiak:

A total of 366 interviews of boat anglers was conducted during the survey of the Kodiak marine sport fishery. Interviewed anglers reported catching a total of 2,208 fish with halibut, sculpin, and rockfish accounting for 77% of the total catch. Most (79.2%) of the boats interviewed were targeting halibut while 14.8% were targeting coho salmon. The anglers targeting coho salmon caught only 0.5% of the halibut but accounted for 76.4% of the coho salmon reported. Similarly, anglers targeting halibut accounted for 99.4% of the halibut catch. Halibut anglers were also responsible for essentially all of the lingcod, cod, flounder, and sculpin catches reported during 1989.

The most popular fishing site was at Buoy 4 (51.4%) while Inner Chiniak had 35.0% of the reported effort. Coho anglers fished primarily (64.8%) in Inner Chiniak but the highest coho salmon catch rates (fish per boat trip) were reported at Cape Chiniak. Halibut anglers fished primarily (60.9%) at Buoy 4 but the highest catch rates were reported at Whale Island. Boat anglers fished with from 1 to 7 rods per boat and averaged 2.6 rods per boat. Most (91.0%) of the boats were either open types or cabin cruisers less than 30 feet in length. Essentially all of the boats were out for the day as only 14 of the 366 boats interviewed fished for 2 or more days. The longest reported fishing trip was 4 days. Most (95.9%) of the boats were operated by local Kodiak/Afognak Island residents although many of these boats had out-of-town or out-of-state anglers who were also fishing. Only three of the 366 interviews were guided boats.

#### Valdez:

A total of 830 interviews of boat anglers was conducted during the survey of the Valdez marine boat sport fishery. Interviewed anglers reported catching a total of 11,006 fish with coho and pink salmon accounting for 75% of the total catch. Guided boats made up only 11.2% of the total interviews. Most (59.5%) of the boats interviewed were targeting coho salmon while 18.9% were targeting pink salmon and 9.8% were targeting halibut.

Most anglers (87.5%) fished within Valdez Arm. Those boats departing out of Valdez to fish areas outside of Valdez Arm were primarily targeting halibut. Boat anglers fished with from 1 to 14 rods per boat and averaged 3.2 rods per boat. Most (88.2%) of the boats were either open types or cabin cruisers less than 30 feet in length, and essentially all of the boats were out for only a single day of fishing. Local Valdez residents accounted for only 17.6% of the interviews while non-local Alaska residents comprised 68.7% of the interviews.

### Whittier:

A total of 244 interviews of boat anglers was conducted during the survey of the Whittier marine boat sport fishery. Only one of the 244 interviews was a guided boat. Interviewed anglers reported catching a total of 1,866 fish of which coho and pink salmon accounted for 58% of the total catch. Forty-five percent of the interviewed anglers were targeting halibut while 24% were targeting sockeye salmon. All interviewed anglers boating out of Whittier fished in western PWS. Most (86.9%) of the boats were cabin cruisers operated by non-local Alaska residents. No boat anglers from outside of Alaska were encountered during the interviews. Boat anglers fished with from 1 to 6 rods per boat and averaged 2.5 rods per boat. Unlike other marine survey areas, anglers fishing out of Whittier often spent more than one day fishing per trip.

### Homer:

A total of 1,313 interviews of boat anglers was conducted during the survey of the Homer marine sport fishery. Interviewed anglers reported catching a total of 33,231 fish with halibut, cod, and sculpin accounting for 95% of the total catch. Most (96.5%) of the boats interviewed were targeting halibut, while only 3.4% of the anglers interviewed reported targeting salmon. Guided boats made up 66.6% of the total interviews, and guided anglers accounted for 86.0% of the total reported halibut harvest.

Areas fished were Kachemak Bay (23.3%), north of Anchor Point (14.8%), north of Point Pogibshia (34.9%), and other outside waters (27.9%). Boat anglers fished with from 1 to 19 rods per boat and averaged the highest of any of the 1989 marine survey sites with 5.7 rods per boat. Most (90.7%) of the boats were cabin cruisers. Essentially all of the boats were out for the day as only 14 of the 1,313 boats interviewed fished for 2 or more days. The longest reported fishing trip was 8 days. Most (95.9%) of the anglers fishing out of Homer were either non-local Alaska residents (43.4%) or non-Alaska residents.

### Cordova:

A total of 79 interviews of boat anglers was conducted during the survey of the Cordova marine sport fishery. Interviewed anglers reported catching a total of 250 fish with halibut, cod, and coho salmon accounting for 79% of the total catch. Most (79.7%) of the boats interviewed were targeting halibut, while the remainder (20.3%) were targeting coho salmon. Only two of the 79 interviews were guided boats.

All interviewed anglers boating out of Cordova fished in eastern PWS. Most (94.9%) of the boats were either open types or cabin cruisers less than 30 feet in length, and essentially all of the boats were out for only a single day of fishing. Ninety-one percent of the anglers interviewed were local Cordova residents. Boat anglers fished with from 1 to 6 rods per boat and averaged 2.5 rods per boat.

## Creel Surveys

### Alaganik River:

All of the 274 anglers interviewed while fishing at Alaganik River during 1989 were unguided, and most (67.5%) were residents of eastern PWS. Anglers were primarily targeting coho salmon (82.5%) and completed anglers (anglers who were done fishing at the site for the day) averaged 2.3 hours fishing per angler.

### Clear Creek:

All of the 101 anglers interviewed while fishing at Clear Creek during 1989 were unguided. Most (45.5%) were non-Alaska residents while the remainder were residents of eastern PWS (37.6%) or were residents from elsewhere in Alaska (16.8%). Anglers were primarily targeting Dolly Varden (41.6%) and completed anglers averaged 2.3 hours fishing per angler.

### Eyak River:

All of the 447 anglers interviewed while fishing at Eyak River during 1989 were unguided. Most anglers (71.8%) were residents of eastern PWS. Anglers were primarily targeting coho salmon (86.8%) and completed anglers averaged 2.0 hours fishing per angler.

### Eshamy:

Of the 138 anglers interviewed while fishing at Eshamy during 1989, 75.0% were unguided. Most anglers (64.2%) were Alaska residents. Anglers were primarily targeting sockeye salmon and completed anglers averaged 2.6 hours fishing per angler.