

FISHERY DATA SERIES NO. 72
HARVEST ESTIMATES FOR SELECTED
SPORT FISHERIES IN SOUTHEAST ALASKA
IN 1987¹

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November 1988
Reprinted June 1990

¹ This investigation was partially financed by the Federal Aid in Sport Fish Restoration Act (16 U.S.C. 777-777K) under Project F-10-3, Job Numbers S-1-1A, S-1-1B, S-1-1C, S-1-1D, S-1-1E, S-1-3, and S-1-8; and by Public Law 99-5, the Pacific Salmon Treaty, under Federal Contract Number NA-87-ABH-00025, provided by the National Marine Fisheries Service (NOAA).

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ABSTRACT

Creel surveys of most of the major saltwater and selected freshwater recreational fisheries in southeast Alaska were conducted during 1987. In the marine fisheries, dockside interviews of recreational anglers were used to estimate effort and harvest for Pacific salmon *Oncorhynchus* species, Pacific halibut *Hippoglossus stenolepis*, rockfish *Sebastes* species, trout *Salmo* species, and char *Salvelinus* species. Freshwater roadside and saltwater shoreline sport fisheries effort and harvest estimates were obtained through completed trip or count type creel survey designs. Angler interviews provided harvest rate estimates for selected species. Scale samples and lengths were taken from chinook salmon *Oncorhynchus tshawytscha* caught by marine recreational anglers for age and size composition estimates. Lengths of Pacific halibut *Hippoglossus stenolepis* were taken to estimate total round weight of the halibut harvest from existing length-weight relationships. The contributions of hatchery chinook salmon and coho salmon *Oncorhynchus kisutch* to the recreational fisheries were estimated from coded-wire tag recovery information.

Approximately 21,500 chinook salmon, 36,000 coho salmon, 45,000 pink salmon *Oncorhynchus gorbuscha*, 36,250 Pacific halibut, 12,750 Dolly Varden *Salvelinus malma*, and 24,500 rockfish *Sebastes* species were harvested in 1987 in the fisheries surveyed. Coho salmon fishing in the Juneau marine fishery was above average during July and early August but below average after this time. Marine anglers in the Ketchikan area had average fishing for chinook and coho salmon but poor fishing for pink salmon. Of the 21,500 chinook salmon taken in the surveyed fisheries, approximately 5,200 were produced by hatcheries. The largest contributors of hatchery chinook salmon were the Crystal Lake (Alaska Department of Fish and Game), Snettisham (Alaska Department of Fish and Game), Little Port Walter (National Marine Fisheries Service), and Neets Bay (Southern Southeast Regional Aquaculture Association) hatcheries. Of the 37,500 coho salmon harvested in the surveyed fisheries, approximately 4,800 were of hatchery origin.

KEY WORDS: Creel survey, angler effort and harvest, catch per unit effort, harvest per unit effort, age composition, length at age estimation, round weight Pacific halibut harvest, recreational fishery, derby, hatchery, enhancement, coded-wire tag, chinook salmon, *Oncorhynchus tshawytscha*, coho salmon, *Oncorhynchus kisutch*, pink salmon, *Oncorhynchus gorbuscha*, Pacific halibut, *Hippoglossus stenolepis*, Dolly Varden, *Salvelinus malma*, rockfish, *Sebastes*, steelhead trout, *Salmo gairdneri*, Juneau, Ketchikan, Petersburg, Wrangell, Haines, Sitka, Yakutat, southeast Alaska, Crystal Lake hatchery, Snettisham hatchery, Neets Bay hatchery, Alaska Department of Fish and Game, National Marine Fisheries Service, Southern Southeast Regional Aquaculture Association.

INTRODUCTION

The waters of southeast Alaska (Figure 1) support important commercial, recreational, and subsistence fisheries for a variety of salmon and bottomfish species. The largest sport fishery in southeast Alaska is the Juneau marine fishery but other important marine fisheries occur around Ketchikan, Petersburg, Wrangell, Haines, and Sitka (Figure 2). In addition, there are many important freshwater sport fisheries in southeast Alaska, including those in the Situk River near Yakutat and the Chilkat and Chilkoot rivers near Haines.

In-season creel survey information is used for a variety of management and reporting purposes. The U.S./Canada Pacific Salmon Treaty requires careful monitoring of commercial and recreational harvests of chinook salmon *Oncorhynchus tshawytscha*. In-season and post-season estimates of the harvests of wild and hatchery chinook salmon stocks by marine sport fisheries in southeast Alaska are needed to monitor Alaska's compliance with catch limits established by the Treaty. Monitoring of the various fisheries is also needed to evaluate hatchery contributions to the coho salmon *Oncorhynchus kisutch* harvest.

This report presents the findings of the various recreational harvest surveys conducted throughout southeast Alaska by the Division of Sport Fish of the Alaska Department of Fish and Game (ADF&G). Harvest surveys of the marine boat recreational fisheries in the Ketchikan, Petersburg, Wrangell, Sitka, Juneau, and Haines areas were conducted in 1987. The Yes Bay lodge marine boat recreational fishery was also surveyed in 1987. Additional surveys of the fisheries located in Thomas Basin in Ketchikan and Blind Slough near Petersburg were conducted to estimate harvest of hatchery produced chinook salmon. Finally, this report presents the findings of the roadside harvest surveys associated with a variety of marine and freshwater sport fisheries in the Juneau, Haines, and Yakutat areas.

HARVEST SURVEYS OF THE MARINE BOAT RECREATIONAL FISHERIES

Introduction

Creel surveys have been used to monitor the Juneau marine fishery since 1960. Marine sport fisheries in Ketchikan, Petersburg, and Wrangell have only been surveyed consistently since 1983. Haines and Sitka marine sport fisheries have only been intermittently surveyed.

In addition to data uses noted above, a number of other data needs exists. For example, harvest rate data for coho salmon in marine recreational fisheries along with harvest rate data from commercial troll and net fisheries are used to monitor the relative abundance and migratory patterns of coho salmon in inside waters. Pacific halibut *Hippoglossus stenolepis* harvest information is provided to the International Pacific Halibut Commission (IPHC) during their consideration of proposed modifications to existing sport fishing regulations.

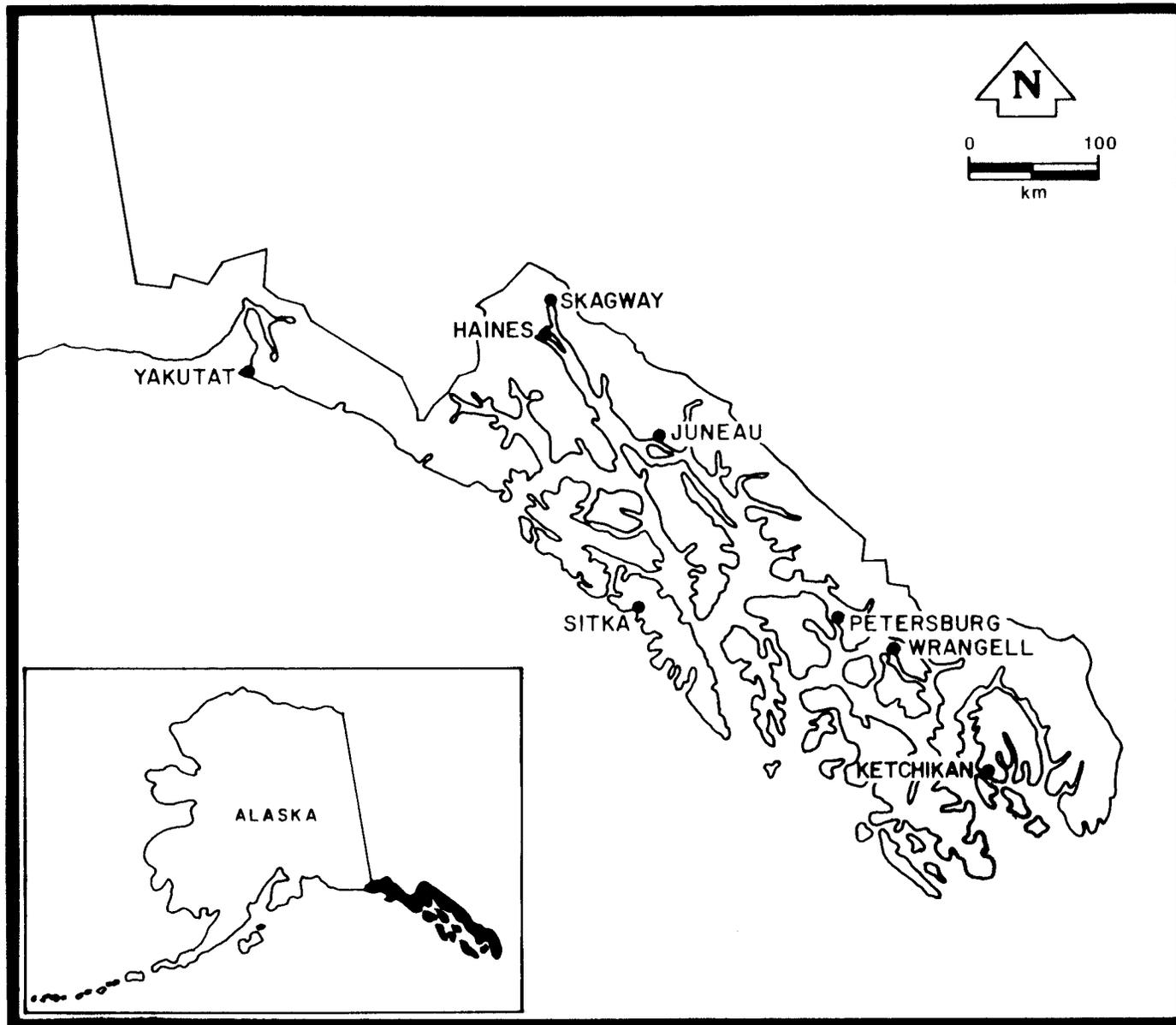


Figure 1. Communities in southeast Alaska where sport fish creel surveys are conducted.

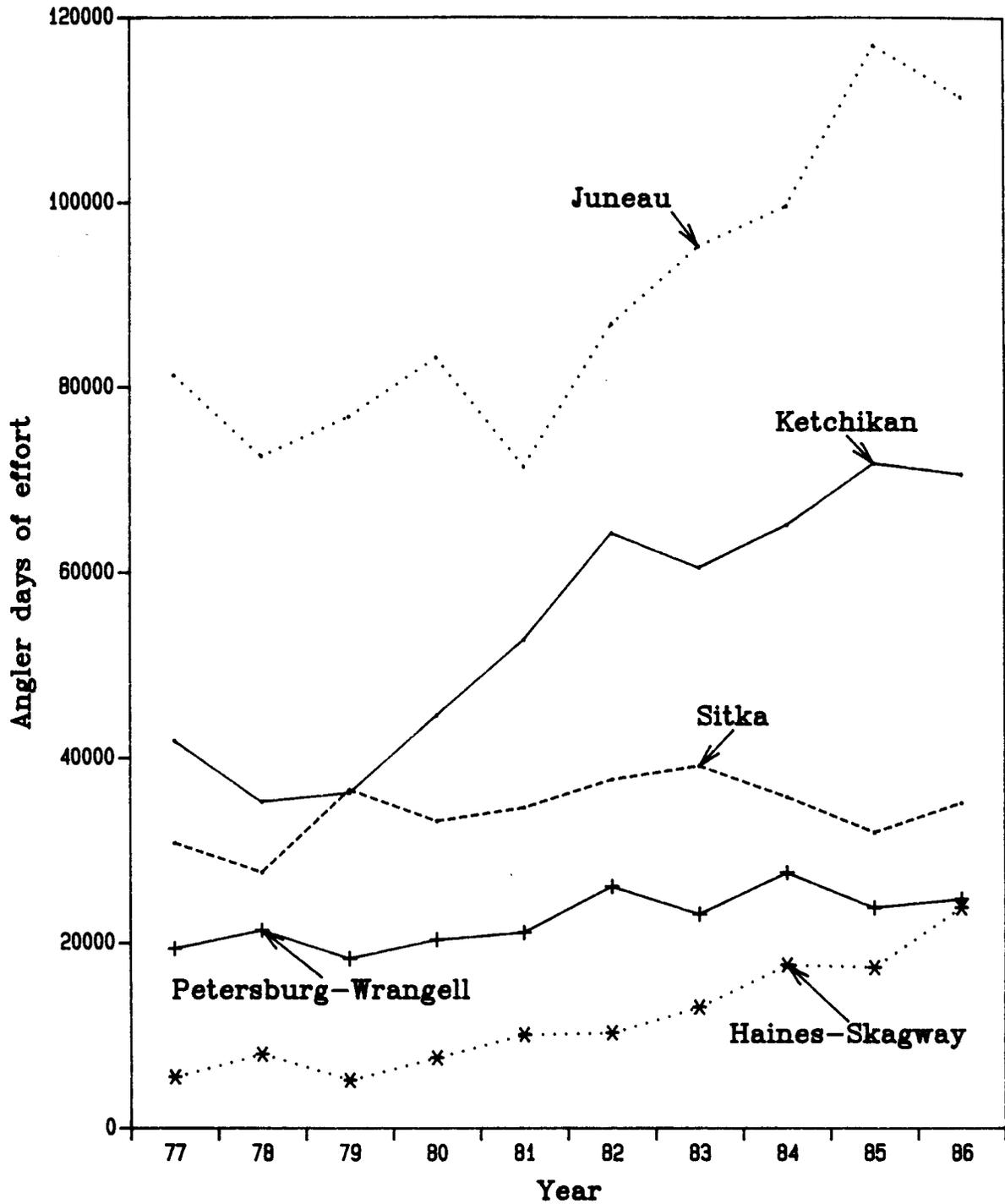


Figure 2. Estimated angler days of effort expended in the major recreational marine fisheries of southeast Alaska (Mills 1979, 1980, 1981a, 1981b, 1982, 1983, 1984, 1985, 1986, 1987).

General Methodology

Seven separate creel surveys of marine boat recreational fisheries were conducted in southeast Alaska in 1987. Aerial boat counts or interviews of boat-parties provided angler effort information. Interviews of boat-parties provided harvest and catch rate information. Only anglers or parties that had completed their fishing trips were interviewed. Effort and harvest information was recorded for all anglers in the boat combined (i.e., a boat-party). The following information was recorded for each boat-party interviewed:

1. the number of rods fished;
2. the number of hours fished;
3. the general area fished (hours fished were recorded separately if different areas were fished);
4. whether the fishing trip was a charter (i.e., if the angler hired a licensed operator) or if it was personal boat trip;
5. whether they were fishing for salmon, bottomfish, or other types of fish (hours fished were recorded separately if different targets were fished); and
6. the number of each fish species which were caught and kept, and the number that were caught and released.

If anglers had chinook salmon, coho salmon, or Pacific halibut in their possession, then chinook and coho salmon were checked for adipose fin clips, chinook salmon were measured (fork length) and scale samples taken, and the Pacific halibut were measured (total length).

Harvest and catch statistics for chinook salmon caught in marine fisheries are reported separately for fish which are less than the legal size limit (28 inches or approximately 71 cm). Small chinook salmon could be legally harvested if they had an adipose fin clip, indicating the presence of a coded-wire tag. In this report chinook salmon less than 28 inches (71 cm) will be referred to as small chinook salmon. Fish larger than 28 inches (71 cm) will be referred to as large chinook salmon.

Angler Effort, Harvest, and Harvest Per Unit Effort:

A count type creel survey (Neuhold and Lu 1957) was used during the Juneau Golden North Salmon Derby; while a direct expansion creel type survey was used to survey all other marine boat fisheries. For the direct expansion survey, boat-parties were intercepted at discrete access locations during a specified period of time. Counts of fish harvested by all boat-parties interviewed during the specified time period were expanded upwards to include the periods of time and access locations for which no samples were taken. Similarly, effort in boat-hours measured from the same interviews was expanded to obtain an estimate of angler effort.

For the count type creel survey, aerial counts of boats were considered to be instantaneous (aerial surveys took approximately one hour) and reflect fishing effort at the time of the count. Effort in boat-hours was estimated by multiplying the boat count by the number of hours available for fishing in the time periods associated with the counts. The harvest per unit effort (HPUE) for each species of fish was estimated from interviews of boat-parties which had completed their fishing trip. The estimated harvest was obtained from the product of the effort and HPUE estimates.

In general, each marine fishery was stratified according to the following set of criteria:

1. Type of fishing day:
 - a. weekday (Monday-Friday);
 - b. weekend-holiday (Saturday, Sunday, and legal holidays including Canadian holidays in the Haines area); and
 - c. derby.
2. Time of day:
 - a. early day (generally defined as starting at 0600 and ending mid-way to civil twilight); and
 - b. late day (starting mid-way between 0600 and civil twilight and ending at civil twilight).
3. Access type:
 - a. heavy use: harbors and boat ramps generally receiving a "large" amount of angler effort and harvest;
 - b. medium use: harbors and boat ramps generally receiving a medium amount of angler effort and harvest (this type was only used in the Juneau marine survey);
 - c. low use: harbors and boat ramps generally receiving a low amount of angler effort and harvest; and
 - d. private moorages (this type was only used in the Juneau marine survey).
4. Seasonal periods consisting of periods varying in length depending upon expected angler effort (e.g., 16 March - 26 April 1987).

Angler effort was estimated in boat-hours according to equations 1-17 (Appendix A). In addition to estimating effort in terms of boat-hours, effort was also expressed in terms of rod-hours. Rod-hours are the number of anglers fishing in a boat-party multiplied by the boat-hours for that boat-party. Accordingly, rod-hours is essentially synonymous with angler-hours. Targeted effort was estimated as the number of rod-hours fished for

either salmon or bottomfish. Catch and harvest was estimated similarly by substituting the corresponding statistics in place of the effort statistics into equations 1-17 (Appendix A). Harvest per unit effort (HPUE) in terms of fish harvested per rod-hour for both targeted and non-targeted effort was estimated according to equations 18-28 (Appendix A).

For the count type creel survey (Juneau derby) a stratified random estimator was used to estimate effort in boat-hours. The average boat count for each day of the derby was multiplied by the total number of available fishing hours within each day. The effort, catch, harvest, and HPUE estimates and the associated variance estimates were obtained according to equations 29-44 (Appendix A).

For both types of surveys (count and direct expansion) the final step in estimating the effort or harvest for the entire season or for unique combinations of individual sampling strata involved combining the stratum estimates according to equations 45-46 (Appendix A).

Approximate 95% confidence intervals (CI) were obtained for harvest and effort estimates from both direct expansion and count type surveys by assuming normality according to equation 47 (Appendix A). Throughout this report, all error bars and \pm numbers associated with harvest and effort estimates represent approximate 95% CI limits. Error bars needed to compare HPUE estimates were also obtained as in equation 47 (Appendix A). Since HPUE is appreciably non-normal, these error bars are not assumed to represent confidence intervals. These error bars are only intended to represent graphically the relative magnitude of the variability of the HPUE estimates.

Contributions of Coded-Wire Tagged Stocks:

If anglers had chinook or coho salmon in their possession, the fish were checked for the presence of a missing adipose fin, indicating the presence of a coded-wire tag (CWT). Adipose-clipped chinook and coho salmon sampled in the creel were measured (tip of snout to fork of tail) and their heads retained. A locking plastic strap with a unique number was inserted through the jaw. Heads and coded micro-wire tag recovery data were sent to the ADF&G CWT Processing Laboratory in Juneau for tag removal and decoding.

Heads were classified as random (randomly sampled during regularly scheduled creel sampling periods) or select (voluntarily turned by unsampled anglers). Only random recoveries were used to estimate CWT contributions. The contribution of a particular tag code to a marine boat sport fishery for different periods of the season was estimated as follows:

$$\hat{C} = m_2 \frac{\hat{H}}{z} \frac{\hat{M}}{m}$$

m_2 = number of tags randomly recovered during the creel survey from a given tag code;

\hat{H} = estimated harvest of a species for a season;

- z = number of fish of a given species examined for missing adipose fins;
- \hat{M} = estimated number of fish of a species in a given hatchery release (tagged and untagged);
- m = number of fish of a species and tag code released from a given hatchery.

This equation was not used to expand recoveries of small chinook salmon. Only tagged, small chinook salmon may be legally retained while untagged, small fish from the same release may not be kept. Therefore, small chinook salmon recoveries were only expanded by the fraction of chinook salmon sampled for adipose-clips and not by the tagged to untagged ratio. Variance estimates for the contribution estimates were not obtained due to an oversight in the procedures for recording adipose fin clipped sample data. Only the general location and date associated with the harvest of the clipped fish was recorded, this did not allow for a one-to-one matching with the sampling stratification associated with harvest estimation (e.g., early day, heavy use access location, biweekly three, weekdays).

Chinook Salmon Age Composition and Mean Length at Age:

For marine fisheries, tip of snout to fork-of-tail lengths of chinook salmon, were obtained for estimating size composition of the sport harvest. Additionally, several scales were removed from the third row above the lateral line in an area on a diagonal from the insertion of the dorsal fin to the origin of the anal fin. Age composition of the sport chinook salmon harvest was then estimated from analysis of the scales. Standard statistical procedures were followed in estimating mean length at age, age composition, and their variances.

Pacific Halibut Round Weight:

Pacific halibut lengths (total length) were measured on most of the sampled sport harvest. Each individual length was converted to a round weight using procedures outlined in Quinn et al. (1983). A mean round weight was calculated from these estimates, and was multiplied by the estimated harvest to estimate total round weight of the harvest.

Ketchikan Area

Introduction:

The Ketchikan marine sport fishery has grown substantially since 1979 and currently it is the second largest marine sport fishery in southeast Alaska (Figure 2). Yearly angler effort has averaged 54,309 angler days over the past 10 years with a peak effort of 71,805 angler days in 1985. Harvests of chinook salmon have varied between 3,845 (1977) and 7,968 (1983) over the past 10 years with an average of 5,539 (Figure 3). The coho salmon harvest in the Ketchikan marine fishery in 1984 and 1986 was the largest in southeast Alaska. During 1986, 20,688 coho were estimated to have been

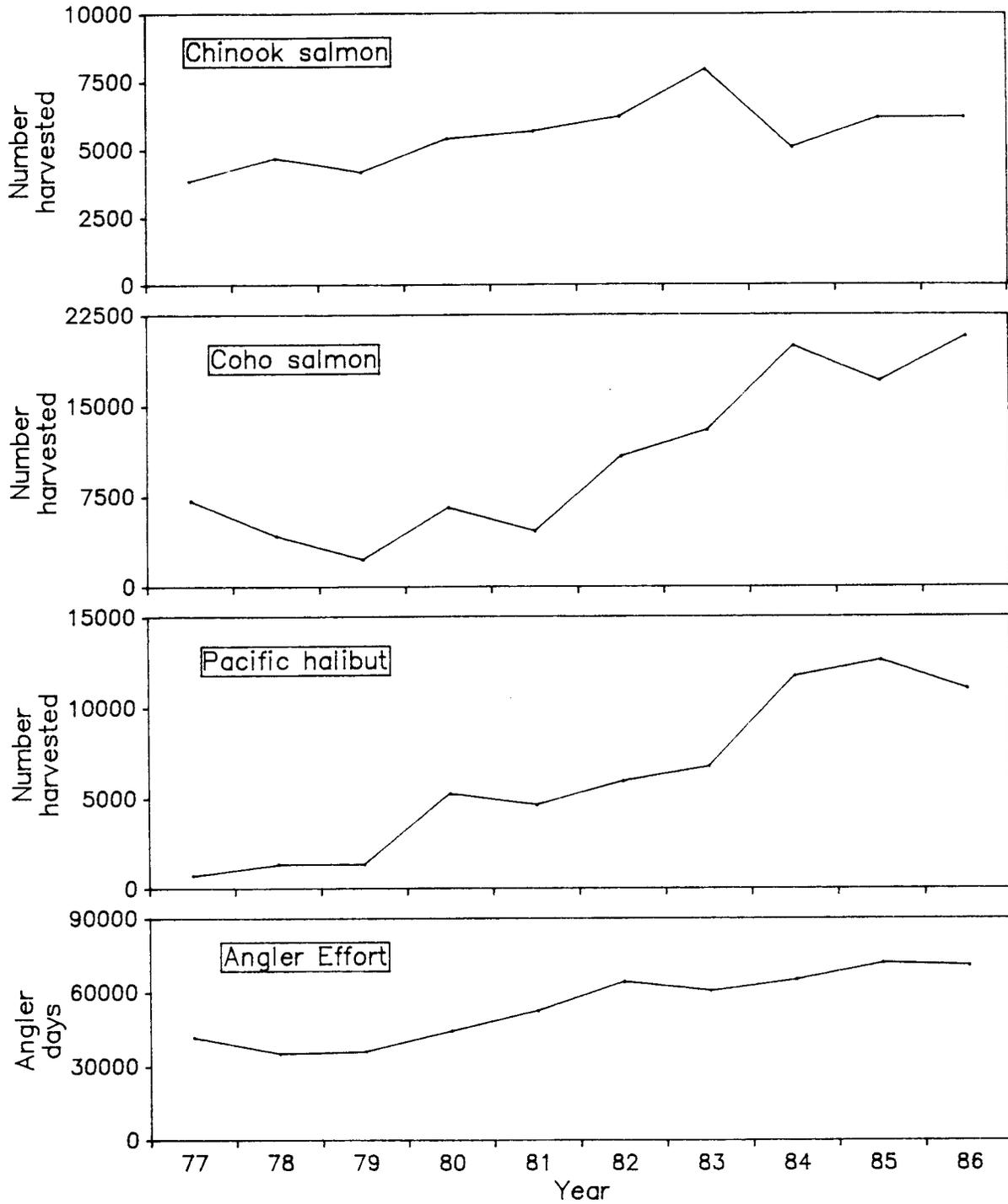


Figure 3. Estimated number of chinook salmon, coho salmon, and Pacific halibut harvested with estimated angler effort in the Ketchikan area recreational marine fishery (Mills 1979, 1980, 1981a, 1981b, 1982, 1983, 1984, 1985, 1986, 1987).

harvested. The large increases in the marine sport harvest of coho salmon in the Ketchikan fishery can be partially attributed to presence of several hatcheries near Ketchikan which produce large numbers of coho salmon. Pacific halibut catches have increased greatly since 1977, but in the last few years catches have stabilized at approximately 12,000 halibut.

The specific objectives for the 1987 Ketchikan marine boat harvest survey were to estimate the following parameters at selected access locations in the Ketchikan area during the 20 April-27 September 1987 time period:

1. angler effort, catch, and harvest of each species of the five primary Pacific salmon, Pacific halibut, and rockfish *Sebastes* species by seasonal period and in total;
2. harvest per unit effort (HPUE) by seasonal period for each species of salmon, Pacific halibut, and rockfish;
3. the number of coded-wire tagged (CWT) wild and hatchery chinook and coho salmon harvested;
4. the age composition and mean length-at-age of the chinook salmon harvest;
5. the total round weight of Pacific halibut harvested; and
6. the species composition of the rockfish harvest.

Site Description:

The major portion of the marine boat sport fishery of Ketchikan occurs north of Ketchikan in the Clover Pass area at the northern entrance to Behm Canal (Figure 4). There are several resorts and boat harbors near Clover Pass which are active during the summer. The Ketchikan area supports the largest sport charter fleet in southeast Alaska and charter boats operate primarily out of both the Clover Pass area and downtown Ketchikan. Sport anglers on day trips venture as far west as the east shore of Prince of Wales Island, northward to the southern shore of Cleveland Peninsula, and southward to the southern tip of Gravina Island and the southern entrance to Behm Canal.

Six access points along the Ketchikan roadside system were sampled (Appendix Table 1). Most sport boat activity originates at Knudson Cove harbor and boat launch and Clover Pass resort north of town; Bar Harbor in downtown Ketchikan is also a major center for sport boat activity. Due to its size, Bar Harbor was split into two areas during afternoon sampling. Smaller access locations sampled included Thomas Basin, the Mountain Point boat launch, and Hole in the Wall harbor. The estimates obtained in the survey represent the effort and harvest by boat-parties which return to the sampled access locations in the Ketchikan area.

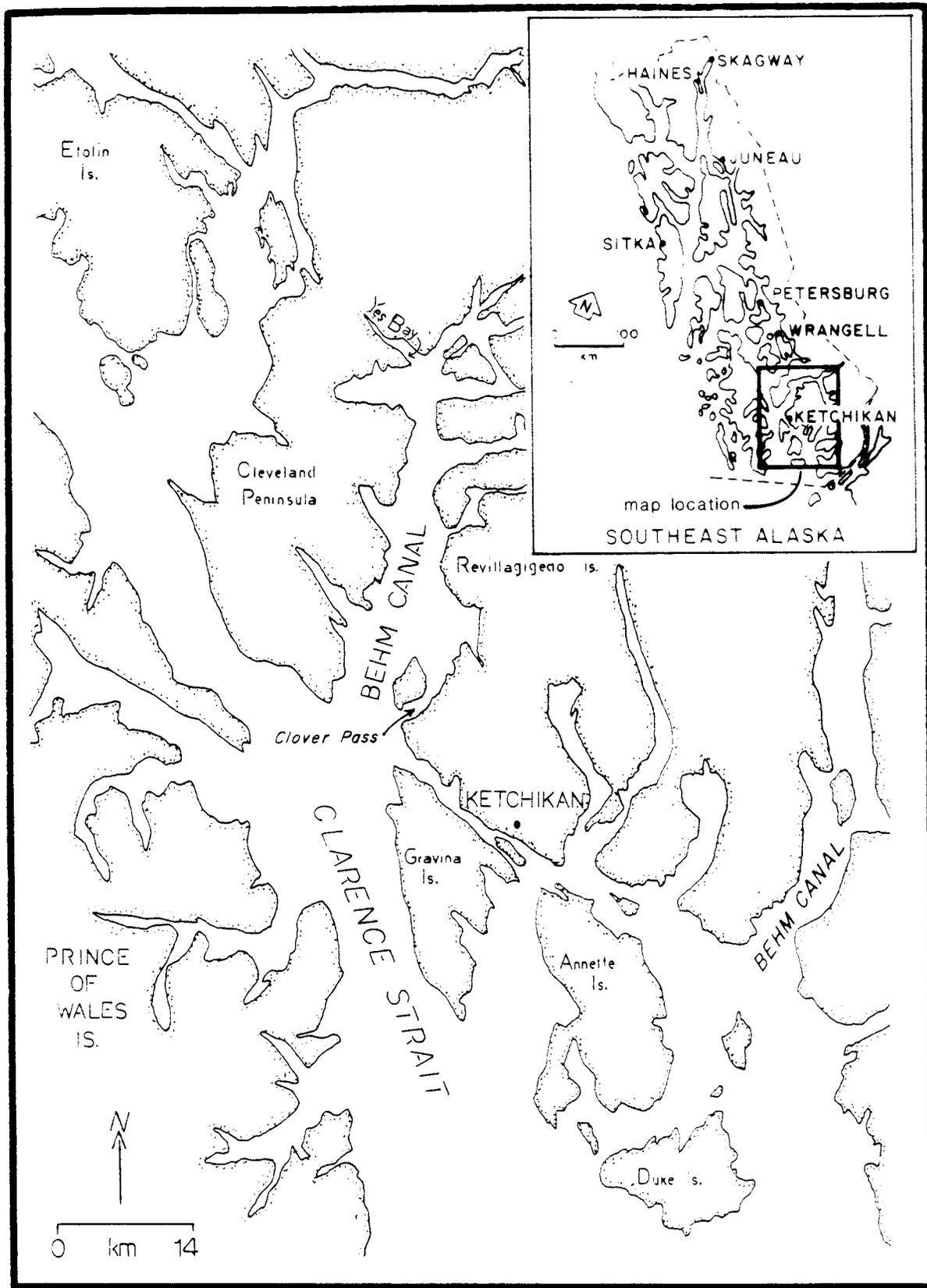


Figure 4. Ketchikan marine boat sport fishing grounds.

Stratification Structure:

Sampling locations were assigned to access strata as follows:

1. Heavy use docks and boat launches:
 - a. Bar Harbor sections 1 and 2 combined (during the early day stratum);
 - b. Bar Harbor section 1 (during the late day stratum);
 - c. Bar Harbor section 2 (during the late day stratum);
 - d. Clover Pass resort; and
 - e. Knudson Cove harbor.
2. Low use docks and boat launches:
 - a. Mountain Point boat launch;
 - b. Hole in the Wall harbor; and
 - c. Thomas Basin harbor.

The seasonal strata for the Ketchikan 1987 survey were:

1. 20 April - 22 May;
2. 23 - 25 May, 30 - 31 May, and 6 - 7 June (the Ketchikan King Salmon Derby);
3. 26 - 29 May, 1 - 5 June, and 8 - 21 June;
4. 22 June - 5 July;
5. 6 - 19 July;
6. 20 July - 2 August;
7. 3 - 16 August;
8. 17 - 30 August;
9. 31 August - 13 September; and
10. 14 - 27 September.

Samples were allocated according to the following scheme for the Ketchikan survey:

1. Within any week (i.e., Monday-Sunday), all weekend-holidays, and derby days were selected for sampling.
2. During the periods of 20 April to 31 May and 27 July to 27 September, two contiguous weekdays were randomly selected for "non-sampling", in order to assure two days off for staff. All remaining weekdays were sampled.
3. In addition to the two contiguous weekdays selected for non-sampling, one of the remaining three days was selected for non-sampling from 1 June to 26 July 1987. This process resulted in two weekdays sampled per week, during this period.
4. Both the early and late time-of-day strata were sampled each day. The time-of-day stratum was further subdivided into two sampling periods which included all the time during each time-of-day stratum, except for the time necessary to travel between sampling locations.

During each selected time-of-day stratum, both of the two possible sampling periods were sampled.

5. Selected samples were allocated to access-type strata at random so that approximately three-fourths of the available samples went to the heavy use stratum and one-fourth to the low use stratum, with a minimum sample size of two for unique combinations of the sampling strata.
6. Within an access-type stratum, one of the possible locations was selected at random (e.g., Bar Harbor, Knudson Cove, or Clover Pass for the heavy use/early day stratum).

The resulting sampling fractions were 80% for heavy use, and 20% for low use access locations. These sampling fractions were selected by using "best guesses" of the angler effort expected at each unique combination of the various stratification levels.

Results:

A total of 3,835 boat-parties were interviewed during the 1987 Ketchikan area survey. The estimated angler effort during the survey period was 95,818 boat-hours or 242,274 rod-hours (Appendix Table 2). Most of this effort was expended during the period from 23 May-13 September 1987 (Figure 5 and Appendix Table 3). Approximately 15% of this effort occurred over the seven-day Ketchikan King Salmon derby.

An estimated 4,426 large chinook salmon and 297 small chinook salmon were harvested during the survey period in Ketchikan (Appendix Table 2). This total estimate does not include hatchery chinook salmon harvested in Thomas Basin (see Thomas Basin THA section for details). Approximately 19% of the harvest of large chinook salmon was taken during the Ketchikan King Salmon derby (Figure 5 and Appendix Table 3). Harvest levels remained fairly constant during the five biweekly periods starting on 22 June and ending on 30 August. Harvest per unit effort (HPUE) of anglers targeting on salmon fluctuated substantially during the survey period.

A total of 882 chinook salmon were examined for adipose fin clips (Appendix Table 4). An estimated 1,409 chinook salmon harvested were of hatchery origin (Appendix Table 5); of these, 999 (71%) were produced by southeast Alaskan hatcheries. Thirty-six percent of the derby harvest of chinook salmon were of hatchery origin, whereas 30% of the entire seasonal harvest was produced by hatcheries. One recovery of a wild chinook salmon (tagged as a juvenile in the Unuk River, a southeast Alaskan stream) was sampled.

Ages were determined from 454 chinook salmon from the Ketchikan area harvest. Approximately, 13% of these fish were age 1.4 or 1.5 (Appendix Tables 6 and 7). Approximately 25% of the sample for which ages were determined were comprised of fish without a freshwater annulus (i.e., either non-Alaskan or hatchery stock). Approximately 24% and 32% of the chinook salmon were age 1.2 and 1.3, respectively.

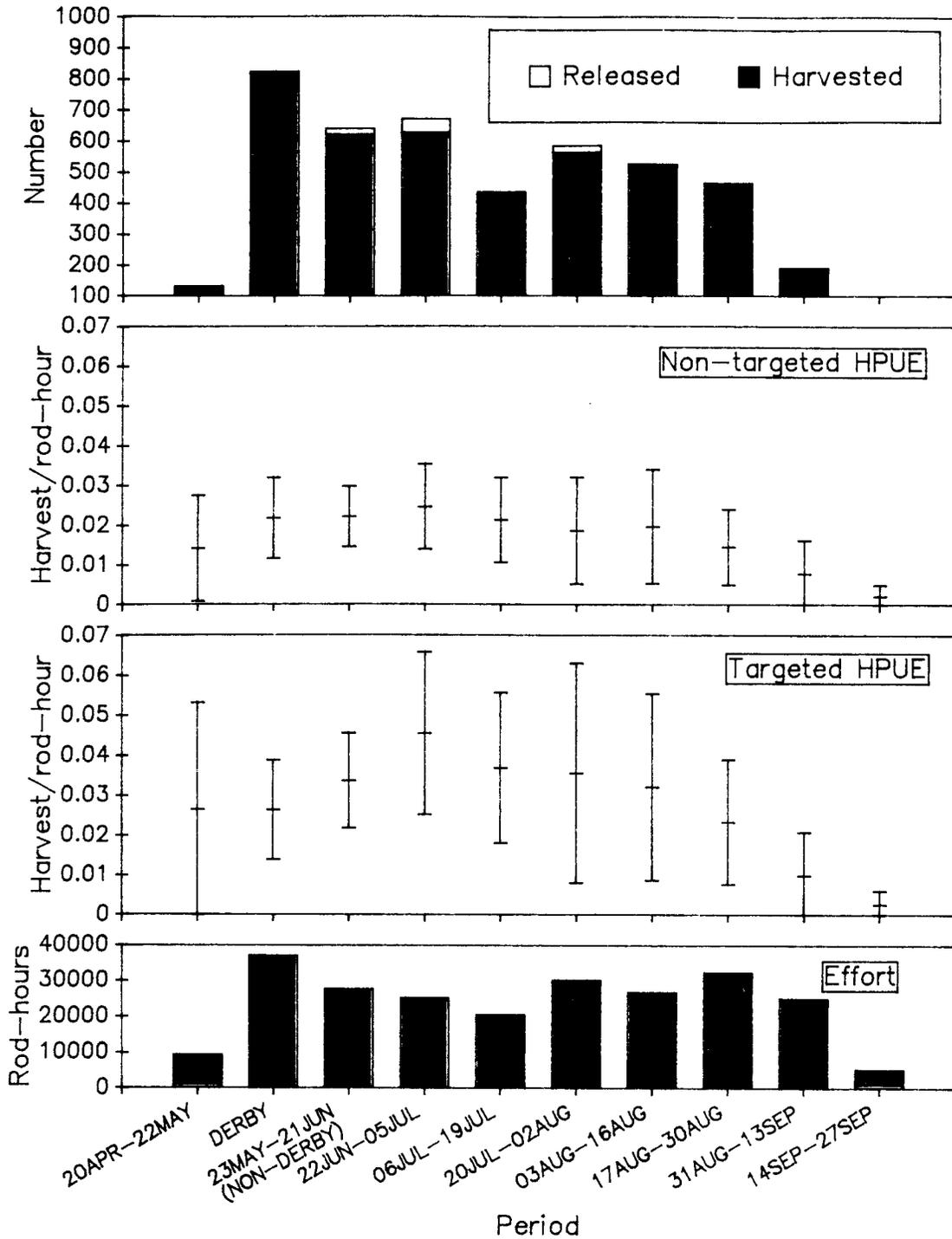


Figure 5. Estimated number of large chinook salmon, caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Ketchikan marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

Coho salmon harvest in the Ketchikan area was estimated at 10,464 fish for the entire survey period (Appendix Table 2). During the biweekly periods starting on 6 July and ending on 13 September, harvest levels of coho salmon increased steadily (Figure 6 and Appendix Table 3). The increasing harvest levels were reflective of a steady increase in HPUE. Harvest during the 31 August - 13 September period represented 33% of the total harvest for the survey. Harvest during the last period surveyed (14-27 September) dropped to 681 coho salmon due primarily to a decrease in angler effort.

A total of 1,743 coho salmon were examined for adipose fin clips (Appendix Table 8). The estimated contribution of hatchery produced coho salmon to the Ketchikan fishery was 4,663 fish or 45% of the total harvest (Appendix Table 9). Southeast Alaskan hatcheries contributed over 99% of these fish, with the Neets Bay hatchery responsible for 41% of the total harvest. Hatcheries in British Columbia contributed the remainder of the hatchery contribution. No random recoveries of CWT coho salmon wild stocks were made.

Over 90% of the 7,646 pink salmon *Oncorhynchus gorbuscha* harvested by Ketchikan anglers (Appendix Table 2) were caught during the 6 July - 30 August period (Figure 7 and Appendix Table 3). No pink salmon were reported caught prior to 22 June. HPUE for pink salmon trends mirrored the changes in harvest and catch levels. Only 235 chum salmon *Oncorhynchus keta* and 144 sockeye salmon *Oncorhynchus nerka* were harvested during the survey period in the Ketchikan area (Appendix Table 2).

Ketchikan anglers harvested 10,493 Pacific halibut during the survey period (Appendix Table 2). The harvest of 2,150 halibut between 23 May and 21 June (including the derby) represented 21% of the total harvest estimate (Figure 8 and Appendix Table 3). Harvest levels during the biweekly periods starting on 22 June and ending on 30 August were fairly consistent. Decreases in harvest during the last two biweekly periods were reflective of a decrease in HPUE. The mean length of 800 sampled Pacific salmon was estimated as 897 mm, while the mean round weight was estimated at 11.6 kg (25.6 lbs). Accordingly, the estimated round weight of the Ketchikan harvest was 121,846 kg (268,621 lbs).

An estimated 46,130 rockfish were caught during the survey period in the Ketchikan area (Appendix Table 2), of which 18,591 (40%) were harvested. Approximately 55% of the identified rockfish harvested were quillback rockfish *Sebastes maliger*, while 30% were yelloweye rockfish *Sebastes ruberrimus*. The remainder of the identified harvest included small numbers of black rockfish *Sebastes melanops*, dusky rockfish *Sebastes ciliatus*, copper rockfish *Sebastes caurinus*, yellowtail rockfish *Sebastes flavidus*, and other species. The seasonal pattern of rockfish catch and harvest (Figure 9 and Appendix Table 3) was very similar to that of Pacific halibut (Figure 8). Harvest levels remained fairly constant during the biweekly periods starting on 22 June and ending on 30 August. Harvest decreased during the last two biweekly periods surveyed due to a substantial decrease in HPUE.

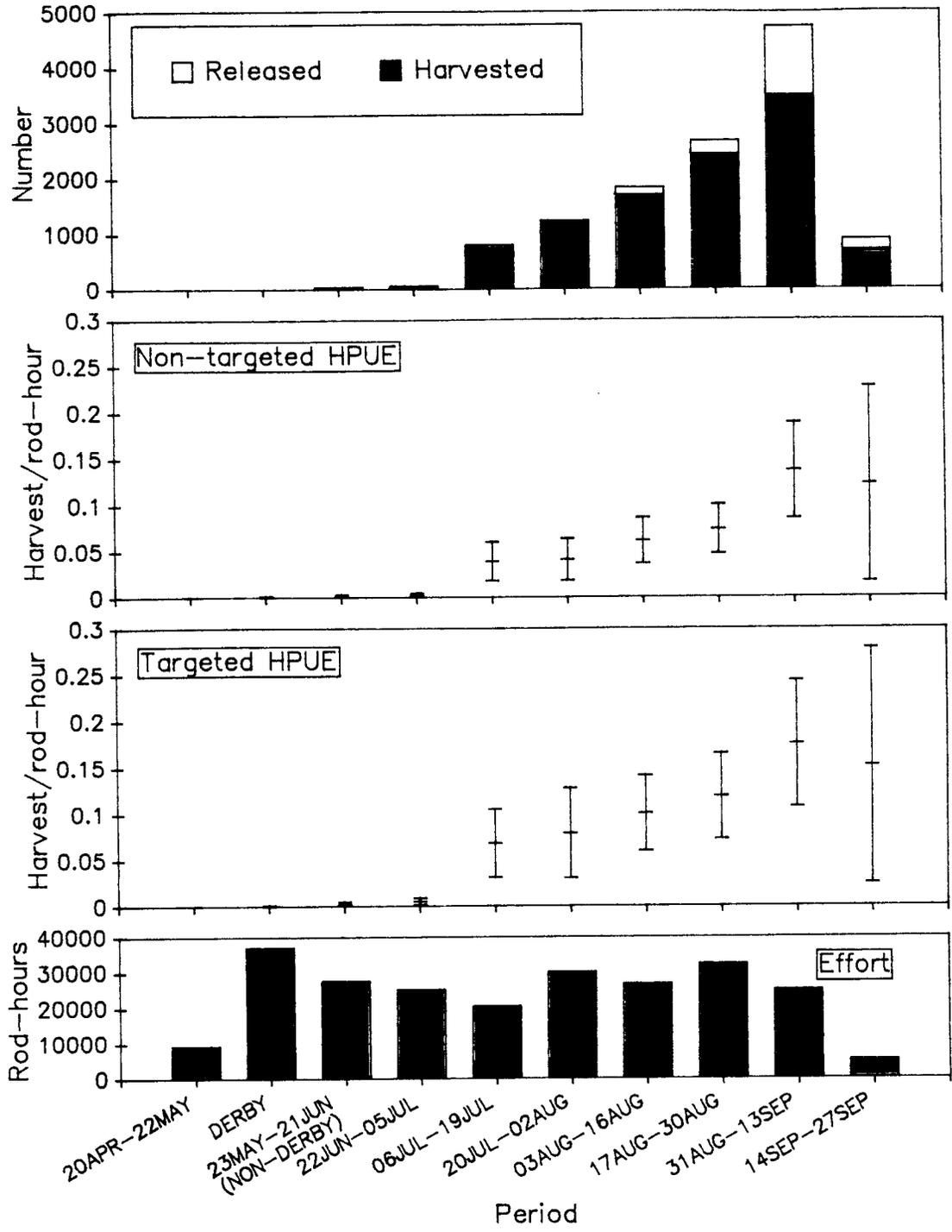


Figure 6. Estimated number of coho salmon caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Ketchikan marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

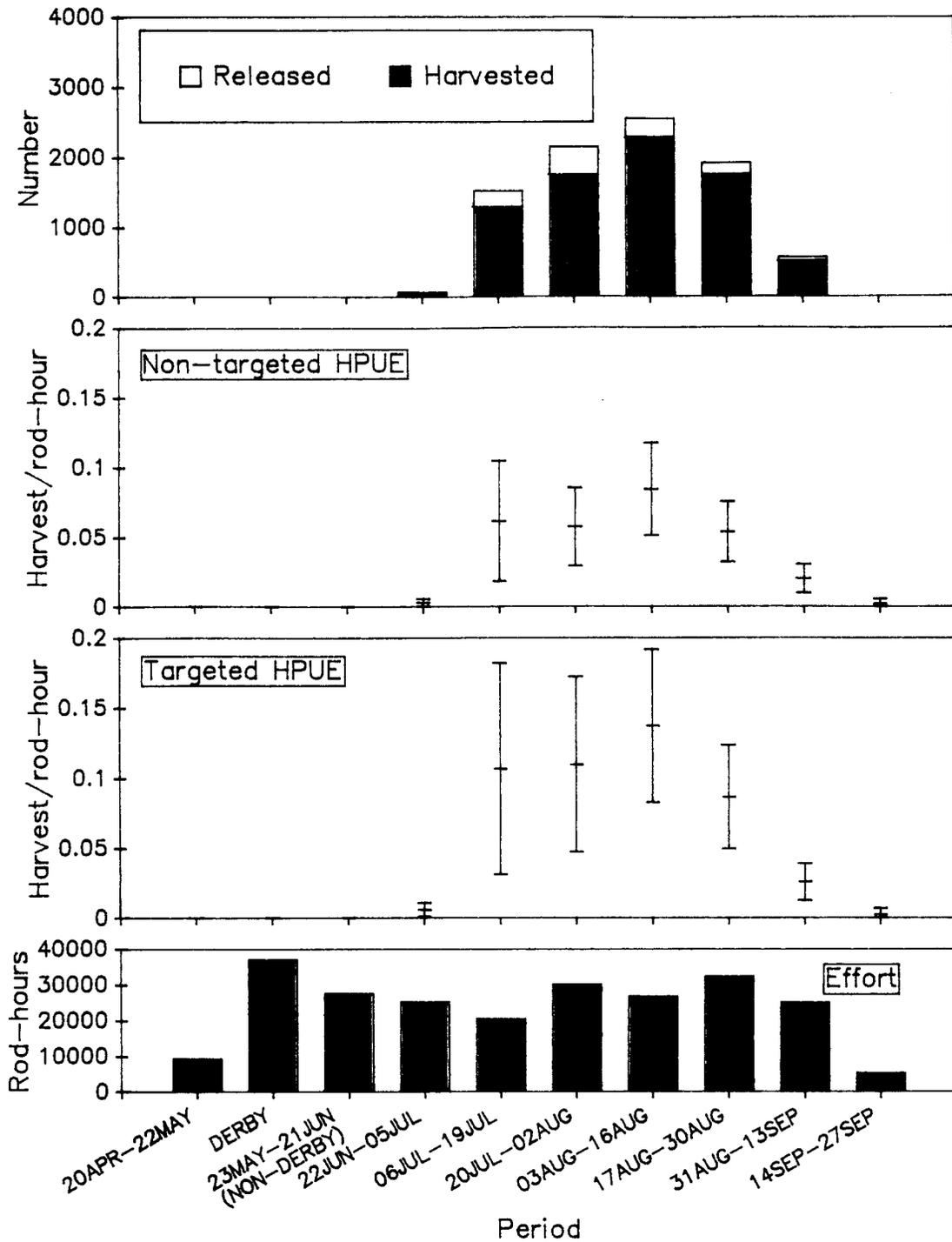


Figure 7. Estimated number of pink salmon caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Ketchikan marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

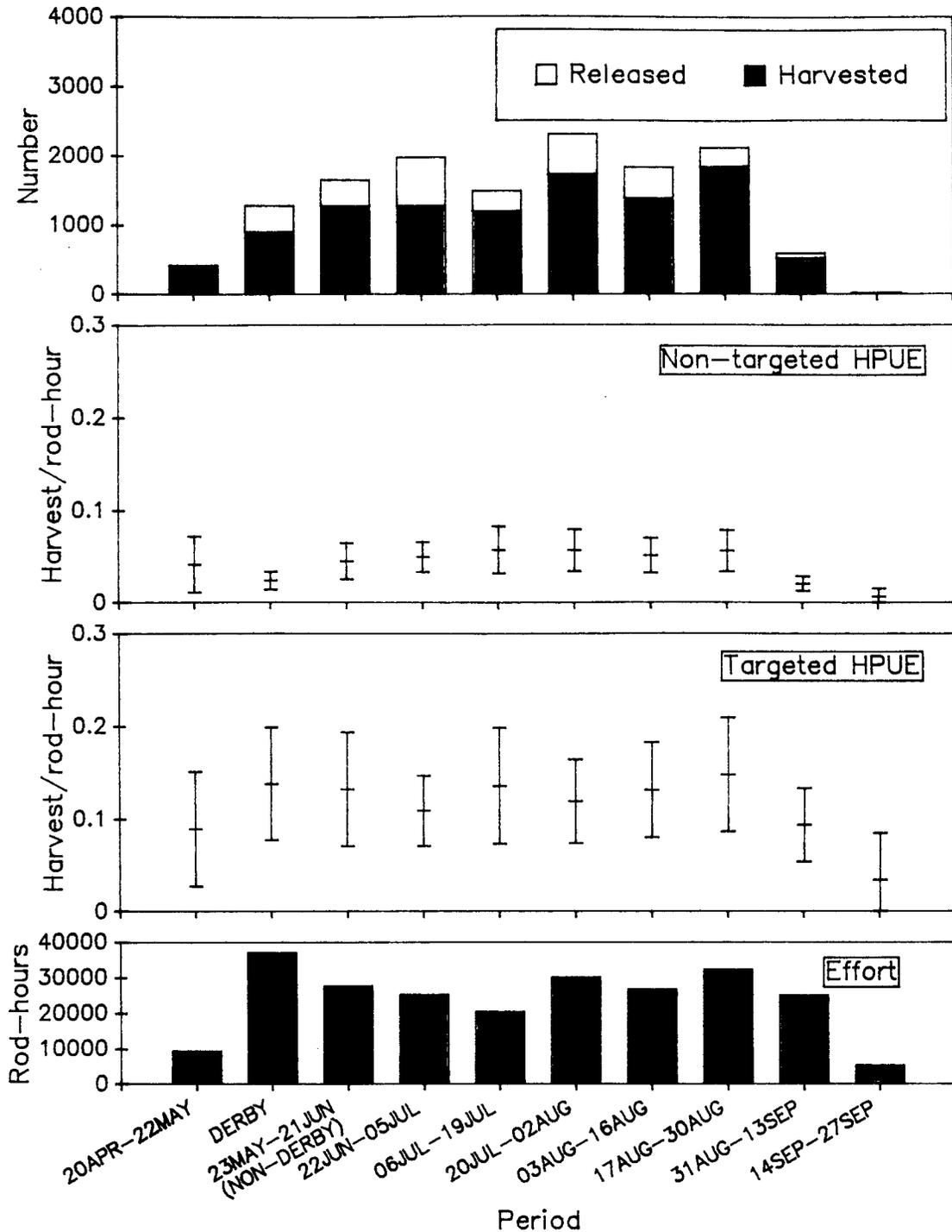


Figure 8. Estimated number of Pacific halibut caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Ketchikan marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

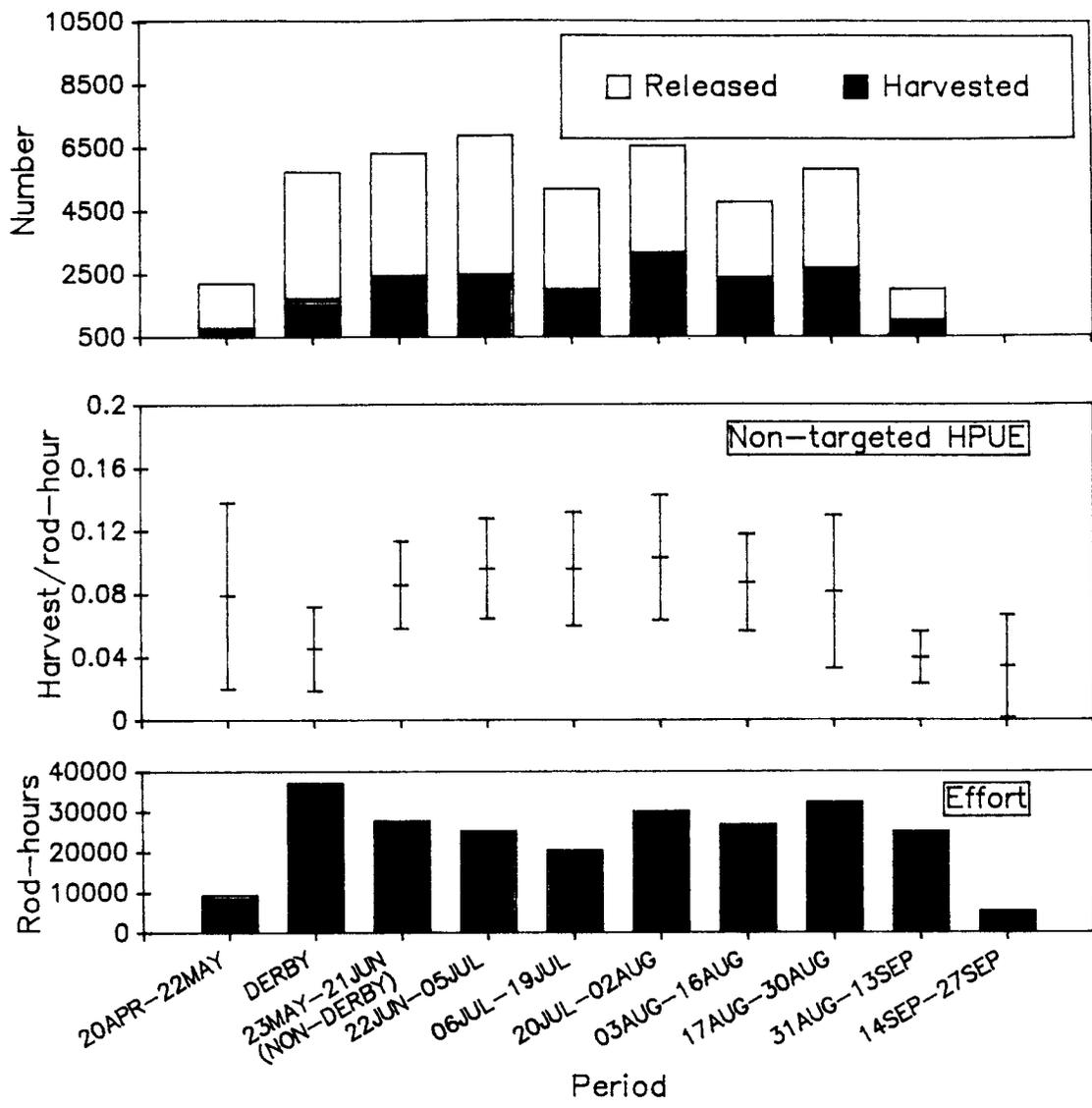


Figure 9. Estimated number of rockfish caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Ketchikan marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

Yes Bay Area

Introduction:

The Yes Bay Resort is a sport fishing facility located in Yes Bay in Behm Canal about 40 miles north of Ketchikan (Figure 10). Some guests at the lodge sport fish for trout, char, and salmon in freshwater, but the major attraction of the lodge is a productive marine fishery for chinook and coho salmon. In 1986, the manager of the lodge voluntarily kept track of the catch, and a total of 580 chinook salmon were harvested by lodge guests and employees (Mecum and Suchanek 1987). Since large releases of hatchery chinook salmon return to nearby Neets Bay, and wild stocks from the Unuk and Chickamin rivers migrate through Behm Canal, more information about the stock composition of the chinook harvest was desired. In 1987, therefore, the Yes Bay lodge manager was contracted to collect additional information on the chinook harvest taken by lodge guests and employees. The objectives for this survey were to estimate:

1. the total angler effort and total catch and harvest of chinook, coho, and pink salmon, Pacific halibut, and rockfish of all species;
2. the number of CWT wild and hatchery chinook and coho salmon harvested;
3. the age composition and mean length-at-age of the chinook salmon harvest.

Site Description:

Sport boats from the Yes Bay lodge do not need to venture far to find excellent fishing (Figure 10). Often anglers concentrate efforts near the mouth of Yes Bay, but sometimes anglers take trips along Behm Canal south to the entrance to Neets Bay or east and north in Behm Canal to the shorelines of Hassler, Bell, and other small islands. Accordingly, there is some overlap between anglers fishing out of the Ketchikan area access locations and the Yes Bay lodge fishery.

Methods:

All effort and harvest of the Yes Bay Resort marine fishery was tabulated from 15 May through 30 June 1987. The following information was recorded for each marine boat trip: date, number of anglers fishing, hours fished, and number of fish kept or released, by species. In addition, each chinook salmon harvested was checked for an adipose clip, and heads from clipped fish were collected and marked with a cinch strap. Heads were then sent to the ADF&G CWT Lab in Juneau for tag removal and decoding. Scales and total lengths (tip of snout to fork of tail) in millimeters were also taken from all chinook salmon harvested. Hatchery contribution and age composition analysis was identical to that of the other marine boat recreational harvest surveys.

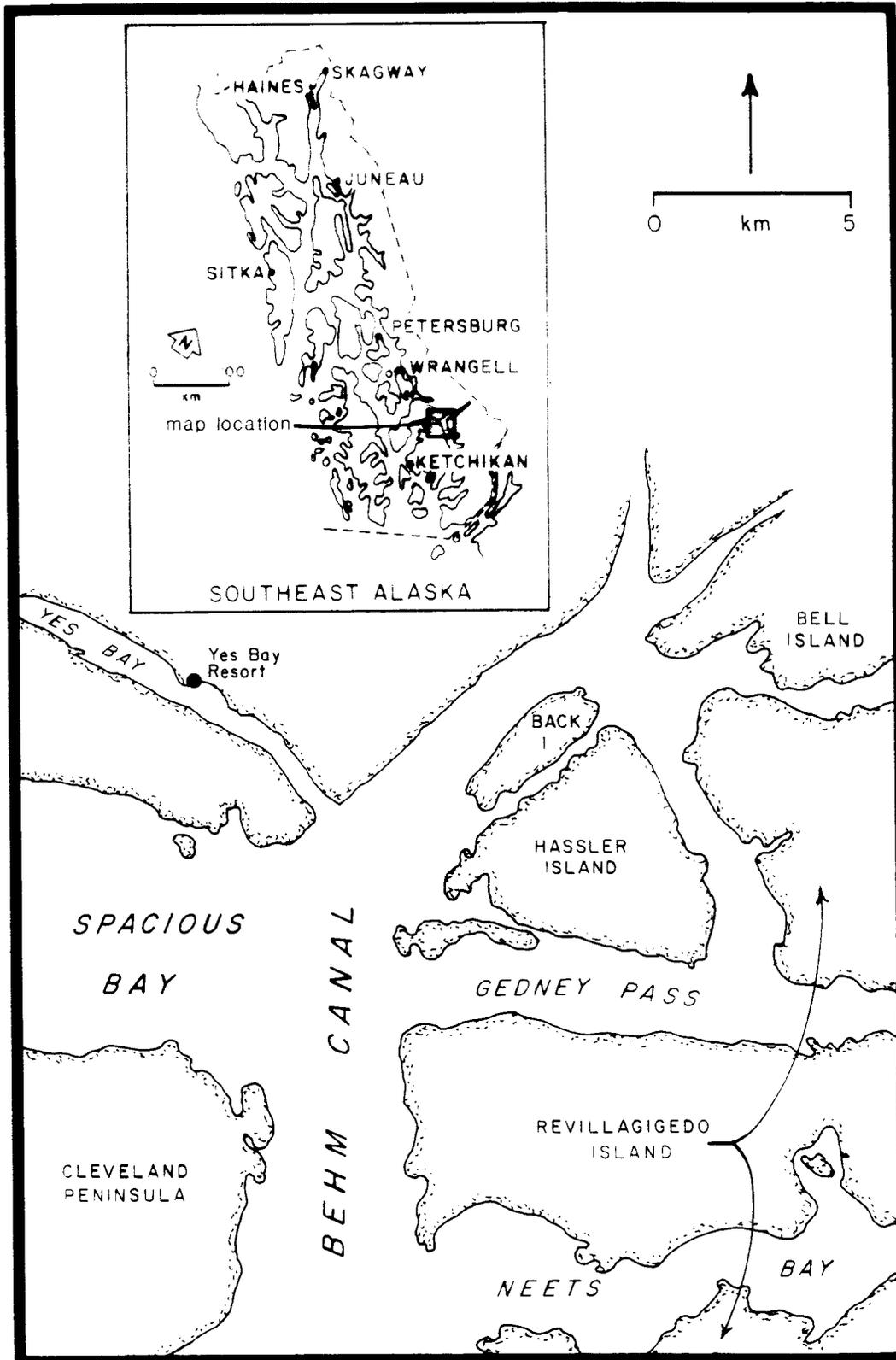


Figure 10. Yes Bay area lodge sport fishing grounds.

Results:

Chinook salmon harvested during the survey period totalled 375 (Appendix Table 10). Few coho and pink salmon were harvested during the survey period in the Yes Bay fishery. A total of 171 Pacific halibut and 269 rockfish of all species were also harvested. Harvest rates for chinook salmon varied little by two week interval (Appendix Table 11). Chinook salmon from the Whitman Lake and Neets Bay hatcheries predominated in the 27% hatchery chinook contribution to the harvest (Appendix Table 12). Many of the Whitman Lake hatchery fish had been released in Neets Bay. Most of the adipose fin clipped hatchery fish were captured from 10 June to 30 June. Approximately, 13% of the harvest was comprised of older, larger chinook salmon (i.e., age classes: 1.4, and 1.5) (Appendix Tables 6 and 7). Thirteen percent of the aged sample was comprised of fish without a freshwater annulus, and assumed to be either of hatchery or non-Alaskan origin. Approximately 26% and 48% of the fish were age 1.2 and 1.3, respectively.

Petersburg Area

Introduction:

Angler effort in the combined Petersburg-Wrangell marine sport fisheries has been increasing slowly and has averaged 22,582 anglers days over the past 10 years (Figure 11). Chinook salmon harvests have generally increased and have averaged 3,179. Coho harvests have fluctuated greatly from a high of 5,141 (1977) to a low of 1,085 (1981), and have averaged 2,457. Like most other marine fisheries in southeast Alaska, harvests of Pacific halibut have increased since 1977, although they have declined since 1984 when a harvest of 5,649 was taken. On-site harvest surveys were conducted during 1987 separately for the Petersburg and Wrangell areas. This section describes the Petersburg survey.

The specific objectives for the 1987 Petersburg marine boat recreational harvest survey were to estimate the following parameters at selected access locations in the Petersburg area during the 20 April-13 September 1987 time period:

1. angler effort, catch, and harvest of each of the five primary species of Pacific salmon, Dolly Varden *Salvelinus malma*, Pacific halibut, and rockfish by seasonal period and in total;
2. HPUE by seasonal period for each species of salmon, Dolly Varden, Pacific halibut, and rockfish species;
3. the number of CWT wild and hatchery chinook and coho salmon harvested;
4. the age composition and mean length-at-age of the chinook salmon harvest; and
5. the total round weight of Pacific halibut harvested.

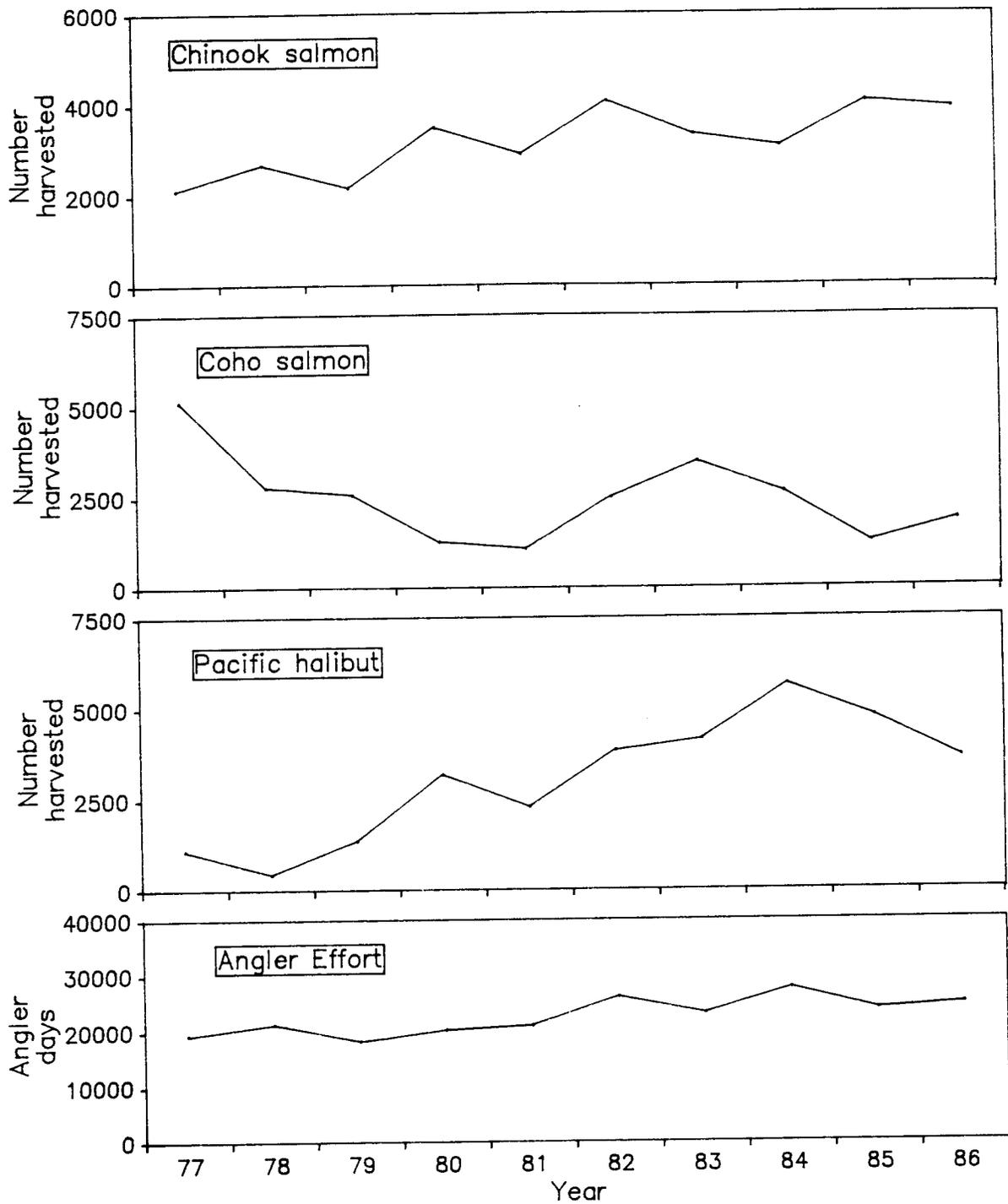


Figure 11. Estimated number of chinook salmon, coho salmon, and Pacific halibut harvested with estimated angler effort in the Petersburg-Wrangell area recreational marine fishery (Mills 1979, 1980, 1981a, 1981b, 1982, 1983, 1984, 1985, 1986, 1987).

Site Description:

The Petersburg marine boat sport fishery occurs along Frederick Sound and along Wrangell Narrows (Figure 12). The only major access point into the fishery is the extensive boat harbor located downtown. For sampling purposes, this harbor was separated into two portions, North and Middle harbor and the South harbor. Little charter boat activity originates from Petersburg.

Stratification Structure:

The North and Middle harbors were assigned to the high use access stratum. While the South harbor was assigned to the low use stratum.

The seasonal strata for the Petersburg 1987 survey were as follows:

1. 20 April - 21 May;
2. 22 - 25 May (the Petersburg King Salmon Derby);
3. 26 May - 21 June;
4. 22 June - 5 July;
5. 6 - 19 July;
6. 20 July - 2 August;
7. 3 - 16 August;
8. 17 - 30 August; and
9. 31 August - 13 September.

Samples were allocated according to the following scheme for the Petersburg survey:

1. Within any week (i.e., Monday-Sunday), all weekend-holidays and derby days were selected for sampling.
2. Within each week two contiguous weekdays were randomly selected for "non-sampling", in order to assure two days off for staff. All remaining weekdays were sampled.
3. During each selected day, two samples were obtained with both occurring in either the early day or late day stratum. Approximately one-third of the available samples were allocated at random to the early day stratum, with the remaining samples allocated to the late day stratum.
4. Selected samples were allocated to access-type strata at random so that approximately two-thirds of the available samples went to the heavy use stratum and one-third to the low use stratum, with a minimum sample size of two for unique combinations of the sampling strata.

The resulting sampling fractions (for each access location type) were 66% for heavy use, and 34% for low use. Resultant sampling fractions for each time of day stratum were 39% for early day and 61% for late day.

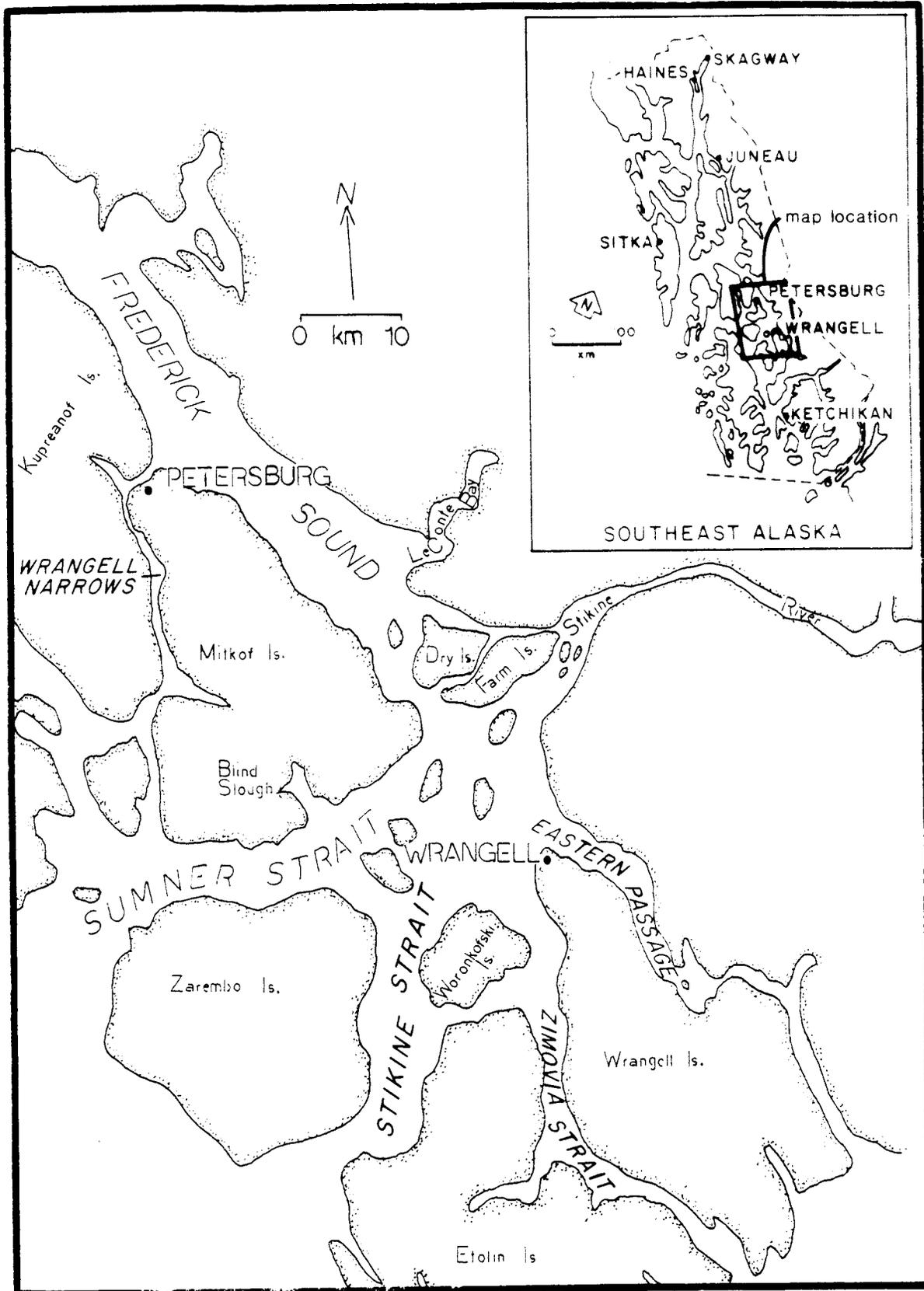


Figure 12. Petersburg and Wrangell marine boat sport fishing grounds.

Results:

A total of 716 boat-parties were interviewed during the 1987 Petersburg area survey. The estimated total angler effort during the survey was 15,557 boat-hours or 35,501 rod-hours (Appendix Table 13). Approximately 20% of the total effort (boat-hours) occurred during the Petersburg King Salmon Derby (Appendix Table 14).

An estimated total of 1,398 large chinook salmon and 3 small chinook salmon were harvested during the 1987 survey period in Petersburg (Appendix Table 13). This total estimate does not include the hatchery chinook salmon harvested in Blind Slough (see Blind Slough THA section for details). Approximately 15% of the harvest of large chinook salmon was taken during the Petersburg King Salmon Derby (Appendix Table 13). During the period following the King Salmon Derby (26 May - 21 June), 744 large chinook salmon were taken (Figure 13 and Appendix Table 14). Harvest and HPUE peaked during the period 26 May to 21 June, and declined thereafter.

The chinook salmon harvest in the Petersburg marine fishery area included 670 fish of hatchery origin, with 525 (78%) chinook salmon from southeast Alaskan hatcheries (Appendix Table 15). Only 27% (57 fish) of the derby harvest of chinook salmon were of hatchery origin, whereas 48% of the entire seasonal harvest were produced by hatcheries.

Ages were determined for 255 chinook salmon sampled from the Petersburg marine harvest. Approximately 42% of these fish were age 1.4 or 1.5 (Appendix Tables 6 and 7). Approximately 25% of the aged sample was comprised of fish without a freshwater annulus. Approximately, 4% and 35% of the fish were age 1.2 and 1.3, respectively.

The Pacific halibut harvest in the Petersburg fishery totaled 1,595 fish, with another 1,375 fish released (Appendix Table 13). Harvest of halibut peaked during the period 17 August to 30 August (Figure 14 and Appendix Table 14) with 327 fish harvested. The mean total length of 119 sampled Pacific halibut was estimated to be 928 mm, with a mean round weight of 12.9 kg (28.5 lbs). The estimated round weight of the Petersburg sport halibut harvest was 20,606 kg (45,429 lbs).

Petersburg anglers also harvested 210 coho salmon, 310 pink salmon, 44 chum salmon, and 31 sockeye salmon (Appendix Table 13). All of the coho salmon harvest and the majority of the pink salmon harvest occurred after 20 July (Appendix Table 14). No hatchery produced coho salmon were harvested, however only 14 coho salmon were examined for adipose fin clips (Appendix Table 8). Only 81 rockfish of various species were harvested in Petersburg, with an additional 285 released (Appendix Table 13). No Dolly Varden were reported harvested by Petersburg anglers during the 1987 survey.

Wrangell Area

Introduction:

As noted above, angler effort in the combined Petersburg-Wrangell marine sport fisheries has increased slowly and has averaged 22,582 anglers days

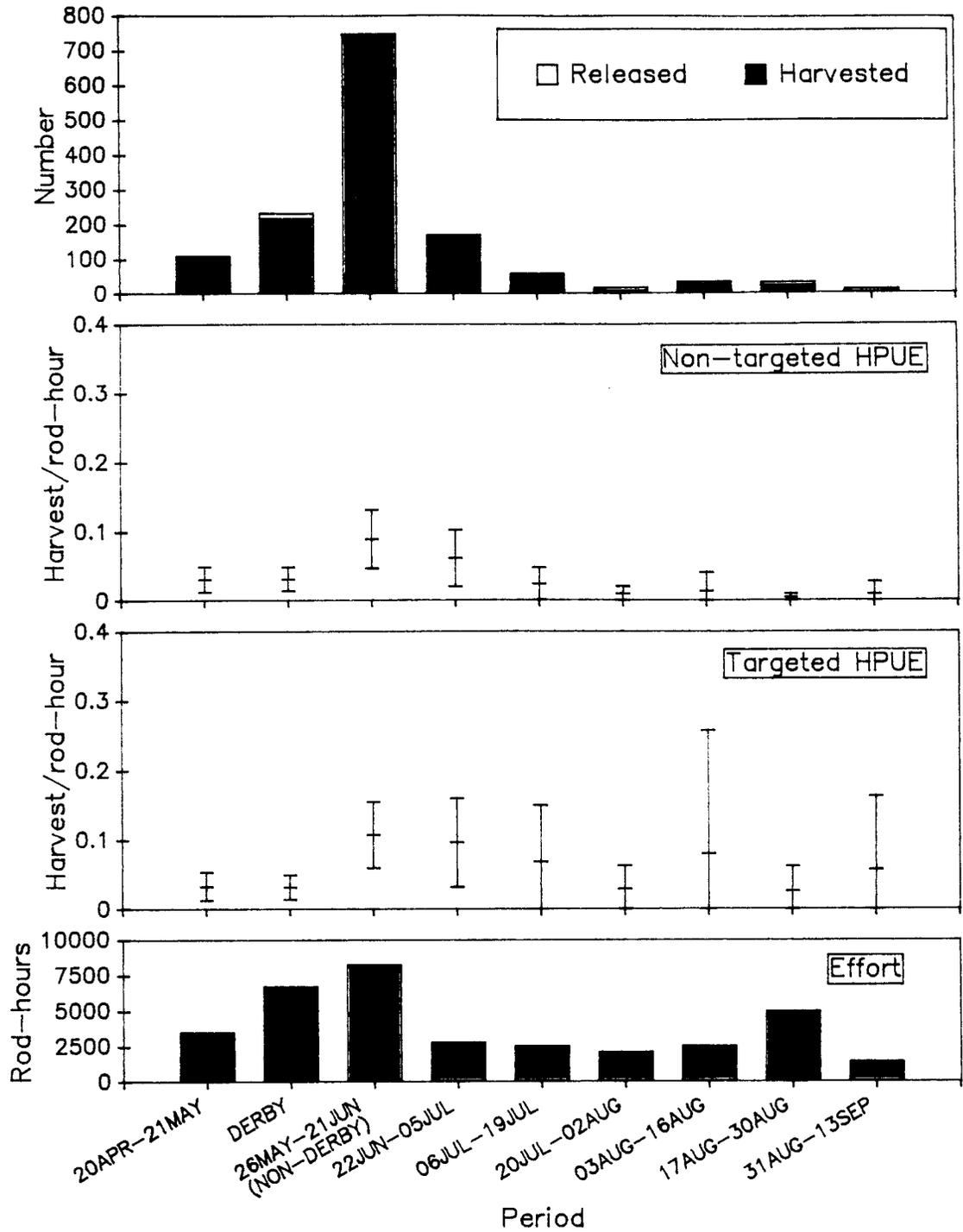


Figure 13. Estimated number of large chinook salmon caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Petersburg marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

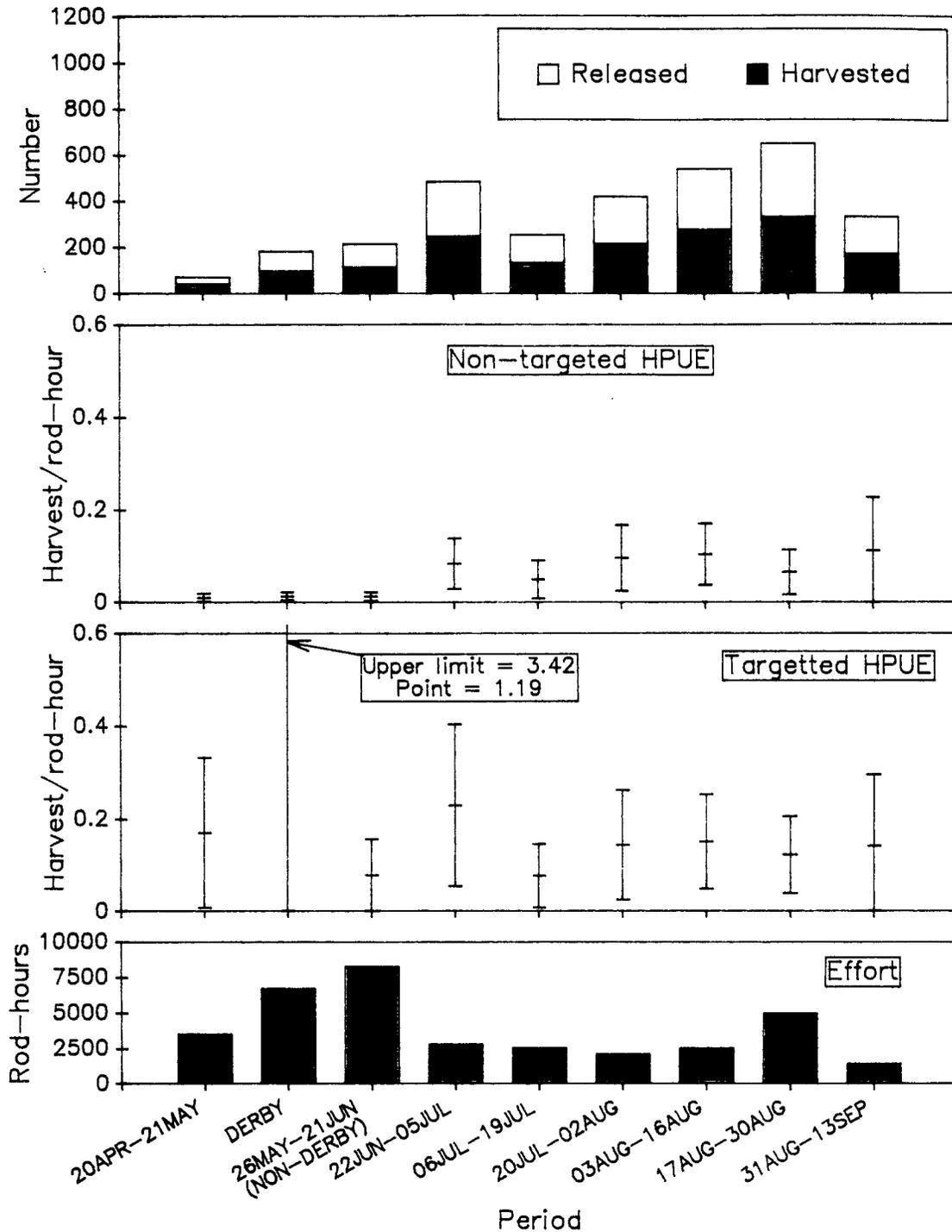


Figure 14. Estimated number of Pacific halibut caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Petersburg marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

over the past 10 years (Figure 2). On-site harvest surveys were conducted during 1987 separately for the Petersburg and Wrangell areas. This section describes the Wrangell survey. The specific objectives for the 1987 Wrangell marine boat recreational harvest survey were the same as those noted for the Petersburg area.

Site Description:

Wrangell sport anglers often target on mature chinook salmon returning to the Stikine River system (Figure 12). Effort is concentrated north and west of Wrangell in protected waters near the east ends of Stikine and Sumner straits, although anglers also venture south of town in Zimovia Strait and Eastern Passage. There are two major access points into the Wrangell fishery: Town and Shumacher harbors. Town harbor was separated into an Inner and Outer portion for sampling purposes during afternoon sampling periods due to its large size. Charter boat activity originating from Wrangell is low.

Stratification Structure:

The two access locations in Wrangell were not split into different strata. Accordingly, either Town Harbor or Shumacher Harbor was selected at random with equal probability.

The seasonal strata for the Wrangell 1987 survey were as follows:

1. 20 April - 25 May;
2. 26 May - 21 June;
3. 22 June - 5 July;
4. 6 - 19 July;
5. 20 July - 2 August;
6. 3 - 16 August;
7. 17 - 30 August; and
8. 31 August - 13 September.

The King Salmon Derby in Wrangell held from 16 May to 31 May 1987. It was not treated as a separate stratum for sampling or estimation purposes.

Samples were allocated according to the following scheme for the Wrangell survey:

1. Within any week (i.e., Monday-Sunday), all weekend-holidays were selected for sampling.
2. Within each week two contiguous weekdays were randomly selected for "non-sampling", in order to assure two days off for staff. All remaining weekdays were sampled.
3. During each selected day, two samples were made. Both samples occurred in either the early day or late day stratum. Approximately one-third of the available samples were allocated at random to the early day stratum, with the remaining samples allocated to the late day stratum.

4. Finally, during early day samples either Town Harbor or Shumacher Harbor was selected at random with equal probability. During late day samples the sites of Inner Town Harbor, Outer Town Harbor, or Shumacher Harbor were selected at random with equal probability.

The resulting sampling fractions (for each time of day type) were 22% for the early day stratum and 78% for the late day stratum.

Results:

The creel sampler in Wrangell interviewed 578 boat-parties during the 1987 survey. Angler effort during the survey totalled 20,851 boat-hours or 51,335 rod-hours (Appendix Table 16). Approximately 42% of the total effort (boat-hours) occurred during the period from 20 April - 25 May 1987. Effort then remained low for the rest of the season (Figure 15 and Appendix Table 17).

An estimated 1,213 large chinook salmon and 5 small chinook salmon were harvested during the 1987 survey period in Wrangell (Appendix Table 16). Approximately 84% of the harvest of large chinook salmon was taken between 20 April and 21 June (Figure 15 and Appendix Table 17). Non-targeted HPUE of large chinook salmon dropped to less than 0.01 fish per rod-hour after 5 July. Only five of the total Wrangell chinook salmon harvested were of hatchery origin, and these came from Whitman Lake in southeast Alaska (Appendix Table 18).

Ages were determined for 107 chinook salmon from the Wrangell area harvest. Approximately 49% of these fish were age 1.4 or 1.5 (Appendix Tables 6 and 7). Approximately 9% of the aged sample were from fish without a freshwater annulus. Approximately 4% and 38% of the fish were age 1.2 and 1.3, respectively.

The Pacific halibut harvest in the Wrangell area totaled 1,894 fish, with another 100 fish released (Appendix Table 16). HPUE and harvest of halibut gradually increased during the months of June and July, to peak during the period 20 July through 2 August (Figure 16 and Appendix Table 17). The mean total length of 146 sampled Pacific halibut was estimated to be 944 mm, with a mean round weight of 12.5 kg (27.6 lbs). Accordingly, the estimated round weight of the Wrangell sport halibut harvest was 23,711 kg (52,274 lbs).

Wrangell anglers also harvested 192 coho salmon, 275 pink salmon, 29 sockeye salmon, 5 Dolly Varden *Salvelinus malma*, and 268 rockfish (Appendix Table 16). All of the coho salmon harvest occurred after 20 July (Appendix Table 17). The majority of the pink salmon were harvested after 6 July. All of the rockfish were harvested prior to 2 August. We estimate that 36 of the coho salmon harvested were hatchery fish released in Earl West Cove in southeast Alaska (Appendix Table 18). No chum salmon were reported in the Wrangell fishery harvest during the 1987 survey.

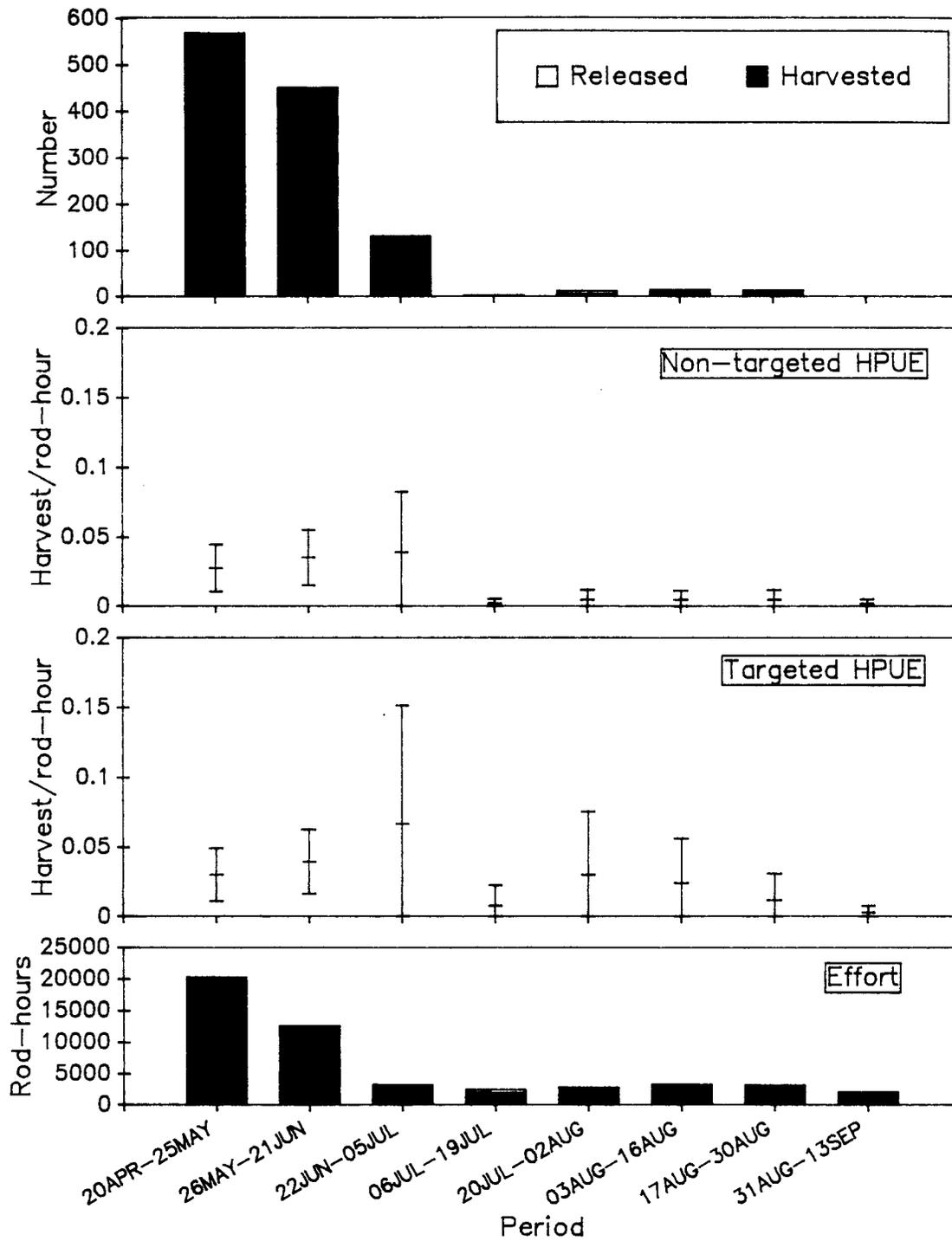


Figure 15. Estimated number of large chinook salmon caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Wrangell marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

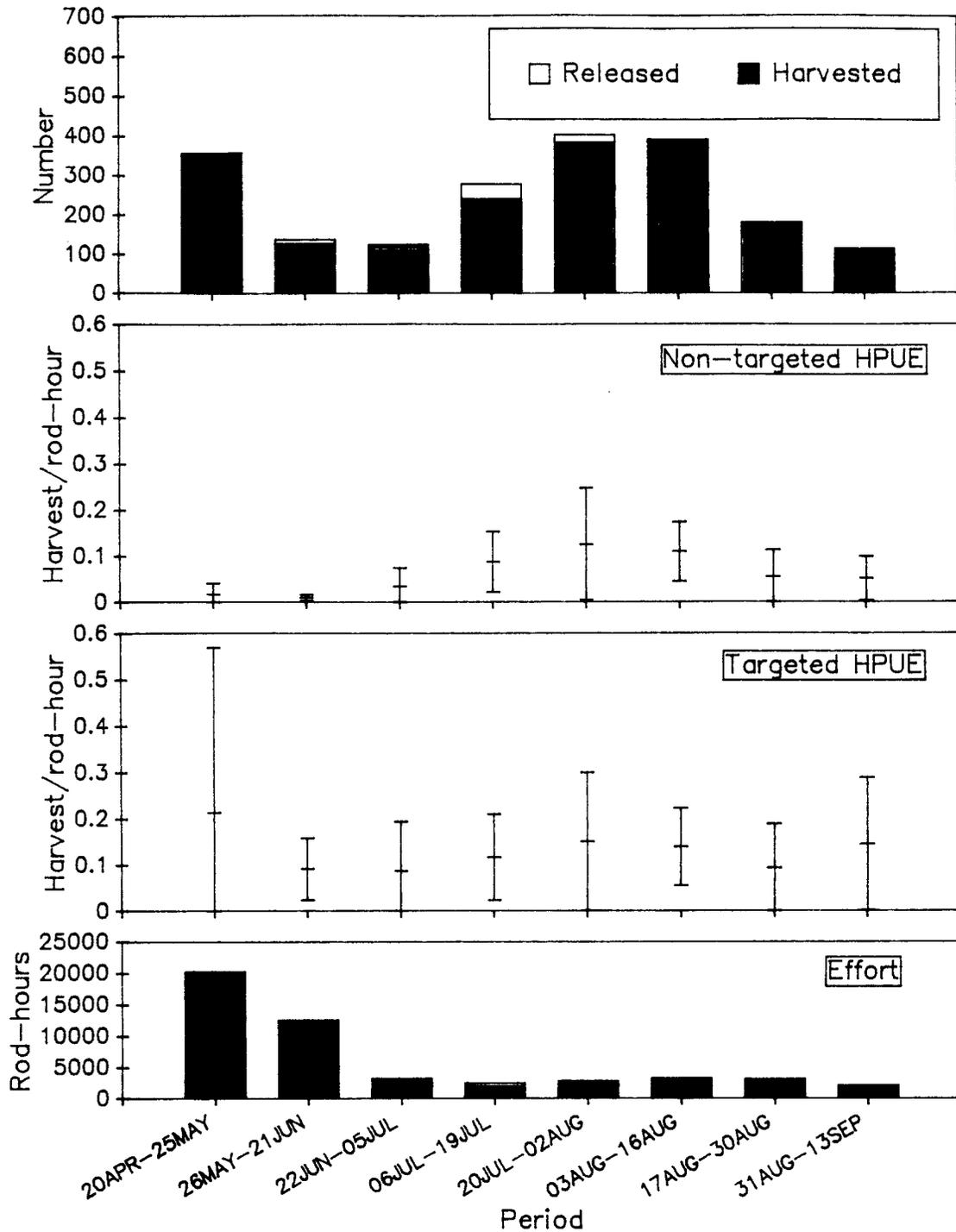


Figure 16. Estimated number of Pacific halibut caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Wrangell marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

Sitka Area

Introduction:

Effort in the Sitka marine fishery over the past 10 years has been fairly stable. An average of 34,259 angler days of effort makes this fishery the third largest in southeast Alaska (Figure 2). Chinook and coho salmon harvests have also been fairly constant with an average of 1,855 chinook salmon and 2,926 coho salmon harvested each year (Figure 17). Harvest of Pacific halibut has increased from a minimum of 339 in 1977 to 8,197 in 1984. The specific objectives for the 1987 Sitka marine boat recreational harvest survey were to estimate the same parameters as in the Ketchikan survey, as noted above, during the 20 April-13 September 1987 time period. Additionally, the catch, harvest, and HPUE of ling cod *Ophiodon elongatus* was estimated.

Site Description:

Sitka anglers primarily fish in Sitka Sound, but day and overnight trips to Salisbury Sound and further north also frequently occur (Figure 18). Numerous islands, bays, and inlets provide sheltered waters throughout the Sitka area. Sampled access points included four harbors and one boat launch. Crescent, Thompson, and Sealing Cove harbors are located in or near downtown Sitka and all three of these harbors support large numbers of both sport and commercial boats. The two other sampled access points were a small harbor called the Cove located about 10 km north of Sitka and the Starrigavin boat launch ramp, located about 13 km north of Sitka. Although there are some private moorages and docks, no attempt was made to sample these areas. Sitka supports a growing sport charter fleet. Charter boats operate mainly from the three downtown harbors.

Stratification Structure:

Access locations were assigned to access strata for the Sitka area as follows:

1. Heavy use docks and boat launches:
 - a. Crescent Harbor;
 - b. Sealing Cover Harbor; and
 - c. Thompson Harbor.
2. Low use docks and boat launches:
 - a. the Cove Harbor; and
 - b. Starrigavin boat launch.

The seasonal strata were:

1. 20 April - 22 May;
2. 23 - 25 May and 30 - 31 May (the Sitka Salmon Derby);
3. 26 - 29 May and 1 - 21 June;
4. 22 June - 5 July;

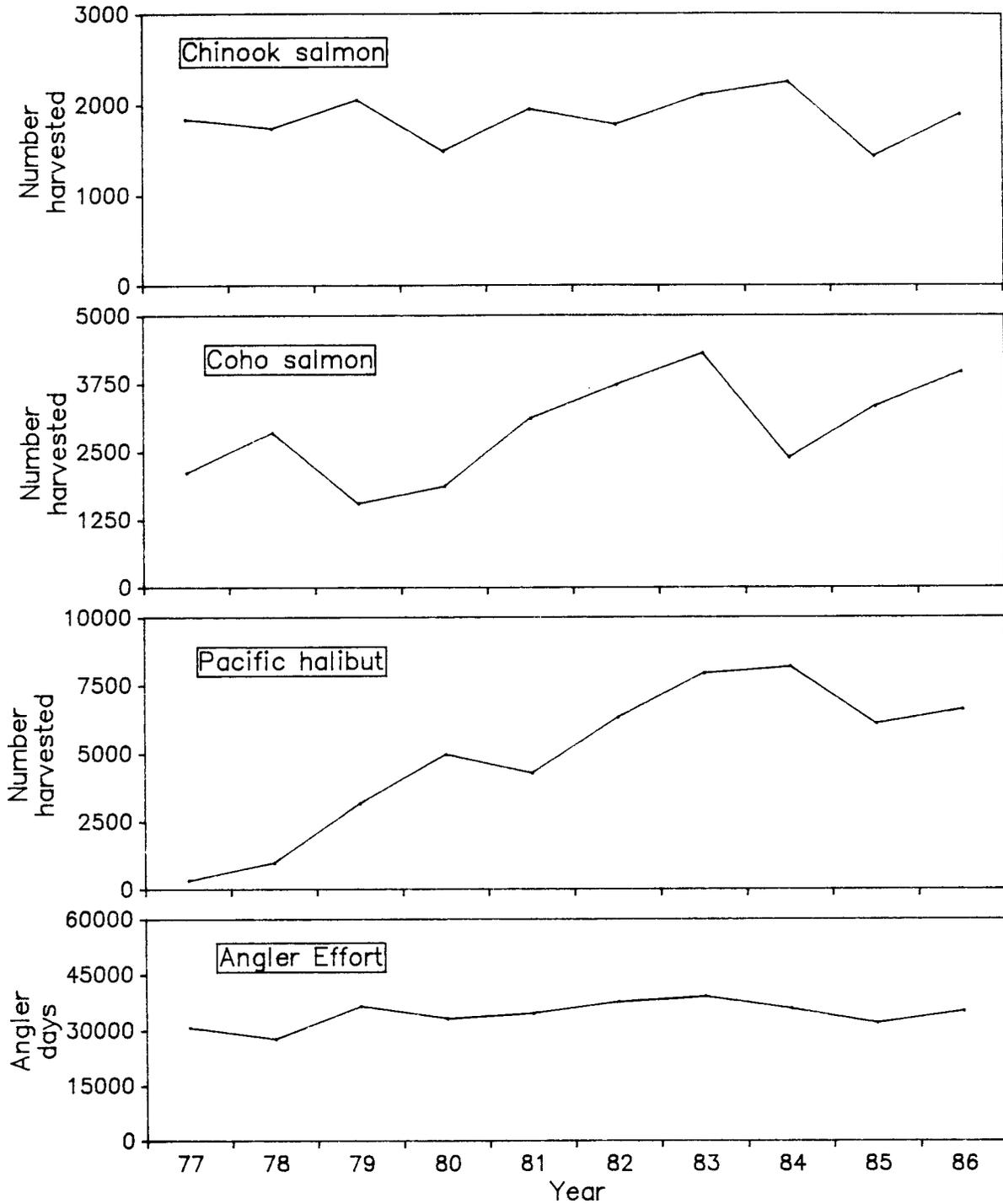


Figure 17. Estimated number of chinook salmon, coho salmon, and Pacific halibut harvested with estimated angler effort in the Sitka area recreational marine fishery (Mills 1979, 1980, 1981a, 1981b, 1982, 1983, 1984, 1985, 1986, 1987).

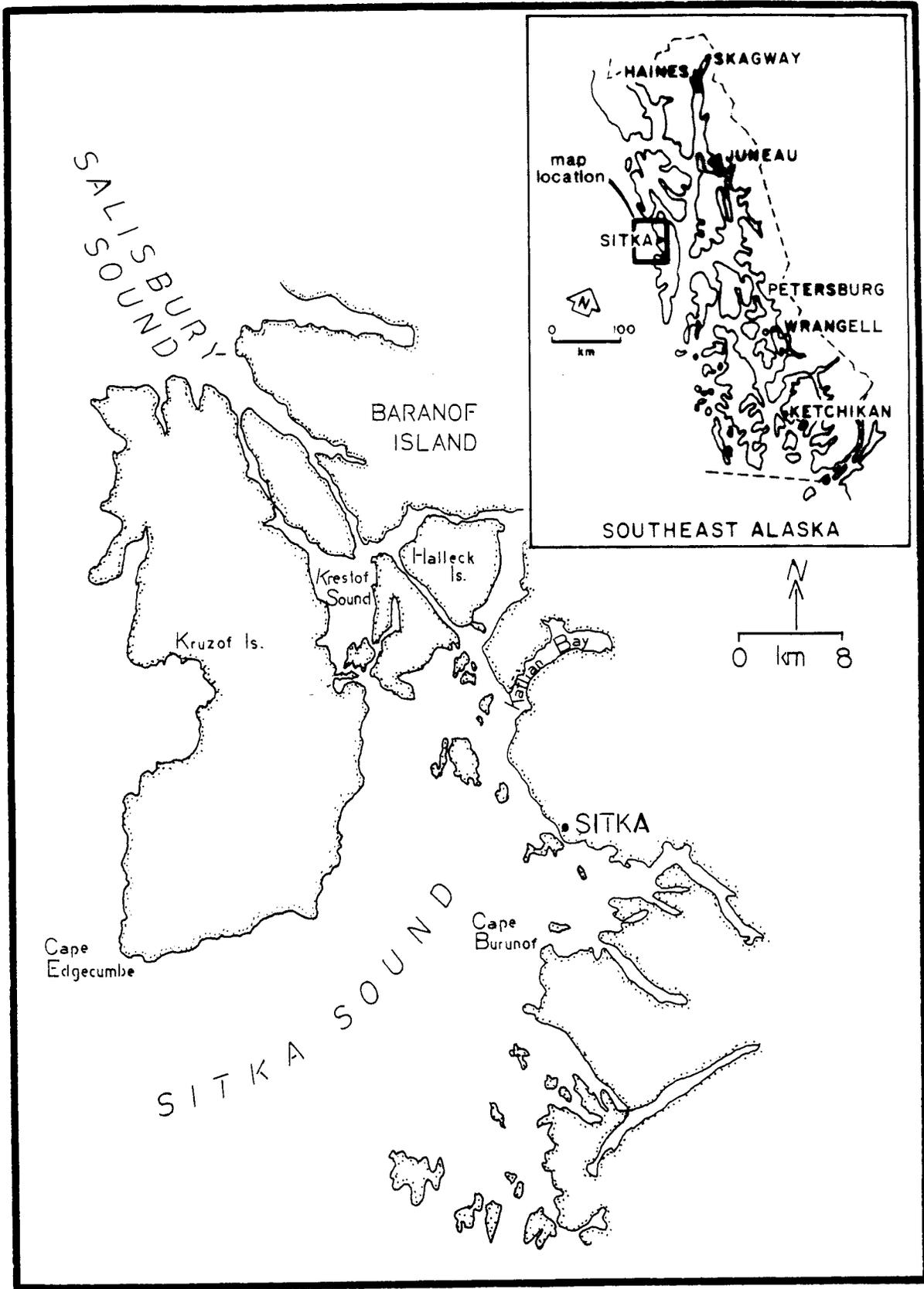


Figure 18. Sitka marine boat sport fishing grounds.

5. 6 - 19 July;
6. 20 July - 2 August;
7. 3 - 16 August;
8. 17 - 30 August; and
9. 31 August - 13 September.

Samples were allocated according to the following scheme for the Sitka survey:

1. Within any week (i.e., Monday-Sunday), all weekend-holidays and derby days were selected for sampling.
2. Within each week, two contiguous weekdays were randomly selected for "non-sampling", in order to assure two days off for staff. All remaining weekdays were sampled.
3. During each selected day two samples were made. Both samples occurred in either the early day or late day stratum. Approximately one-third of the available samples were allocated at random to the early day stratum, with the remaining samples allocated to the late day stratum.
4. Finally, selected samples were allocated to access-type strata at random so that approximately five-sixths of the available samples went to the heavy use stratum and one-sixth to the low use stratum, with a minimum sample size of two for unique combinations of the sampling strata.

The resulting sampling fractions (for each access location type) were 66.5% for heavy use, and 33.5% for low use. Resultant sampling fractions for each time of day stratum were 36.5% for early day and 63.5% for late day.

Results:

Creel samplers interviewed 442 boat-parties in the Sitka marine sport fishery. Angler effort during the survey period was 24,129 boat-hours or 58,814 rod-hours (Appendix Table 19). Approximately 24% of the effort occurred during the Sitka Salmon Derby. A total of 5,707 boat-hours or 14,436 rod-hours were expended during the Derby (Figure 19 and Appendix Table 20).

An estimated total of 2,354 large chinook salmon and 112 small chinook salmon were harvested by Sitka marine anglers (Appendix Table 19). Approximately 15% of the large chinook salmon harvest was taken during the Sitka Salmon Derby (Figure 19 and Appendix Table 20). Harvest levels and HPUE were highest during the 1-13 September period. An estimated 150 hatchery chinook salmon sport were harvested by Sitka anglers (Appendix Table 21). Of these, 53 (35%) were produced by southeast Alaska hatcheries. Of the estimated 150 hatchery origin fish harvested, 69 were taken during the Sitka Salmon Derby. Ages were determined from a sample of 289 chinook salmon from the Sitka area sport harvest. Approximately 17% of these chinook salmon were age 1.4; 57% of the aged sample were fish without a

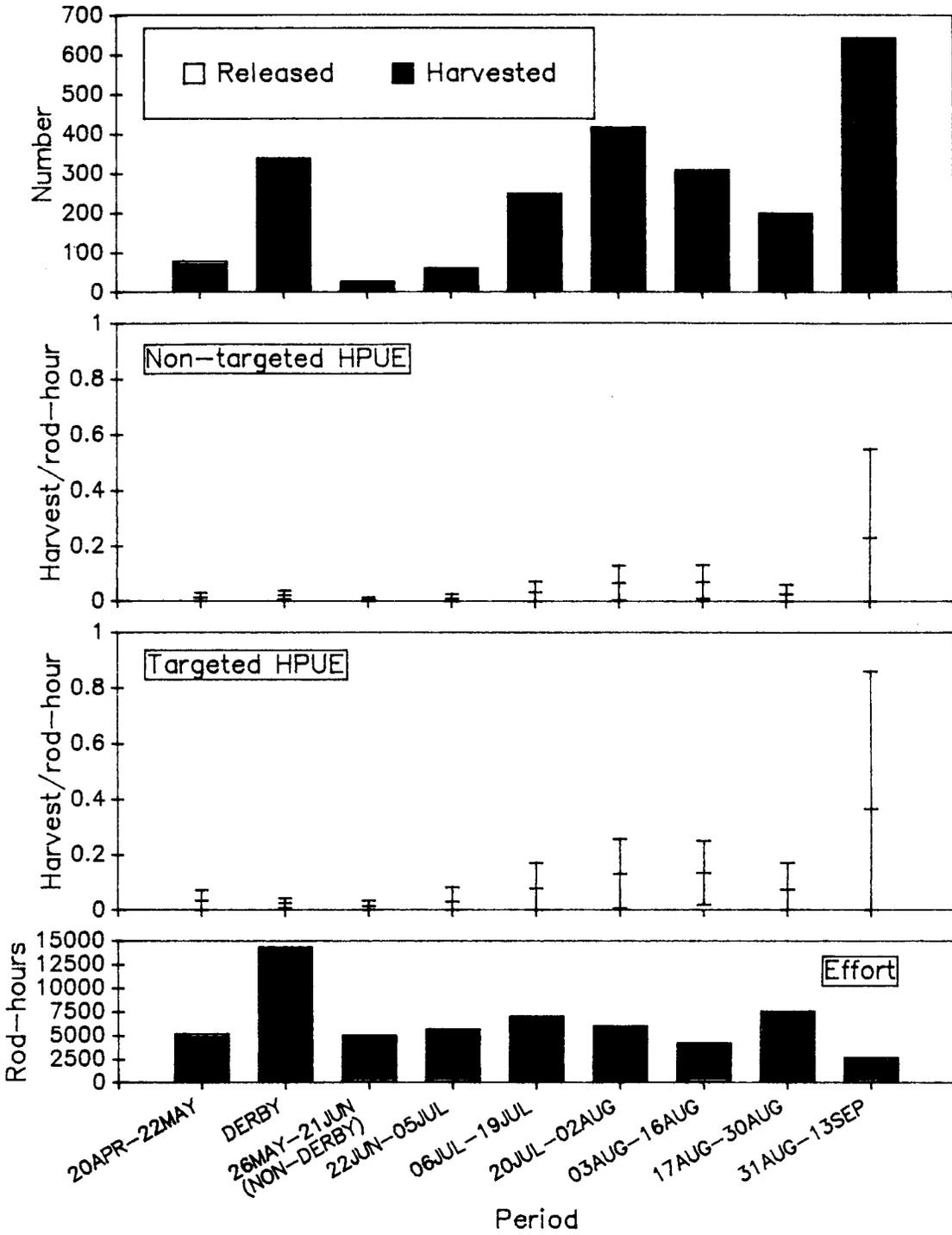


Figure 19. Estimated number of large chinook salmon caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Sitka marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

freshwater annulus; and 13% and 12% of the fish were age 1.2 and 1.3, respectively (Appendix Tables 6 and 7).

All of the 1,185 coho salmon harvested were taken after 6 July (Appendix Tables 19 and 20). The catch dropped to only 9 fish after 31 August (Figure 20 and Appendix Table 20) and was accompanied by a drop in HPUE. An estimated 5% of the coho salmon harvested were of hatchery origin (Appendix Table 22). All hatchery coho salmon harvested were from southeast Alaska hatcheries.

Sitka anglers also harvested 1,327 pink salmon (Appendix Table 19). Pink salmon harvest and HPUE peaked between 6 July and 31 August (Figure 21 and Appendix Table 20). A harvest of 73 chum salmon and 223 sockeye salmon was also taken (Appendix Table 19).

The Pacific halibut harvest in the Sitka fishery totaled 8,314 fish (Appendix Table 19). Harvest of halibut peaked during the 17-30 August period (Figure 22 and Appendix Table 20). The mean total length of 210 sampled Pacific halibut was estimated to be 925 mm, with a mean round weight of 12.2 kg (26.95 lbs). Accordingly, the estimated round weight of the Sitka sport halibut harvest was 101,431 kg (224,062 lbs).

An estimated total of 17,913 rockfish of various species were caught by sport anglers during the survey in the Sitka area (Appendix Table 19). Of these, only 3,469 (19%) were harvested. Approximately 31% of the identified rockfish harvest were quillback rockfish. An additional 31% were black rockfish, with 23% yelloweye rockfish, and 12% dusky rockfish. The remainder of the identified harvest was comprised of small numbers of copper rockfish and other miscellaneous species. Twenty-nine percent of the total harvest occurred from 20 April to 22 May (Figure 23 and Appendix Table 20). Rockfish harvest remained high during the following month from 23 May to 21 June. The rise in harvest during the period 17 August to 30 August was apparently due to an increase in effort rather than improved HPUE. Additionally, a total of 952 ling cod were harvested in the Sitka area sport fishery, and an additional 467 (33% of the total catch) were released (Appendix Table 19).

Juneau Area

Introduction:

Angler effort in the Juneau marine fishery has increased during the last ten years, with an average of 89,557 angler days (Figure 24). Harvest of chinook salmon has increased only moderately, with substantial fluctuations occurring during this same period. Chinook salmon harvest has averaged 7,537, with a minimum harvest of 5,431 (1983), and a maximum harvest of 10,614 (1982) fish. Coho salmon harvests have generally decreased during the last ten years; with an average harvest of 16,640, a minimum of 9,753 (1981), and a maximum of 24,659 (1982) fish. Harvest of Pacific halibut has increased during the last ten years; with an average harvest of 11,286, a minimum of 1,976 (1978), and a maximum of 18,651 (1983) fish.

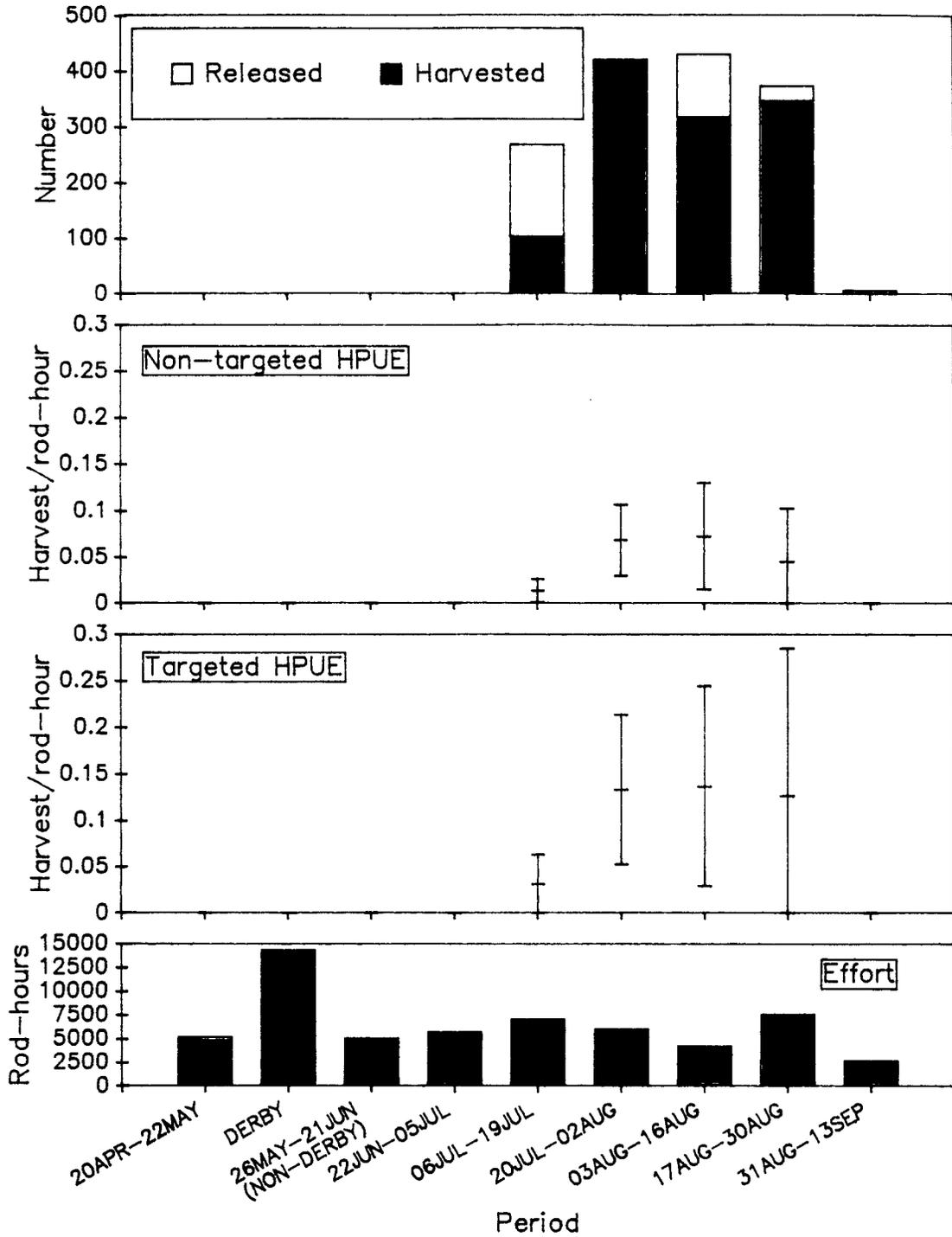


Figure 20. Estimated number of coho salmon caught and released; with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Sitka marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

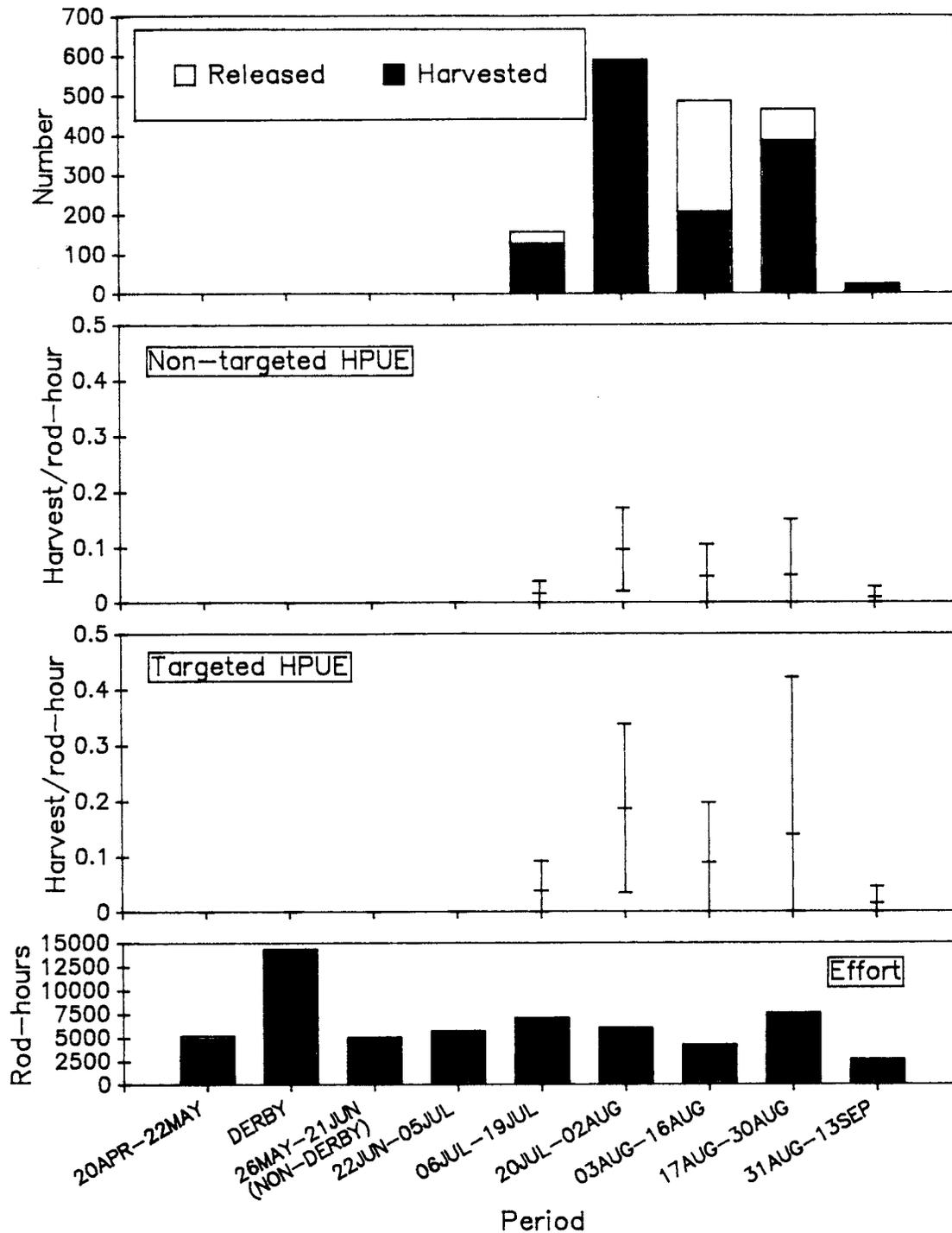


Figure 21. Estimated number of pink salmon caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Sitka marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

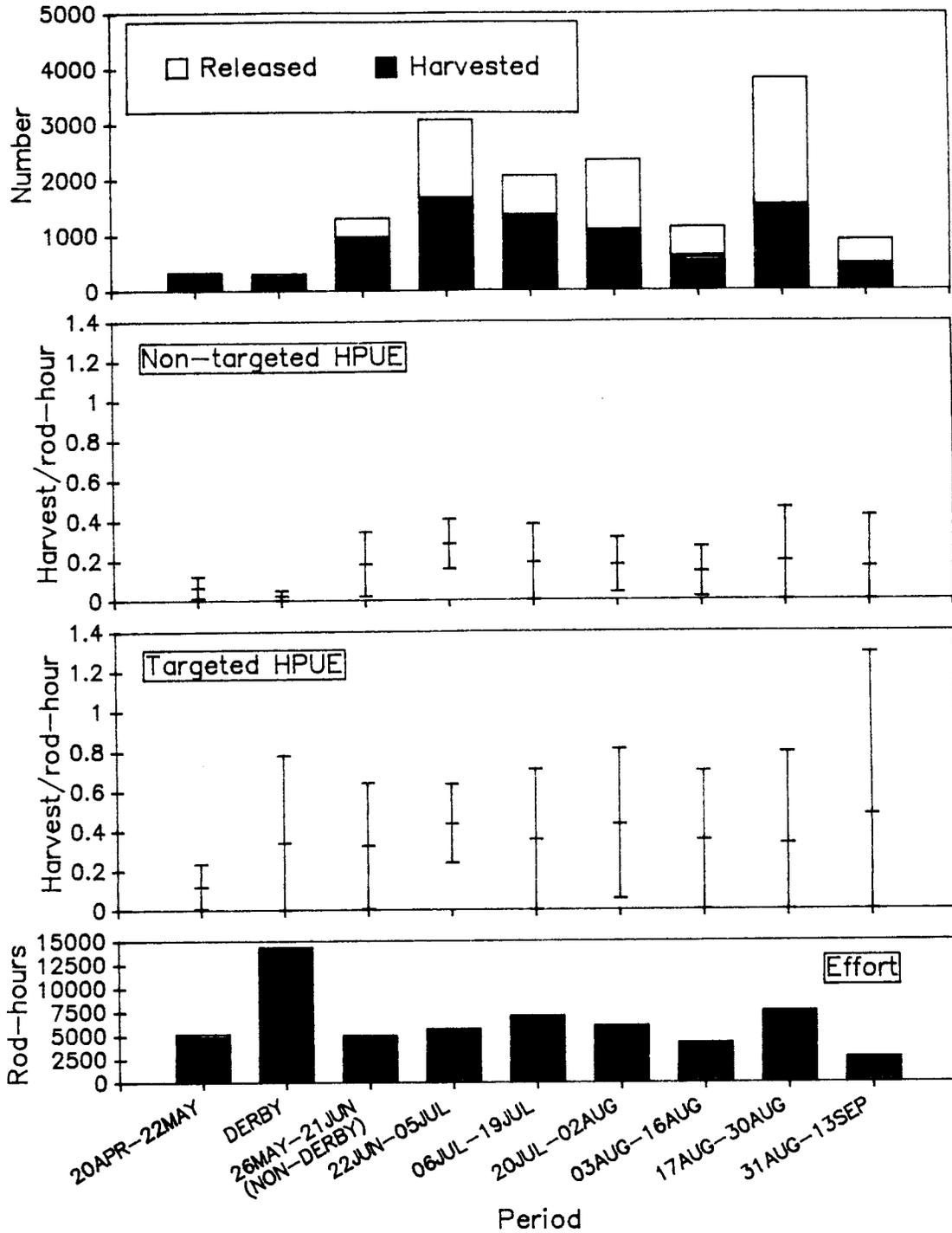


Figure 22. Estimated number of Pacific halibut caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Sitka marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

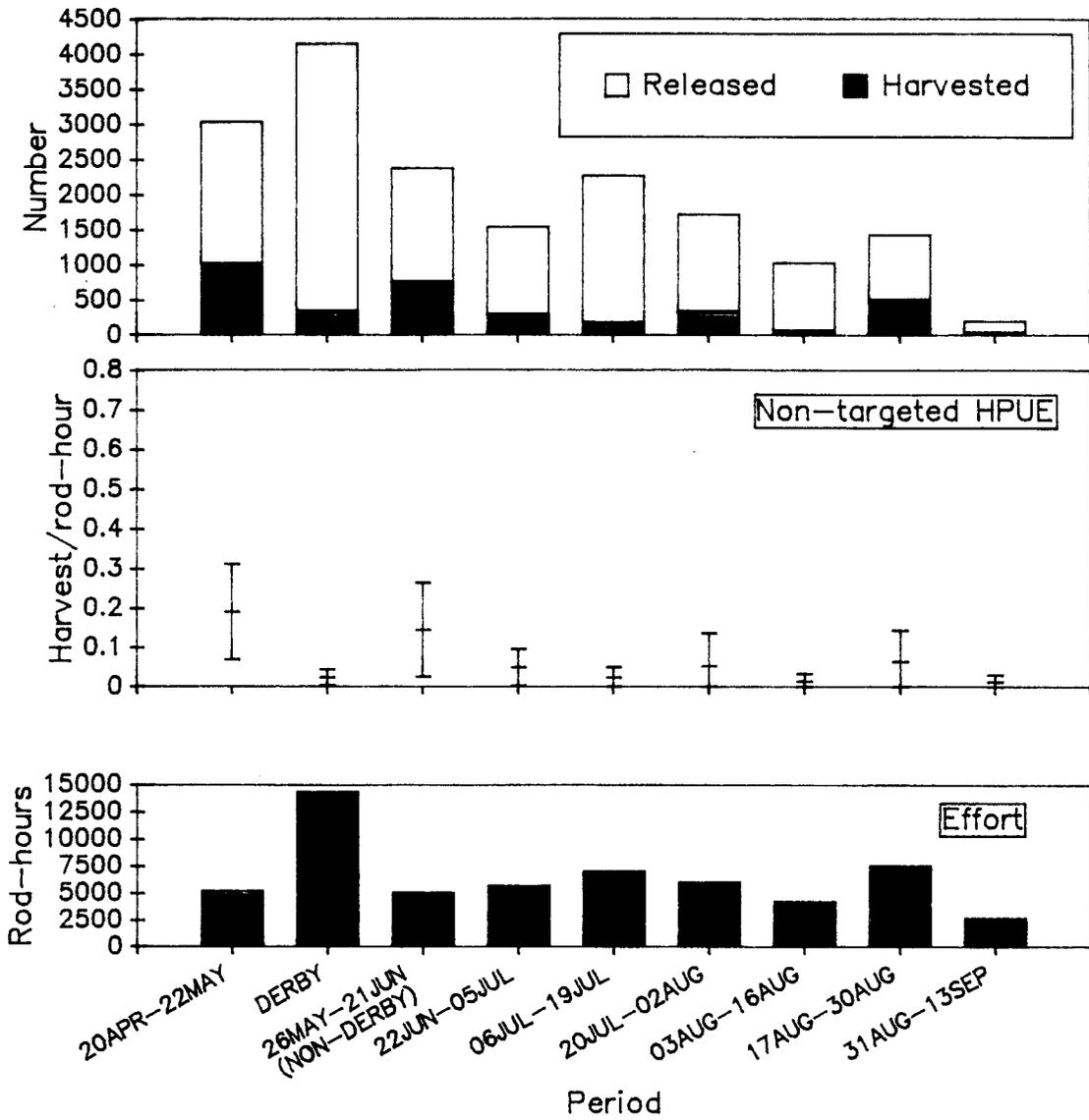


Figure 23. Estimated number of rockfish species caught and released, with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Sitka marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

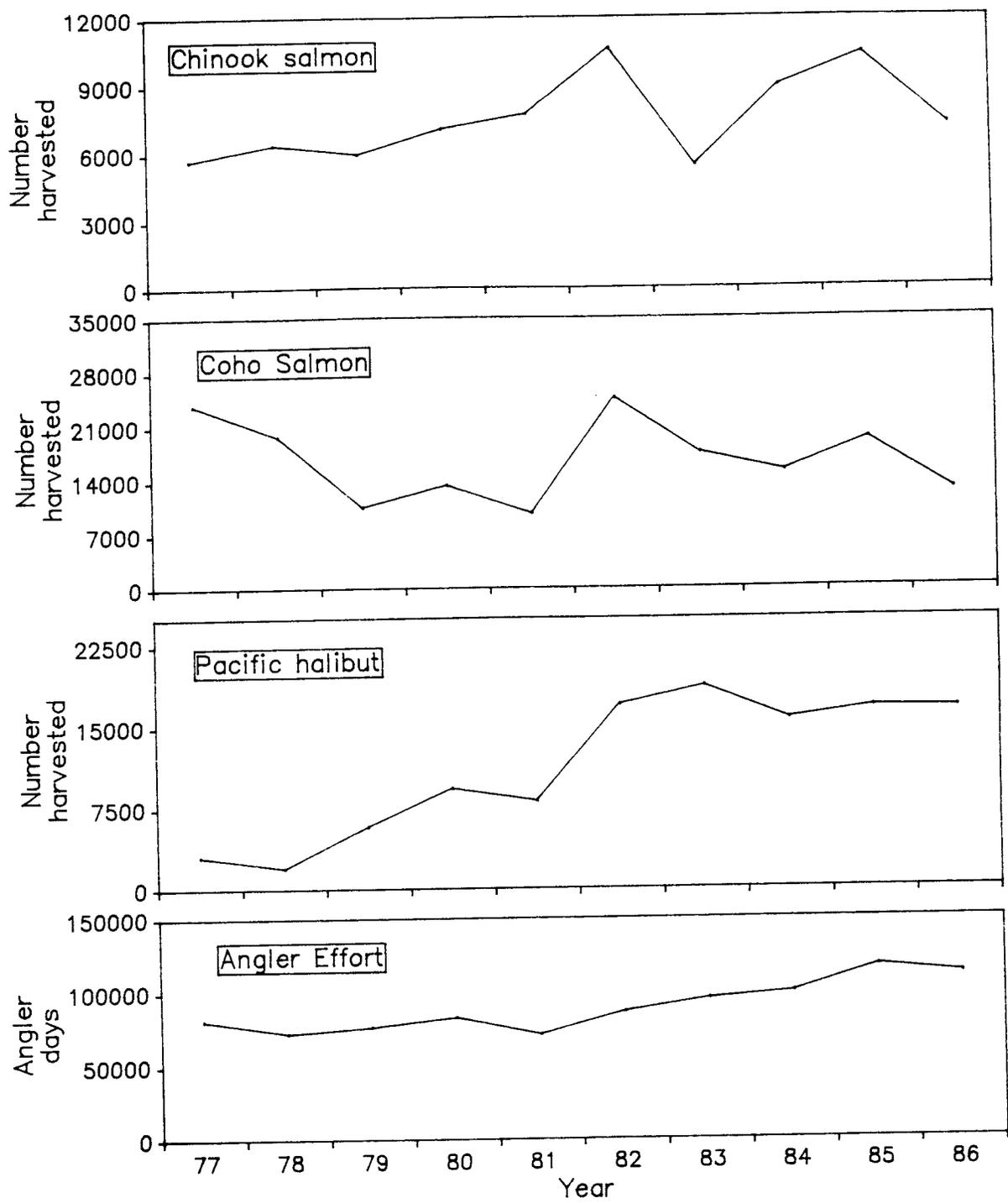


Figure 24. Estimated number of chinook salmon, coho salmon, and Pacific halibut harvested with estimated angler effort in the Juneau area recreational marine fishery (Mills 1979, 1980, 1981a, 1981b, 1982, 1983, 1984, 1985, 1986, 1987).

On-site creel surveys of the Juneau marine sport fishery have been conducted every year since 1960 (Mattson 1975; Schmidt et al. 1973; Schmidt and Robards 1974, 1975; Robards 1976, 1977, 1978; Marriott et al. 1979; Schwan 1980, 1981, 1982; Neimark and Schwan 1983; Neimark 1984, 1985; and Mecum and Suchanek 1986, 1987). The objectives for the 1987 Juneau marine harvest survey were to estimate the same parameters as in the Petersburg survey during the 16 March to 27 September 1987 time period.

Site Description:

The Juneau marine boat sport fishery generally encompasses the area from Taku Inlet north and west through Stephens Passage to the vicinity of Berner's Bay in lower Lynn Canal (Figure 25). Some boat-parties on day trips also venture into Chatham Strait and south of Taku Inlet. Anglers on multi-day trips extend much further into surrounding waters. Effort originates primarily in Auke Bay (Auke Bay launch, Government Dock, Dehart's Marina, and Fishermen's Bend marina), but substantial effort originates in a number of other boat harbors and launches scattered along the Juneau roadside (Appendix Table 23). Some effort also originates at private docks and moorages, and the largest concentrations of these sites were also sampled. Juneau has the second largest charter boat fleet in southeast Alaska. Charter boats are most active out of the Auke Bay harbors, with a few operators working out of Tee, Aurora, and Douglas harbors. The effort and harvest estimates obtained in the survey represent the fishery defined by boat-parties which return to selected access locations in the Juneau area as noted above.

Stratification Structure:

As noted above, there are a wide variety and number of access locations in Juneau. To more efficiently sample these locations, the locations were stratified according to category. In some cases, the delineation of location depended upon the time of day because the expected angler effort returning during the late day stratum was high enough to warrant a finer division of location. The categories were defined according to the expected level of angler effort or type of access. The categories and the associated locations were:

1. Heavy use docks and boat launches:
 - a. Auke Bay "docks": Auke Bay boat launch and Dehart's Marina, during the early day stratum;
 - b. Auke Bay boat launch, during the late day stratum;
 - c. Tee Harbor; and
 - d. Fishermen's Bend marina.

2. Medium use docks and boat launches:
 - a. Dehart's Marina, during the late day stratum;
 - b. Amalga Harbor;
 - c. North Douglas boat ramp; and
 - d. Auke Bay Government dock.

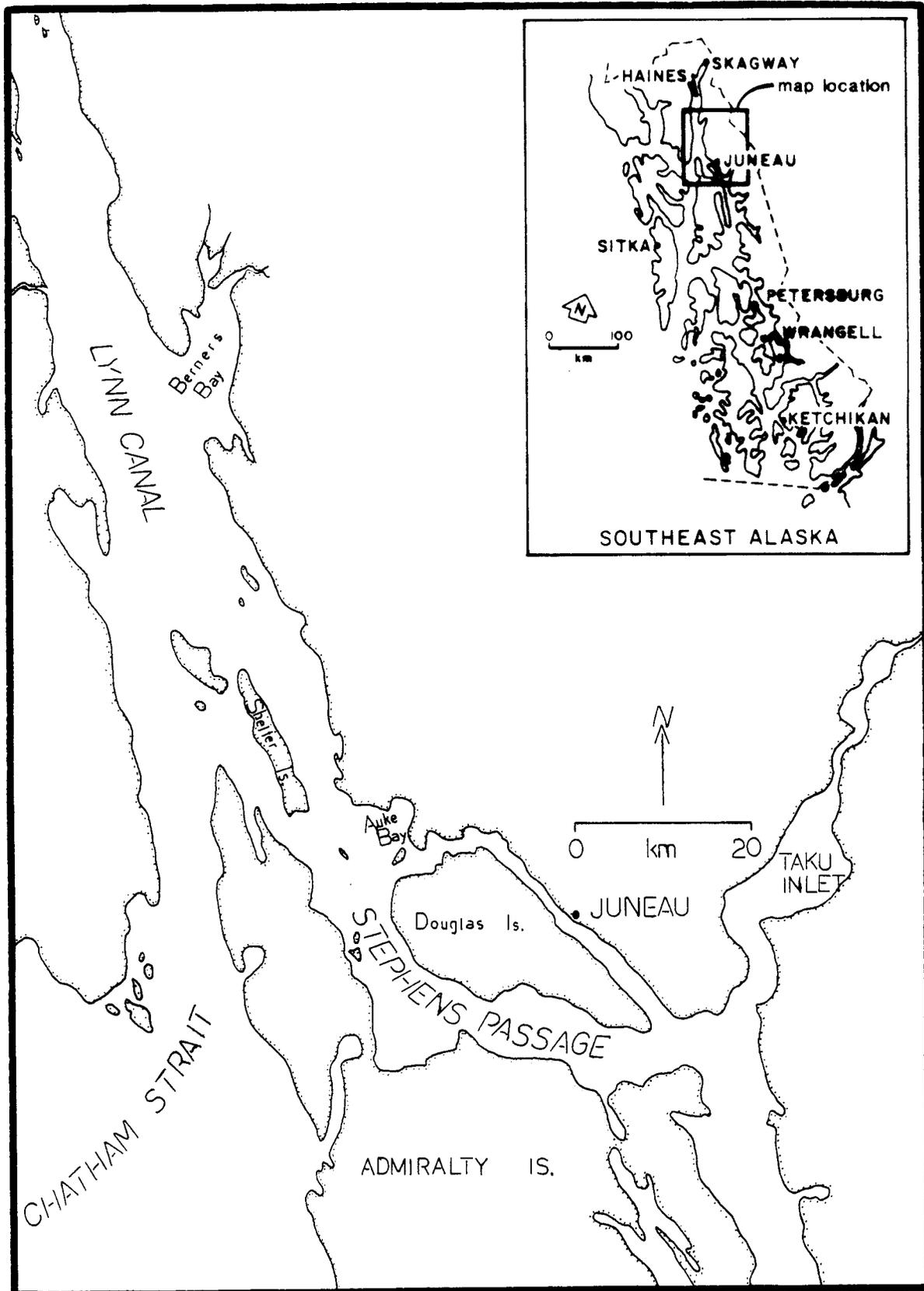


Figure 25. Juneau marine boat sport fishing grounds.

3. Low use docks and boat launches:
 - a. Douglas Harbor;
 - b. Aurora Harbor sections 1 and 2, during the early day stratum;
 - c. Aurora Harbor section 1, during the late day stratum;
 - d. Aurora Harbor section 2, during the late day stratum;
 - e. Harris Harbor; and
 - f. Tee Harbor area unimproved boat launch.

4. Private moorages:
 - a. Auke Bay and Fritz Cove area moorages;
 - b. Lena Cove area moorages;
 - c. Indian Cove area moorages; and
 - d. Tee Harbor area moorages.

The 1987 season was stratified into "seasonal" time periods. The dates for each stratum were dependent upon the type of access location (note that larger groupings were used for the low use harbors and private moorages, due to the lower level of sampling effort directed at these locations). The seasonal time periods were as follows:

1. For heavy and medium use docks and boat launches:
 - a. 16 March - 26 April 1987;
 - b. 27 April - 25 May 1987;
 - c. 26 May - 21 June 1987;
 - d. 22 June - 5 July 1987;
 - e. 6 July - 19 July 1987;
 - f. 20 July - 2 August 1987;
 - g. 3 August - 13 August 1987;
 - h. 14 August - 16 August 1987;
 - i. 17 August - 30 August 1987;
 - j. 31 August - 13 September 1987; and
 - k. 14 September - 27 September 1987.

2. For low use docks and boat launches, private moorages, and saltwater shoreline locations:
 - a. 27 April - 21 June 1987;
 - b. 22 June 1987 - 9 August 1987; and
 - c. 10 August 1987 - 13 September 1987.

Samples were allocated according to the following scheme for the heavy and medium use dock and boat launch access strata:

1. Within any week (i.e., Monday-Sunday), all weekend-holidays and derby days were selected for sampling. The exception being the first seasonal stratum (16 March - 26 April) during which a total of 9 of 12 possible weekend-holidays were randomly selected.

2. Within each week two contiguous weekdays were randomly selected for "non-sampling", in order to assure two days off for staff. All

remaining weekdays were sampled; with the exception of the first seasonal stratum (16 March - 26 April), during which a total of 9 of 30 possible weekdays were randomly selected.

3. During the first seasonal stratum (16 March - 26 April) a sample was allocated to either an early or a late day stratum during the selected dates. The time-of-day stratum were further subdivided into two sampling periods which included all the time during each time-of-day stratum (except for the time necessary to travel between sampling locations). During weekdays an equal number of the available samples each day were allocated to the early and late day strata (i.e., 5 days each or 10 samples each). During weekend-holidays 4 of the selected dates were allocated to the early day stratum, while 5 of the selected dates were allocated to the late day stratum (or 8 and 10 samples, respectively). During each selected time-of-day stratum both of the two possible sampling periods were sampled.

For all other seasonal strata, both an early and a late time-of-day stratum were selected (i.e., the entire day). During each selected time-of-day stratum both of the two possible sampling periods were sampled.

4. Next, selected samples were allocated to access-type strata at random so that approximately two-thirds of the available samples went to the heavy use stratum and one-third to the medium use stratum, with a minimum sample size of 2 for unique combinations of the sampling strata.
5. Finally, within an access-type stratum, one of the possible locations was selected at random (e.g., Auke Bay boat launch, Tee Harbor, or Fishermen's Bend for the heavy use/late day stratum). The exception being that prior to 7 May and after 30 September, Tee Harbor was "unavailable" for sampling as this harbor was closed.

Samples were allocated according to the following scheme, for the low use dock and boat launch and private moorages:

1. Within any week (i.e., Monday-Sunday), all weekend-holidays (and/or derby days) were selected for survey.
2. Then two contiguous weekdays were randomly selected for "non-sampling" (in order to assure two days off for staff). From 27 April to 22 May and from 27 July to 13 September, all remaining weekdays were sampled. During all other weeks two of the remaining three weekdays were selected at random. The reason for the difference in number of days selected was related to the available hours of daylight in the noted periods and personnel constraints.
3. Within the selected days, early or late day strata were randomly selected, with approximately one-third of the days sampled in the early day stratum and two-thirds in the late day stratum. Due to the expected low angler effort expended at these locations, and due to logistical constraints associated with sampling the private moorages,

the time-of-day strata were not subdivided into separate sampling periods. Accordingly, each selected day/period represents one sample.

4. Next, the selected samples were allocated to access-type strata at random such that approximately two-thirds of the available samples went to the low use stratum, and one-sixth each to the private moorages and saltwater shoreline, with a minimum sample size of two within a unique combination of strata.
5. Finally, within an allocated access type, one of the possible locations was selected at random.

The resulting sampling fractions (for each access location type) were 60.5% for heavy use, 27.1% for medium use, 8.0% for low use, and 4.4% for private moorages. These sampling fractions were selected by using "best guesses" of the angler effort expected at each unique combination of the various stratification levels.

During the Juneau Golden North Salmon Derby aerial counts of the number of boats fishing in the Juneau area were made. Two counts approximately one hour in duration, were made each day of the derby. Flight times were selected at random without replacement from the possible times of 0630, 0730, 0830, ..., and 2030 each day.

Results:

A total of 3,583 boat-parties was interviewed during the 1987 Juneau marine sport fishery. The effort expended by anglers returning to the selected access locations in the Juneau area was 154,827 boat-hours or 401,840 rod-hours (Appendix Table 24). Slightly over 1% of the fishing effort occurred during the 16 March - 26 April period (Figure 26 and Appendix Table 25). Seven percent of the total effort was expended during the 27 April - 25 May period, and 12% of the total was expended during the 26 May - 21 June period. Fishing effort increased substantially during the next month and a half. Approximately 19% of the total seasonal effort was expended during the three day Juneau Golden North Salmon Derby.

During the 1987 survey period 8,663 large chinook salmon and 230 small chinook salmon were harvested (Appendix Table 24). The harvest increased steadily during the 27 April to 19 July period (Figure 26 and Appendix Table 25). Harvest of large chinook salmon dropped off substantially during the following biweekly period (20 July-2 August). The harvest increased dramatically during the 3-16 August period. Approximately 50% of this harvest occurred during the derby (Appendix Table 26). The harvest during the derby resulted from increased angler effort as evidenced by the decrease in HPUE during this period compared to the preceding seasonal periods.

An estimated 2,060 hatchery origin chinook salmon were harvested in the Juneau area (Appendix Table 27); of these 2,015 (98%) were produced by southeast Alaska hatcheries. A total of 263, of the 2,060 total hatchery contribution were harvested during the derby.

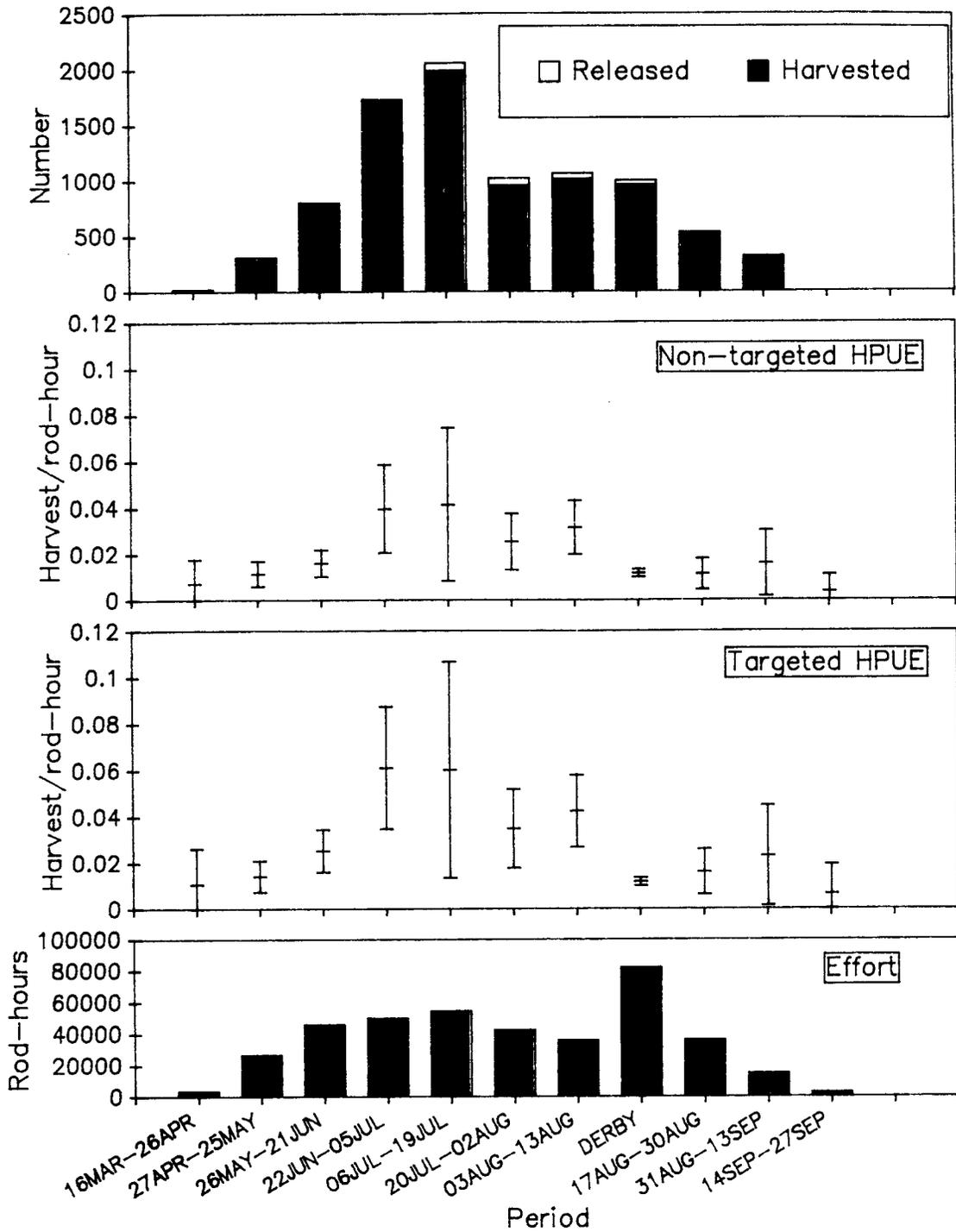


Figure 26. Estimated number of large chinook salmon caught and released with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Juneau marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

Ages were determined from 386 chinook salmon sampled from the Juneau area non-Derby harvest. Approximately 11% of these fish were ages 1.4 or 1.5 (Appendix Tables 6 and 7). During the derby, 228 samples were aged with only 1% age 1.4 and none at age 1.5. Approximately 7% of the non-derby and 11% of the derby samples were comprised of fish without a freshwater annulus. Of the non-derby fish 14% and 68% were age 1.2 and 1.3 respectively; whereas, 21% and 68% of the derby fish were age 1.2 and 1.3, respectively.

The coho salmon harvest for the survey period was estimated at 17,610 fish (Appendix Table 24). Nearly 100% of this harvest was taken between 22 July and 13 September (Figure 27 and Appendix Table 25). As with chinook salmon, a substantial portion (17%) of the harvest of coho salmon occurred during the derby, although HPUE during the derby was low. The estimated contribution of hatchery produced coho salmon to the Juneau fishery was 94 fish or less than 1% of the total harvest (Appendix Table 28). Southeast Alaskan hatcheries accounted for all of the hatchery coho salmon.

Juneau anglers also harvested 12,219 pink salmon, 944 chum salmon, and 227 sockeye salmon (Appendix Table 24). The majority (86%) of the pink salmon harvest occurred between 22 June and 19 July (Appendix Table 25). The harvest of chum salmon occurred predominantly during the periods of 22 June-19 July and 3-30 August. The harvest of sockeye salmon occurred predominantly during the 22 June-5 July period.

Most (67%) of the 1,720 rockfish harvested during the entire survey period were taken during the biweekly period of 6-19 July 1987 (Appendix Tables 24 and 25). The majority (76%) of the total harvest of 893 Dolly Varden were taken during the 26 May to 5 July period (Figure 28 and Appendix Table 25). Correspondingly, HPUE was greater during the two periods of 26 May-21 June and 22 June-5 July, compared to the seasonal periods immediately before and after this time period.

An estimated total of 13,513 Pacific halibut was harvested during the survey period (Appendix Table 24). Most (82%) of these fish were harvested between 26 May and 16 August (Figure 29 and Appendix Table 25). Targeted HPUE increased during the derby, and then returned to pre-derby levels immediately afterwards. The estimated mean length of 456 sampled Pacific halibut was 895 mm, with the mean round weight estimated at 12.2 kg (26.9 lbs). Accordingly, the estimated round weight of the Juneau harvest was 164,882 kg (363,500 lbs).

Haines Area

Introduction:

Marine effort in the Haines-Skagway area has increased substantially since 1977. Most effort is centered in the Haines area. Angler days of effort have averaged 11,887, but in 1979 only 5,203 angler days were expended in the marine fishery (Figure 30). In 1986, 23,827 angler days were expended. Harvests of chinook salmon have increased since 1977 averaging 1,250 fish. Very few coho salmon are harvested in the Haines-Skagway marine fishery; yearly harvests have averaged only 332. Pacific halibut harvest has

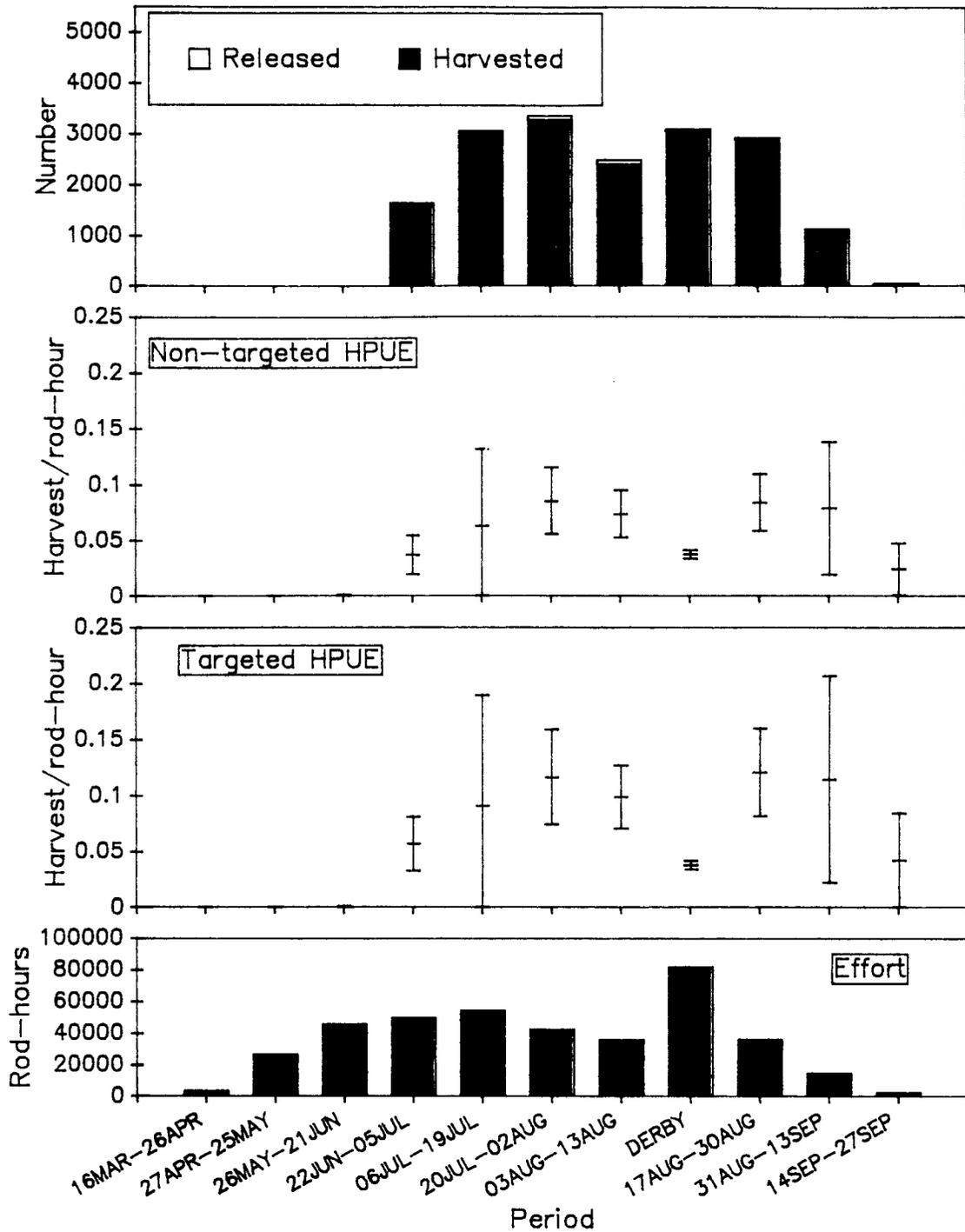


Figure 27. Estimated number of coho salmon caught and released with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Juneau marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

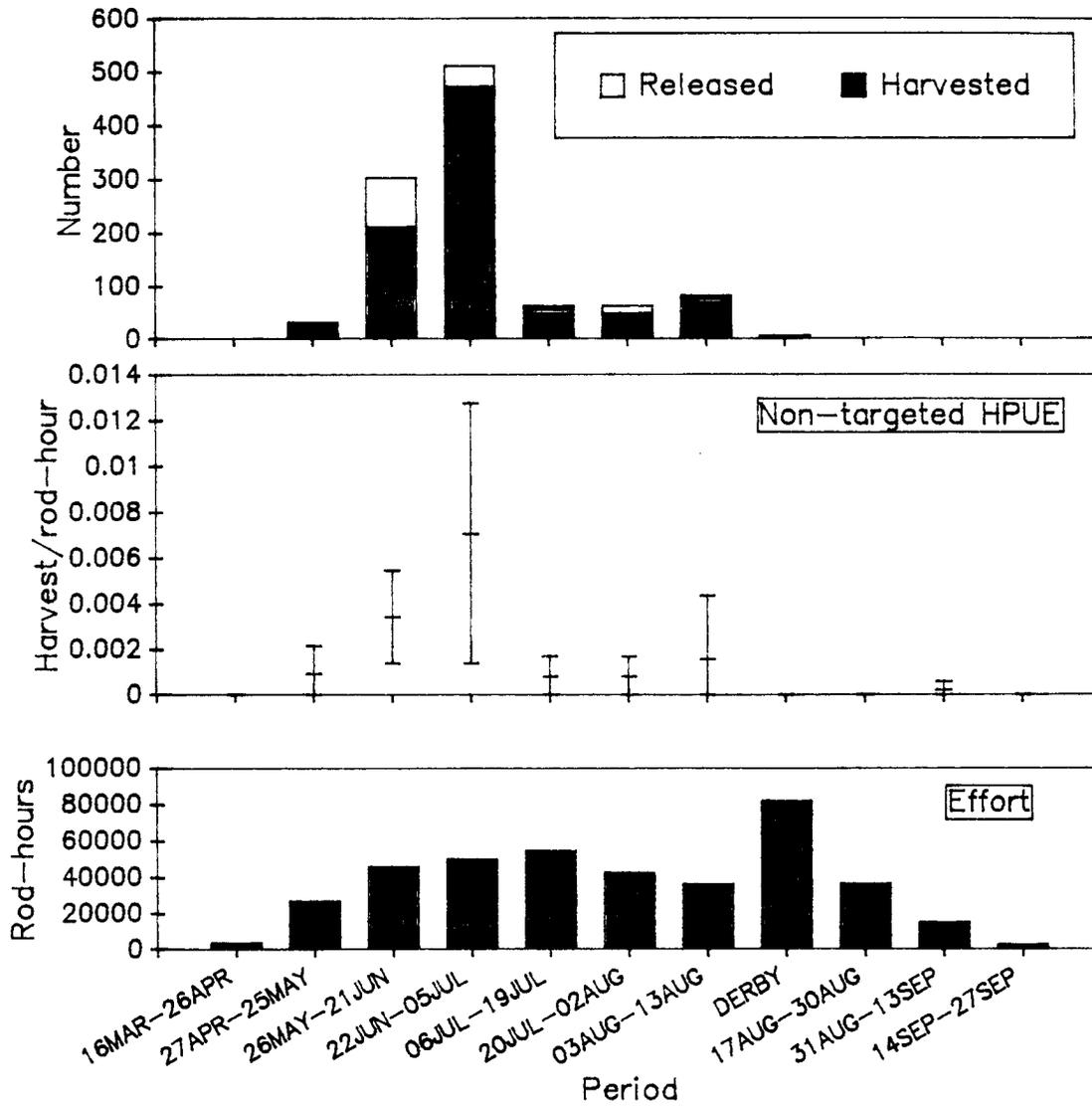


Figure 28. Estimated number of Dolly Varden caught and released with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Juneau marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

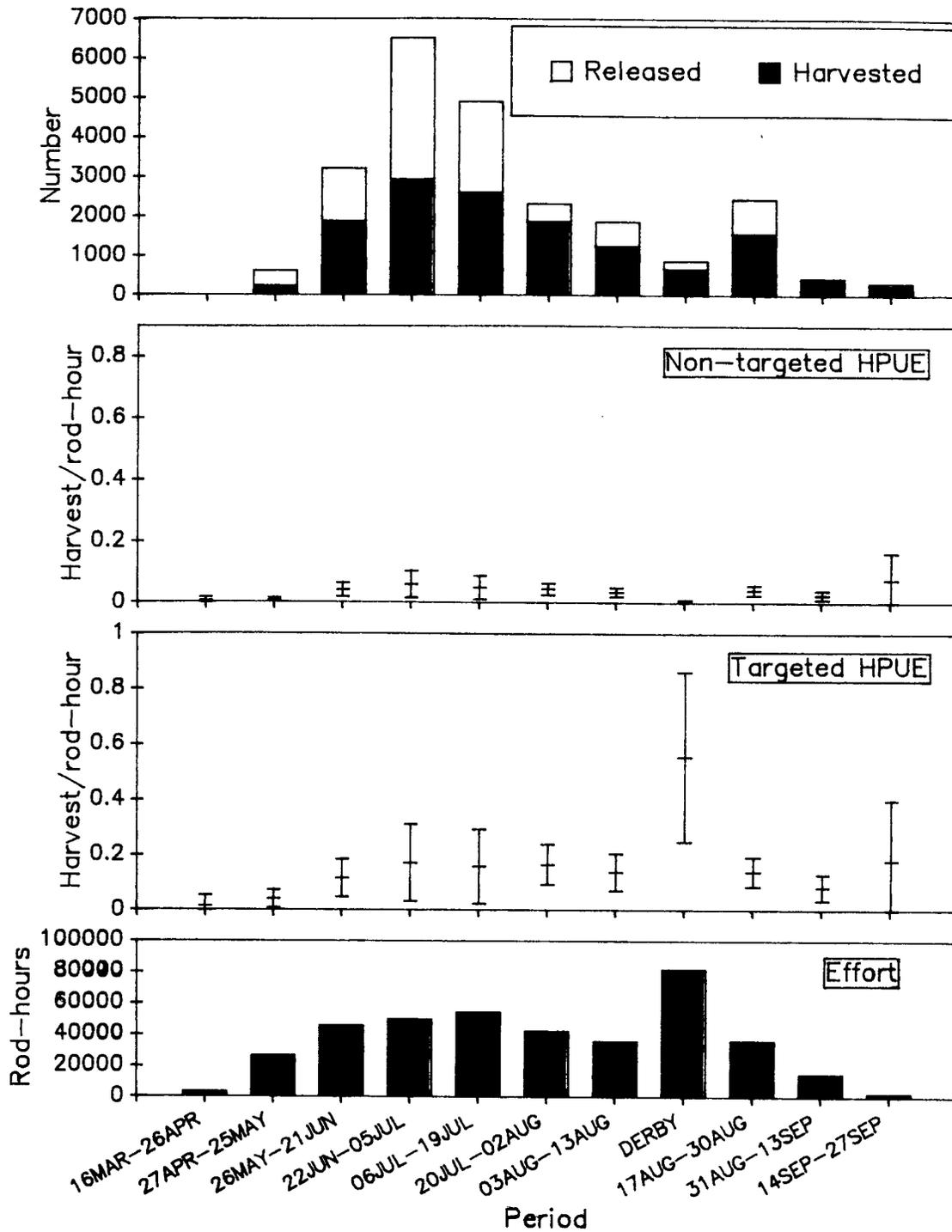


Figure 29. Estimated number of Pacific halibut caught and released with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Juneau marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

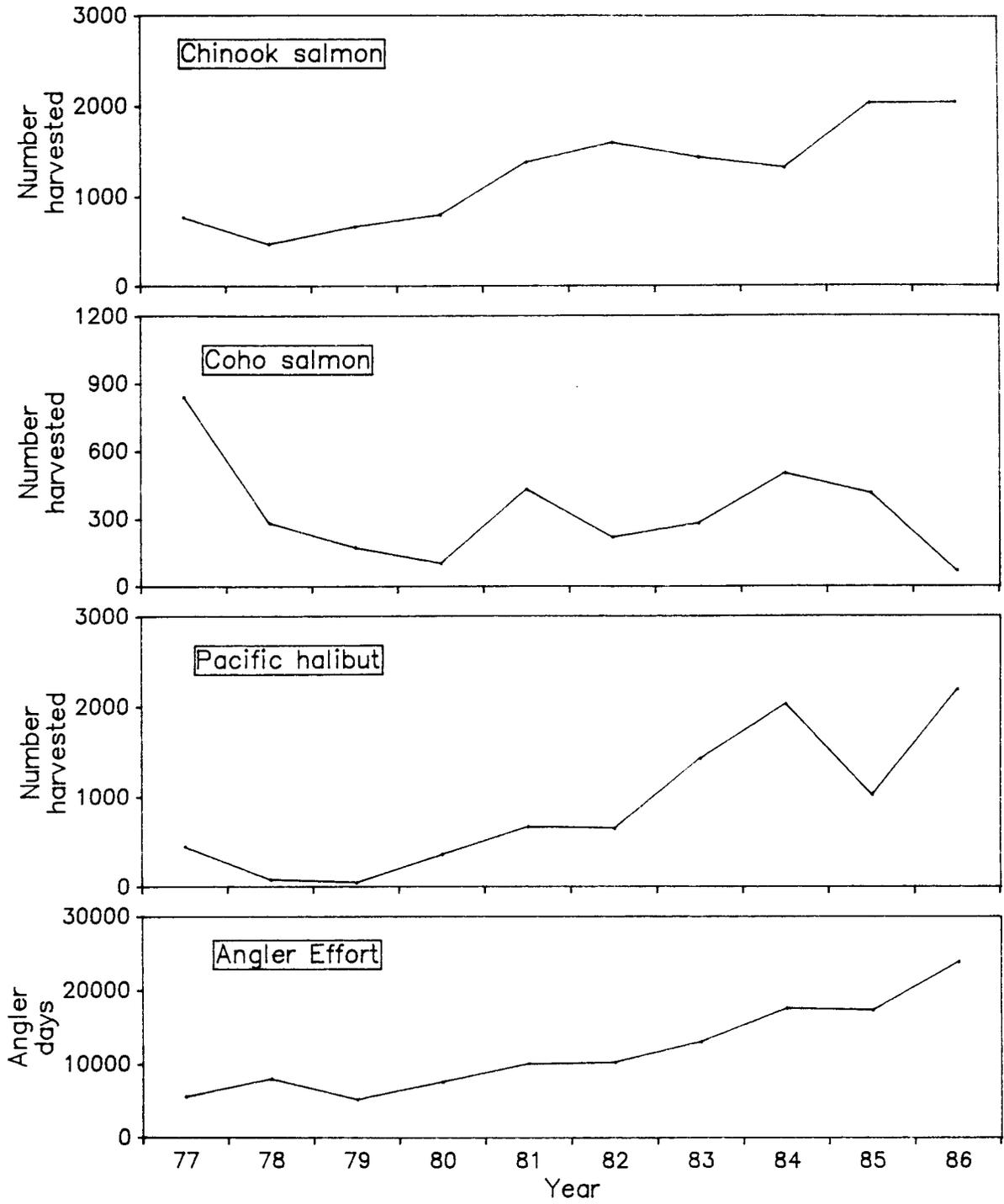


Figure 30. Estimated number of chinook salmon, coho salmon, and Pacific halibut harvested with estimated angler effort in the Haines-Skagway area recreational marine fishery (Mills 1979, 1980, 1981a, 1981b, 1982, 1983, 1984, 1985, 1986, 1987).

increased from 49 in 1979 to an estimated 2,189 in 1986. The specific objectives for the 1987 Haines marine boat recreational harvest survey were the same as those noted for the Petersburg area. The survey was conducted during the 20 April to 12 July 1987 time period:

Site Description:

During the spring, sport anglers on marine boat trips from Haines concentrate their efforts in Chilkat Inlet on mature chinook salmon returning to the Chilkat River (Figure 31). In 1987, the head of Chilkat Inlet north of a line extending from the mouth of Ludaseska Creek to the northern tip of Kochu Island to the southern entrance to Paradise Cove was closed to sport fishing for chinook salmon from 15 May through 15 July. Anglers fishing Chilkat Inlet usually start their trips at Letnikof Cove boat launch and dock or at the Chilkat State park boat launch, both of which are located on the west side of the Chilkat peninsula. The other access point for boat anglers is from downtown Haines at the Small Boat harbor, from which anglers fish Chilkoot Inlet and Chilkat Inlet for chinook salmon and Pacific halibut. A growing charter boat fleet operates in the spring from the Letnikof boat dock.

Stratification Structure:

During the seasonal period stratum of 20 April to 3 May 1987, access locations were not stratified. During this period only the small boat harbor and Letnikof Cove were sampled (with equal probability) as Chilkat State Park was closed at this time. After 3 May 1987 the season was stratified for a heavy use access stratum only, according to the following periods:

1. 4 - 18 May;
2. 19 - 22 and 26 - 29 May;
3. 23 - 25 and 30 - 31 May (The Haines King Salmon Derby);
4. 1 - 14 June;
5. 15 - 28 June; and
6. 29 June - 12 July.

The heavy use access strata contained the Chilkat State Park and Letnikof Cove access locations.

After 3 May 1987, the low use access stratum (containing only the small boat harbor) had the following seasonal strata associated with it:

1. 4 - 22 May, 26 - 29 May, and 1 - 14 June;
2. 23 - 25 and 30 - 31 May (The Haines King Salmon Derby); and
3. 15 June - 12 July 1987.

Samples were allocated according to the following scheme:

1. Within any week (i.e., Monday-Sunday), all weekend-holidays and derby days were selected for sampling.
2. Within each week two weekdays were randomly selected for sampling;

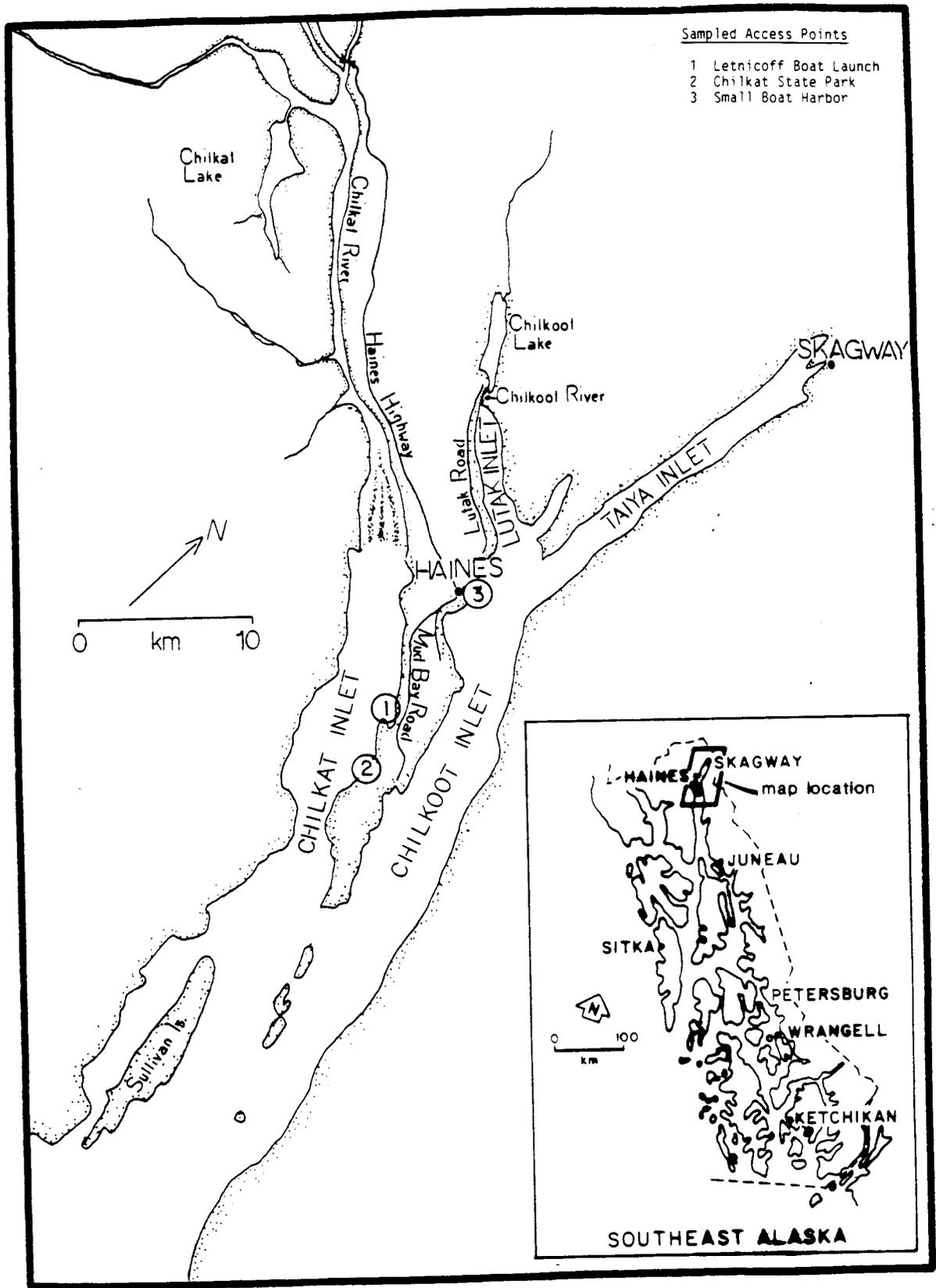


Figure 31. Haines marine boat sport fishing grounds.

3. During each selected day two samples were made. Both samples occurred in either the early day or late day stratum. Approximately one-third of the available samples were allocated at random to the early day stratum, with the remaining samples allocated to the late day stratum.
4. Selected samples were allocated to access-type strata (after 3 May 1987) at random so that approximately four-fifths of the available samples went to the heavy use stratum and one-fifth of the samples to the low use stratum, with a minimum sample size of two for unique combinations of the sampling strata.
5. Finally, access location within each access location stratum were selected at random with equal probability (e.g., Chilkat State Park or Letnikof Cove for the heavy use stratum).

The resulting sampling fractions, for each access location type were 79% for heavy use, and 21% for low use. Resultant sampling fractions for each time of day stratum was 45% for the early day and 55% for the late day. These sampling fractions were selected by using best guesses of the angler effort expected at each unique combination of the various stratification levels.

Results:

A total of 226 boat-parties were interviewed during the 1987 Haines area marine sport fishery. The estimated angler effort during the survey period was 10,887 boat-hours or 26,594 rod-hours (Appendix Table 29), with 30% of the effort occurring during the Haines King Salmon Derby (Figure 32 and Appendix Table 30). A total of 3,218 boat-hours or 8,284 rod-hours were expended during the Derby. Effort was very low prior to the period encompassing the Derby at the end of May, and dropped again to a very low level after the end of June.

Haines marine anglers harvested 1,094 large chinook salmon and 4 small chinook salmon during 1987 (Appendix Table 29). Approximately 15% of the large chinook salmon harvest was taken during the Haines King Salmon Derby (Figure 32 and Appendix Table 30). Largest catches occurred during the 1-14 June period. An estimated 14 (1%) chinook salmon harvested in the Haines fishery were of hatchery origin, all from Little Port Walter hatchery (Appendix Table 31). Ages were determined for 119 chinook salmon sampled from the Haines marine boat sport fishery. Approximately 44% of the fish were ages 1.4 or 1.5 (Appendix Tables 6 and 7). Fifty-six percent of the fish were age 1.3, with less than 1% aged at 1.2. All chinook salmon sampled from the harvest had one freshwater annulus.

No other species of salmon were harvested by marine boat sport anglers during the time covered by the creel survey (Appendix Table 29). Haines anglers did harvest 101 Dolly Varden and 292 Pacific halibut. The estimated mean total length of 19 sampled Pacific halibut was to be 913 mm, with a mean round weight of 16.1 kg (35.57 lbs). Accordingly, the estimated round weight of the Haines sport halibut harvest for the period 20 April through 12 July 1987 was 4,701 kg (10,386 lbs). Haines anglers did not report harvesting any rockfish during the 1987 survey.

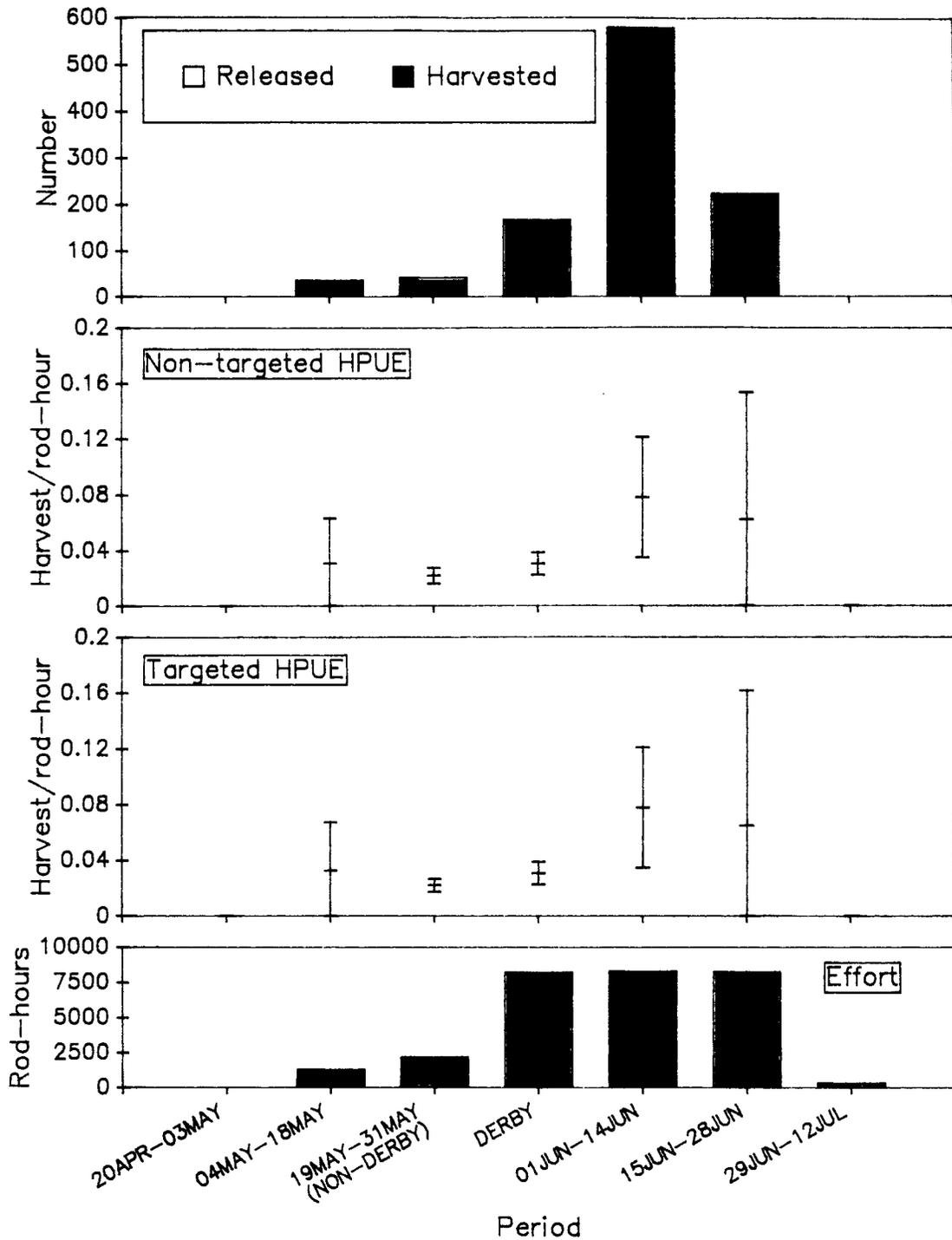


Figure 32. Estimated number of large chinook salmon caught and released with estimated harvest per unit effort (HPUE) and estimated angler effort for the 1987 Haines marine boat recreational harvest survey by seasonal period. Error bars represent the point estimate ± 2 standard errors.

Discussion

Over 9,000 angler contacts were made by creel samplers in the Ketchikan, Petersburg, Wrangell, Sitka, Juneau, and Haines marine sport boat fisheries in 1987. Total harvest estimates (Appendix Table 32) for the surveyed marine boat fisheries were similar to those observed for the same fisheries in 1986, with the following notable exceptions:

1. The Ketchikan coho salmon harvest was 50% less than 1986, declining from 20,814 in 1986 (Mecum and Suchanek 1987) to 10,464 in 1987 (Appendix Table 32). The statewide harvest survey reported a similar reduction in harvest level of 19,582 in the Ketchikan area during 1986 to 11,263 in 1987 (Mills 1987, 1988)
2. The coho salmon harvest in Juneau in 1987 increased from the poor harvest level in 1986. The estimated harvest of 17,610 fish (Appendix Table 32) represented an increase of 80% over the 1986 level. Mills reported a similar increase from 11,708 fish harvested by saltwater anglers in 1986 to 17,281 in 1987 (Mills 1987, 1988).
3. The harvest of all rockfish species (combined) in Ketchikan increased threefold over the 1986 harvest level, from 6,017 in 1986 (Mecum and Suchanek 1987) to 18,591 (Appendix Table 32). These results do not agree with harvest estimates reported by Mills. In 1986 saltwater boat-parties fishing in the Ketchikan area harvested an estimated 17,124 rockfish according to the statewide harvest survey (Mills 1987). During 1987, Mills (1988) reported a similar estimate of 17,628. However anglers responding to the statewide mail survey may have reported other non-rockfish species as rockfish harvested.

Biweekly sampled harvest rates for chinook salmon in the Juneau fishery increased over the rates sampled during 1986 (Appendix Table 33), but were comparable to the rates observed in 1984 and 1985. Biweekly sampled harvest rates for coho salmon in the Juneau fishery were greater than those observed in 1986 (Appendix Table 34).

The age composition of the chinook salmon harvest varied considerably among the various surveyed fisheries (Appendix Table 6). Approximately 44% of the Haines area harvest was composed of age classes 1.4 or 1.5. These age classes also dominated in the Petersburg (42%) and Wrangell (49%) harvests. The proportion of chinook salmon harvested without a freshwater annulus, which is indicative of either non-Alaskan or hatchery origin, varied substantially among the different fisheries. The Haines fishery had no aged samples without a freshwater annulus. The Yes Bay, Wrangell, Juneau non-derby, and Juneau derby fisheries had only moderate proportions of chinook salmon without a freshwater annulus (13%, 9%, 7%, and 11%, respectively). In the Ketchikan and Petersburg fisheries, 25% of the chinook salmon harvest had no freshwater annulus. In the Sitka fishery, 57% of the aged sample was without a freshwater annulus.

Approximately 22% of the total chinook salmon harvest was comprised of hatchery origin fish (Appendix Table 35). The contribution of hatchery production to the chinook salmon harvest was similar to the 24% contribution

level reported for 1986 by Mecum and Suchanek (1987). The majority of the chinook salmon hatchery origin harvest was produced by southeast Alaskan hatcheries (Appendix Tables 5, 12, 15, 18, 21, 27, and 31).

Approximately 16% of the region-wide coho salmon harvest was of hatchery origin (Appendix Table 35). The vast majority (96%) of these hatchery fish were caught by Ketchikan anglers. Most of these salmon were produced by southeast Alaskan hatcheries (Appendix Tables 9, 18, 22, and 28). Mecum and Suchanek (1987) reported a similar (17%) contribution of hatchery origin coho salmon to the recreational harvest during 1986.

RECREATIONAL HARVEST SURVEYS OF TERMINAL HARVEST AREAS (THA)

Introduction

Enhancement efforts designed to benefit both commercial fisheries and marine boat sport fisheries may also produce benefits for shore based anglers. In southeast Alaska, chinook and coho salmon returning to hatcheries have generated sport fisheries where none existed before. These fisheries are often small and special regulations are needed to properly manage the number of people crowded into the limited area of the fishery. The angling opportunities available in these sites are often otherwise scarce in the region and so evaluation of the harvest and other attributes of the fishery is important.

Hatchery chinook salmon releases from the Deer Mountain and Crystal Lake hatcheries have produced runs of salmon which return to hatchery sites on Ketchikan Creek in downtown Ketchikan and Crystal Creek in Blind Slough near Petersburg. Because returns have exceeded brood stock needs, sport fisheries have developed at both of these areas. Special regulations have been used in Thomas Basin and Blind Slough to regulate these fisheries. Creel surveys have been conducted periodically since 1983 in order to better manage the fisheries and to document benefits of the releases to sport anglers. Most anglers fish from shore but occasionally small boats are used in the fisheries. The objective of the surveys was to estimate the total angler effort, HPUE, and harvest of hatchery chinook salmon in the Thomas Basin THA sport fishery from 15 June through 2 August 1987, and in the Blind Slough THA from 1 June through 26 July 1987.

Thomas Basin THA

Site Description:

The Thomas Basin sport fishery is limited to a small area of saltwater immediately adjacent to the Thomas Basin harbor in downtown Ketchikan. Anglers must fish downstream from the bridge over Ketchikan Creek. Pilings to the north effectively limit the fishery to an area less than one hundred meters in width. Fishing conditions are often crowded due to the small area available for fishing.

Methods:

A creel survey of anglers who had completed fishing was used to estimate fishery characteristics at Thomas Basin. Sampling effort was allocated to provide an estimate of effort and harvest for weekday and weekend-holiday strata during the period from 15 June to 2 August. The fishing day was assumed to begin at 0600 and end at 2200. Each sampling period was 3 to 4 hours in length (depending on personnel scheduling) and start times were randomly selected. Ten sampling periods were randomly selected for sampling from the weekday strata and eleven from the weekend-holiday strata. Data analysis procedures were the same as those used for the marine boat direct expansion harvest surveys. All chinook salmon harvested by Thomas Basin anglers were assumed to be of hatchery origin.

Results and Discussion:

Anglers harvested an estimated 64 large chinook salmon in 1,951 rod-hours of effort during the period from 15 June to 2 August 1987 at Thomas Basin (Appendix Table 36). No small chinook salmon were sampled nor were any chinook salmon reported as released. The harvest rate for large chinook salmon was 0.034 fish per rod-hour of angling effort. Harvest levels of chinook salmon in the Thomas Basin THA during 1987 were well below 1986 levels, with 202 fish harvested in 1986 (Mecum and Suchanek 1987) versus 64 fish in 1987.

Blind Slough THA

Site Description:

The Blind Slough sport fishery has one primary access point from a short trail which leads from a parking lot to Blind Slough rapids. Blind Slough is actually an extensive estuary which, at low tide, consists of a channel several miles in length containing mostly fresh water from numerous tributaries (Figure 33). Anglers can disperse along the entire channel, however, they tend to concentrate during low tide at the most productive pools at or below Blind Slough rapids. Anglers fishing near the mouth of the slough from boats usually could not be sampled, but anglers on foot were sampled as they returned to their vehicles.

Methods:

Estimates of fishery characteristics were obtained from a creel survey based on randomized sampling of completed angling trips at the only major access point into the Blind Slough fishery. Sampling effort was allocated to provide weekly estimates of effort, harvest, and HPUE. Days within each week in the fishery were stratified into weekdays and weekend-holidays. There were four sampling periods of 3 hours and 45 minutes during each day. Period 1 started at 0730 hours and ended at 1115 hours, period 2 began at 1116 hours and ended at 1500 hours, period 3 began at 1501 hours and ended at 1845 hours, and period 4 began at 1846 hours and ended at 2230 hours. A simple random sample of five of these periods for both the weekday and weekend-holiday strata was chosen each week. Data analysis procedures were

BLIND SLOUGH AREA SPORT FISHERY

3 km

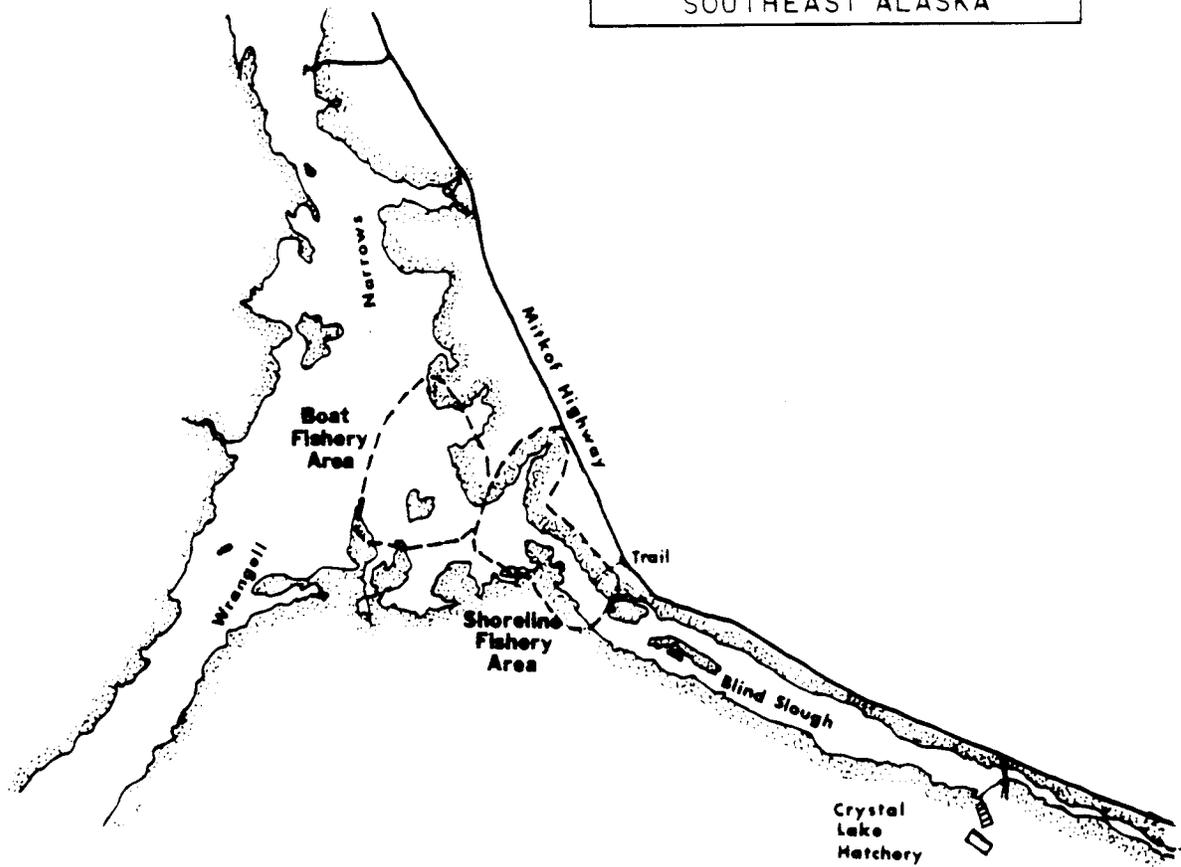
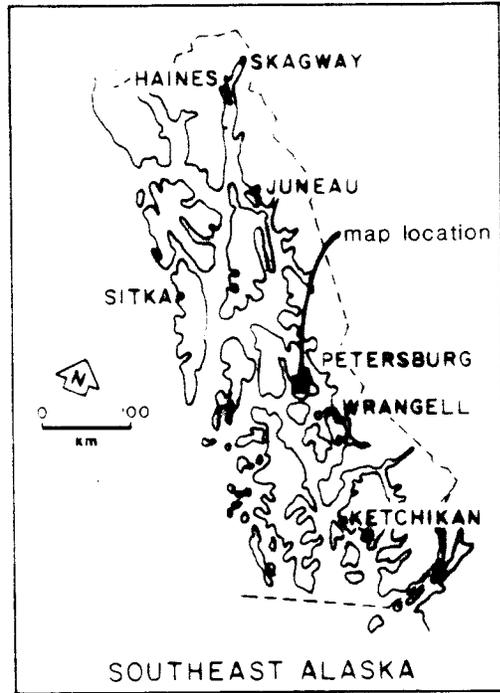


Figure 33. The Blind Slough Terminal Harvest Area (THA).

the same as those used for the marine boat recreational direct expansion harvest surveys. All chinook salmon harvested by Blind Slough anglers were assumed to be of hatchery origin and therefore no heads, scales, or lengths were collected.

Results and Discussion:

An estimated 4,555 rod-hours were expended by anglers at Blind Slough to harvest 758 chinook salmon (Appendix Table 37). Harvest rates for chinook salmon peaked from 13 July to 19 July, and catch rates were high during the last week of the survey (20-26 July) when most chinook were being released (Appendix Table 38). During the first two weeks of the survey (1-14 June), catch rates for chinook were very low.

The harvest of chinook salmon in the Blind Slough THA has continued to gradually increase: estimated harvest was 105 salmon in 1984 (Neimark 1985), 212 salmon in 1985 (Mecum and Suchanek 1986), 556 salmon in 1986 (Mecum and Suchanek 1986), and 758 salmon in 1987.

SELECT FRESHWATER AND MARINE ROADSIDE RECREATIONAL HARVEST SURVEYS

Introduction

Although much of the recreational sport fishing effort in southeast Alaska is from boats in saltwater, important fisheries are also accessed from roads adjacent to major southeast communities. Most of these fisheries are in freshwater, although saltwater shorelines can also have major fisheries at creek mouths or along productive beaches. Many of the sport fisheries are so dispersed as to provide little chance of over harvesting specific fish stocks. In some more accessible locations, however, it is believed there is more potential for over harvest. On the Juneau roadside, there are large numbers of sport anglers congregating at a few sites. In the Yakutat and Haines areas, very productive systems have been under intense commercial fishing pressure, and these areas also provide popular sport fisheries. By close monitoring through creel surveys, it is believed that the need for regulatory action can be recognized and, if necessary, action can be taken to preserve these fisheries.

Procedures for estimating angler effort and harvest for the various roadside recreational harvest surveys were similar to those used for the marine harvest surveys. The count type of creel survey was used for the Juneau and Haines area roadside recreational harvest surveys and for the Ankau lagoon survey on the Yakutat roadside. For all count type surveys, angler counts were taken in concert with the interviews. Direct expansion type surveys were used to estimate angler effort for the Situk River, Lost River, and Tawah Creek recreational fisheries in the Yakutat area. Data analysis procedures for both types of surveys were equivalent to those used for the marine harvest surveys (see equations 1-47, Appendix A, for estimation formulae). However, the individual angler rather than the boat-party was the unit for count and interview sampling.

Juneau Area

Introduction:

The Juneau-Douglas road system provides access to a number of saltwater beaches and freshwater streams and lakes. Although the effort at accessible areas is small in comparison to the Juneau marine boat fishery, the roadside provides important sport fishing opportunities for anglers without boats. The 1987 creel surveys were designed to obtain information from fisheries at 26 locations along the Juneau-Douglas road system. Results of the surveys will be useful in determining the current patterns of angler activity and harvest rates at various locations in the fishery.

The following objectives were addressed during the surveys:

1. To estimate the angler effort, HPUE, and harvest of important sport fish species at major fisheries along the Juneau-Douglas road system from 20 April through 13 September 1987.
2. To estimate the angler effort, HPUE, and harvest of coho salmon at the Cowee, Peterson, Montana, and Salmon creek fisheries from 14 September through 11 October 1987.

Site Description:

Study locations were scattered along most of the Juneau-Douglas road system (Figure 34 and Appendix Table 39). Sites were generally the same as those surveyed in 1986 (Mecum and Suchanek 1987). These sites were selected by examining previous survey data to determine areas of heaviest angler use and accessibility. Peterson Creek (also known as Outer Point Creek), on Douglas Island, was not sampled in 1987 as no effort was documented there in 1986. A new fishery access point, Bayview Subdivision, was surveyed in 1987. The largest wild stock coho salmon fisheries on the Juneau roadside were surveyed. Salmon Creek was also selected for the coho salmon surveys because this creek was stocked with 20,400 coho smolt in 1985. Major roadside fisheries, such as Windfall Lake and Salmon Creek Reservoir, which are located far from the road, were not sampled. The creel survey at the Scout Camp was discontinued after 9 August because it took too long to survey.

Stratification Structure:

A count type creel survey was used to sample the roadside fisheries. The sampling season was first divided into four sampling periods:

1. 20 April - 21 June 1987;
2. 22 June - 9 August 1987;
3. 10 August - 13 September 1987; and
4. 14 September - 11 October 1987.

Within each of these sampling periods, all days were placed into weekday and weekend-holiday strata. Each day in each stratum was divided into two

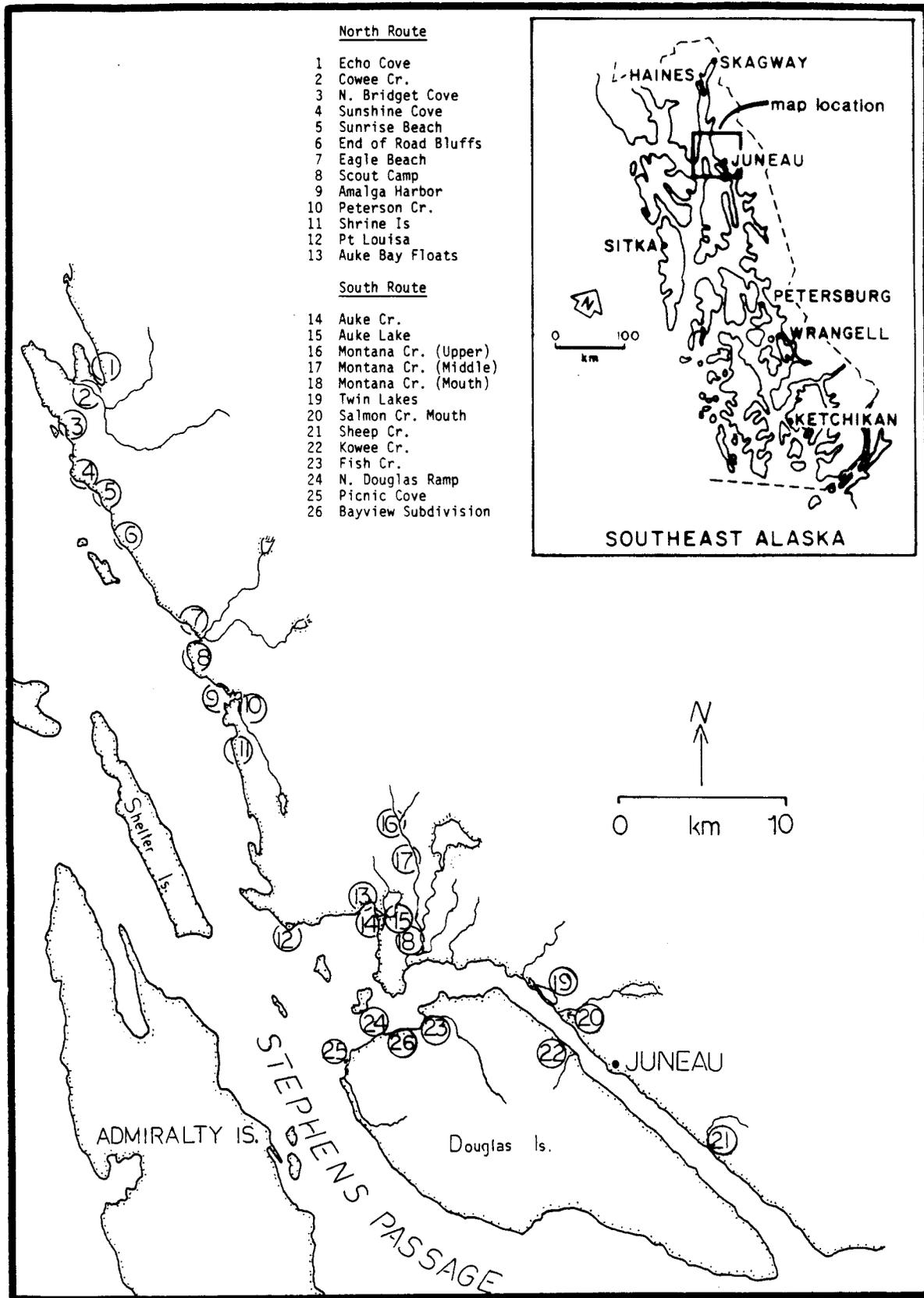


Figure 34. Sport fishing areas along the Juneau road system.

sampling periods of equal length. From 20 April to 9 August, the fishing day was assumed to begin at 0600 and end at 2200. From 10 August to 13 September the fishing day was assumed to begin at 0700 and end at 2200. From 14 September to 11 October, the fishing day was assumed to begin at 0800 and end at 2000 . Since all the sites could not be sampled in less than 10 to 12 hours, the entire fishery was divided into a northern sampling route (Auke Bay Floats and north) and southern sampling route (south of Auke Bay Floats). Samples were allocated randomly both between the morning and afternoon sampling periods and between weekday or weekend-holiday strata for the three strata running from 20 April to 13 September. From 14 September to 11 October, five surveys were randomly allocated to the afternoon period and three to the morning period for both the weekday and weekend-holiday strata for both the north and south routes. Starting locations for each survey were randomly chosen, but then the rest of the route was selected so that mileage was minimized. The duration of surveys varied in length depending on season, weather, and route, but typically took less than the time allotted in the schedule. For this reason, starting times for the surveys were randomly selected by the creel technician after they estimated survey duration.

Results:

The estimated angler effort in the Juneau roadside fisheries surveyed between 20 April and 11 October was approximately 48,000 rod-hours (Appendix Table 40). Pink salmon were harvested in the largest numbers, with an estimated total harvest of approximately 16,200. The largest pink salmon fishery was at Sheep Creek, where very strong hatchery returns led to a harvest of 10,905 fish. Other saltwater fisheries for pink salmon included Echo Cove (1,252), North Bridget Cove (242), Sunrise Beach (330), Shrine Island (677), Point Louisa (695), and Picnic Cove (422). Streams producing good catches of pink salmon included Cowee Creek (893) and Fish Creek (429).

Dolly Varden were harvested in most areas, with the total harvest approaching 4,000 fish. Largest harvests of Dolly Varden occurred in Sunshine Cove (546), Cowee Creek (477), Kowee Creek (469), Twin Lakes (348), Peterson Creek (332), and Echo Cove (306). Over 8,000 Dolly Varden were estimated to have been released.

The harvest of coho salmon >41 cm (>16") totalled about 300, and it appears to have been a poor year for coho salmon fishing. Bad weather and high water conditions hampered fishing for coho salmon in September. The largest harvests of wild coho salmon >41 cm (>16") were estimated to have occurred at Cowee Creek (110) and Peterson Creek (118). The Salmon Creek coho salmon smolt release of 1985 was apparently a failure as no angler effort was recorded at the site in September, and no coho salmon were observed. Hatchery releases at Twin Lakes were more successful as about 500 landlocked coho salmon <41 cm (<16") were harvested and another 500 caught and released.

Discussion:

Most of the patterns of angler effort and harvest for the various Juneau roadside fisheries were similar to those observed during the last

comprehensive survey conducted in 1983 (Neimark 1984; Appendix Table 40), however, a few interesting differences exist. A dramatic reduction in effort and harvest was apparent for the End of Road Bluffs site, where effort fell from 1,161 rod-hours in 1983 to 91 rod-hours in 1987. Other sites exhibiting dramatic reductions in effort between 1983 and 1987 include Amalga Harbor (52% reduction in effort), Auke Bay Floats (91%), Auke Creek Mouth (83%), Twin Lakes (59%), and the Ferry Terminal (88%). Effort and harvest at the Twin Lakes fishery, however, improved over the pattern evident in the 1986 survey, which only covered the 1 July to 20 September period (Mecum and Suchanek 1987).

Increases in angler effort occurred at Sunshine Cove (178% increase), Scout Camp (416% increase) and Peterson Creek (118% increase) from the 1983 survey (Neimark 1984; Appendix Table 40). Additionally, the Montana Creek fishery exhibited an 84% increase in angler effort. Most of this increase at Montana Creek was due to an increase in effort in the lower section of the stream from 385 rod-hours in 1983 to 1,472 rod-hours in 1987, and an increase in the upper section from 67 rod-hours to 593 rod-hours. In the middle section rod-hours decreased from 810 to 251 from 1983 to 1987.

The most dramatic changes in harvest occurred at the Sheep Creek and Picnic Cove fisheries. At the Sheep Creek site, which experienced a 14% reduction in effort from 1983 to 1987 (Neimark 1984; and Appendix Table 40), the harvest of pink salmon increased from 5,585 in 1983 to 10,905 in 1987. Picnic Cove, which also experienced a moderate reduction in angler effort (6,650 rod-hours in 1983 to 4,342 rod-hours in 1987), had substantial reductions in harvest of Dolly Varden (1983: 543 versus 1987: 29), coho salmon (1983: 71 versus 1987: 0), and pink salmon (1983: 907 versus 1987: 0).

Statewide postal survey harvest estimates (Mills 1984, 1985, 1986, and 1987) for the years 1983 through 1986 have averaged 640 chinook salmon and 1,109 Pacific halibut in saltwater along the shoreline from Dupont to Echo Cove and Douglas Island. Mills (1988) reported a harvest of 117 chinook salmon and 1,296 Pacific halibut in this area during 1987. The 1987 on-site creel surveys of saltwater shore anglers documented a chinook salmon harvest of only 87 and no Pacific halibut harvested. The 1987 creel surveys encompassed most known saltwater shoreline access points. This low documented harvest suggests that boat anglers responding to past postal surveys may have reported their boat effort as shoreline effort.

Haines Area

Introduction:

Over 25% of the freshwater sport fishing effort in southeast Alaska occurred in the Haines-Skagway area in 1986 (Mills 1987). Anglers fishing in the Chilkat and Chilkoot river and lake systems near Haines contributed most of this effort. Sport fishing effort on these two systems has nearly doubled since 1981. Increased tourism has led to heavy use by non-resident anglers. In addition, commercial fishing pressure on sockeye and coho salmon returning to the Chilkat and Chilkoot systems has intensified.

Creel surveys have been done on the Chilkat and Chilkoot river systems since 1984 to monitor trends in angler use, catch rates, and harvest of coho and sockeye. Information from the surveys has been used for in-season management, such as emergency closures, to ensure adequate escapements. In the future, creel survey data may be used by management personnel to comment on regulatory changes proposed to the Alaska Board of Fisheries.

The following objectives were addressed during the surveys:

1. To estimate the freshwater roadside sport angler effort, catch, and harvest by species in the Chilkoot River from 13 July to 1 November 1987.
2. To estimate the freshwater sport roadside angler effort, catch, and harvest by species in the Chilkat Rivers from 8 September to 1 November 1987.
3. To estimate the saltwater roadside sport angler effort, catch, and harvest by species in Lutak Inlet from 13 July to 1 November 1987.

Site Description:

Lutak Inlet stretches north of Haines along the Lutak Road. Shore anglers fish the inlet for Dolly Varden and pink salmon from Tanani Bay to the mouth of the Chilkoot River. Because the road parallels the open inlet, anglers were counted and interviewed wherever they were encountered along the road.

The Chilkoot River is located 13 km north of Haines at the end of Lutak Road. The river itself is only 2.4 km (1.5 miles) in length and anglers concentrate at a few pools scattered along its length. Since a road parallels the river, almost all anglers can be contacted.

Road access to the Chilkat River occurs at the end of Sawmill Road and from the Haines highway along highway km 4.8 to 35.4 (miles 3 to 22) paralleling the river. Anglers fishing for chum and coho salmon concentrate along the major parking areas along the highway, and whenever a parked vehicle was encountered, the surrounding area was searched for anglers. Almost all anglers in this stretch of river could be counted and interviewed.

Stratification Structure:

A count type creel survey was used to sample the roadside fisheries. The Chilkoot River was divided into two areas for purposes of the survey, above and below the ADF&G weir, located 0.8 km (0.5 mile) above the mouth of the River. The Chilkat River survey site included counts and interviews of anglers from all access points on the Haines Highway. In addition, anglers fishing in saltwater along Lutak Inlet were interviewed.

The sampling season was divided into eight, two-week sampling periods:

1. 13 July to 26 July 1987;
2. 27 July to 9 August 1987;
3. 10 August to 23 August 1987;

4. 24 August to 7 September 1987;
5. 8 September to 20 September 1987;
6. 21 September to 4 October 1987;
7. 5 October to 18 October 1987; and
8. 19 October to 1 November 1987.

Within each seasonal stratum the days were further stratified as weekdays (Monday-Friday) or weekend-holidays (Saturday, Sunday, and all U.S. and Canadian legal holidays).

Each sampling day was subdivided into four equal sampling periods during the first five seasonal strata (13 July-20 September 1987). After 20 September, the sampling day was subdivided into three equal sampling periods. The sampling day was defined as starting at approximately 0600 and ending at the nearest 15 minute increment to the average civil twilight within each biweekly period.

Samples were selected at random within each seasonal stratum from the total number of available samples within either the weekday or weekend-holiday stratum. Sample selection was constrained such that at least two contiguous days were not sampled within each week (Monday-Sunday); no more than two samples were scheduled in any one day; and the sample period combination of period one and period four within one day was not permitted.

For each sample selected, the interviews and counts started at either site one (upstream of the ADF&G weir on the Chilkoot River) or site four (the Chilkat River), selected at random. Within each of the four sites sampled, either an angler count or the interviews were conducted first (selected at random). Angler counts took no longer than one-half hour within any one of the four sites.

Results:

Chilkoot River Roadside Survey. An estimated total of 25,298 rod-hours of effort was expended in this fishery during the 13 July to 1 November 1987 time period (Appendix Table 41). Approximately 69% of this effort occurred downstream of the ADF&G weir. The majority (79%) of the effort was expended prior to 8 September 1987 (Figure 35).

Anglers harvested 1,007 sockeye salmon during the entire survey period in the Chilkoot River (Appendix Table 41). All sockeye salmon were caught prior to 8 September 1987, and most (80%) were caught during between 27 July and 23 August (Figure 35). Most (98%) of the harvested sockeye salmon were caught below the ADF&G weir.

The pink salmon harvest in Chilkoot River during the survey period was estimated at 5,912 fish with and additional 3,507 released (Appendix Table 41). All pink salmon were caught prior to 21 September, and most (76%) were caught between 10 August and 7 September (Figure 36). Only 4% of the Chilkoot harvest of pink salmon was taken above the ADF&G weir (Appendix Table 41). HPUE during the first month of the survey averaged less than 0.06 fish/rod-hour). HPUE increased substantially after 9 August, rising to a peak of 0.44 fish/rod-hour (Figure 36).

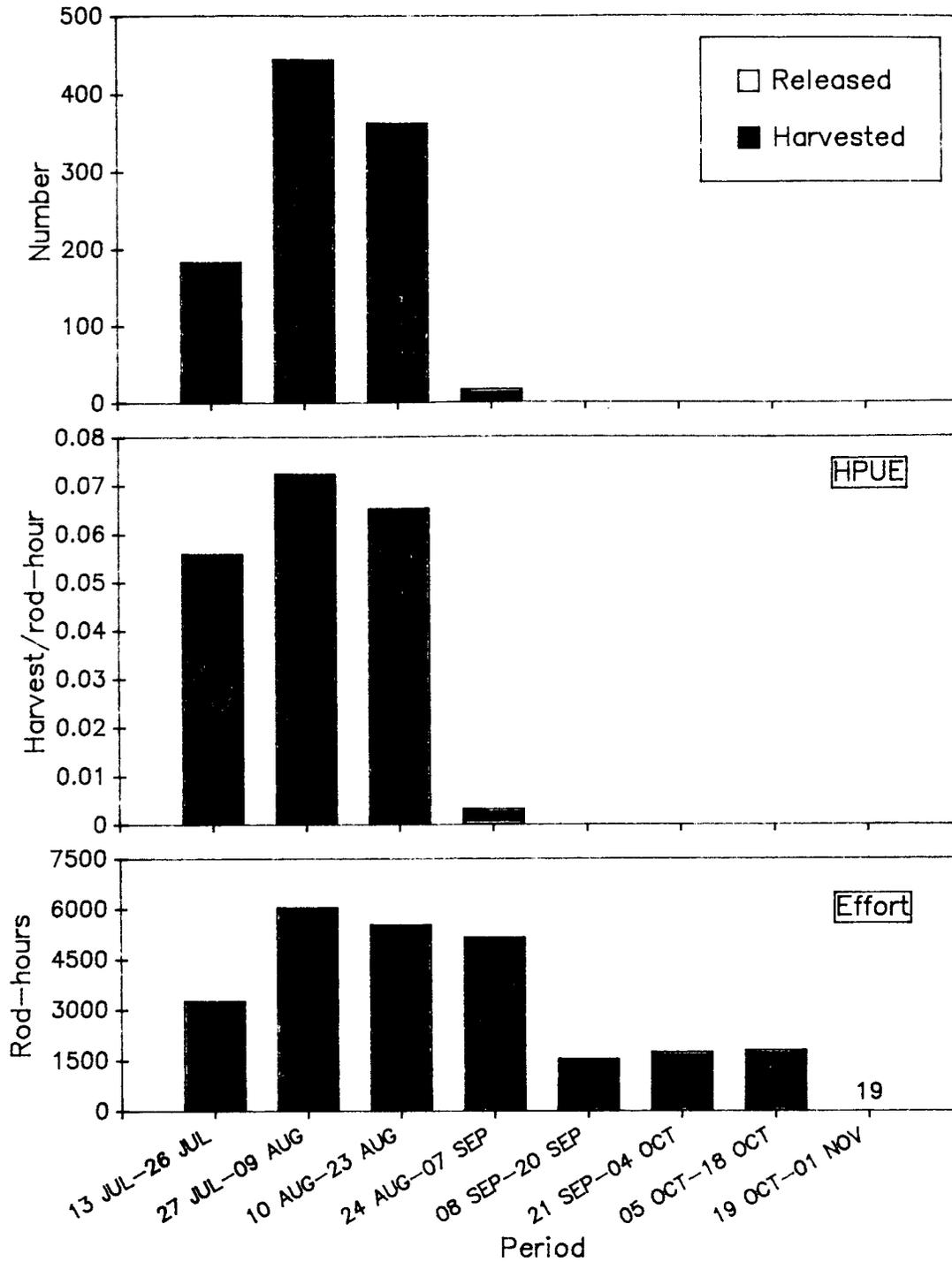


Figure 35. Estimated number of sockeye salmon caught, harvested, and released, with estimated harvest per unit effort (HPUE) and angler effort for the 1987 Chilkoot River roadside recreational harvest survey by seasonal period.

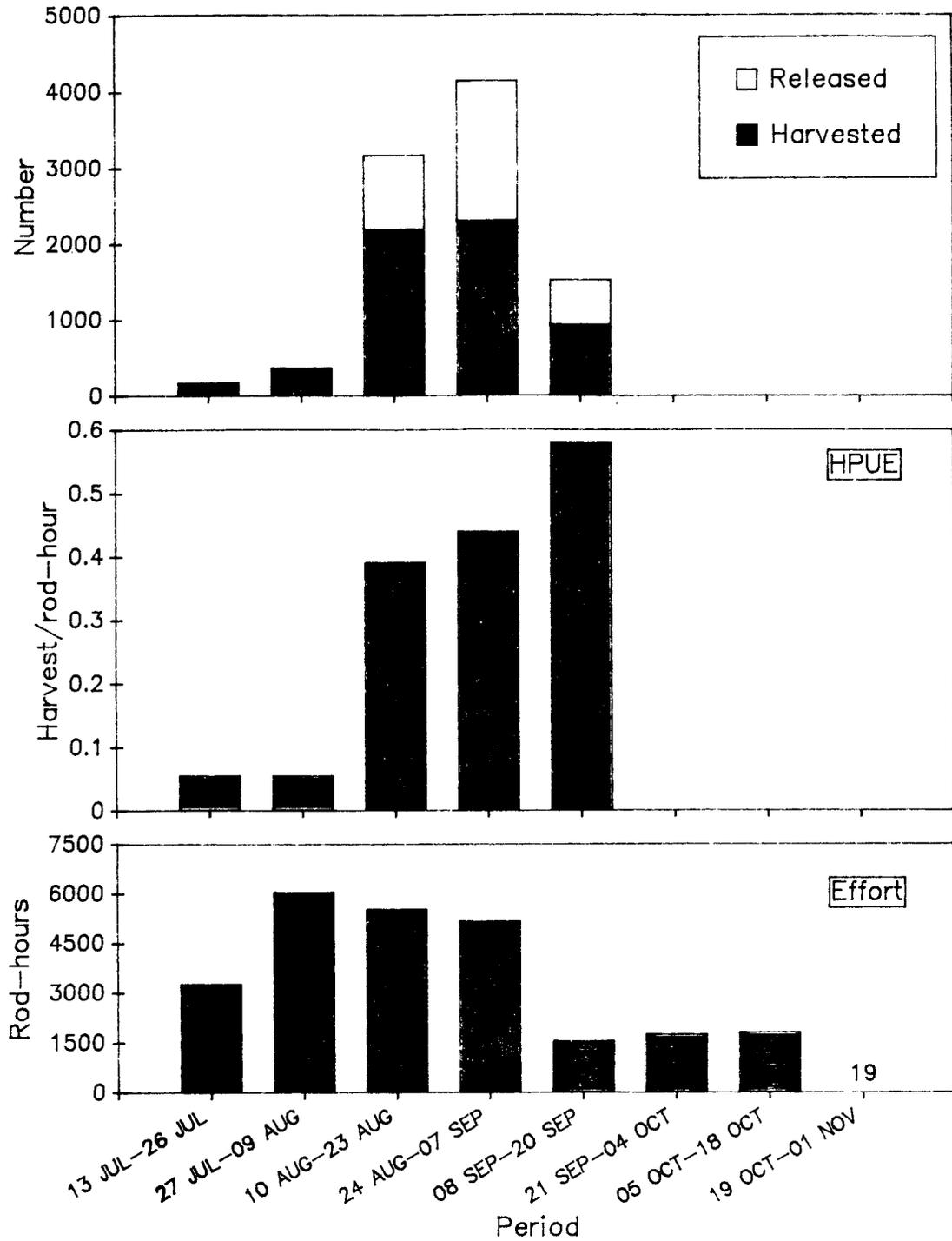


Figure 36. Estimated number of pink salmon caught, harvested, and released, with estimated harvest per unit effort (HPUE) and angler effort for the 1987 Chilkoot River roadside recreational harvest survey by seasonal period.

Chilkoot River anglers harvested 6,897 Dolly Varden during the entire survey period (Appendix Table 41). Approximately 86% of these were caught above the ADF&G weir. Most of the harvest (78%) occurred prior to 7 September 1987 (Figure 37). HPUE fluctuated between a low of 0.22 and a high of 0.38 fish/rod-hour between 13 July and 4 October. Harvest rates decreased to a seasonal low of 0.14 fish/rod-hour between 5 October and 18 October. The seasonal HPUE high of 3.32 fish/rod-hour was estimated during the last biweekly period. However, this harvest rate was obtained from a minimal amount of effort (<0.1% of the total seasonal effort) and harvest (<1% of the total harvest). Approximately 22% of the total catch of Dolly Varden were released. Anglers also harvested 60 chum salmon, 378 coho salmon, and 44 cutthroat trout.

Lutak Inlet Roadside Survey. An estimated total of 1,732 rod-hours of effort was expended by saltwater roadside anglers in this fishery during the 13 July to 1 November 1987 period (Appendix Table 41). Anglers harvested 273 pink salmon, and 116 Dolly Varden. The vast majority of the angler effort and harvest occurred prior to 24 August 1987.

Chilkat River Roadside Survey. Anglers expended 3,217 rod-hours of effort to harvest 81 coho salmon, 1,302 chum salmon, and 11 Dolly Varden between 8 September and 1 November 1987 (Appendix Table 41). The majority (64%) of the chum salmon were caught during the 5-18 October period (Figure 38).

Discussion:

Estimates of angler effort in 1987 were comparable to those in 1986 (Mecum and Suchanek 1987), although a moderate reduction was observed in the Chilkoot River fishery (from 32,484 rod-hours in 1986 to 25,298 rod-hours in 1987). The 1987 level of effort in the Chilkoot River was only slightly below the level observed for the 1985 survey (Mecum and Suchanek 1986). Harvest of Dolly Varden increased substantially from the level observed in 1986 (from 3,941 in 1986 to 6,897 in 1987). Harvest of pink salmon also increased substantially (from 1,422 in 1986 to 5,912 in 1987), however harvest of both coho and sockeye salmon decreased from the 1983 levels (coho salmon: 708 in 1983 to 378 in 1987; sockeye salmon: 2,873 in 1986 to 1,007 in 1987).

Angler effort along Lutak Inlet increased from 1,471 rod-hours in 1986 to 1,732 rod-hours in 1987 over a similar survey period (Mecum and Suchanek 1987). However, this level of effort still does not approach the 4,082 rod-hours of angler effort estimated for the 1985 fishery (Mecum and Suchanek 1986). Harvest of Dolly Varden and pink salmon decreased from the levels estimated in 1985 and 1986.

Angler effort in the roadside fishery along the Chilkat River increased slightly from 3,061 rod-hours in 1986 (Mecum and Suchanek 1987) to 3,217 rod-hours in 1987. As with the Lutak Inlet fishery, this is below the 1985 estimate of 6,685 rod-hours of angler effort (Mecum and Suchanek 1986). Both Dolly Varden and coho salmon harvests decreased substantially from the estimates obtained in 1985 and 1986, whereas, chum salmon harvest of 1,302 fish increased from the 1986 level of 496.

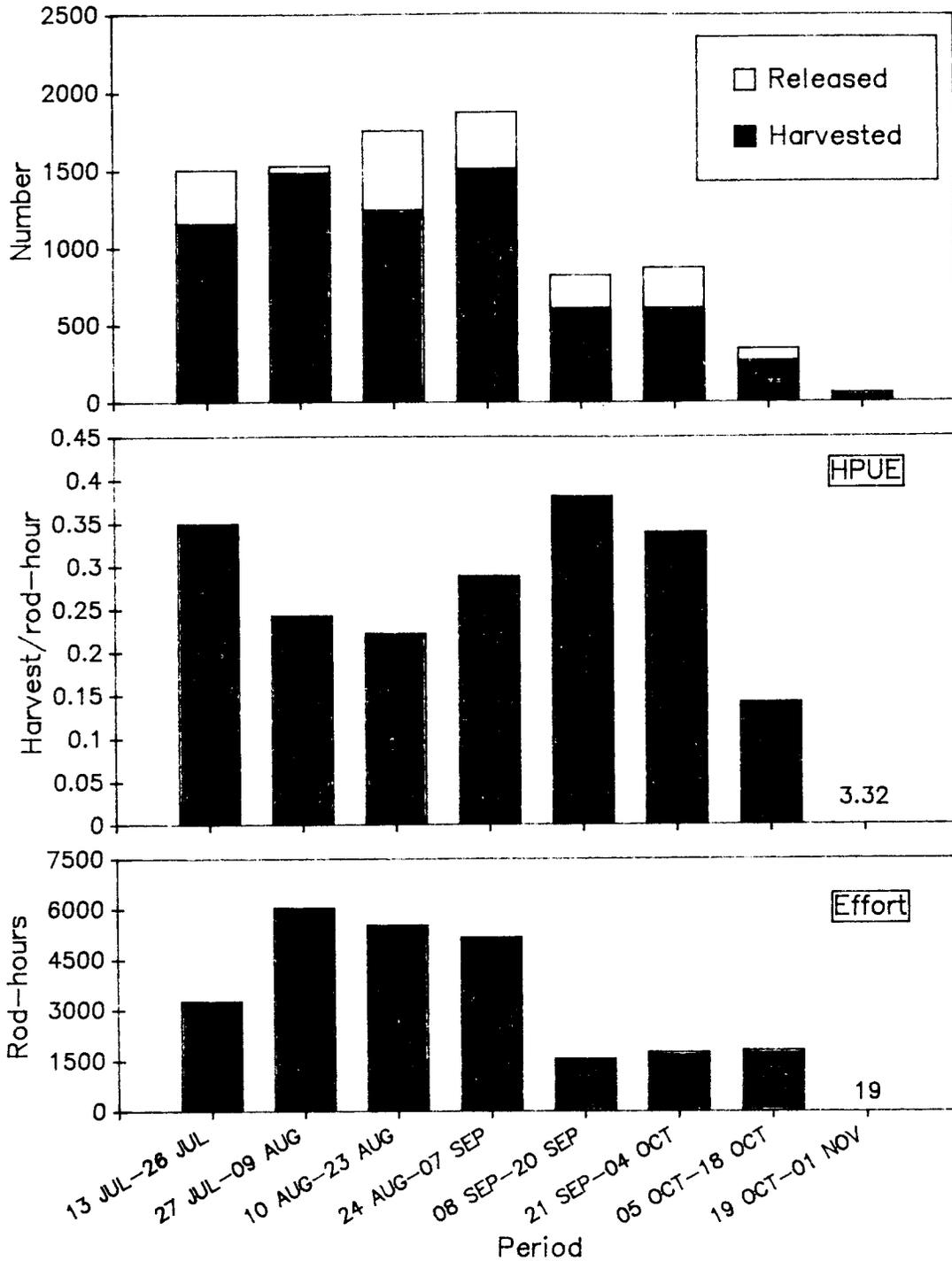


Figure 37. Estimated number of Dolly Varden caught, harvested, and released, with estimated harvest per unit effort (HPUE) and angler effort for the 1987 Chilkoot River roadside recreational harvest survey by seasonal period.

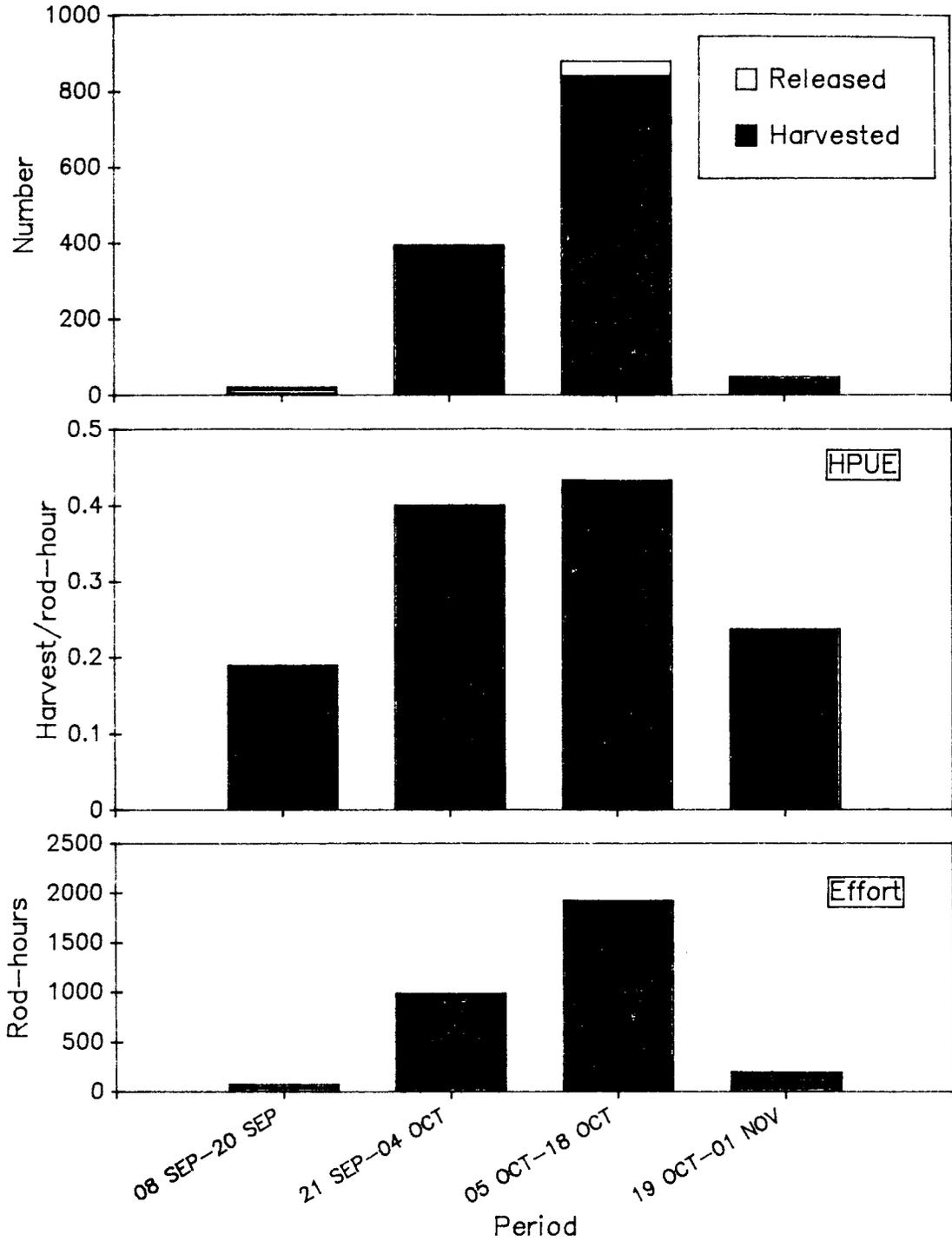


Figure 38. Estimated number of chum salmon caught, harvested, and released, with estimated harvest per unit effort (HPUE) and angler effort for the 1987 Chilkat River roadside recreational harvest survey by seasonal period.

Yakutat Area

Introduction:

Recreational fisheries based on wild stocks of salmonids in the Situk River and other systems near Yakutat have grown to national significance. The spring sport fishery for steelhead trout *Salmo gairdneri* in the Situk River is the largest in northern southeast Alaska. Baseline creel survey data for the Situk River have been collected since 1984.

Salmon stocks on which other Yakutat sport fisheries are based are also extensively harvested by commercial fisheries in the Gulf of Alaska and at the mouths of the rivers. Situk River chinook salmon stocks are currently depressed in numbers and must be closely monitored. Coho salmon stocks are subjected to intense troll and set net fisheries and are also highly prized by sport anglers. Monitoring of coho salmon sport effort and harvests in several Yakutat systems is also needed for proper in-season management of stocks. Creel survey information on all these fisheries is provided by management personnel to the Alaska Board of Fisheries during their consideration of proposed changes to sport fishing regulations.

The following objectives were addressed during the surveys:

1. To estimate the total angler effort and total harvest of chinook salmon in the Situk River from 15 June to 16 August 1987.
2. To estimate the total angler effort and total harvest of coho salmon in the Situk and Lost rivers, and Ankau Lagoon from 17 August to 11 October 1987.
3. To estimate the total angler effort and total harvest of steelhead trout in the Situk River from 6 April to 25 May 1987.

Site Description:

The Situk River is the primary destination for sport anglers living in or visiting Yakutat. One road from Yakutat (Forest Highway 10) leads to the Nine Mile Bridge over the Situk River about 23 km from its mouth, while the Airport Road crosses the Situk near its mouth at an access point called the Lower Landing (Figure 39). Anglers on foot often concentrate near these two crossings, and motor boats are also used from the Lower Landing. Float trips between the Nine Mile Bridge and the Lower Landing are also popular. A checkpoint for vehicles was stationed on both access roads to sample anglers returning from the two river crossings.

The Lost River-Tawah Creek sport fishery occurs primarily downstream from the Airport Road crossing of Lost River at the confluence of the two creeks. Anglers also fish pools in the immediate vicinity of the bridge and the Lost River mouth. The Lower Landing check station on Airport Road was used to sample anglers returning from this fishery.

Ankau Lagoon is located about 12 km west of Yakutat at the end of the Ankau Road. Anglers fish from a bridge spanning the lagoon and from boats that

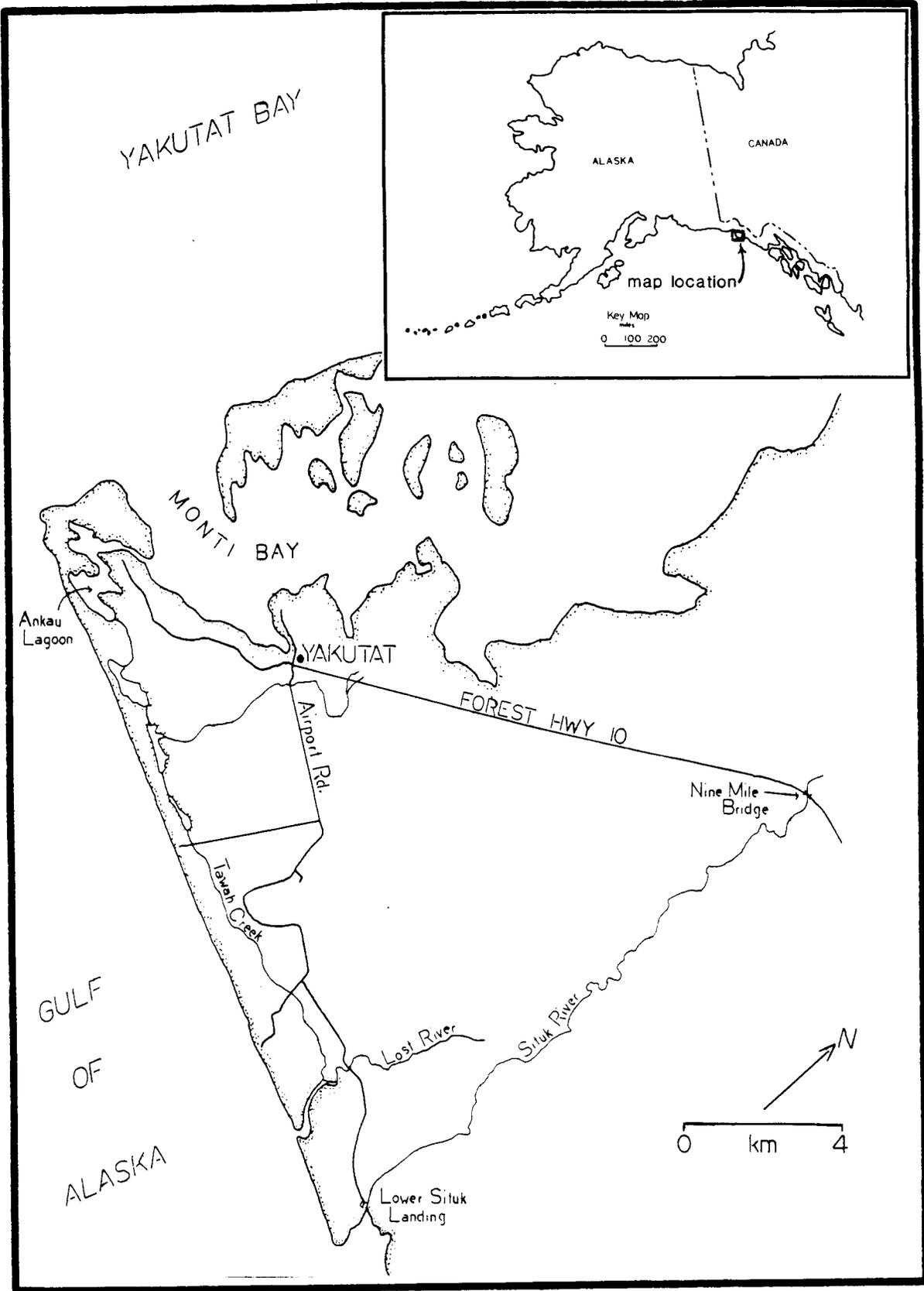


Figure 39. Sport fishing areas along the Yakutat road system.

are also used to access the fishery. Almost all anglers participating in the fishery were interviewed by creel clerks using a boat run from town or by a canoe which was kept on site.

Stratification Structure:

A direct expansion type creel survey using completed trip interviews was used on the Lost River, Tawah Creek, and Situk River steelhead trout, chinook and coho salmon fisheries. The Lower Landing and Nine Mile bridge access locations were treated as separate strata for sampling allocation purposes. However, angler effort, catch, and harvest for the Situk River fisheries were stratified separately from the Lost River and Tawah Creek fisheries. Accordingly, results are summarized for the two sites on Situk River and for the combination of Lost River and Tawah Creek. A count type creel survey was used on the coho salmon fishery in Ankau Lagoon. Ankau Lagoon and is reported separately.

Spring Steelhead Trout Survey. During the spring 1987 period the Yakutat roadside recreational harvest survey was directed at the steelhead trout fishery in the Situk River only. During this period, the fishery was stratified into four biweekly periods:

1. 6 - 19 April;
2. 20 April - 3 May;
3. 4 - 17 May; and
4. 18 - 31 May.

Each day in the fishery was stratified into early and late day strata. Within each time of day stratum there were two possible sampling periods. The days of the week (Monday-Sunday) were not separated into weekdays versus weekend-holidays strata due to the nature of the Yakutat fisheries (i.e., many fly-in vacationers). Each fishing day was defined as starting at 0600 and ending on the nearest whole hour for the average civil twilight within each biweekly period. Approximately three-fifths of the samples were allocated to the late day stratum, with the remaining samples allocated to the early day stratum. Samples were selected at random within each seasonal stratum from the total number of available samples within either early or late day strata. Samples were constrained such that no more than three samples were conducted in one day.

During the early day stratum, approximately 50% of the selected samples were scheduled for the Nine Mile Bridge and 50% for the lower landing site (assignments made on a random basis). During the late day stratum a minimum sample size of two was allocated to the Nine Mile Bridge on a random basis, leaving five samples for the Lower Landing site. The sample size allocation between early and late day strata and between sites was reflective of the expected magnitude of angler effort within each unique combination.

Summer Chinook and Coho Salmon Survey. During the summer period, 15 June 1987 to 9 August 1987, the harvest survey consisted of a direct expansion creel survey (using completed trip interviews) of the Situk River, Lost River, and Tawah Creek systems for the chinook and coho salmon fisheries.

During this period, the fishery was separated into four biweekly seasonal strata:

1. 15 - 28 June;
2. 29 June - 12 July;
3. 13 - 26 July; and
4. 27 July - 9 August.

The fishing day was stratified and subdivided into sampling periods in a manner similar to the spring survey. Approximately two-thirds of the samples were allocated to the late day stratum, and one-third to the early day stratum. Samples were constrained such that at least one pair of contiguous days were not sampled within each week (Monday-Sunday); no more than two samples were conducted in one day; and sample combinations of early day period 1 and late day period 2 were not selected within any one day. During both the early and late day strata a minimum sample size of two was allocated to the Nine Mile Bridge site on a random basis with the remaining samples allocated to the Lower Landing site. This resulted in a 50% split between the two sites during the early day stratum. During the late day stratum, the resulting sampling fractions were approximately 29% for the Nine Mile Bridge site and 71% for the Lower Landing site.

Fall Coho Salmon Survey. During the fall period, 17 August 1987 to 11 October 1987, the harvest survey directed at coho salmon fisheries consisted of a direct expansion creel survey (using completed trip interviews) of the Situk River, Lost River, and Tawah Creek systems and a count type creel survey of the Ankau Lagoon complex. During this period the fishery was separated into four strata:

1. 17 - 30 August;
2. 31 August - 13 September;
3. 14 - 27 September; and
4. 28 September - 11 October.

The fishing day was stratified and subdivided into sampling periods in a manner similar to the spring and summer schedules. During the last seasonal stratum, the hours of daylight were reduced such that the fishing day (starting at 0630) was no longer stratified. The fishing day was divided into three sampling periods during the last seasonal stratum.

During the first three seasonal strata 63% of the samples were allocated to the late day stratum, while 37% went to the early day. During the first three periods, samples were selected at random within each seasonal stratum from the total number of available samples within either the early day stratum or late day stratum. During the last seasonal stratum, a total of 14 samples were allocated at random to the three possible sampling periods. Samples were constrained such that at least one pair of contiguous days were not sampled within each week (Monday-Sunday); no more than two samples were conducted in one day; and sample combinations of early day period 1 and late day period 2 were not selected within any one day.

A minimum sample size of two was allocated at random to the Nine Mile Bridge site for the first three seasonal strata (both the early day and late day

stratum). During the early day stratum, two samples were allocated to the Ankau Lagoon, whereas three samples were allocated during the late day stratum. Accordingly, three samples were allocated to the early day-Lower Landing site and five samples for the late day-Lower Landing site on a random basis.

During the last seasonal stratum, the Nine Mile Bridge was allocated two samples on a random basis. The Ankau Lagoon site was allocated five samples, and the Lower Landing site was allocated the remaining seven samples.

Results:

Situk River Spring 1987 Steelhead Trout Survey. Anglers expended 10,466 rod-hours of effort during the 6 April to 31 May 1987 period. Approximately 87% of this effort was expended by anglers interviewed at the Lower Landing site (Appendix Table 42). Seventy-eight percent of the spring angler effort occurred prior to 3 May 1987. Situk River Anglers caught 4,176 steelhead trout during the survey period of which only 391 (9%) were harvested (Figure 40). A larger proportion (38%) of the 9 Mile bridge catch was harvested than at the Lower Landing site (7%). Accordingly, 28% of the harvest was taken by anglers interviewed at the 9 Mile bridge, compared to only 7% of the catch of steelhead trout by these same anglers. Catch rates (CPUE) ranged from 0.00 fish per rod-hour during the 18-31 May period to a high of 0.52 fish per rod-hour between 20 April and 3 May. Additionally, 302 Dolly Varden were harvested.

Situk River Summer 1987 Chinook Salmon Survey. Anglers interviewed at the Lower Landing site in the Situk River expended 3,166 rod-hours of effort from 15 June to 9 August (Appendix Table 42). Only 686 rod-hours of effort were expended during the 29 June to 9 August period by 9 Mile bridge site anglers. Seventy-five large chinook salmon (>41 cm or 16 inches) were harvested and 270 large chinook salmon were released. Harvest of small chinook salmon (<41 cm or 16 inches) was estimated at 319 fish during the survey period. In addition to chinook salmon, Situk River anglers harvested 899 sockeye salmon, 630 pink salmon, 20 coho salmon, and 356 Dolly Varden during the summer survey period.

Situk River, Lost River, and Tawah Creek Fall 1987 Coho Salmon Survey. Anglers interviewed at the Lower Landing check station near Yakutat expended 13,664 rod-hours of fishing effort on the Situk River, Lost River, and Tawah Creek systems during the 17 August to 11 October 1987 period (Appendix Table 42). Approximately 51% of this effort was expended by Situk River anglers. Situk River anglers harvested 1,750 coho salmon during the fall survey period, whereas, 1,839 coho salmon were harvested from the Lost River-Tawah Creek systems. Anglers in the three systems also harvested 155 pink salmon and 29 Dolly Varden.

Ankau Lagoon Fall 1987 Coho Salmon Survey. An estimated 6,615 rod-hours was expended by Ankau Lagoon anglers during the 17 August to 11 October 1987 period (Appendix Table 42). These anglers harvested a total of 1,377 coho salmon with the majority (59%) harvested between 31 August and 13 September.

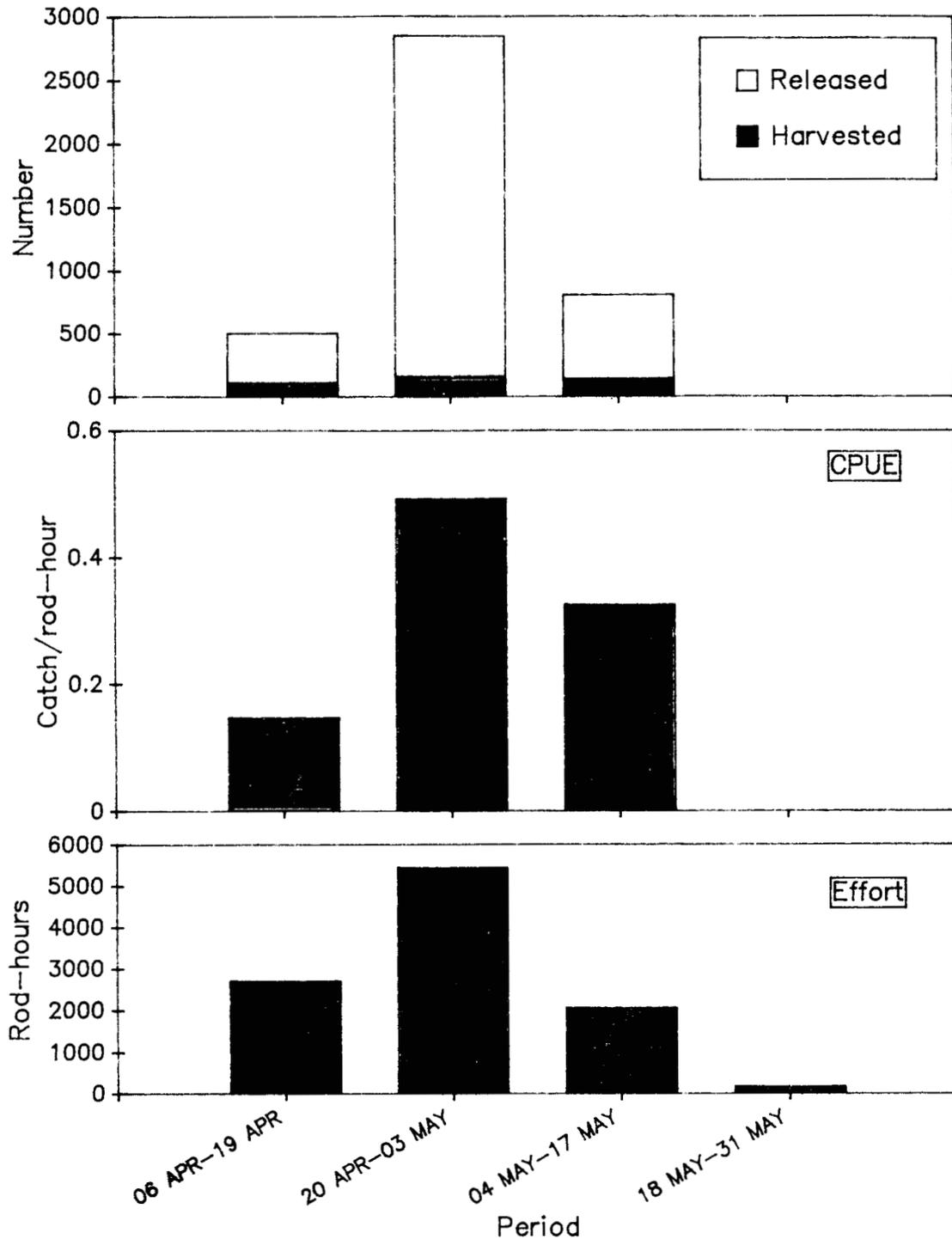


Figure 40. Estimated number of steelhead trout harvested and released, with estimated catch per unit effort (CPUE) and angler effort for the Spring 1987 Situk River Lower Landing site roadside recreational harvest survey by seasonal period.

Discussion:

Angler effort estimates for the Situk River and Lost River-Tawah Creek fisheries during 1987 were lower than estimates obtained during comparable periods in 1985 and 1986 (Mecum and Suchanek 1986, 1987). The Situk River (Lower Landing only) effort estimate of 19,225 rod-hours in 1987 represented a 27% decrease from 26,243 rod-hours in 1986 (over the periods of 14 April-1 June, 16 June-20 July, and 16 August-15 October). Similarly, the Lost River-Tawah Creek fishery decreased (20%) from an estimated 8,428 rod-hours in 1986 to 6,741 rod-hours in 1987. This is also down from the 10,666 rod-hours estimate in 1985. Similarly, the angler effort estimate of 6,615 rod-hours in the Ankau Lagoon fall coho salmon fishery represented an 18% decrease from the estimated 8,083 rod-hours observed in 1986.

Estimated harvest of steelhead trout (279 fish) in the spring Situk River fishery was similar to estimates obtained in 1985 (327) and 1986 (271) for comparable survey periods (Mecum and Suchanek 1986, 1987). The total estimated catch of 3,894 for 1987, however, was substantially above the catch estimates for 1985 (2,987) and 1986 (2,355).

Harvest of both small (<41 cm or 16 inches) and large (>41 cm or 16 inches) chinook salmon in 1987 in the Situk River fisheries increased over levels observed in 1986 (Mecum and Suchanek 1987). Conservation closures in 1986 curtailed the harvest during that year.

Coho salmon harvest in 1987 (4,986) in the surveyed fisheries along the Yakutat roadside increased slightly from levels observed in 1986 (4,171 for comparable survey periods), and did not reach the estimated harvest of Situk River and Lost River-Tawah Creek fisheries in 1985 (6,957 for comparable survey periods) (Mecum and Suchanek 1986 and 1987).

ACKNOWLEDGEMENTS

We wish to thank the creel survey staff of Randy Ericksen, Bob Johnson, Sue Millard, Mark Anderson, Dale Brandenburger, Mike Jaenicke, Garry Keller, Kris Norosz, Ann Blackwell, Page Else, Larry Edwards, Evon Zerbetz, Beth Kluthe, and Deidre Holum for their invaluable data collection efforts and many suggestions to improve survey techniques. Randy Ericksen and Bob Johnson also helped in developing site descriptions in the Haines and Yakutat areas, respectively. The ADF&G staff of the Fisheries Rehabilitation, Enhancement, and Development (FRED) Division CWT lab are gratefully acknowledged for their work on dissecting salmon heads, coded-wire tag decoding, and data reduction efforts. The staff of the Stock Biology Section of the Division of Commercial Fisheries, in particular Ben Van Alen, Scott McPherson, and Mindy Rowse are acknowledged for age determination of chinook salmon scale samples and data analysis of age-length data. We thank Donna Buchholz and Gail Heineman of the Research and Technical Services Unit (RTS) of the Division of Sport Fish for their diligence in mark sense form processing and data control. Gail Heineman is also appreciated for her programming assistance in obtaining harvest and variance estimates for the various marine boat harvest surveys. Ardys Armstrong, also of RTS, is thanked for editorial typing assistance. Carol

Hepler, of RTS, is thanked for cartographic support, as is Pat Morrow for helping to generate the computer plots. Becky Strauch, Game Division, is appreciated for her help in generating some computer developed maps. ADF&G biometricians, Hal Geiger, Dave Bernard, Bob Conrad, and Mike Mills are all thanked for their suggestions for improvements to the study design. Editorial comments from Rocky Holmes are gratefully acknowledged as his suggestions helped improve this report.

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APPENDIX A - ESTIMATION METHODS FOR HARVEST, EFFORT, AND HPUE

The following equations were used for estimation of harvest and effort for the direct expansion completed-trip interview type creel surveys. The first step involved the estimation of angler effort:

$$\begin{aligned} \hat{E}_h &= \text{estimated boat-hours in the } h\text{th stratum of the fishery;} \\ &= R_h (e_{h..} \div r_h.) \end{aligned} \quad [1]$$

h = subscript denoting stratum (as defined by the combination of seasonal period, access location type, type of fishing day;

R_h = total number of hours in the h th stratum, defined by the number of hours available for boat-parties to return to access locations;

$e_{h..}$ = total effort (in hours) expended by boat-parties interviewed within the h th stratum;

$$= \sum_{i=1}^{n_h} \hat{e}_{hi}. \quad [2]$$

i = subscript denoting an individual sample within the h th stratum;

n_h = number of samples collected within the h th stratum;

\hat{e}_{hi} = estimated effort for the i th sample within the h th stratum;

$$= O_i \bar{e}_{hi}. \quad [3]$$

O_i = number of boats counted in the i th sample within the h th stratum (including interviewed boats and "missed" boats);

$$= o_i + p_i \quad [4]$$

o_i = number of boat-parties interviewed during the i th sample;

p_i = number of boats not interviewed (i.e., "missed") during the i th sample;

$$\bar{e}_{hi} = \frac{\sum_{j=1}^{o_i} (e_{hij})}{o_i} \quad [5]$$

j = subscript denoting the boat-party interviewed during the i th sample within the h th stratum;
 e_{hij} = effort (in boat-hours) of the j th boat-party interviewed in the i th sample in the h th stratum;
 $r_{h.}$ = total number of hours sampled in the h th stratum;

$$= \sum_{i=1}^{n_h} r_{hi} \quad [6]$$

r_{hi} = hours sampled during the i th sample in the h th stratum;
 $\hat{V}_h(\hat{E}_h)$ = the variance estimate for the estimate of E_h , obtained by the standard formula for the estimation of the variance of a product of a constant and a variance (Lehmann 1975);

$$= R_h^2 \hat{V}(e_{h..} \div r_{h.}) \quad [7]$$

$\hat{V}(e_{h..} \div r_{h.})$ = the variance estimate for the effort rate (i.e., the ratio of $e_{h..}$ to $r_{h.}$), which is estimated approximately by the standard formula for the variance of the ratio of random variables (Cochran 1977);

$$\approx \{ \bar{e}_{h..} \div \bar{r}_{h.} \}^2 \{ [s_e^2 \div (\bar{e}_{h..})^2] + [s_r^2 \div (\bar{r}_{h.})^2] - [(2 \text{cov}_h(e,r)) \div (\bar{e}_{h..} \bar{r}_{h.})] \} \quad [8]$$

$\bar{e}_{h..}$ = mean effort (in boat-hours) for the n_h samples in the h th stratum;

$$= e_{h..} \div n_h \quad [9]$$

$\bar{r}_{h.}$ = mean hours sampled for the n_h samples in the h th stratum

$$= r_{h.} \div n_h \quad [10]$$

$$\begin{aligned}
s_e^2 &= \text{variance estimate associated with estimating the effort component of the effort rate, obtained by using a modified two-stage sampling approach estimator (Cochran 1977);} \\
&= \left\{ [(R_h - r_h) \div R_h] [s_{B_e}^2 \div n_h] \right\} \\
&\quad + \left\{ [(O_h - o_h) \div (R_h O_h)] [s_{W_e}^2 \div o_h] \right\}
\end{aligned} \tag{11}$$

$$\begin{aligned}
s_{B_e}^2 &= \text{the between sample variance for effort;} \\
&= \frac{\sum_{i=1}^{n_h} (\hat{e}_{hi.} - \bar{e}_{h..})^2}{n_h - 1}
\end{aligned} \tag{12}$$

$$\begin{aligned}
O_h &= \text{total number of boats counted (both interviewed and boats for which no interviews were obtained) over all } n_h \text{ samples within the } h\text{th stratum;} \\
&= \sum_{i=1}^{n_h} O_i
\end{aligned} \tag{13}$$

$$\begin{aligned}
o_h &= \text{total number of interviews over all } n_h \text{ samples within the } h\text{th stratum;} \\
&= \sum_{i=1}^{n_h} o_i
\end{aligned} \tag{14}$$

$$\begin{aligned}
s_{W_e}^2 &= \text{the within sample (between boat) variance for effort;} \\
&= [O_i^2 \div o_i] \left[\sum_{j=1}^{o_i} (e_{hij} - \bar{e}_{hi.})^2 \div (o_i - 1) \right]
\end{aligned} \tag{15}$$

$$\begin{aligned}
s_r^2 &= \text{variance estimate associated with estimating the hours sampled component of the effort rate} \\
&= [(R_h - r_h) \div (R_h n_h)] \left[\sum_{i=1}^{n_h} (r_{hi} - \bar{r}_{h.})^2 \div (n_h - 1) \right]
\end{aligned} \tag{16}$$

$$\begin{aligned}
\text{cov}_h(e,r) &= \text{covariance estimate between the effort and hours} \\
&\quad \text{sampled components of the effort rate estimate;} \\
&= [(R_h - r_{h.}) \div (R_h n_h)] \\
&\quad \left[\sum_{i=1}^{n_h} \{ (e_{hi.} - \bar{e}_{h..}) (r_{hi} - \bar{r}_{h.}) \} \div (n_h - 1) \right]
\end{aligned}
\tag{17}$$

The approach presented above for variance estimation is valid for a stratified simple random sampling design with only one stage of sample selection. Our use of this approach was not entirely correct, in that selection of time to sample within a unique combination of stratum definitions, was not a simple random process. As such, the location to sample within access location stratum represents a second stage of sampling. Due to the complexities of the sample allocation process and due to the limitations of sampling density (i.e., budgetary constraints), we were not able to estimate the variance for the second stage. However, the use of a single-stage sampling approach is conservative in that the resulting variance estimates will be larger than if a multi-stage estimator could be applied.

Harvest per unit effort (HPUE) in terms of fish harvested per rod-hour for both targeted and non-targeted effort was estimated as follows for the direct expansion creel surveys:

$$\begin{aligned}
\hat{P}_h &= \text{estimated total harvest per unit effort for the } h\text{th} \\
&\quad \text{stratum of the fishery;} \\
&= \hat{H}_h \div \hat{E}_h
\end{aligned}
\tag{18}$$

where h is defined above;

\hat{H}_h = estimated harvest for a particular species for the hth stratum of the fishery, obtained by substituting harvest statistics into equation one, above;

\hat{E}_h = estimated angler effort in rod-hours (either targeted or non-targeted) for the hth stratum of the fishery, also obtained by equation one, above;

$$\begin{aligned} \hat{V}_h(\hat{P}_h) &= \text{estimated variance of the HPUE estimate for the } h\text{th stratum;} \\ &\approx (\bar{h}_{h..} + \bar{e}_{h..})^2 \{ [s_h^2 + (\bar{h}_{h..})^2] + [s_e^2 + (\bar{e}_{h..})^2] \\ &\quad - [(2\text{cov}_h(h,e)) + (\bar{h}_{h..}\bar{e}_{h..})] \} \end{aligned} \quad [19]$$

$\bar{h}_{h..}$ = overall mean harvest per boat in the h th stratum, estimated by substituting the appropriate harvest statistic into equation nine, above;

$\bar{e}_{h..}$ = see equation nine, above;

s_h^2 = variance estimate associated with estimating the harvest component of HPUE, obtained by substituting the appropriate harvest statistics into equations 11-16, above;

s_e^2 = variance estimate associated with estimating the angler effort component of HPUE, obtained by substituting either targeted or non-targeted rod-hour effort statistics into equations 11-16, above;

$$\begin{aligned} \text{cov}_h(h,e) &= \text{covariance estimate between harvest and angler effort components of HPUE for the } h\text{th stratum;} \\ &= [(R_h - r_h) \div R_h] [\text{cov}_B(h,e) \div n_h] + \\ &\quad [(O_h - o_h) \div (R_h O_h)] [\text{cov}_W(h,e) \div o_h] \end{aligned} \quad [20]$$

where R_h , r_h , O_h , and o_h are as defined above;

$$\begin{aligned} \text{cov}_B(h,e) &= \text{the between sample covariance component of the covariance estimate between harvest and angler effort;} \\ &= \frac{n_h}{\sum_{i=1}^{n_h}} [(\hat{h}_{hi.} - \bar{h}_{h..})(\hat{e}_{hi.} - \bar{e}_{h..})] \div (n_h - 1) \end{aligned} \quad [21]$$

$\hat{h}_{hi.}$ = estimated harvest for the i th sample within the h th stratum, and is obtained by substituting the appropriate harvest statistic into equations 3-5, above;

$\hat{e}_{hi.}$ = see equations 3-5, above;

$cov_W(h,e)$ = the within sample covariance component of the covariance between harvest and angler effort;

$$= \frac{2 \sum_{i=1}^{o_i} \left[\sum_{j=1}^{n_h} [(h_{hij} - \bar{h}_{hi.})(e_{hij} - \bar{e}_{hi.})] \right]}{[o_i - 1]} \div n_h \quad [22]$$

Harvest per unit effort estimates across all strata (e.g., for one seasonal period disregarding access type, day type, etc.) were obtained as follows:

\hat{P}_c = combined HPUE estimate over selected strata;

$$= \left(\sum_{h=1}^q \hat{H}_h \right) \div \left(\sum_{h=1}^q \hat{E}_h \right) \quad [23]$$

q = the number of stratum to be combined;

$\hat{V}_c(\hat{P}_c)$ = the variance of the across-strata estimate of HPUE;

$$= \left(\hat{H}_c \div \hat{E}_c \right)^2 \left([\hat{V}_{Hc} \div \hat{H}_c^2] + [\hat{V}_{Ec} \div \hat{E}_c^2] - [2cov_c(H,E) \div (\hat{H}_c \hat{E}_c)] \right) \quad [24]$$

$$\hat{H}_c = \sum_{h=1}^q \hat{H}_h \quad [25]$$

$$\hat{E}_c = \sum_{h=1}^q \hat{E}_h \quad [26]$$

$$\hat{V}_{Hc} = \sum_{h=1}^q \hat{V}_h(\hat{H}_h) \quad [27]$$

$$\hat{V}_{Ec} = \sum_{h=1}^q \hat{V}_h(\hat{E}_h) \quad [28]$$

Variance equations 27 and 28, used above, indicate an assumed independence of the various harvest and effort estimates among strata. This assumption is not entirely valid in that positively correlated levels of effort and harvest would be expected at the various access strata (e.g., heavy use and low use) during similar time periods. However, this assumption is

conservative in nature such that the variance estimates obtained would be positively biased.

For the count type creel survey (Juneau derby) a stratified random estimator was used to estimate effort in boat-hours. The average boat count for each day of the derby was multiplied by the total number of available fishing hours within each day. The effort estimates and the associated variance estimates were obtained according to the following equations (essentially following the approach of Von Geldern and Tomlinson 1973):

$$\begin{aligned} \hat{E}_h &= \text{estimated boat-hours expended on the } h\text{th day of the} \\ &\quad \text{derby fishery;} \\ &= U_h \bar{x}_h \end{aligned} \quad [29]$$

h = subscript denoting day of the derby;

U_h = total number of hours (available for fishing) on the h th day;

\bar{x}_h = mean number of boats fishing for the h th day;

$$= \frac{d_h}{\sum_{i=1}^{d_h} (x_{hi})} \div d_h \quad [30]$$

i = subscript denoting sample within the h th day;

d_h = number of samples (i.e., counts) completed on the h th day;

x_{hi} = number of recreational boats fishing counted in the i th sample in the h th day;

$\hat{V}_h(\hat{E}_h)$ = the variance estimate for the estimate of E_h ;

$$= [(D_h - d_h) \div D_h] [U_h^2 (s_h^2 \div d_h)] \quad [31]$$

D_h = number of possible counts which can be conducted on the h th day (approximately equal to U_h , as each flight takes approximately one hour to complete);

$$s_h^2 = \frac{d_h}{\sum_{i=1}^{d_h} (x_{hi} - \bar{x}_h)^2} \div (d_h - 1) \quad [32]$$

Boat-party catch and harvest rates were estimated from interview data using a stratified random estimator, according to the following equations:

$$\begin{aligned} \hat{T}_h &= \text{estimated total catch or harvest per unit effort for} \\ &\quad \text{the hth day of the derby fishery;} \\ &= \left[\sum_{i=1}^{n_h} \left(\sum_{j=1}^{o_i} c_{hij} \right) \right] \div \left[\sum_{i=1}^{n_h} \left(\sum_{j=1}^{o_i} e_{hij} \right) \right] \end{aligned} \quad [33]$$

h = subscript denoting day of the derby;

i = subscript denoting an individual interview sample within the hth day;

j = subscript denoting the boat-party interviewed in the ith sample;

n_h = number of samples collected within the hth day;

o_i = number of boat-parties interviewed within the ith sample;

c_{hij} = catch or harvest of the jth boat-party interviewed on the ith sample in the hth day;

e_{hij} = effort of the jth boat-party interviewed;

$$\begin{aligned} \hat{V}_h(\hat{T}_h) &= \text{estimated variance of the catch per unit effort (CPUE)} \\ &\quad \text{or HPUE estimate in the hth day of the derby fishery;} \\ &\approx \left\{ \bar{c}_{h..} \div \bar{e}_{h..} \right\}^2 \left\{ [s_c^2 \div (\bar{c}_{h..})^2] + [s_e^2 \div (\bar{e}_{h..})^2] \right. \\ &\quad \left. - [(2 \text{ cov}(c,e)) \div (\bar{c}_{h..} \bar{e}_{h..})] \right\} \end{aligned} \quad [34]$$

$\bar{c}_{h..}$ = overall mean of means catch or harvest per boat on the hth day;

$$= \sum_{i=1}^{n_h} (\bar{c}_{hi.}) \div n_h \quad [35]$$

$\bar{c}_{hi.}$ = mean catch per boat within the ith sample on the hth day;

$$= \sum_{j=1}^{o_i} (\bar{c}_{hij}) \div o_i \quad [36]$$

$\bar{e}_{h..}$ = overall mean of means effort per boat on the hth day of the derby, calculated by replacing the appropriate effort statistics into equation 35, above;

$\bar{e}_{hi.}$ = mean effort per boat within the ith sample within the hth day, calculated by replacing the appropriate effort statistics into equation 36, above;

s_c^2 = variance estimate associated with estimating the catch component of the CPUE or HPUE estimate;

$$= [(R_h - r_{h.}) \div R_h][s_{B_c}^2 \div n_h] + [1 \div R_h][s_{W_c}^2 \div o_h] \quad [37]$$

R_h = total number of hours on the hth day, defined by the number of hours available for boat-parties to return to all of the associated access locations on the hth day;

$r_{h.}$ = see equation 6, above;

$s_{B_c}^2$ = the between samples variance component of the variance estimate for catch;

$$= \sum_{i=1}^{n_h} (\bar{c}_{hi.} - \bar{c}_{h..})^2 \div (n_h - 1) \quad [38]$$

$s_{W_c}^2$ = the within sample variance component of the variance estimate for catch;

$$= \left\{ \sum_{i=1}^{n_h} \left(\frac{\sum_{j=1}^{o_i} (c_{hij} - \bar{c}_{hi.})^2}{[o_i - 1]} \right) \right\} \div n_h \quad [39]$$

o_h = see equation 14, above;

s_e^2 = variance estimate associated with estimating the effort component of the CPUE or HPUE estimate which is calculated by substituting the corresponding effort statistics into equations 37 through 40, above;

$cov(c,e)$ = covariance estimate between the catch and effort components of the CPUE or HPUE estimate;

$$= [(R_h - r_{h.}) \div R_h][cov_B(c,e) \div n_h] + [1 \div R_h][cov_W(c,e) \div o_h] \quad [40]$$

$$\begin{aligned} \text{cov}_B(c,e) &= \text{the between samples covariance component of the} \\ &\quad \text{covariance estimate between catch and effort;} \\ &= \sum_{i=1}^{n_h} [(\bar{c}_{hi.} - \bar{c}_{h..})(\bar{e}_{hi.} - \bar{e}_{h..})] \div (n_h - 1) \end{aligned} \quad [41]$$

$$\begin{aligned} \text{cov}_W(c,e) &= \text{the within samples covariance component of the} \\ &\quad \text{covariance estimate between catch and effort;} \\ &= \left(\sum_{i=1}^{n_h} \left\{ \frac{\sum_{j=1}^{o_i} [(c_{hij} - \bar{c}_{hi.})(e_{hij} - \bar{e}_{hi.})]}{[o_i - 1]} \right\} \right) \div n_h \end{aligned} \quad [42]$$

As indicated in equation 37, a modified two-stage estimator was used. However, the sampling design is more accurately a stratified random design. In the modified two-stage design we have defined period sampled as the primary level of sampling and boat-parties interviewed as the secondary level. Since the boat-parties interviewed represent a random component in the model rather than a fixed component, the secondary term in the corresponding variance equation does not include a finite population correction factor (fpc).

The next step involved estimating the harvest for each day of the derby:

$$\begin{aligned} \hat{H}_h &= \text{estimated catch or harvest of the hth day;} \\ &= \hat{E}_h \hat{T}_h \end{aligned} \quad [43]$$

$$\begin{aligned} \hat{V}_h(\hat{H}_h) &= \text{estimated variance of the estimate of } H_h, \text{ assuming} \\ &\quad \text{independence of the estimates of effort and CPUE or} \\ &\quad \text{HPUE, obtained by using the formula proposed by Goodman} \\ &\quad \text{(1960) for the estimation of the variance of a product} \\ &\quad \text{of two random independent variables;} \\ &= \hat{E}_h^2 \hat{V}_h(\hat{T}_h) + \hat{T}_h^2 \hat{V}_h(\hat{E}_h) - \hat{V}_h(\hat{E}_h) \hat{V}_h(\hat{T}_h) \end{aligned} \quad [44]$$

Overall HPUE for the derby was estimated similarly to combined HPUE for the non-derby surveys (equations 23-28, above).

For both types of surveys (count and direct expansion) the final step in estimating the effort or harvest for the entire season or for unique

combinations of individual sampling strata involved combining the stratum estimates:

$$\begin{aligned} \hat{H} &= \text{overall estimated catch, harvest, or effort;} \\ &= \sum_{h=1}^q (H_h) \end{aligned} \quad [45]$$

q = number of strata to be combined;

$$\begin{aligned} \hat{V}(\hat{H}) &= \text{estimated variance of } \hat{H}, \text{ assuming independence of the} \\ &\quad \text{stratum estimates;} \\ &= \sum_{h=1}^q (\hat{V}_h(\hat{H}_h)) \end{aligned} \quad [46]$$

Approximate 95% confidence intervals (CI) were obtained for harvest and effort estimates from both direct expansion and count type surveys by assuming normality. Accordingly, CI limits are obtained as follows:

$$\hat{H} \pm 2 (\hat{V}(\hat{H}))^{1/2} \quad [47]$$

The lower limit of the CI equal to either the value obtained by equation 47, or equal to the actual number of fish observed in the sampled harvest, whichever is greater. Since the harvest and effort estimates are not expected to be exactly normal these CI limits are only approximate. In particular we expect the upper limits to be non-conservative (i.e., the upper tail coverage will be less than the stated alpha level, or 0.025). This is because of the assumed upper tail skew to these type of statistics.

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APPENDIX B - APPENDIX TABLES

Appendix Table 1. Location and description of access points into the Ketchikan marine boat sport fishery that were sampled in 1987.

Access Point	Description
1. Bar Harbor	Located just north of downtown Ketchikan. This is the largest harbor in Ketchikan with large numbers of both sport and commercial boats. There is also a boat launch located at the site.
2. Clover Pass	Located at the Clover Pass resort about 12 miles (19.3 km) north of Ketchikan. The boats tied up at this harbor are almost all sport boats.
3. Knudson Cove	Located about 13 miles (20.9 km) north of Ketchikan. The sampled access point includes both a boat launch and a dock complex. Most of the boats tied up here are sport boats.
4. Thomas Basin	Located in downtown Ketchikan. Although a good sized harbor, the majority of the boats tied up here are commercial.
5. Hole in the Wall	Located eight miles (12.9 km) south of town. This small harbor has only a few boats.
6. Mountain Point	Located 6 miles (9.7 km) south of town. This access point is a semi-improved boat launch, with plans and funding for further improvements by 1990.

Appendix Table 2. Estimated effort and catches for the Ketchikan marine boat recreational fishery during the 20 April - 27 September 1987 period.

	APPROXIMATE 95% C.I. LOWER LIMIT	ESTIMATE	APPROXIMATE 95% C.I. UPPER LIMIT
TOTAL ROD-HOURS FISHED	223,433	242,274	261,115
SALMON HOURS	142,980	157,306	171,704
BOTTOMFISH HOURS	77,508	84,954	92,401
BOAT-HOURS FISHED	88,836	95,818	102,800
PACIFIC HALIBUT KEPT	9,244	10,493	11,741
PACIFIC HALIBUT RELEASED	2,715	3,390	4,066
LARGE CHINOOK SALMON KEPT AND ENTERED	3,605	4,415	5,225
DERBY KEPT	194	518	842
DERBY ENTERED	---	298	---
DERBY KEPT AND ENTERED	492	816	1,140
LARGE CHINOOK SALMON RELEASED	29	118	208
SMALL CHINOOK SALMON KEPT	178	308	438
DERBY KEPT	5	28	59
DERBY ENTERED	---	11	---
DERBY KEPT AND ENTERED	16	39	70
SMALL CHINOOK SALMON RELEASED	14,792	16,775	18,758
COHO SALMON KEPT	8,832	10,464	12,095
COHO SALMON RELEASED	1,206	1,991	2,777
PINK SALMON KEPT	6,149	7,646	9,143
PINK SALMON RELEASED	804	1,265	1,726
CHUM SALMON KEPT	158	235	311
CHUM SALMON RELEASED	1	3	7
SOCKEYE SALMON KEPT	22	114	239
SOCKEYE SALMON RELEASED	0	0	0
QUILLBACK ROCKFISH KEPT	3,742	5,454	7,165
DUSKY ROCKFISH KEPT	19	115	222
COPPER ROCKFISH KEPT	74	140	206
BLACK ROCKFISH KEPT	99	373	646
YELLOWTAIL ROCKFISH KEPT	19	65	129
YELLOWEYE ROCKFISH KEPT	2,474	2,949	3,424
OTHER ROCKFISH SPECIES KEPT	554	843	1,133
UNIDENTIFIED ROCKFISH KEPT	7,086	8,653	10,220
TOTAL ROCKFISH KEPT	16,185	18,591	20,997
TOTAL ROCKFISH SPECIES RELEASED	24,015	27,539	31,063

Appendix Table 3. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Ketchikan area marine boat harvest survey.

	SEASONAL PERIOD STRATUM									
	20 APR-22 MAY	DERBY	23 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP	14 SEP-27 SEP
NUMBER OF SAMPLES	90	42	72	54	47	53	60	59	60	39
NUMBER OF BOATS COUNTED	144	675	423	514	326	400	394	523	482	65
NUMBER OF BOATS INTERVIEWED	139	637	411	499	317	389	386	514	478	65
HOURS SAMPLED	277	160	272	203	178	179	182	177	181	108
HOURS AVAILABLE TO SAMPLE	3,062	731	2,446	1,502	1,479	1,445	1,403	1,331	1,255	1,138
ROD-HOURS FISHED										
ESTIMATE	9,586	37,387	28,002	25,499	20,752	30,387	27,069	32,650	25,363	5,578
VARIANCE	5,587,957	20,503,845	7,472,451	5,442,154	5,877,236	16,247,516	7,346,407	9,417,146	7,683,246	3,168,550
SALMON HOURS FISHED										
ESTIMATE	5,129	30,980	18,406	13,791	11,980	15,848	16,612	20,255	19,803	4,502
VARIANCE	2,453,402	14,996,688	3,953,990	1,918,515	2,308,680	9,794,307	3,030,613	5,863,795	5,630,432	1,874,350
BOTTOMFISH HOURS FISHED										
ESTIMATE	4,444	6,407	9,596	11,709	8,773	14,539	10,457	12,395	5,560	1,076
VARIANCE	940,358	943,869	1,517,918	1,709,403	1,350,790	3,055,141	1,553,364	1,913,653	616,673	262,063
BOAT-HOURS FISHED										
ESTIMATE	4,661	14,575	11,148	10,169	8,752	11,225	9,623	13,098	10,094	2,474
VARIANCE	1,154,874	2,542,914	1,117,967	800,204	1,108,509	1,337,042	700,028	1,710,887	1,189,857	524,599
PACIFIC HALIBUT KEPT										
ESTIMATE	398	886	1,264	1,269	1,190	1,725	1,375	1,833	516	36
VARIANCE	11,380	19,776	60,152	28,834	50,841	63,764	44,935	102,917	6,772	443
NON-TARGETED HPUE										
ESTIMATE	0.0415	0.0237	0.0451	0.0498	0.0573	0.0568	0.0508	0.0562	0.0203	0.0065
VARIANCE	0.000229	0.000022	0.000096	0.000065	0.000163	0.000126	0.000087	0.000124	0.000015	0.000019
TARGETED HPUE										
ESTIMATE	0.0896	0.1382	0.1317	0.1084	0.1357	0.1187	0.1315	0.1479	0.0928	0.0337
VARIANCE	0.000958	0.000920	0.000939	0.000357	0.000983	0.000505	0.000656	0.000942	0.000390	0.000639
PACIFIC HALIBUT RELEASED										
ESTIMATE	35	409	408	732	323	601	477	306	98	0
VARIANCE	270	15,039	13,940	19,689	11,890	19,160	19,297	13,319	1,478	0

-Continued-

Appendix Table 3. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Ketchikan area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM									
	20 APR-22 MAY	DERBY	23 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP	14 SEP-27 SEP
LARGE CHINOOK										
SALMON KEPT										
ESTIMATE	136	816	621	628	441	563	532	471	195	12
VARIANCE	2,931	26,222	7,434	15,501	9,521	35,255	34,328	21,919	10,916	47
NON-TARGETED HPUE										
ESTIMATE	0.0142	0.0218	0.0222	0.0246	0.0212	0.0185	0.0197	0.0144	0.0077	0.0021
VARIANCE	0.000044	0.000026	0.000014	0.000029	0.000028	0.000044	0.000051	0.000022	0.000018	0.000002
TARGETED HPUE										
ESTIMATE	0.0266	0.0263	0.0337	0.0456	0.0368	0.0355	0.0321	0.0233	0.0099	0.0026
VARIANCE	0.000177	0.000038	0.000035	0.000102	0.000088	0.000190	0.000136	0.000061	0.000029	0.000003
LARGE CHINOOK										
SALMON RELEASED										
ESTIMATE	0	12	25	50	0	27	0	3	0	0
VARIANCE	0	59	126	1,125	0	692	0	7	0	0
SMALL CHINOOK										
SALMON KEPT										
ESTIMATE	0	39	11	18	19	12	67	113	25	4
VARIANCE	0	240	52	100	166	53	841	2,646	163	16
NON-TARGETED HPUE										
ESTIMATE	0.0000	0.0011	0.0004	0.0007	0.0009	0.0004	0.0025	0.0035	0.0010	0.0008
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000003	0.000000	0.000001
TARGETED HPUE										
ESTIMATE	0.0000	0.0013	0.0006	0.0013	0.0016	0.0007	0.0040	0.0056	0.0012	0.0010
VARIANCE	0.000000	0.000000	0.000000	0.000001	0.000001	0.000000	0.000003	0.000007	0.000000	0.000001
SMALL CHINOOK										
SALMON RELEASED										
ESTIMATE	135	2,111	1,557	1,525	1,482	1,933	2,194	3,001	2,118	719
VARIANCE	5,638	189,313	68,931	51,938	56,272	146,513	113,896	184,021	128,437	38,535

-Continued-

Appendix Table 3. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Ketchikan area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM									
	20 APR-22 MAY	DERBY	23 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP	14 SEP-27 SEP
COHO SALMON KEPT										
ESTIMATE	0	18	59	78	818	1,254	1,674	2,409	3,472	681
VARIANCE	0	200	291	559	37,794	88,631	83,840	135,893	279,487	38,985
NON-TARGETED HPUE										
ESTIMATE	0.0000	0.0005	0.0021	0.0031	0.0394	0.0413	0.0618	0.0738	0.1369	0.1221
VARIANCE	0.000000	0.000000	0.000000	0.000001	0.000109	0.000126	0.000153	0.000176	0.000658	0.002772
TARGETED HPUE										
ESTIMATE	0.0000	0.0006	0.0032	0.0057	0.0683	0.0791	0.1008	0.1190	0.1753	0.1513
VARIANCE	0.000000	0.000000	0.000001	0.000003	0.000338	0.000597	0.000415	0.000533	0.001154	0.004040
COHO SALMON RELEASED										
ESTIMATE	0	2	3	0	0	22	172	279	1,284	230
VARIANCE	0	3	8	0	0	105	7,345	9,077	125,225	12,566
PINK SALMON KEPT										
ESTIMATE	0	0	0	84	1,279	1,740	2,281	1,746	507	10
VARIANCE	0	0	0	1,104	177,005	124,766	147,757	96,099	13,429	92
NON-TARGETED HPUE										
ESTIMATE	0.0000	0.0000	0.0000	0.0033	0.0616	0.0573	0.0843	0.0535	0.0200	0.0018
VARIANCE	0.000000	0.000000	0.000000	0.000002	0.000463	0.000193	0.000273	0.000115	0.000026	0.000003
TARGETED HPUE										
ESTIMATE	0.0000	0.0000	0.0000	0.0061	0.1068	0.1098	0.1373	0.0862	0.0256	0.0022
VARIANCE	0.000000	0.000000	0.000000	0.000006	0.001416	0.000967	0.000742	0.000340	0.000044	0.000005
PINK SALMON RELEASED										
ESTIMATE	0	0	0	15	258	426	298	193	76	0
VARIANCE	0	0	0	116	8,725	25,214	14,781	3,466	932	0
CHUM SALMON KEPT										
ESTIMATE	0	10	3	8	3	9	75	43	57	27
VARIANCE	0	20	6	21	6	33	343	240	316	484
NON-TARGETED HPUE										
ESTIMATE	0.0000	0.0003	0.0001	0.0003	0.0001	0.0003	0.0028	0.0013	0.0023	0.0048
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000000	0.000001	0.000018
TARGETED HPUE										
ESTIMATE	0.0000	0.0003	0.0002	0.0006	0.0003	0.0005	0.0045	0.0021	0.0029	0.0060
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000001	0.000001	0.000001	0.000027
CHUM SALMON RELEASED										
ESTIMATE	0	0	0	0	3	0	0	0	0	0
VARIANCE	0	0	0	0	5	0	0	0	0	0

-Continued-

Appendix Table 3. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Ketchikan area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM									
	20 APR-22 MAY	DERBY	23 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP	14 SEP-27 SEP
SOCKEYE SALMON KEPT										
ESTIMATE	0	3	0	0	6	89	16	0	0	0
VARIANCE	0	4	0	0	21	3,852	51	0	0	0
NON-TARGETED HPUE										
ESTIMATE	0.0000	0.0001	0.0000	0.0000	0.0003	0.0029	0.0006	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000004	0.000000	0.000000	0.000000	0.000000
TARGETED HPUE										
ESTIMATE	0.0000	0.0001	0.0000	0.0000	0.0005	0.0056	0.0010	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000017	0.000000	0.000000	0.000000	0.000000
SOCKEYE SALMON RELEASED										
ESTIMATE	0	0	0	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0	0	0	0
QUILLBACK ROCKFISH KEPT										
ESTIMATE	23	125	563	845	730	981	569	1,374	156	88
VARIANCE	195	1,114	26,099	48,263	31,754	32,073	45,342	541,718	2,694	3,395
DUSKY ROCKFISH KEPT										
ESTIMATE	0	12	88	15	0	0	0	0	0	0
VARIANCE	0	108	2,696	59	0	0	0	0	0	0
COPPER ROCKFISH KEPT										
ESTIMATE	0	0	19	15	16	35	27	19	0	9
VARIANCE	0	0	93	128	244	236	199	129	0	64
BLACK ROCKFISH KEPT										
ESTIMATE	0	0	46	54	35	28	151	30	28	0
VARIANCE	0	0	958	1,523	443	115	15,232	204	242	0
YELLOWTAIL ROCKFISH KEPT										
ESTIMATE	0	0	41	0	0	0	24	0	0	0
VARIANCE	0	0	551	0	0	0	466	0	0	0
YELLOWEYE ROCKFISH KEPT										
ESTIMATE	73	211	346	378	368	440	417	532	151	34
VARIANCE	1,663	5,666	7,709	5,764	8,685	7,856	9,277	6,376	2,906	556

-Continued-

Appendix Table 3. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Ketchikan area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM									
	20 APR-22 MAY	DERBY	23 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP	14 SEP-27 SEP
OTHER ROCKFISH SPECIES KEPT										
ESTIMATE	55	2	94	52	88	116	190	135	81	28
VARIANCE	727	3	1,518	505	3,998	1,864	8,662	2,345	982	357
UNIDENTIFIED ROCKFISH KEPT										
ESTIMATE	606	1,332	1,208	1,092	747	1,533	968	555	580	32
VARIANCE	42,269	195,911	54,296	55,825	41,921	145,367	37,096	15,381	25,312	275
ALL ROCKFISH KEPT										
ESTIMATE	757	1,682	2,404	2,450	1,984	3,135	2,347	2,645	997	190
VARIANCE	44,853	202,802	93,920	112,068	87,044	187,510	116,274	566,153	32,137	4,647
NON-TARGETED HPUE										
ESTIMATE	0.0790	0.0450	0.0859	0.0961	0.0956	0.1032	0.0867	0.0810	0.0393	0.0340
VARIANCE	0.000868	0.000175	0.000190	0.000250	0.000327	0.000390	0.000234	0.000589	0.000068	0.000267
ALL ROCKFISH RELEASED										
ESTIMATE	1,489	4,138	3,953	4,464	3,251	3,461	2,464	3,249	1,057	100
VARIANCE	231,433	361,202	352,408	321,612	754,467	329,692	136,703	584,493	29,592	4,502

Appendix Table 4. Numbers of chinook salmon examined for coded-wire tags in southeast Alaska marine sport fisheries in 1987.

Fishery	Stratum	Large Chinook Salmon			Small Chinook Salmon		
		Estimated Harvest	Number Sampled	Percent	Estimated Harvest	Number Sampled	Percent
Ketchikan	Non-Derby (20 Apr-21 Jun)	757	121	16	11	2	18
	Non-Derby (22 Jun-13 Sep)	2,842	330	12	258	39	15
	Derby Entered ¹	298	298	100	11	11	100
	Derby Take Home ¹	518	76	15	28	5	18
	Total	4,415	825	19	308	57	19
Petersburg	Non-Derby (20 Apr-21 Jun)	857	157	18	0	0	---
	Non-Derby (22 Jun-13 Sep)	327	49	15	3	1	33
	Derby (22-25 May)	214	197	92	0	0	---
	Total	1,398	403	29	3	1	33
Wrangell	20 Apr-21 Jun	1,023	119	12	0	0	---
	22 Jun-13 Sep	190	20	11	5	1	20
	Total	1,213	139	11	5	1	20
Sitka	Non-Derby (20 Apr-21 Jun)	111	10	9	27	1	4
	Non-Derby (22 Jun-13 Sep)	1,900	95	5	85	7	8
	Derby Entered (23-25, 30-31 May)	281	281	100	0	0	---
	Derby Take Home (23-25, 30-31 May)	62	5	8	0	0	---
	Total	2,354	391	17	112	8	7
Juneau	Non-Derby (20 Apr-21 Jun)	1,128	126	11	0	0	---
	Non-Derby (22 Jun-16 Aug)	5,687	609	11	157	17	11
	Non-Derby (17 Aug-27 Sep)	886	78	9	30	0	0
	Derby Entered (14-16 Aug)	630	630	100	7	7	100
	Derby Take Home (14-16 Aug)	325	42	13	43	5	12
	Total	8,656	1,485	17	237	29	12
Haines	Non-Derby (20 Apr-12 Jun)	925	66	7	0	0	---
	Derby Entered (23-25, 30-31 May)	67	67	100	0	0	---
	Derby Take Home (23-25, 30-31 May)	102	22	22	4	0	0
	Total	1,094	155	14	4	0	0
TOTAL		19,130	3,398	18	669	96	14

¹ 23-25 May, 30-31 May, 6-7 June

Appendix Table 5. Estimated contribution of hatchery and wild tagged chinook salmon to the Ketchikan marine boat sport fishery from 20 April to 27 September 1987.

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Non-Derby 4/20-6/21		Derby		Non-Derby 6/22-9/13		Total 4/20-9/13	
				Recov	Contr	Recov	Contr	Recov	Contr	Recov	Contr
Oregon	ODFW	Bonneville	073008					1	65	1	65
			073125					1	9	1	9
	ODFW	Elk River	073751					1	7	1	7
	ODFW	Irrigon	073327					1	7	1	7
	ODFW	Marion Forks	073663			1	1			1	1
	ODFW	Trask	072956			1	1			1	1
Oregon Total						2	2	4	88	6	90
Washington	WDF	Cowlitz	633449					1	7	1	7
			633326					2	13	2	13
	WDF	Nooksack	632846					1	10	1	10
	WDF	Priest Rapids	633222					1	7	1	7
	WDF	Rocky Reach	632844			1	1			1	1
	WDF	Soleduck	632258 633318	1	6			1	7	1	6 7
Washington Total				1	6	1	1	6	44	8	51
British Columbia	CDFO	Kitimat River	022436			1	1			1	1
			022743			1	1			1	1
			022744			1	2			1	2
			022745	1	7	1	7	2	18	4	32
			023253			1	1			1	1
			023256			1	6			1	6
	CDFO	Puntledge River	022555	1	28					1	28
	CDFO	Quinsam River	022631	1	85					1	85
			023325					1	7	1	7
			023328					1	7	1	7
			024018					1	7	1	7
	CDFO	Robertson Creek	023739					1	7	1	7
	CDFO	Snootli Creek	022756					1	27	1	27
	CDFO	Tenderfoot Cr.	022720						1	13	1
023221							1	17	1	17	

-Continued-

Appendix Table 5. Estimated contribution of hatchery and wild tagged chinook salmon to the Ketchikan marine boat sport fishery from 20 April to 27 September 1987 (Continued).

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Non-Derby 4/20-6/21		Derby		Non-Derby 6/22-9/13		Total 4/20-9/13	
				Recov	Contr	Recov	Contr	Recov	Contr	Recov	Contr
	CDFR	Quinsam River	082053					1	9	1	9
			082105					1	9	1	9
			082136					1	9	1	9
			082261			1	1			1	1

British Columbia Total				3	120	7	19	12	130	22	269

Southeast Alaska	ADF&G	Crystal Lake	042229					2	41	2	41
			042353			1	3			1	3
			042354					1	40	1	40
			042355			1	7			1	7
	ADF&G	Deer Mountain	042222			1	7			1	7
			042223			1	5			1	5
			042357			1	37			1	37
			042534	1	6			3	20	4	26
			042535			1	6	1	7	2	13
			042538			1	1			1	1
			042713					1	7	1	7
	SSRAA	Neets Bay	040321			1	1	1	36	2	37
			040344			1	1			1	1
	SSRAA	Whitman Lake	040325					1	7	1	7
			040329					3	20	3	20
			040330			1	1	1	7	2	8
			040333					4	26	4	26
			040346			1	6	2	13	3	19
			040347			2	2	2	13	4	15
			040349	1	6					1	6
			040350					1	7	1	7
			042255	4	88	9	52	3	68	16	208
			042430	1	22	8	48	2	60	11	130
			042431	1	22	4	14			5	36
			042463	1	6	3	3	11	86	15	95
			042503	1	21	2	7	2	57	5	85
			B40907	1	6	2	2			3	8
			B40908			2	2			2	2
	MIC	Tamgas Creek	471625			2	71			2	71
			471628	2	13	3	3	1	9	6	25
			471631			1	6			1	6

Southeast Alaska Total				13	190	49	285	42	524	104	999

HATCHERY ALL AREAS GRAND TOTAL				17	316	59	307	64	786	141	1409

		(Wild) Unuk River	042058			1	NA			1	NA

¹ ODFW = Oregon Department of Fish and Wildlife
 CDFO = Canadian Department of Fisheries and Oceans
 ADF&G = Alaska Department of Fish and Game
 WDF = Washington Department of Fisheries
 CDFR = Canadian Department of Fisheries Research
 SSRAA = Southern Southeast Regional Aquaculture Association
 MIC = Metlakatla Indian Community

Appendix Table 6. Age composition of chinook salmon from select southeast Alaska sport fisheries, 1987.

Fishery (Sampling Dates)		Brood Year and Age Class										Total	
		1985		1984		1983		1982		1981			1980
		0.1	0.2	1.1	0.3	1.2	0.4	1.3	0.5	1.4	1.5		
Ketchikan Creel 20 April- 27 September	Males n		6	4	13	17	1	28		9		78	
	%		7.7	5.1	16.7	21.8	1.3	35.9		11.5		100	
	S.E.		1.3	1.0	1.8	1.9	0.5	2.3		1.5			
	Fe- n		5	1	19	19	3	38		1	24	110	
	males %		4.5	0.9	17.3	17.3	2.7	34.5		0.9	21.8	100	
	S.E.		1.0	0.4	1.8	1.8	0.8	2.2		0.4	1.9		
Total	n	2	26	26	71	108	13	146	2	59	1	454	
	%	0.4	5.7	5.7	15.6	23.8	2.9	32.2	0.4	13.0	0.2	100	
	S.E.	0.3	1.1	1.1	1.7	2.0	0.8	2.2	0.3	1.6	0.2		
Yes Bay 15 May- 30 June	Total n		2		31	74	4	134		34	2	281	
	%		0.7		11.0	26.3	1.4	47.7		12.1	0.7	100	
	S.E.		0.5		1.9	2.6	0.7	3.0		1.9	0.5		
Petersburg Creel 20 April- 13 September	Males n		1	1	3	2	3	36	2	23	1	72	
	%		1.4	1.4	4.2	2.8	4.2	50.0	2.8	31.9	1.4	100	
	S.E.		0.7	0.7	1.3	1.0	1.3	3.1	1.0	2.9	0.7		
	Fe- n				3		13	25	4	39	2	86	
	males %				3.5		15.1	29.1	4.7	45.3	2.3	100	
	S.E.				1.1		2.2	2.8	1.3	3.1	0.9		
Total	n		2	1	13	10	22	90	11	97	9	255	
	%		0.8	0.4	5.1	3.9	8.6	35.3	4.3	38.0	3.5	100	
	S.E.		0.6	0.4	1.4	1.2	1.8	3.0	1.3	3.0	1.2		
Wrangell Creel 20 April- 13 September	Males n				2	1	3	15		15		36	
	%				5.6	2.8	8.3	41.7		41.7		100	
	S.E.				2.2	1.6	2.7	4.8		4.8			
	Fe- n				1	1		10	1	13		26	
	males %				3.8	3.8		38.5	3.8	50.0		100	
	S.E.				1.9	1.9		4.7	1.9	4.9			
Total	n				5	4	4	41	1	51	1	107	
	%				4.7	3.7	3.7	38.3	0.9	47.7	0.9	100	
	S.E.				2.0	1.8	1.8	4.7	0.9	4.9	0.9		

-Continued-

Appendix Table 6. Age composition of chinook salmon from select Southeast Alaska sport fisheries, 1987 (Continued).

Fishery (Sampling Dates)		Brood Year and Age Class											
		1985		1984		1983		1982		1981		1980	Total
		0.1	0.2	1.1	0.3	1.2	0.4	1.3	0.5	1.4	1.5		
Sitka Creel 20 April- 13 September	Males n									1		1	
	%									100.0		100	
	S.E.									0.0			
	Fe- n				1		2			1		4	
	males %				25.0		50.0			25.0		100	
	S.E.				2.5		2.9			2.5			
Total	n		24	3	86	38	51	34	3	50		289	
	%		8.3	1.0	29.8	13.1	17.6	11.8	1.0	17.3		100	
	S.E.		1.6	0.6	2.7	2.0	2.2	1.9	0.6	2.2			
Juneau Creel 16 March- 27 September	Males n			1	2	6	1	54		4	1	69	
	%			1.4	2.9	8.7	1.4	78.3		5.8	1.4	100	
	S.E.			0.6	0.9	1.4	0.6	2.1		1.2	0.6		
	Fe- n		1		2	12	2	68		19	2	106	
	males %		0.9		1.9	11.3	1.9	64.2		17.9	1.9	100	
	S.E.		0.5		0.7	1.6	0.7	2.4		2.0	0.7		
Total	n		4	1	19	54	5	261		36	6	386	
	%		1.0	0.3	4.9	14.0	1.3	67.6		9.3	1.6	100	
	S.E.		0.5	0.3	1.1	1.8	0.6	2.4		1.5	0.6		
Juneau Derby 14-16 August	Males n		1		2	6		23				32	
	%		3.1		6.3	18.8		71.9				100	
	S.E.		1.2		1.6	2.6		3.0					
	Fe- n		1		6	15		45				67	
	males %		1.5		9.0	22.4		67.2				100	
	S.E.		0.8		1.9	2.8		3.1					
Total	n		3		20	47	1	155		2		228	
	%		1.3		8.8	20.6	0.4	68.0		0.9		100	
	S.E.		0.8		1.9	2.7	0.4	3.1		0.6			
Haines Creel 20 April-12 July	Males n							16		12	4	32	
	%							50.0		37.5	12.5	100	
	S.E.							2.5		2.5	1.7		
	Fe- n							16		11	2	29	
	males %							55.2		37.9	6.9	100	
	S.E.							4.6		4.5	2.3		
Total	n				1			66		43	9	119	
	%				0.8			55.5		36.1	7.6	100	
	S.E.				0.8			4.6		4.4	2.4		

Appendix Table 7. Length at age, by sex, for chinook salmon from select Southeast Alaska sport fisheries, 1987.¹

Fishery (Sampling Dates)	Brood Year and Age Class											
	1985		1984		1983		1982		1981		1980	Total
	0.1		0.2	1.1	0.3	1.2	0.4	1.3	0.5	1.4	1.5	
Ketchikan Creel 20 April- 27 September	Males	Mean		672	475	818	734	1045	902		994	
		S.E.		20	23	29	13		18		45	
		n		6	4	13	17	1	28		9	78
	Females	Mean		648	420	816	751	1038	898	995	992	
		S.E.		42		20	19	38	11		18	
		n		5	1	19	19	3	38	1	24	110
	Total ²	Mean	387	670	475	817	727	962	885	982	984	1022
		S.E.	2	12	10	11	6	25	7	13	12	
		n	2	26	26	71	108	13	146	2	59	1
	Yes Bay 15 May- 30 June	Total	Mean		745		837	759	1007	883		1012
S.E.				15		16	6	30	7		10	9
n				2		31	74	4	134		34	2
Petersburg Creel 20 April- 13 September	Males	Mean		730	390	800	695	908	877	950	972	1140
		S.E.				35	45	26	17	60	20	
		n		1	1	3	2	3	36	2	23	1
	Females	Mean				822		935	840	977	949	1037
		S.E.				47		26	16	18	14	13
		n				3		13	25	4	39	2
	Total ²	Mean		720	390	811	777	93	854	977	960	1035
		S.E.		10		14	26	18	9	19	8	20
		n		2	1	13	10	22	90	11	97	9
	Wrangell Creel 20 April- 13 September	Males	Mean				967	772	1128	891		1052
S.E.						17		31	24		17	
n						2	1	3	15		15	
Females		Mean				945	720		882	1091	1013	
		S.E.							16		9	
		n				1	1		10	1	13	
Total ²		Mean				930	777	1082	875	1091	1030	776
		S.E.				31	26	52	12		8	
		n				4	4	4	40	1	51	1

-Continued-

Appendix Table 7. Length at age, by sex, for chinook salmon from select Southeast Alaska sport fisheries, 1987 (Continued).¹

Fishery (Sampling Dates)	Brood Year and Age Class													
			1985		1984		1983		1982		1981		1980	Total
			0.1	0.2	1.1	0.3	1.2	0.4	1.3	0.5	1.4	1.5		
Sitka Creel 20 April- 13 September	Males	Mean									965			
		S.E. n									1		1	
	Females	Mean				715		760		995				
		S.E. n				1		2		1			4	
Total ²	Mean		732	693	807	733	962	859	1012	976				
	S.E.		11	15	8	10	10	15	32	13				
	n		23	3	86	38	49	34	3	49		285		
Juneau Creel 16 March- 27 September	Males	Mean				805	720	790	769		945	1010		
		S.E. n				15	20	7	96		4	1	68	
	Females	Mean		650		805	703	885	774		911	1012		
		S.E. n		1		10	20	15	6		17	62	106	
Total ²	Mean		657	680	770	708	915	764		915	1054			
	S.E.		8		12	7	66	3		15	37			
	n		4	1	19	54	4	257		36	6	381		
Juneau Derby 14-16 August	Males	Mean		725		884	761		819					
		S.E. n		1		76	18		13				32	
	Females	Mean		730		829	759		819					
		S.E. n		1		24	18		8				67	
Total ²	Mean		713		811	747	960	815		870				
	S.E.		15		16	8		5		90				
	n		3		20	47	1	155		2		228		
Haines Creel 20 April-12 July	Males	Mean						809		946	1066			
		S.E. n							19		34	14	32	
	Females	Mean							797		945	975		
		S.E. n							21		38	15	29	
Total ²	Mean					692		796		928	1077			
	S.E.							10		18	49			
	n					1		66		41	9	117		

¹ All measurements are tip-of-snout to fork-of-tail to nearest cm.

² Totals include unsexed fish.

Appendix Table 8. Numbers of coho salmon examined for coded-wire tags in southeast Alaska marine sport fisheries in 1987.

Fishery	Stratum	Coho		
		Estimated Harvest	Number Sampled	Percent
Ketchikan	Non-Derby (20 Apr-21 Jun)	59	11	19
	Non-Derby (22 Jun-13 Sep)	10,387	1,730	17
	Derby Take Home ¹	18	2	11
	Total	10,464	1,743	17
Petersburg	Non-Derby (20 Apr-21 Jun)	0	0	---
	Non-Derby (22 Jun-13 Sep)	210	14	7
	Derby (22-25 May)	0	0	---
	Total	210	14	7
Wrangell	20 Apr-21 Jun	0	0	---
	22 Jun-13 Sep	192	33	17
	Total	192	33	17
Sitka	Non-Derby (20 Apr-21 Jun)	0	0	---
	Non-derby (22 Jun-13 Sep)	1,185	63	5
	Derby (23-25, 30-31 May)	0	0	---
	Total	1,185	63	5
Juneau	Non-Derby (20 Apr-21 Jun)	13	2	15
	Non-Derby (22 Jun-16 Aug)	10,417	1,102	11
	Non-Derby (17 Aug-27 Sep)	4,124	518	11
	Derby Entered (14-16 Aug)	1,779	1,779	100
	Derby Take Home (14-16 Aug)	1,277	170	13
	Total	17,610	3,571	20
Haines	Non-Derby (20 Apr-12 Jun)	0	0	---
	Derby (23-25, 30-31 May)	0	0	---
	Total	0	0	---
TOTAL		29,661	5,424	18

¹ 23-25 May, 30-31 May, 6-7 June

Appendix Table 9. Estimated contribution of hatchery and wild tagged coho salmon to Ketchikan marine boat sport fishery from 20 April to 27 September 1987.

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Non-Derby 4/20-6/21		Derby		Non-Derby 6/22-9/27		Total 4/20-9/13		
				Recov	Contr	Recov.	Contr.	Recov	Contr	Recov	Contr	
British Columbia	CDFO	Fort Babine CDP	023431					1	6	1	6	
	CDFO	Kincolith CDP	023501			1	9	1	6	2	15	
	British Columbia Total						1	9	2	12	3	21
Southeast Alaska	AAI	Burnett Inlet	041337					1	6	1	6	
	SSRAA	Earl West Cove	040324					3	56	3	56	
	SSRAA	Neets Bay	040337						3	829	3	829
			040339						1	299	1	299
			040340						5	1621	5	1621
			040341						5	1537	5	1537
	SSRAA	Whitman Lake	040328						3	85	3	85
			040334						3	157	3	157
040335								1	52	1	52	
Southeast Alaska Total								25	4642	25	4642	
ALL AREAS	GRAND TOTAL			0	0	1	9	27	4654	28	4663	

¹ CDFO = Canadian Department of Fisheries and Oceans AAI = Alaska Aquaculture Incorporated
 SSRAA = Southern Southeast Regional Aquaculture Association

Appendix Table 10. Angler effort and harvest for the 1987 Yes Bay area lodge sport fishery.

PERIOD	ROD- HOURS EFFORT	LARGE CHINOOK SALMON		SMALL CHINOOK SALMON		COHO SALMON KEPT	PINK SALMON KEPT	PACIFIC HALIBUT KEPT	ROCK- FISH KEPT
		KEPT	RELEASED	KEPT	RELEASED				
5/15-5/31	630	47	0	0	98	0	0	5	49
6/01-6/15	2,162	126	18	1	509	0	0	60	122
6/16-6/30	2,587	198	9	3	381	1	6	106	98
TOTAL	5,379	371	27	4	988	1	6	171	269

Appendix Table 11. Biweekly harvest per unit effort (HPUE) by species for the 1987 Yes Bay area lodge sport fishery.

PERIOD	ROD- HOURS EFFORT	CHINOOK SALMON	COHO SALMON	PINK SALMON	PACIFIC HALIBUT	ROCKFISH
5/15-5/31	630	0.075	0.000	0.000	0.008	0.078
6/01-6/15	2,162	0.059	0.000	0.000	0.028	0.056
6/16-6/30	2,587	0.078	0.000	0.002	0.041	0.038

Appendix Table 12. Estimated contribution of hatchery and wild tagged chinook salmon to the Yes Bay area lodge sport fishery from 15 May to 30 June 1987.

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Recov	Contr
British Columbia	CDFO	Kitimat River	022742	1	20
			022745	1	1
	CDFR	Quinsam River	082221	1	1
----- British Columbia Total				3	22

Southeast Alaska	SSRAA	Neets Bay	040321	2	8
			Whitman Lake	042255	5
	042430	8		28	
	042431	2		7	
	042503	2		7	
	044063	1		2	
	B40907	4		4	
	MIC	Tamgas Creek	471625	1	9
----- Southeast Alaska Total				28	80
=====					
ALL AREAS HATCHERY			GRAND TOTAL	31	102
=====					
	(Wild)	Chickamin River	042062	1	NA
	(Wild)	Unuk River	042158	1	NA
			042520	1	NA

¹ CDFO = Canadian Department of Fisheries and Oceans CDFR = Canadian Department of Fisheries Research
 SSRAA = Southern Southeast Regional Aquaculture Association MIC = Metlakatla Indian Community

Appendix Table 13. Estimated effort and harvest for the Petersburg marine boat recreational fishery survey, 20 April - 13 September 1987.

	APPROXIMATE 95% C.I. LOWER LIMIT	ESTIMATE	APPROXIMATE 95% C.I. UPPER LIMIT
ROD-HOURS FISHED	30,619	35,501	40,382
SALMON HOURS	18,699	21,906	25,113
BOTTOMFISH HOURS	9,280	11,665	14,050
BOAT-HOURS FISHED	13,518	15,557	17,596
PACIFIC HALIBUT KEPT	1,238	1,595	1,952
PACIFIC HALIBUT RELEASED	1,023	1,375	1,728
LARGE CHINOOK SALMON KEPT AND ENTERED	1,094	1,398	1,701
DERBY ONLY KEPT	113	214	316
LARGE CHINOOK SALMON RELEASED	11	50	96
SMALL CHINOOK SALMON KEPT	1	3	9
DERBY ONLY KEPT	0	0	0
SMALL CHINOOK SALMON RELEASED	255	340	425
COHO SALMON KEPT	44	210	376
COHO SALMON RELEASED	12	58	161
PINK SALMON KEPT	51	310	607
PINK SALMON RELEASED	23	105	187
CHUM SALMON KEPT	5	44	103
CHUM SALMON RELEASED	12	58	161
SOCKEYE SALMON KEPT	6	31	79
SOCKEYE SALMON RELEASED	2	10	29
DOLLY VARDEN KEPT	0	0	0
DOLLY VARDEN RELEASED	1	5	13
ROCKFISH KEPT	27	81	135
ROCKFISH RELEASED	56	285	748

Appendix Table 14. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Petersburg area marine boat harvest survey.

	SEASONAL PERIOD STRATUM									
	20 APR-21 MAY	DERBY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP	
NUMBER OF SAMPLES	44	8	38	20	20	20	20	20	20	20
NUMBER OF BOATS COUNTED	100	107	175	60	48	57	51	72	46	
NUMBER OF BOATS INTERVIEWED	100	107	175	60	48	57	51	72	46	
HOURS SAMPLED	143	26	122	64	64	64	64	65	64	
HOURS AVAILABLE TO SAMPLE	989	128	895	469	462	452	431	417	386	
ROD-HOURS FISHED										
ESTIMATE	3,583	6,790	8,335	2,878	2,618	2,172	2,591	5,042	1,493	
VARIANCE	359,285	826,715	2,022,718	275,627	578,750	135,858	202,451	1,367,020	188,191	
SALMON HOURS FISHED										
ESTIMATE	3,347	6,711	6,907	1,814	912	703	449	813	250	
VARIANCE	347,960	744,207	1,032,954	104,585	170,057	21,800	56,935	89,729	3,651	
BOTTOMFISH HOURS FISHED										
ESTIMATE	224	79	1,428	1,064	1,706	1,469	1,804	2,698	1,192	
VARIANCE	5,272	4,944	314,902	84,331	339,603	136,158	138,043	226,866	171,851	
BOAT-HOURS FISHED										
ESTIMATE	1,853	3,093	3,995	1,421	1,005	921	1,021	1,590	657	
VARIANCE	109,339	155,029	491,789	65,608	68,305	16,698	24,526	80,989	27,351	
PACIFIC HALIBUT KEPT										
ESTIMATE	38	94	110	244	129	211	272	327	169	
VARIANCE	180	656	1,209	4,193	1,471	4,742	5,250	9,111	5,033	
NON-TARGETED HPUE										
ESTIMATE	0.0107	0.0139	0.0132	0.0848	0.0494	0.0972	0.1050	0.0649	0.1134	
VARIANCE	0.000017	0.000018	0.000022	0.000745	0.000421	0.001276	0.001113	0.000586	0.003324	
TARGETED HPUE										
ESTIMATE	0.1707	1.1941	0.0768	0.2294	0.0759	0.1438	0.1508	0.1213	0.1420	
VARIANCE	0.006591	1.239597	0.001503	0.007613	0.001177	0.003496	0.002571	0.001719	0.005933	
PACIFIC HALIBUT RELEASED										
ESTIMATE	47	109	115	146	17	196	293	368	84	
VARIANCE	297	2,608	3,172	2,014	57	9,802	7,130	5,333	724	

-Continued-

Appendix Table 14. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Petersburg area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM								
	20 APR-21 MAY	DERBY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP
LARGE CHINOOK									
SALMON KEPT									
ESTIMATE	112	214	744	174	62	20	36	21	14
VARIANCE	719	2,570	15,027	2,440	620	119	1,215	153	163
NON-TARGETED HPUE									
ESTIMATE	0.0312	0.0315	0.0893	0.0606	0.0236	0.0093	0.0139	0.0041	0.0096
VARIANCE	0.000083	0.000073	0.000448	0.000416	0.000137	0.000028	0.000187	0.000007	0.000081
TARGETED HPUE									
ESTIMATE	0.0334	0.0319	0.1078	0.0961	0.0677	0.0287	0.0801	0.0255	0.0575
VARIANCE	0.000099	0.000074	0.000566	0.001032	0.001672	0.000277	0.007855	0.000316	0.002799
LARGE CHINOOK									
SALMON RELEASED									
ESTIMATE	0	20	8	3	0	0	5	14	0
VARIANCE	0	309	50	7	0	0	19	147	0
SMALL CHINOOK									
SALMON KEPT									
ESTIMATE	0	0	0	3	0	0	0	0	0
VARIANCE	0	0	0	7	0	0	0	0	0
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000001	0.000000	0.000000	0.000000	0.000000	0.000000
TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0018	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000002	0.000000	0.000000	0.000000	0.000000	0.000000
SMALL CHINOOK									
SALMON RELEASED									
ESTIMATE	17	109	139	38	20	0	0	8	10
VARIANCE	94	117	1,200	276	77	0	0	27	24

-Continued-

Appendix Table 14. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Petersburg area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM								
	20 APR-21 MAY	DERBY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP
COHO SALMON KEPT									
ESTIMATE	0	0	0	0	0	5	66	124	15
VARIANCE	0	0	0	0	0	20	1,315	5,493	48
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0023	0.0253	0.0247	0.0100
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000004	0.000215	0.000247	0.000030
TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0071	0.1461	0.1530	0.0598
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000042	0.012468	0.011124	0.000932
COHO SALMON RELEASED									
ESTIMATE	0	0	0	0	0	0	58	0	0
VARIANCE	0	0	0	0	0	0	2,685	0	0
PINK SALMON KEPT									
ESTIMATE	0	0	0	6	22	207	51	23	0
VARIANCE	0	0	0	35	193	20,851	509	434	0
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0022	0.0085	0.0951	0.0196	0.0047	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000004	0.000034	0.004684	0.000087	0.000018	0.000000
TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0036	0.0245	0.2939	0.1134	0.0289	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000011	0.000353	0.046086	0.006150	0.000751	0.000000
PINK SALMON RELEASED									
ESTIMATE	0	0	0	0	0	81	24	0	0
VARIANCE	0	0	0	0	0	1,226	466	0	0
CHUM SALMON KEPT									
ESTIMATE	0	0	25	0	0	0	0	19	0
VARIANCE	0	0	594	0	0	0	0	278	0
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0030	0.0000	0.0000	0.0000	0.0000	0.0037	0.0000
VARIANCE	0.000000	0.000000	0.000009	0.000000	0.000000	0.000000	0.000000	0.000012	0.000000
TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0036	0.0000	0.0000	0.0000	0.0000	0.0231	0.0000
VARIANCE	0.000000	0.000000	0.000013	0.000000	0.000000	0.000000	0.000000	0.000480	0.000000
CHUM SALMON RELEASED									
ESTIMATE	0	0	0	0	0	0	58	0	0
VARIANCE	0	0	0	0	0	0	2,685	0	0

-Continued-

Appendix Table 14. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Petersburg area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM								
	20 APR-21 MAY	DERBY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP
SOCKEYE SALMON KEPT									
ESTIMATE	0	0	0	0	26	5	0	0	0
VARIANCE	0	0	0	0	548	20	0	0	0
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0100	0.0023	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000088	0.000004	0.000000	0.000000	0.000000
TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0286	0.0071	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000820	0.000042	0.000000	0.000000	0.000000
SOCKEYE SALMON RELEASED									
ESTIMATE	0	0	0	0	10	0	0	0	0
VARIANCE	0	0	0	0	88	0	0	0	0
DOLLY VARDEN KEPT									
ESTIMATE	0	0	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0	0	0
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
DOLLY VARDEN RELEASED									
ESTIMATE	5	0	0	0	0	0	0	0	0
VARIANCE	18	0	0	0	0	0	0	0	0
ROCKFISH KEPT									
ESTIMATE	0	0	0	0	26	25	16	0	13
VARIANCE	0	0	0	0	368	184	76	0	101
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0101	0.0115	0.0061	0.0000	0.0090
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000062	0.000043	0.000012	0.000000	0.000052
ROCKFISH RELEASED									
ESTIMATE	0	0	258	0	0	15	0	12	0
VARIANCE	0	0	53,262	0	0	79	0	60	0

Appendix Table 15. Estimated contribution of hatchery produced chinook salmon to the Petersburg marine boat sport fishery from 20 April to 13 September 1987.

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Non-Derby 4/20-6/21		Derby 5/22-25		Non-Derby 6/22-9/13		Total 4/20-9/13		
				Recov	Contr	Recov	Contr	Recov	Contr	Recov	Contr	
British Columbia	CDFO	Big Qualicum R.	022825					1	93	1	93	
	CDFO	Kitimat River	023256			1	3			1	3	
	CDFO	Quinsam River	022304			2	10	1	34	3	44	
	CDFR	Quinsam River	082049	082052			2	2			2	2
							1	1			1	1
						1	1			1	1	
						1	1			1	1	
British Columbia Total						8	18	2	127	10	145	
Southeast Alaska	ADF&G	Crystal Lake	042205	1	6					1	6	
			042229	8	103	4	9			12	112	
			042353	1	18	1	3			2	21	
			042354	2	50	2	9			4	59	
			042355	2	73	1	7	1	45	4	125	
			042356	1	38			4	142	5	180	
			042512			1	1			1	1	
			042614			1	1			1	1	
	NMFS	Little Port Walter	031810	031811			1	1			1	1
							1	1			1	1
					1	5			1	5		
1					6			1	6			
SSRAA	Whitman Lake	042431			2	7			2	7		
Southeast Alaska Total				17	299	14	39	5	187	36	525	
HATCHERY ALL AREAS		GRAND TOTAL		17	299	22	57	7	314	46	670	

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CDFO = Canadian Department of Fisheries and Oceans
 ADF&G = Alaska Department of Fish and Game
 SSRAA = Southern Southeast Regional Aquaculture
 Association

CDFR = Canadian Department of Fisheries Research
 NMFS = National Marine Fisheries Service

Appendix Table 16. Estimated effort and harvest for the Wrangell marine boat recreational fishery survey, 20 April - 13 September 1987.

	APPROXIMATE 95% C.I. LOWER LIMIT	ESTIMATE	APPROXIMATE 95% C.I. UPPER LIMIT
ROD-HOURS FISHED	41,636	51,355	61,075
SALMON HOURS	27,927	38,895	45,862
BOTTOMFISH HOURS	10,980	14,461	17,962
BOAT-HOURS FISHED	16,667	20,851	25,035
PACIFIC HALIBUT KEPT	1,280	1,894	2,507
PACIFIC HALIBUT RELEASED	16	100	190
LARGE CHINOOK SALMON KEPT	844	1,213	1,582
LARGE CHINOOK SALMON RELEASED	0	0	0
SMALL CHINOOK SALMON KEPT	1	5	14
SMALL CHINOOK SALMON RELEASED	121	261	402
COHO SALMON KEPT	101	192	283
COHO SALMON RELEASED	0	0	0
PINK SALMON KEPT	39	275	651
PINK SALMON RELEASED	3	24	56
CHUM SALMON KEPT	0	0	0
CHUM SALMON RELEASED	4	24	56
SOCKEYE SALMON KEPT	4	29	84
SOCKEYE SALMON RELEASED	0	0	0
DOLLY VARDEN KEPT	1	5	14
DOLLY VARDEN RELEASED	1	10	29
ROCKFISH KEPT	34	268	526
ROCKFISH RELEASED	5	25	63

Appendix Table 17. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Wrangell area marine boat harvest survey.

	SEASONAL PERIOD STRATUM							
	20 APR-25 MAY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP
NUMBER OF SAMPLES	47	37	18	20	19	17	19	20
NUMBER OF BOATS COUNTED	246	130	39	34	33	38	24	36
NUMBER OF BOATS INTERVIEWED	244	130	39	34	33	38	24	36
HOURS SAMPLED	156	119	59	66	63	55	62	65
HOURS AVAILABLE TO SAMPLE	1,396	1,119	586	578	564	538	521	483
ROD-HOURS FISHED								
ESTIMATE	20,429	12,780	3,393	2,662	2,994	3,470	3,341	2,286
VARIANCE	15,291,710	3,833,908	732,537	432,502	580,995	428,041	2,028,337	288,732
SALMON HOURS FISHED								
ESTIMATE	18,755	11,411	1,992	654	490	726	1,381	1,486
VARIANCE	14,962,352	3,750,588	622,705	66,174	21,177	49,575	491,958	138,945
BOTTOMFISH HOURS FISHED								
ESTIMATE	1,674	1,369	1,401	2,008	2,504	2,744	1,960	800
VARIANCE	878,621	92,622	290,541	331,701	489,616	302,923	589,007	54,264
BOAT-HOURS FISHED								
ESTIMATE	8,821	5,318	1,487	1,062	994	1,148	1,053	969
VARIANCE	3,086,731	866,778	91,832	69,643	38,055	39,433	135,010	48,697
PACIFIC HALIBUT KEPT								
ESTIMATE	358	124	120	235	378	381	182	116
VARIANCE	48,328	1,274	3,523	4,196	24,029	7,080	3,564	2,143
NON-TARGETED HPUE								
ESTIMATE	0.0175	0.0097	0.0355	0.0882	0.1261	0.1097	0.0544	0.0509
VARIANCE	0.000127	0.000010	0.000386	0.001066	0.003709	0.001015	0.000857	0.000553
TARGETED HPUE								
ESTIMATE	0.2137	0.0908	0.0860	0.1169	0.1508	0.1387	0.0927	0.1455
VARIANCE	0.031559	0.001086	0.002888	0.002163	0.005603	0.001713	0.002244	0.005140
PACIFIC HALIBUT RELEASED								
ESTIMATE	0	15	5	43	25	11	0	0
VARIANCE	0	107	25	1,279	515	108	0	0

-Continued-

Appendix Table 17. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Wrangell area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM							
	20 APR-25 MAY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP
LARGE CHINOOK SALMON								
KEPT								
ESTIMATE	570	453	133	5	15	17	16	4
VARIANCE	17,949	11,450	4,300	19	104	107	105	12
NON-TARGETED HPUE								
ESTIMATE	0.0279	0.0355	0.0393	0.0018	0.0050	0.0050	0.0048	0.0017
VARIANCE	0.000071	0.000100	0.000472	0.000003	0.000013	0.000010	0.000014	0.000002
TARGETED HPUE								
ESTIMATE	0.0304	0.0397	0.0669	0.0075	0.0303	0.0237	0.0116	0.0027
VARIANCE	0.000090	0.000133	0.001787	0.000054	0.000512	0.000256	0.000090	0.000006
LARGE CHINOOK SALMON								
RELEASED								
ESTIMATE	0	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0	0
SMALL CHINOOK SALMON								
KEPT								
ESTIMATE	0	0	0	0	5	0	0	0
VARIANCE	0	0	0	0	19	0	0	0
NON-TARGETED HPUE								
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000002	0.000000	0.000000	0.000000
TARGETED HPUE								
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0101	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000088	0.000000	0.000000	0.000000
SMALL CHINOOK SALMON								
RELEASED								
ESTIMATE	128	95	10	0	0	14	14	0
VARIANCE	3,260	1,248	93	0	0	172	159	0

-Continued-

Appendix Table 17. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Wrangell area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM							
	20 APR-25 MAY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP
COHO SALMON KEPT								
ESTIMATE	0	0	0	0	20	57	57	58
VARIANCE	0	0	0	0	313	669	578	511
NON-TARGETED HPUE								
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0066	0.0164	0.0171	0.0255
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000038	0.000065	0.000105	0.000133
TARGETED HPUE								
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0405	0.0784	0.0414	0.0392
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.001446	0.001843	0.000745	0.000327
COHO SALMON RELEASED								
ESTIMATE	0	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0	0
PINK SALMON KEPT								
ESTIMATE	0	0	0	198	45	33	0	0
VARIANCE	0	0	0	34,034	1,045	304	0	0
NON-TARGETED HPUE								
ESTIMATE	0.0000	0.0000	0.0000	0.0743	0.0149	0.0094	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.005140	0.000131	0.000028	0.000000	0.000000
TARGETED HPUE								
ESTIMATE	0.0000	0.0000	0.0000	0.3025	0.0910	0.0450	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.093828	0.005079	0.000765	0.000000	0.000000
PINK SALMON RELEASED								
ESTIMATE	0	10	0	0	0	14	0	0
VARIANCE	0	86	0	0	0	172	0	0
CHUM SALMON KEPT								
ESTIMATE	0	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0	0
NON-TARGETED HPUE								
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
TARGETED HPUE								
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
CHUM SALMON RELEASED								
ESTIMATE	0	10	0	0	0	14	0	0
VARIANCE	0	84	0	0	0	172	0	0

-Continued-

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Appendix Table 17. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Wrangell area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM							
	20 APR-25 MAY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	31 AUG-13 SEP
SOCKEYE SALMON KEPT								
ESTIMATE	0	0	0	0	29	0	0	0
VARIANCE	0	0	0	0	740	0	0	0
NON-TARGETED HPUE								
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0098	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000089	0.000000	0.000000	0.000000
TARGETED HPUE								
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0597	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.003399	0.000000	0.000000	0.000000
SOCKEYE SALMON RELEASED								
ESTIMATE	0	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0	0
DOLLY VARDEN KEPT								
ESTIMATE	5	0	0	0	0	0	0	0
VARIANCE	19	0	0	0	0	0	0	0
NON-TARGETED HPUE								
ESTIMATE	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
DOLLY VARDEN RELEASED								
ESTIMATE	10	0	0	0	0	0	0	0
VARIANCE	89	0	0	0	0	0	0	0
ROCKFISH KEPT								
ESTIMATE	30	26	137	60	15	0	0	0
VARIANCE	341	530	14,778	755	176	0	0	0
NON-TARGETED HPUE								
ESTIMATE	0.0015	0.0020	0.0405	0.0227	0.0050	0.0000	0.0000	0.0000
VARIANCE	0.000001	0.000003	0.001387	0.000138	0.000021	0.000000	0.000000	0.000000
ROCKFISH RELEASED								
ESTIMATE	5	20	0	0	0	0	0	0
VARIANCE	20	336	0	0	0	0	0	0

Appendix Table 18. Estimated contribution of hatchery produced chinook salmon and coho salmon to the Wrangell marine boat sport fishery from 20 April to 13 September 1987.

Region	Agency ¹	Hatchery/ Release Site	Tag Code	4/20-6/21		6/22-9/13		Total 4/20-9/13	
				Recov	Contr	Recov.	Contr.	Recov	Contr
<u>Chinook Salmon</u>									
Southeast Alaska	SSRAA	Whitman Lake	040346			1	5	1	5
<u>Coho Salmon</u>									
Southeast Alaska	SSRAA	Earl West Cove	040324			2	36	2	36

¹ SSRAA = Southern Southeast Regional Aquaculture Association

Appendix Table 19. Estimated effort and harvest for the Sitka marine boat recreational fishery survey, 20 April - 13 September 1987.

	APPROXIMATE 95% C.I. LOWER LIMIT	ESTIMATE	APPROXIMATE 95% C.I. UPPER LIMIT
ROD-HOURS FISHED	45,196	58,814	72,433
SALMON HOURS FISHED	23,490	33,130	42,771
BOTTOMFISH HOURS FISHED	17,968	24,266	30,564
BOAT-HOURS FISHED	18,925	24,129	29,333
PACIFIC HALIBUT KEPT	5,987	8,314	10,642
PACIFIC HALIBUT RELEASED	3,981	7,214	10,447
LARGE CHINOOK SALMON KEPT AND ENTERED	1,472	2,354	3,236
DERBY KEPT	5	62	131
DERBY ENTERED	---	281	---
DERBY KEPT AND ENTERED	274	343	412
LARGE CHINOOK SALMON RELEASED	0	0	0
SMALL CHINOOK SALMON KEPT	8	112	249
DERBY KEPT	0	0	0
DERBY ENTERED	---	0	---
DERBY KEPT AND ENTERED	0	0	0
SMALL CHINOOK SALMON RELEASED	2,479	4,084	5,688
COHO SALMON KEPT	794	1,185	1,575
COHO SALMON RELEASED	22	324	726
PINK SALMON KEPT	494	1,327	2,160
PINK SALMON RELEASED	81	402	723
CHUM SALMON KEPT	6	73	148
CHUM SALMON RELEASED	1	10	29
SOCKEYE SALMON KEPT	14	223	607
SOCKEYE SALMON RELEASED	0	0	0
LING COD KEPT	478	952	1,427
LING COD RELEASED	53	467	881
QUILLBACK ROCKFISH KEPT	310	833	1,357
DUSKY ROCKFISH KEPT	92	319	546
COPPER ROCKFISH KEPT	2	19	43
BLACK ROCKFISH KEPT	221	837	1,452
YELLOWTAIL ROCKFISH KEPT	0	0	0
YELLOWEYE ROCKFISH KEPT	272	625	978
OTHER ROCKFISH SPECIES KEPT	13	94	175
UN-ID'D ROCKFISH KEPT	263	742	1,220
TOTAL ROCKFISH KEPT	2,437	3,469	4,501
TOTAL ROCKFISH SPECIES RELEASED	10,321	14,444	18,568

Appendix Table 20. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Sitka area marine boat harvest survey.

	SEASONAL PERIOD STRATUM								
	20 APR-22 MAY	DERBY	23 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	01 AUG-13 SEP
NUMBER OF SAMPLES	42	9	34	20	20	20	20	20	18
NUMBER OF BOATS COUNTED	73	61	47	51	42	45	33	61	29
NUMBER OF BOATS INTERVIEWED	73	61	47	51	42	45	33	61	29
HOURS SAMPLED	126	27	101	60	60	60	60	59	54
HOURS AVAILABLE TO SAMPLE	2,734	415	2,129	1,199	1,181	1,146	1,094	1,041	862
ROD-HOURS FISHED									
ESTIMATE	5,285	14,436	5,153	5,811	7,172	6,142	4,335	7,690	2,790
VARIANCE	1,050,642	21,123,538	1,139,182	326,545	4,776,510	1,607,619	950,114	14,096,577	1,293,684
SALMON HOURS FISHED									
ESTIMATE	2,257	13,450	2,221	2,014	3,195	3,177	2,307	2,742	1,767
VARIANCE	288,902	17,763,015	322,143	342,943	1,480,267	565,628	259,309	1,740,412	472,878
BOTTOMFISH HOURS FISHED									
ESTIMATE	2,927	986	2,932	3,797	3,842	2,499	1,748	4,579	958
VARIANCE	817,657	192,896	766,375	182,981	1,304,476	517,150	303,848	5,570,072	260,578
BOAT-HOURS FISHED									
ESTIMATE	2,561	5,707	1,906	2,499	2,548	2,716	1,493	3,529	1,170
VARIANCE	185,261	2,965,694	122,893	46,582	344,265	171,593	54,836	2,704,892	174,551
PACIFIC HALIBUT KEPT									
ESTIMATE	352	335	946	1,653	1,353	1,083	612	1,521	460
VARIANCE	14,922	25,189	134,640	104,198	306,090	122,918	54,704	499,634	91,608
NON-TARGETED HPUE									
ESTIMATE	0.0665	0.0232	0.1836	0.2844	0.1886	0.1764	0.1412	0.1977	0.1649
VARIANCE	0.000701	0.000176	0.006516	0.003867	0.009248	0.004582	0.003918	0.017754	0.016287
TARGETED HPUE									
ESTIMATE	0.1202	0.3404	0.3226	0.4352	0.3521	0.4336	0.3501	0.3321	0.4800
VARIANCE	0.003121	0.048656	0.024941	0.009630	0.031652	0.035233	0.030084	0.053060	0.165152
PACIFIC HALIBUT RELEASED									
ESTIMATE	0	31	374	1,439	748	1,296	547	2,313	465
VARIANCE	0	357	26,716	378,382	46,993	333,219	54,094	1,634,783	137,826

-Continued-

Appendix Table 20. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Sitka area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM								
	20 APR-22 MAY	DERBY	23 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	01 AUG-13 SEP
LARGE CHINOOK SALMON									
KEPT									
ESTIMATE	81	343	31	64	253	420	313	203	646
VARIANCE	1,218	1,188	426	2,347	12,308	29,605	12,475	7,634	127,426
NON-TARGETED HPUE									
ESTIMATE	0.0154	0.0238	0.0059	0.0110	0.0353	0.0684	0.0721	0.0263	0.2316
VARIANCE	0.000053	0.000063	0.000018	0.000071	0.000355	0.000984	0.000926	0.000294	0.025288
TARGETED HPUE									
ESTIMATE	0.0361	0.0255	0.0138	0.0318	0.0792	0.1323	0.1354	0.0739	0.3657
VARIANCE	0.000313	0.000070	0.000099	0.000664	0.002116	0.003914	0.003236	0.002274	0.061048
LARGE CHINOOK SALMON									
RELEASED									
ESTIMATE	0	0	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0	0	0
SMALL CHINOOK SALMON									
KEPT									
ESTIMATE	0	0	27	0	11	0	0	65	9
VARIANCE	0	0	709	0	115	0	0	3,832	66
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0053	0.0000	0.0016	0.0000	0.0000	0.0085	0.0031
VARIANCE	0.000000	0.000000	0.000028	0.000000	0.000002	0.000000	0.000000	0.000082	0.000010
TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0122	0.0000	0.0035	0.0000	0.0000	0.0237	0.0049
VARIANCE	0.000000	0.000000	0.000154	0.000000	0.000013	0.000000	0.000000	0.000640	0.000025
SMALL CHINOOK SALMON									
RELEASED									
ESTIMATE	101	747	540	278	574	273	469	344	759
VARIANCE	2,632	244,591	27,634	13,307	69,442	24,081	48,020	40,039	174,102

-Continued-

Appendix Table 20. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Sitka area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM								
	20 APR-22 MAY	DERBY	23 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	01 AUG-13 SEP
COHO SALMON KEPT									
ESTIMATE	0	0	0	0	101	423	315	345	0
VARIANCE	0	0	0	0	1,072	6,299	10,637	20,166	0
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0141	0.0689	0.0727	0.0449	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000039	0.000369	0.000833	0.000821	0.000000
TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0317	0.1332	0.1366	0.1259	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000250	0.001617	0.002906	0.006340	0.000000
COHO SALMON RELEASED									
ESTIMATE	0	0	0	0	169	0	117	30	9
VARIANCE	0	0	0	0	26,789	0	12,678	826	66
PINK SALMON KEPT									
ESTIMATE	0	0	0	0	124	592	203	382	26
VARIANCE	0	0	0	0	5,026	38,227	13,512	116,168	592
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0173	0.0964	0.0469	0.0496	0.0093
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000125	0.001409	0.000830	0.002552	0.000090
TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0387	0.1864	0.0880	0.1392	0.0146
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000709	0.005732	0.002915	0.019939	0.000222
PINK SALMON RELEASED									
ESTIMATE	0	0	0	0	34	0	284	84	0
VARIANCE	0	0	0	0	1,038	0	23,731	1,002	0
CHUM SALMON KEPT									
ESTIMATE	0	0	0	0	0	0	13	43	17
VARIANCE	0	0	0	0	0	0	157	979	263
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0030	0.0056	0.0062
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000009	0.000024	0.000040
TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0056	0.0156	0.0098
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000031	0.000186	0.000099
CHUM SALMON RELEASED									
ESTIMATE	0	0	0	0	0	0	0	10	0
VARIANCE	0	0	0	0	0	0	0	88	0

-Continued-

Appendix Table 20. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Sitka area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM								
	20 APR-22 MAY	DERBY	23 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	01 AUG-13 SEP
SOCKEYE SALMON KEPT									
ESTIMATE	0	0	0	0	0	197	26	0	0
VARIANCE	0	0	0	0	0	36,254	626	0	0
NON-TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0320	0.0060	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.001004	0.000035	0.000000	0.000000
TARGETED HPUE									
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0619	0.0113	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.003805	0.000124	0.000000	0.000000
SOCKEYE SALMON RELEASED									
ESTIMATE	0	0	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0	0	0
QUILLBACK ROCKFISH KEPT									
ESTIMATE	375	10	281	0	51	33	0	74	9
VARIANCE	26,864	97	33,063	0	2,411	974	0	5,160	66
DUSKY ROCKFISH KEPT									
ESTIMATE	53	62	94	32	17	0	31	30	0
VARIANCE	1,484	648	7,795	932	268	0	914	826	0
COPPER ROCKFISH KEPT									
ESTIMATE	8	10	0	0	0	0	0	0	0
VARIANCE	58	97	0	0	0	0	0	0	0
BLACK ROCKFISH KEPT									
ESTIMATE	122	156	164	0	17	257	0	121	0
VARIANCE	5,662	7,360	17,201	0	268	58,966	0	5,165	0
YELLOWTAIL ROCKFISH KEPT									
ESTIMATE	0	0	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0	0	0
YELLOWEYE ROCKFISH KEPT									
ESTIMATE	140	31	77	51	28	33	26	231	9
VARIANCE	3,191	357	1,507	515	383	1,007	626	23,505	66

-Continued-

Appendix Table 20. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Sitka area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM								
	20 APR-22 MAY	DERBY	23 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-16 AUG	17 AUG-30 AUG	01 AUG-13 SEP
OTHER ROCKFISH SPECIES KEPT									
ESTIMATE	29	0	0	15	0	11	0	40	0
VARIANCE	371	0	0	238	0	108	0	914	0
UN-ID'D ROCKFISH KEPT									
ESTIMATE	281	62	136	188	56	0	0	0	17
VARIANCE	25,910	1,167	10,901	15,992	2,939	0	0	0	263
ALL ROCKFISH KEPT									
ESTIMATE	1,008	332	752	286	169	333	57	496	35
VARIANCE	63,541	9,727	70,467	17,677	6,269	61,056	1,540	35,570	395
NON-TARGETED HPUE									
ESTIMATE	0.1908	0.0230	0.1459	0.0493	0.0235	0.0542	0.0132	0.0645	0.0124
VARIANCE	0.003643	0.000100	0.003567	0.000547	0.000173	0.001744	0.000091	0.001592	0.000076
ALL ROCKFISH RELEASED									
ESTIMATE	2,046	3,835	1,645	1,276	2,115	1,403	992	948	184
VARIANCE	1,033,792	1,681,467	322,087	82,146	576,566	148,253	23,050	372,949	10,350
LING COD KEPT									
ESTIMATE	37	---	61	147	194	172	49	259	33
VARIANCE	663	---	1,276	2,930	15,851	6,900	1,507	26,721	488
NON-TARGETED HPUE									
ESTIMATE	0.0069	---	0.0119	0.0253	0.0271	0.0280	0.0114	0.0337	0.0117
VARIANCE	0.000026	---	0.000054	0.000093	0.000376	0.000216	0.000087	0.000722	0.000086

¹ Catch and harvest of ling cod were not recorded during the derby period.

Appendix Table 21. Estimated contribution of hatchery produced chinook salmon to the Sitka marine boat sport fishery from 20 April to 13 September 1987.

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Non-Derby 4/20-6/21		Derby 5/23-25,30-31		Non-Derby 6/22-9/13		Total 4/20-9/13			
				Recov	Contr	Recov	Contr	Recov	Contr	Recov	Contr		
Oregon	ODFW	Bonneville	073007			1	2			1	2		
			073125			1	1			1	1		
	ODFW	Marion Forks	073663			1	1			1	1		
			072955			1	1			1	1		
			073055	1	11					1	11		
Oregon Total				1	11	4	5			5	16		
Washington	WDF	Humptulips	633230			1	1			1	1		
			632859			1	9			1	9		
			632222			1	7			1	7		
	Washington Total						3	17			3	17	
British Columbia	CDFO	Capilano River	022531			1	2			1	2		
			022601			1	6			1	6		
			022803			1	2			1	2		
			022745			1	1			1	1		
			022631			1	14			1	14		
			023142			1	1			1	1		
			022459	1	22					1	22		
			Quinsam River	082056				1	1			1	1
				082103				1	13			1	13
082111					1	1			1	1			
082121					1	1			1	1			
British Columbia Total				1	22	10	42			11	64		
Southeast Alaska	ADF&G	Hidden Falls	042335					1	24	1	24		
			042337					1	24	1	24		
	NSRAA	Medvejie CIF	042247			1	1			1	1		
			040321			1	4			1	4		
	Southeast Alaska Total						2	5	2	48	4	53	
ALL AREAS GRAND TOTAL				2	33	19	69	2	48	23	150		

¹ ODFW = Oregon Department of Fish and Wildlife
 CDFO = Canadian Department of Fisheries and Oceans
 ADF&G = Alaska Department of Fish and Game
 SSRAA = Southern Southeast Regional Aquaculture Association
 WDF = Washington Department of Fisheries
 CDFR = Canadian Department of Fisheries Research
 NSRAA = Northern Southeast Regional Aquaculture Association

Appendix Table 22. Estimated contribution of hatchery produced coho salmon to the Sitka marine boat sport fishery from 20 April to 13 September 1987.

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Non-Derby 4/20-6/21		Derby 5/23-25,30-31		Non-Derby 6/22-9/13		Total 4/20-9/13	
				Recov	Contr	Recov	Contr	Recov	Contr	Recov	Contr
Southeast Alaska	ADF&G	Salmon L. (Wild)	041324					1	NA	1	NA
	NSRAA	Medvejie CIF	B40506					1	57	1	57

¹ ADF&G = Alaska Department of Fish and Game

NSRAA = Northern Southeast Regional Aquaculture Association

Appendix Table 23. Location and description of access points in the Juneau marine boat sport fishery that were sampled in 1987.

Access Point	Description
<u>Harbors and boat launches:</u>	
1. Auke Bay launch	Located in Auke Bay at Glacier Highway Mile 13 (20.9 km). This access point includes two boat launches and a finger float.
2. Tee Harbor	Located west of Glacier Highway - Mile 20 (32.2 km). This large harbor houses primarily sport boats.
3. Douglas Harbor	Located in Douglas. The harbor includes both docks and a boat launch. Both sport and commercial boats are tied up here.
4. Fishermen's Bend	Located in Auke Bay just north of the Auke Bay launch (Glacier Highway Mile 13 or 20.9 km). This large harbor contains primarily sport boats with a few commercial boats.
5. Dehart's Marina	Located adjacent to the Auke Bay launch (Glacier Highway Mile 13 or 20.9 km). This is a mid-sized harbor with mostly sport boats.
6. Aurora Harbor	Located just north of downtown Juneau. This very large harbor contains many sport and commercial boats.
7. Harris Harbor	Located just north of downtown Juneau and just south of Aurora Harbor. This harbor supports mostly commercial boats with a few sport boats. There also is a boat ramp that was sampled.
8. Amalga Harbor	Located at end of access road one mile (1.6 km) west of Glacier Highway Mile 25 (40.2 km). This heavily used site contains two boat launches and a finger float.
9. North Douglas boat launch	Located at North Douglas Highway Mile 9 (14.5 km). This access site consists of a single boat launch.
10. Auke Bay Government Dock	Located in Auke Bay just west of the Auke Bay boat launch (Glacier Highway Mile 13 or 20.9 km). This harbor provides both transient and permanent mooring to a variety of sport and commercial boats.
11. Tee boat launch	Located at Glacier Highway Mile 18 (29.0 km). This access point consists of an unimproved boat launch.
<u>Private moorages:</u>	
1. Auke Bay private moorages	This group of moorages extend from the head of Auke Bay south to Battleship Island and west to the mouth of Wadleigh Creek (Glacier Highway Mile 12 to 13 or 19.3 to 20.9 km).
2. Fritz Cove private moorages	This group of moorages extends from Battleship Island south to and including the Smugglers Cove area at the tip of the Mendenhall Peninsula (accessible at end of Fritz Cove road - Glacier Highway Mile 12 or 19.3 km).
3. Lena Cove private moorages	This group of moorages includes boats in Lena Cove along with those moored just west of Lena Point near Glacier Highway Mile 15 to 16 (24.1 to 25.7 km).
4. Indian Cove private moorages	This group of moorages includes Indian Cove along with those in Auke Nu Cove near Glacier Highway Mile 14 to 15 (22.5 to 24.1 km).
5. Tee Harbor private moorages	This group of moorages includes all boats moored out in Tee Harbor which were not sampled during regular Tee Harbor or Tee Boat Launch sampling.

Appendix Table 24. Estimated boat effort and catches for the Juneau marine boat recreational fishery during the 16 March - 27 September 1987 period.

	APPROXIMATE 95% C.I. LOWER LIMIT	ESTIMATE	APPROXIMATE 95% C.I. UPPER LIMIT
ROD-HOURS FISHED	366,195	401,840	437,485
SALMON HOURS	281,950	307,124	332,297
BOTTOMFISH HOURS	80,654	94,658	108,663
BOAT-HOURS FISHED	139,029	154,827	170,625
PACIFIC HALIBUT KEPT	11,021	13,513	16,005
PACIFIC HALIBUT RELEASED	5,444	10,357	15,270
CHINOOK >28 IN KEPT AND ENTERED	7,158	8,656	10,154
DERBY KEPT	189	325	462
DERBY ENTERED	---	630	---
DERBY KEPT AND ENTERED	819	955	1,092
LARGE CHINOOK SALMON RELEASED	117	318	519
SMALL CHINOOK SALMON KEPT	121	230	339
DERBY KEPT	11	43	75
DERBY ENTERED	---	7	---
DERBY KEPT AND ENTERED	18	50	82
SMALL CHINOOK SALMON RELEASED	4,624	6,198	7,772
COHO SALMON KEPT AND ENTERED	14,414	17,610	20,806
DERBY ONLY KEPT	975	1,277	1,579
DERBY ONLY ENTERED	---	1,779	---
DERBY ONLY KEPT AND ENTERED	2,754	3,056	3,358
COHO SALMON RELEASED	285	445	605
PINK SALMON KEPT AND ENTERED ¹	4,708	12,219	19,730
DERBY ONLY KEPT	241	336	432
DERBY ONLY ENTERED ¹	---	---	---
DERBY ONLY KEPT AND ENTERED ¹	241	336	432
PINK SALMON RELEASED	1,435	1,895	2,355
CHUM SALMON KEPT AND ENTERED	486	715	944
DERBY ONLY KEPT	7	31	56
DERBY ONLY ENTERED	---	39	---
DERBY ONLY KEPT AND ENTERED	45	70	95
CHUM SALMON RELEASED	5	27	53
SOCKEYE SALMON KEPT AND ENTERED	20	227	453
DERBY ONLY KEPT	0	0	0
DERBY ONLY ENTERED	---	9	---
DERBY ONLY KEPT AND ENTERED	9	9	9
SOCKEYE SALMON RELEASED	0	0	0
DOLLY VARDEN KEPT	450	893	1,336
DOLLY VARDEN RELEASED	65	182	290
ROCKFISH KEPT	297	1,720	3,142
ROCKFISH RELEASED	83	533	1,068

¹ Pink salmon were not accepted by Derby officials during the 1987 Juneau Golden North Salmon Derby.

Appendix Table 25. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Juneau area marine boat harvest survey.

	SEASONAL PERIOD STRATUM										
	16 MAR-26 APR	27 APR-25 MAY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-13 AUG	DERBY	17 AUG-30 AUG	31 AUG-13 SEP	14 SEP-27 SEP
<u>HEAVY AND MEDIUM USE ACCESS LOCATIONS ONLY</u>											
NUMBER OF SAMPLES	38	86	78	44	37	45	36	12	45	48	38
NUMBER OF BOATS COUNTED	50	288	436	369	358	471	349	528	322	222	32
NUMBER OF BOATS INTERVIEWED	49	287	433	366	357	468	348	528	320	221	32
HOURS SAMPLED	123	280	308	176	144	155	117	107	147	151	104
HOURS AVAILABLE TO SAMPLE	2,345	2,605	2,756	1,439	1,418	1,376	1,034	520	1,354	1,255	1,138
ROD-HOURS FISHED											
ESTIMATE	3,116	20,986	35,884	42,178	46,004	35,958	30,474	82,608	29,638	12,564	2,633
VARIANCE	578,876	5,856,019	14,888,477	56,940,436	141,040,281	15,664,005	7,442,555	757,598	10,775,619	3,730,123	349,679
SALMON HOURS FISHED											
ESTIMATE	2,111	16,844	22,826	27,304	31,641	26,195	22,645	81,436	20,514	8,624	1,509
VARIANCE	303,739	3,780,269	6,400,551	15,864,833	56,504,269	10,031,617	4,006,022	1,203,595	6,502,060	3,162,325	164,960
BOTTOMFISH HOURS FISHED											
ESTIMATE	1,005	4,142	13,058	14,843	14,363	9,763	7,802	1,171	9,125	3,939	1,124
VARIANCE	183,429	946,448	4,651,952	13,555,917	20,221,113	1,948,526	1,502,517	96,729	1,217,703	346,626	123,330
BOAT-HOURS FISHED											
ESTIMATE	1,661	8,860	14,518	15,209	15,877	13,957	11,609	30,043	11,630	4,969	1,212
VARIANCE	166,280	1,026,165	2,896,902	6,076,408	7,681,325	2,035,858	1,046,005	29,238,117	1,780,987	352,169	67,388
PACIFIC HALIBUT KEPT											
ESTIMATE	17	176	1,540	2,555	2,264	1,624	1,076	651	1,267	324	204
VARIANCE	273	2,789	132,204	678,410	432,142	67,331	38,619	5,881	34,796	6,272	11,039
NON-TARGETED HPUE											
ESTIMATE	0.0370	0.1121	0.2785	0.7905	0.4469	0.2684	0.2131	0.0079	0.2678	0.0984	0.1823
VARIANCE	0.001829	0.004673	0.006264	0.210700	0.023693	0.005256	0.002630	0.000001	0.006401	0.000856	0.011206
TARGETED HPUE											
ESTIMATE	0.1250	0.6252	0.8626	1.9755	2.2697	1.1276	0.9442	0.5563	0.8891	0.2827	0.3822
VARIANCE	0.029900	0.168844	0.083695	0.985815	1.552137	0.114912	0.120756	0.023347	0.111861	0.009242	0.047105
PACIFIC HALIBUT RELEASED											
ESTIMATE	0	289	931	3,260	2,104	451	606	258	774	67	91
VARIANCE	0	15,561	59,433	4,169,896	1,156,399	23,901	60,595	6,677	117,016	572	7,773

-Continued-

Appendix Table 25. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Juneau area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM										
	16 MAR-26 APR	27 APR-25 MAY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-13 AUG	DERBY	17 AUG-30 AUG	31 AUG-13 SEP	14 SEP-27 SEP
<u>HEAVY AND MEDIUM</u>											
<u>USE ACCESS</u>											
<u>LOCATIONS ONLY</u>											
(Continued)											
LARGE CHINOOK SALMON											
KEPT											
ESTIMATE	23	239	578	1,667	1,900	909	962	955	330	199	10
VARIANCE	230	2,412	6,877	70,032	339,507	37,104	23,984	4,662	8,671	7,083	85
NON-TARGETED HPUE											
ESTIMATE	0.0389	0.1062	0.1463	0.2232	0.3828	0.2144	0.2417	0.0116	0.0632	0.1253	0.0092
VARIANCE	0.001107	0.002418	0.001322	0.003552	0.025861	0.006982	0.004721	0.000001	0.000734	0.005434	0.000085
TARGETED HPUE											
ESTIMATE	0.0421	0.1191	0.2129	0.3108	0.5159	0.2695	0.3018	0.0117	0.0944	0.1629	0.0141
VARIANCE	0.001192	0.002526	0.002585	0.005473	0.038638	0.011558	0.006462	0.000001	0.001629	0.006962	0.000208
LARGE CHINOOK SALMON											
RELEASED											
ESTIMATE	0	0	34	0	82	80	68	54	0	0	0
VARIANCE	0	0	1,122	0	1,527	3,087	1,831	584	0	0	0
SMALL CHINOOK SALMON											
KEPT											
ESTIMATE	0	0	0	18	29	38	15	50	30	0	0
VARIANCE	0	0	0	189	237	1,045	158	254	454	0	0
NON-TARGETED HPUE											
ESTIMATE	0.0000	0.0000	0.0000	0.0061	0.0101	0.0069	0.0022	0.0006	0.0078	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000043	0.000077	0.000041	0.000004	0.000000	0.000055	0.000000	0.000000
TARGETED HPUE											
ESTIMATE	0.0000	0.0000	0.0000	0.0097	0.0130	0.0084	0.0028	0.0006	0.0115	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000096	0.000115	0.000064	0.000006	0.000000	0.000114	0.000000	0.000000
SMALL CHINOOK SALMON											
RELEASED											
ESTIMATE	0	88	430	1,308	655	738	390	907	227	20	0
VARIANCE	0	982	8,689	229,638	31,521	35,917	4,418	2,536	5,392	76	0

-Continued-

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Appendix Table 25. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Juneau area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM										
	16 MAR-26 APR	27 APR-25 MAY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-13 AUG	DERBY	17 AUG-30 AUG	31 AUG-13 SEP	14 SEP-27 SEP
<u>HEAVY AND MEDIUM</u>											
<u>USE ACCESS</u>											
<u>LOCATIONS ONLY</u>											
(Continued)											
COHO SALMON KEPT											
ESTIMATE	0	0	13	1,561	2,888	3,058	2,230	3,056	2,489	986	63
VARIANCE	0	0	92	56,491	1,937,620	165,982	62,511	22,798	64,908	117,135	728
NON-TARGETED HPUE											
ESTIMATE	0.0000	0.0000	0.0015	0.1495	0.7302	0.7492	0.5398	0.0370	0.7654	0.6557	0.0718
VARIANCE	0.000000	0.000000	0.000001	0.001526	0.257193	0.053508	0.012337	0.000003	0.082038	0.100053	0.001242
TARGETED HPUE											
ESTIMATE	0.0000	0.0000	0.0024	0.2220	0.9511	0.9592	0.7028	0.0375	1.0099	0.8775	0.1172
VARIANCE	0.000000	0.000000	0.000003	0.002523	0.334028	0.092795	0.016743	0.000004	0.100355	0.139987	0.003744
COHO SALMON RELEASED											
ESTIMATE	0	0	0	29	29	106	107	68	55	14	0
VARIANCE	0	0	0	185	272	2,099	2,208	490	682	40	0
PINK SALMON KEPT											
ESTIMATE	0	0	55	3,553	5,033	487	428	336	187	37	0
VARIANCE	0	0	1,419	661,272	11,778,610	6,817	13,160	2,294	3,155	727	0
NON-TARGETED HPUE											
ESTIMATE	0.0000	0.0000	0.0086	0.4779	0.7518	0.1148	0.3307	0.0041	0.0353	0.0214	0.0000
VARIANCE	0.000000	0.000000	0.000022	0.024805	0.226382	0.001983	0.142694	0.000000	0.000317	0.000470	0.000000
TARGETED HPUE											
ESTIMATE	0.0000	0.0000	0.0131	0.7365	0.9846	0.1515	0.3501	0.0041	0.0522	0.0246	0.0000
VARIANCE	0.000000	0.000000	0.000056	0.053464	0.333441	0.003665	0.142909	0.000000	0.000640	0.000504	0.000000
PINK SALMON RELEASED											
ESTIMATE	0	0	39	391	390	267	175	350	56	0	0
VARIANCE	0	0	851	15,332	9,448	5,385	5,076	5,240	574	0	0

-Continued-

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Appendix Table 25. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Juneau area marine boat harvest survey (Continued).

SEASONAL PERIOD STRATUM											
	16 MAR-26 APR	27 APR-25 MAY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-13 AUG	DERBY	17 AUG-30 AUG	31 AUG-13 SEP	14 SEP-27 SEP
<u>HEAVY AND MEDIUM</u>											
<u>USE ACCESS</u>											
<u>LOCATIONS ONLY</u>											
(Continued)											
CHUM SALMON KEPT											
ESTIMATE	0	0	6	134	206	48	34	70	107	23	0
VARIANCE	0	0	24	3,510	2,900	555	132	153	3,523	203	0
NON-TARGETED HPUE											
ESTIMATE	0.0000	0.0000	0.0010	0.0235	0.0346	0.0116	0.0043	0.0009	0.0249	0.0053	0.0000
VARIANCE	0.000000	0.000000	0.000001	0.000133	0.000094	0.000093	0.000002	0.000000	0.000483	0.000012	0.000000
TARGETED HPUE											
ESTIMATE	0.0000	0.0000	0.0015	0.0325	0.0495	0.0138	0.0058	0.0009	0.0364	0.0082	0.0000
VARIANCE	0.000000	0.000000	0.000001	0.000216	0.000205	0.000116	0.000004	0.000000	0.001000	0.000027	0.000000
CHUM SALMON RELEASED											
ESTIMATE	0	0	0	0	4	3	0	9	5	5	0
VARIANCE	0	0	0	0	16	6	0	102	24	17	0
SOCKEYE SALMON KEPT											
ESTIMATE	0	0	6	196	17	0	0	9	0	0	0
VARIANCE	0	0	11	12,631	120	0	0	0	0	0	0
NON-TARGETED HPUE											
ESTIMATE	0.0000	0.0000	0.0010	0.0124	0.0024	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000071	0.000003	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
TARGETED HPUE											
ESTIMATE	0.0000	0.0000	0.0015	0.0166	0.0033	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000001	0.000110	0.000005	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
SOCKEYE SALMON RELEASED											
ESTIMATE	0	0	0	0	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0	0	0	0	0

-Continued-

Appendix Table 25. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Juneau area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM										
	16 MAR-26 APR	27 APR-25 MAY	26 MAY-21 JUN	22 JUN-05 JUL	06 JUL-19 JUL	20 JUL-02 AUG	03 AUG-13 AUG	DERBY	17 AUG-30 AUG	31 AUG-13 SEP	14 SEP-27 SEP
<u>HEAVY AND MEDIUM</u>											
<u>USE ACCESS</u>											
<u>LOCATIONS ONLY</u>											
(Continued)											
DOLLY VARDEN KEPT											
ESTIMATE	0	20	124	298	36	29	49	0	0	3	0
VARIANCE	0	158	1,158	11,509	332	232	1,780	0	0	5	0
NON-TARGETED HPUE											
ESTIMATE	0.0000	0.0052	0.0263	0.0512	0.0368	0.0063	0.1674	0.0000	0.0000	0.0006	0.0000
VARIANCE	0.000000	0.000014	0.000130	0.000848	0.001905	0.000023	0.051271	0.000000	0.000000	0.000000	0.000000
DOLLY VARDEN RELEASED											
ESTIMATE	0	0	97	33	5	13	5	9	0	0	0
VARIANCE	0	0	2,622	210	21	102	19	102	0	0	0
ROCKFISH KEPT											
ESTIMATE	0	20	67	63	1,154	84	200	0	34	6	18
VARIANCE	0	216	707	1,306	465,528	1,212	29,852	0	611	9	304
NON-TARGETED HPUE											
ESTIMATE	0.0000	0.0055	0.0280	0.0109	0.1791	0.0198	0.0306	0.0000	0.0034	0.0012	0.0159
VARIANCE	0.000000	0.000024	0.000352	0.000059	0.009015	0.000190	0.000743	0.000000	0.000007	0.000000	0.000268
ROCKFISH RELEASED											
ESTIMATE	0	0	16	71	151	278	0	0	17	0	0
VARIANCE	0	0	110	1,427	6,124	63,736	0	0	235	0	0

-Continued-

Appendix Table 25. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Juneau area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM		
	27 APR-21 JUN	22 JUN-09 AUG	10 AUG-13 SEP
<u>LOW USE AND PRIVATE</u>			
<u>MOORAGE ACCESS</u>			
<u>LOCATIONS ONLY</u>			
NUMBER OF SAMPLES	23	27	20
NUMBER OF BOATS COUNTED	41	106	30
NUMBER OF BOATS INTERVIEWED	40	104	30
HOURS SAMPLED	156	194	120
HOURS AVAILABLE TO SAMPLE	8,298	9,154	4,013
ROD-HOURS FISHED			
ESTIMATE	17,774	30,891	11,134
VARIANCE	28,360,022	24,105,957	7,156,869
SALMON HOURS FISHED			
ESTIMATE	14,714	22,336	8,426
VARIANCE	20,963,221	17,488,909	12,049,398
BOTTOMFISH HOURS FISHED			
ESTIMATE	3,060	8,555	2,709
VARIANCE	1,518,980	1,666,728	1,049,942
BOAT-HOURS FISHED			
ESTIMATE	7,290	13,167	4,826
VARIANCE	5,255,747	3,074,991	1,696,490
PACIFIC HALIBUT KEPT			
ESTIMATE	352	1,069	393
VARIANCE	57,567	50,671	33,679
NON-TARGETED HPUE			
ESTIMATE	0.0376	0.1645	0.2433
VARIANCE	0.000958	0.011789	0.045191
TARGETED HPUE			
ESTIMATE	0.1522	0.5164	1.2540
VARIANCE	0.015736	0.067404	1.957188
PACIFIC HALIBUT RELEASED			
ESTIMATE	608	728	190
VARIANCE	284,744	118,061	14,830

	SEASONAL PERIOD STRATUM		
	27 APR-21 JUN	22 JUN-09 AUG	10 AUG-13 SEP
<u>LOW USE AND PRIVATE</u>			
<u>MOORAGE ACCESS</u>			
<u>LOCATIONS ONLY</u>			
(Continued)			
LARGE CHINOOK SALMON KEPT			
ESTIMATE	288	249	346
VARIANCE	15,381	7,295	37,749
NON-TARGETED HPUE			
ESTIMATE	0.0307	0.0384	0.3136
VARIANCE	0.000377	0.000508	0.032334
TARGETED HPUE			
ESTIMATE	0.0408	0.0535	0.3763
VARIANCE	0.000717	0.001014	0.045014
LARGE CHINOOK SALMON RELEASED			
ESTIMATE	0	0	0
VARIANCE	0	0	0
SMALL CHINOOK SALMON KEPT			
ESTIMATE	0	57	0
VARIANCE	0	605	0
NON-TARGETED HPUE			
ESTIMATE	0.0000	0.0032	0.0000
VARIANCE	0.000000	0.000002	0.000000
TARGETED HPUE			
ESTIMATE	0.0000	0.0049	0.0000
VARIANCE	0.000000	0.000006	0.000000
SMALL CHINOOK SALMON RELEASED			
ESTIMATE	789	264	382
VARIANCE	211,733	8,439	80,165

-Continued-

Appendix Table 25. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Juneau area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM		
	27 APR-21 JUN	22 JUN-09 AUG	10 AUG-13 SEP
<u>LOW USE AND PRIVATE</u>			
<u>MOORAGE ACCESS</u>			
<u>LOCATIONS ONLY</u>			
(Continued)			
COHO SALMON KEPT			
ESTIMATE	0	680	585
VARIANCE	0	63,473	61,860
NON-TARGETED HPUE			
ESTIMATE	0.0000	0.2524	0.6771
VARIANCE	0.000000	0.023677	0.379154
TARGETED HPUE			
ESTIMATE	0.0000	0.3394	0.7431
VARIANCE	0.000000	0.036084	0.401444
COHO SALMON RELEASED			
ESTIMATE	0	38	0
VARIANCE	0	422	0
PINK SALMON KEPT			
ESTIMATE	0	2,068	34
VARIANCE	0	1,633,453	443
NON-TARGETED HPUE			
ESTIMATE	0.0000	0.3880	0.0046
VARIANCE	0.000000	0.088676	0.000010
TARGETED HPUE			
ESTIMATE	0.0000	0.4486	0.0064
VARIANCE	0.000000	0.113248	0.000031
PINK SALMON RELEASED			
ESTIMATE	0	226	0
VARIANCE	0	10,967	0

	SEASONAL PERIOD STRATUM		
	27 APR-21 JUN	22 JUN-09 AUG	10 AUG-13 SEP
<u>LOW USE AND PRIVATE</u>			
<u>MOORAGE ACCESS</u>			
<u>LOCATIONS ONLY</u>			
(Continued)			
CHUM SALMON KEPT			
ESTIMATE	0	20	68
VARIANCE	0	336	1,771
NON-TARGETED HPUE			
ESTIMATE	0.0000	0.0011	0.0091
VARIANCE	0.000000	0.000001	0.000041
TARGETED HPUE			
ESTIMATE	0.0000	0.0017	0.0127
VARIANCE	0.000000	0.000003	0.000126
CHUM SALMON RELEASED			
ESTIMATE	0	0	0
VARIANCE	0	0	0
SOCKEYE SALMON KEPT			
ESTIMATE	0	0	0
VARIANCE	0	0	0
NON-TARGETED HPUE			
ESTIMATE	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000
TARGETED HPUE			
ESTIMATE	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000
SOCKEYE SALMON RELEASED			
ESTIMATE	0	0	0
VARIANCE	0	0	0

-Continued-

Appendix Table 25. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Juneau area marine boat harvest survey.

	SEASONAL PERIOD STRATUM		
	27 APR-21 JUN	22 JUN-09 AUG	10 AUG-13 SEP
<u>LOW USE AND PRIVATE</u>			
<u>MOORAGE ACCESS</u>			
<u>LOCATIONS ONLY</u>			
(Continued)			
DOLLY VARDEN KEPT			
ESTIMATE	96	238	0
VARIANCE	6,186	27,692	0
NON-TARGETED HPUE			
ESTIMATE	0.0362	0.0589	0.0000
VARIANCE	0.002207	0.003366	0.000000
DOLLY VARDEN RELEASED			
ESTIMATE	0	20	0
VARIANCE	0	336	0
ROCKFISH KEPT			
ESTIMATE	76	0	0
VARIANCE	6,131	0	0
NON-TARGETED HPUE			
ESTIMATE	0.0385	0.0000	0.0000
VARIANCE	0.003180	0.000000	0.000000
ROCKFISH RELEASED			
ESTIMATE	0	0	0
VARIANCE	0	0	0

Appendix Table 26. Estimated effort and harvest of the Juneau Golden North Salmon Derby, 1971 to 1987.

Year	Dates Held	Angler ¹ Validation	Chinook Salmon			Coho Salmon			Pink Salmon			Chum Salmon			Sockeye Salmon		
			Entered	Kept	Total	Entered	Kept	Total	Entered	Kept	Total	Entered	Kept	Total	Entered	Kept	Total
1971	7/16-7/18	7,434	682	---	---	1,331	---	---	409	---	---	226	---	---	---	---	-
1972	7/21-7/23	8,199	528	---	---	1,817	---	---	328	---	---	123	---	---	---	---	-
1973	7/20-7/22	7,915	637	---	---	449	---	---	278	---	---	34	---	---	---	---	-
1974	7/26-7/28	7,714	291	---	---	1,526	---	---	226	---	---	24	---	---	---	---	-
1975	7/18-7/20	7,847	276	184	460	315	354	669	174	531	705	15	14	29	0	0	0
1976	7/23-7/25	8,466	136	167	303	536	1,135	1,671	58	96	154	4	12	16	1	0	1
1977	8/05-8/07	8,762	161	355	516	1,206	2,419	3,625	259	55	314	28	1	29	1	1	2
1978	8/11-8/13	8,283	210	40	250	1,779	1,076	2,855	122	98	220	13	9	22	0	0	0
1979	8/03-8/05	8,327	350	657	1,007	663	2,561	3,224	98	242	340	52	44	96	0	5	5
1980	8/22-8/24	7,386	271	206	477	694	1,583	2,277	67	145	212	97	33	130	0	0	0
1981	8/07-8/09	7,524	436	437	873	541	1,223	1,764	104	186	290	22	3	25	0	0	0
1982	8/13-8/15	9,067	407	609	1,016	1,640	3,680	5,320	500	1,487	1,987	15	0	15	0	0	0
1983	8/05-8/07	10,775	310	562	872	1,243	1,721	2,964	728	763	1,491	57	86	143	7	10	17
1984	8/03-8/05	12,832	764	91	855	961	634	1,594	457	119	576	100	0	100	6	0	6
1985	8/09-8/11	12,423	1,020	202	1,222	2,350	569	2,919	2,550 ²	776	3,326	160	13	176	0	8	8
1986	8/01-8/03	---	752	321	1,073	245	122	367	0 ²	213	213	3	14	17	3	0	3
1987	8/14-8/16	---	637	368	1,005	1,779	1,277	3,056	0 ²	336	336	39	31	70	9	0	9

¹ Angler validations and number of Derby tickets sold not comparable since 1985 because 1-day validation requirement has been changed to 1 or 3-day validation.

² Pink salmon were not accepted by the Derby.

Appendix Table 27. Estimated contribution of hatchery produced chinook salmon *Oncorhynchus tshawytscha* to the Juneau marine boat sport fishery from 16 March to 27 September 1987.

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Non-Derby 3/16-6/21		Non-Derby 6/22-8/13		Derby 8/14-16		Non-Derby 8/17-9/27		Total 3/16-9/27	
				Recov	Contr	Recov	Contr	Recov	Contr	Recov	Contr	Recov	Contr
British Columbia	CDFO	Kitimat River	022743			1	10					1	10
			023253			1	9					1	9
			023254					1	2			1	2
			023255			1	9					1	9
	CDFO	Snootli Creek	022741					2	6			2	6
CDFR	Quinsam River	082362			1	9					1	9	
British Columbia Total						4	37	3	8			7	45
Southeast Alaska	ADF&G	Crystal Lake	042353			2	61	5	14			7	75
			042354	1	41	4	173	6	32			11	246
			042355			2	125	3	20			5	145
			042356			4	148	2	14			6	162
			042512					1	5			1	5
			042616					1	9			1	9
	ADF&G	Hidden Falls	042335	1	11	1	11	2	2			4	24
			042336			2	22	3	4	2	27	7	53
	ADF&G	Snettisham	040663					1	9			1	9
			040963			1	9					1	9
			042350			14	639	15	88			29	727
042363			2	18	14	133	8	8			24	159	

-Continued-

Appendix Table 27. Estimated contribution of hatchery produced chinook salmon to the Juneau marine boat sport fishery from 16 March to 27 September 1987 (Continued).

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Non-Derby 3/16-6/21		Non-Derby 6/22-8/13		Derby 8/14-16		Non-Derby 8/17-9/27		Total 3/16-9/27	
				Recov	Contr	Recov	Contr	Recov	Contr	Recov	Contr	Recov	Contr
	NMFS	Little Port Walter	031808			1	9	2	2			3	11
			031811			2	19					2	19
			031812					2	2			2	2
			031815			1	9					1	9
			031826					2	2			2	2
			031827			1	9					1	9
			031829					2	2	1	13	3	15
			031830					2	2			2	2
			031831			1	9					1	9
			031834					1	8			1	8
			031837					1	1			1	1
			031838					1	1			1	1
			031839			4	42	1	1			5	43
			031850					1	9			1	9
			031854			1	9					1	9
			031857					1	1			1	1
			036306					2	2			2	2
			036308			1	10	1	1			2	11
			036309			3	29	1	1			4	30
	SSRAA	Neets Bay	040321					4	14			4	14
	SSRAA	Whitman Lake	042255			1	33					1	33
			042503			2	40	1	1	1	26	4	67
	MIC	Tangas Creek	471625			1	85					1	85
Southeast Alaska Total				4	70	64	1624	72	255	4	66	144	2015
ALL AREAS	GRAND TOTAL			4	70	68	1661	75	263	4	66	151	2060

¹ CDFO = Canadian Department of Fisheries and Oceans CDFR = Canadian Department of Fisheries Research
ADF&G = Alaska Department of Fish and Game NMFS = National Marine Fisheries Service
SSRAA = Southern Southeast Regional Aquaculture Association MIC = Metlakatla Indian Community

Appendix Table 28. Estimated contribution of hatchery and wild tagged coho salmon to the Juneau marine boat sport fishery from 16 March to 27 September 1987.

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Non-Derby 6/22-8/13		Derby 8/14-8/16		Non-Derby 8/17-9/27		Total 6/22-9/13	
				Recov	Contr	Recov.	Contr.	Recov	Contr	Recov	Contr
Southeast Alaska	ADF&G	Berners R. (Wild)	042446			1	NA			1	NA
	ADF&G	Snettisham	B41207	2	72	1	4			3	76
	ADF&G	Speel L. (Wild)	042433			1	NA			1	NA
	NMFS	Auke Creek	032024	1	10	1	8			2	18
	NMFS	(Wild)	031900 032020			8 1	NA NA	1	8	9 1	NA NA

¹ ADF&G = Alaska Department of Fish and Game

NMFS = National Marine Fisheries Service

Appendix Table 29. Estimated effort and harvest for the Haines marine boat recreational fishery during the 20 April - 12 July 1987 period.

	APPROXIMATE 95% C.I. LOWER LIMIT	ESTIMATE	APPROXIMATE 95% C.I. UPPER LIMIT
ROD-HOURS FISHED	21,480	26,594	31,709
SALMON HOURS	18,468	22,850	27,231
BOTTOMFISH HOURS	1,369	3,773	6,178
BOAT-HOURS FISHED	8,857	10,887	12,917
PACIFIC HALIBUT KEPT	211	292	373
PACIFIC HALIBUT RELEASED	6	97	231
LARGE CHINOOK SALMON KEPT AND ENTERED	716	1,094	1,472
DERBY KEPT	60	102	145
DERBY ENTERED	---	67	---
DERBY KEPT AND ENTERED	126	169	212
LARGE CHINOOK SALMON RELEASED	0	0	0
SMALL CHINOOK SALMON KEPT	1	4	11
DERBY KEPT	1	4	11
DERBY ENTERED	---	0	---
DERBY KEPT AND ENTERED	1	4	11
SMALL CHINOOK SALMON RELEASED	523	1,828	3,134
COHO SALMON KEPT	0	0	0
COHO SALMON RELEASED	0	0	0
PINK SALMON KEPT	0	0	0
PINK SALMON RELEASED	0	0	0
CHUM SALMON KEPT	0	0	0
CHUM SALMON RELEASED	0	0	0
SOCKEYE SALMON KEPT	0	0	0
SOCKEYE SALMON RELEASED	0	0	0
DOLLY VARDEN KEPT	13	101	188
DOLLY VARDEN RELEASED	1	12	.
ROCKFISH KEPT	0	0	0
ROCKFISH RELEASED	0	0	0

Appendix Table 30. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Haines area marine boat harvest survey.

	SEASONAL PERIOD STRATUM						
	20 APR-03 MAY	04 MAY-18 MAY	19 MAY-31 MAY	DERBY	01 JUN-14 JUN	15 JUN-28 JUN	29 JUN-12 JUL
<u>HEAVY USE ACCESS</u>							
<u>LOCATIONS ONLY</u>							
NUMBER OF SAMPLES	16	12	6	13	12	11	12
NUMBER OF BOATS COUNTED	2	24	9	89	62	19	7
NUMBER OF BOATS INTERVIEWED	2	24	9	85	62	19	7
HOURS SAMPLED	44	42	21	45	42	39	42
HOURS AVAILABLE TO SAMPLE	438	455	306	254	494	497	494
ROD-HOURS FISHED							
ESTIMATE	68	1,206	1,978	8,284	7,351	3,624	416
VARIANCE	2,037	132,097	61,483	76,359	1,532,228	2,329,446	54,060
SALMON HOURS FISHED							
ESTIMATE	68	1,134	1,950	7,388	7,351	3,472	136
VARIANCE	2,037	122,313	37,168	66,294	1,532,228	2,341,339	10,590
BOTTOMFISH HOURS FISHED							
ESTIMATE	0	71	57	896	0	152	280
VARIANCE	0	3,285	2,957	2,998	0	17,270	34,709
BOAT-HOURS FISHED							
ESTIMATE	29	624	771	3,217	3,313	1,224	195
VARIANCE	427	24,724	21,097	10,649	287,539	241,219	7,030

-Continued-

Appendix Table 30. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Haines area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM						
	20 APR-03 MAY	04 MAY-18 MAY	19 MAY-31 MAY	DERBY	01 JUN-14 JUN	15 JUN-28 JUN	29 JUN-12 JUL
<u>HEAVY USE ACCESS</u>							
<u>LOCATIONS ONLY</u>							
(Continued)							
PACIFIC HALIBUT KEPT							
ESTIMATE	0	6	14	112	40	46	6
VARIANCE	0	32	194	46	303	812	31
NON-TARGETED HPUE							
ESTIMATE	0.0000	0.0051	0.0072	0.0135	0.0055	0.0126	0.0146
VARIANCE	0.000000	0.000025	0.000050	0.000001	0.000006	0.000090	0.000243
TARGETED HPUE							
ESTIMATE	0	0.0870	0.2500	0.1246	--- ¹	0.3000	0.0216
VARIANCE	0	0.011233	0.115596	0.000114	--- ¹	0.102517	0.000597
PACIFIC HALIBUT RELEASED							
ESTIMATE	0	0	0	29	0	0	0
VARIANCE	0	0	0	16	0	0	0
LARGE CHINOOK SALMON KEPT							
ESTIMATE	0	37	43	169	574	225	0
VARIANCE	0	257	0	446	15,764	18,523	0
NON-TARGETED HPUE							
ESTIMATE	0.0000	0.0308	0.0217	0.0205	0.0781	0.0620	0.0000
VARIANCE	0.000000	0.000263	0.000008	0.000007	0.000464	0.002092	0.000000
TARGETED HPUE							
ESTIMATE	0.0000	0.0327	0.0220	0.0229	0.0781	0.0648	0.0000
VARIANCE	0.000000	0.000301	0.000005	0.000009	0.000464	0.002350	0.000000
LARGE CHINOOK SALMON RELEASED							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0

¹ No anglers reported targeting on bottomfish during this period.

-Continued-

Appendix Table 30. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Haines area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM						
	20 APR-03 MAY	04 MAY-18 MAY	19 MAY-31 MAY	DERBY	01 JUN-14 JUN	15 JUN-28 JUN	29 JUN-12 JUL
<u>HEAVY USE ACCESS</u>							
<u>LOCATIONS ONLY</u>							
(Continued)							
SMALL CHINOOK SALMON							
KEPT							
ESTIMATE	0	0	0	4	0	0	0
VARIANCE	0	0	0	12	0	0	0
NON-TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
SMALL CHINOOK SALMON							
RELEASED							
ESTIMATE	0	0	0	246	863	675	0
VARIANCE	0	0	0	6,469	88,010	329,370	0
COHO SALMON KEPT							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0
NON-TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
COHO SALMON RELEASED							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0

-Continued-

Appendix Table 30. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Haines area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM						
	20 APR-03 MAY	04 MAY-18 MAY	19 MAY-31 MAY	DERBY	01 JUN-14 JUN	15 JUN-28 JUN	29 JUN-12 JUL
<u>HEAVY USE ACCESS</u>							
<u>LOCATIONS ONLY</u>							
(Continued)							
PINK SALMON KEPT							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0
NON-TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
PINK SALMON RELEASED							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0
CHUM SALMON KEPT							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0
NON-TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
CHUM SALMON RELEASED							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0

-Continued-

Appendix Table 30. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Haines area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM						
	20 APR-03 MAY	04 MAY-18 MAY	19 MAY-31 MAY	DERBY	01 JUN-14 JUN	15 JUN-28 JUN	29 JUN-12 JUL
<u>HEAVY USE ACCESS</u>							
<u>LOCATIONS ONLY</u>							
(Continued)							
SOCKEYE SALMON KEPT							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0
NON-TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
SOCKEYE SALMON RELEASED							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0
DOLLY VARDEN KEPT							
ESTIMATE	0	0	0	18	60	0	0
VARIANCE	0	0	0	62	1,367	0	0
NON-TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0021	0.0082	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000001	0.000027	0.000000	0.000000
DOLLY VARDEN RELEASED							
ESTIMATE	0	0	0	12	0	0	0
VARIANCE	0	0	0	0	0	0	0
ROCKFISH KEPT							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0
NON-TARGETED HPUE							
ESTIMATE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VARIANCE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
ROCKFISH RELEASED							
ESTIMATE	0	0	0	0	0	0	0
VARIANCE	0	0	0	0	0	0	0

-Continued-

Appendix Table 30. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Haines area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM			SEASONAL PERIOD STRATUM			SEASONAL PERIOD STRATUM	
	04 MAY-14 JUN	15 JUN-12 JUL		04 MAY-14 JUN	15 JUN-12 JUL		04 MAY-14 JUN	15 JUN-12 JUL
<u>LOW USE ACCESS LOCATIONS ONLY</u>			<u>LOW USE ACCESS LOCATIONS ONLY</u> (Continued)			<u>LOW USE ACCESS LOCATIONS ONLY</u> (Continued)		
NUMBER OF SAMPLES	10	8	LARGE CHINOOK SALMON KEPT			COHO SALMON KEPT NON-TARGETED HPUE		
NUMBER OF BOATS COUNTED	6	12	ESTIMATE	10	36	ESTIMATE	0.0000	0.0000
NUMBER OF BOATS INTERVIEWED	6	12	VARIANCE	84	640	VARIANCE	0.000000	0.000000
HOURS SAMPLED	35	28	NON-TARGETED HPUE			TARGETED HPUE		
HOURS AVAILABLE TO SAMPLE	627	495	ESTIMATE	0.0067	0.0164	ESTIMATE	0.0000	0.0000
ROD-HOURS FISHED			VARIANCE	0.000073	0.000175	VARIANCE	0.000000	0.000000
ESTIMATE	1,444	2,222	TARGETED HPUE			COHO SALMON RELEASED		
VARIANCE	1,510,020	842,285	ESTIMATE	0.0116	0.0708	ESTIMATE	0	0
SALMON HOURS FISHED			VARIANCE	0.000224	0.005169	VARIANCE	0	0
ESTIMATE	836	513	LARGE CHINOOK SALMON RELEASED			PINK SALMON KEPT		
VARIANCE	543,767	144,178	ESTIMATE	0	0	ESTIMATE	0	0
BOTTOMFISH HOURS FISHED			VARIANCE	0	0	VARIANCE	0	0
ESTIMATE	608	1,709	SMALL CHINOOK SALMON KEPT			NON-TARGETED HPUE		
VARIANCE	243,346	1,140,747	ESTIMATE	0	0	ESTIMATE	0.0000	0.0000
BOAT-HOURS FISHED			VARIANCE	0	0	VARIANCE	0.000000	0.000000
ESTIMATE	629	886	NON-TARGETED HPUE			TARGETED HPUE		
VARIANCE	306,158	131,395	ESTIMATE	0.0000	0.0000	ESTIMATE	0.0000	0.0000
PACIFIC HALIBUT KEPT			VARIANCE	0.000000	0.000000	VARIANCE	0.000000	0.000000
ESTIMATE	10	58	TARGETED HPUE			PINK SALMON RELEASED		
VARIANCE	84	147	ESTIMATE	0.0000	0.0000	ESTIMATE	0	0
NON-TARGETED HPUE			VARIANCE	0.000000	0.000000	VARIANCE	0	0
ESTIMATE	0.0067	0.0261	SMALL CHINOOK SALMON RELEASED			NON-TARGETED HPUE		
VARIANCE	0.000073	0.000146	ESTIMATE	0	45	VARIANCE	0.000000	0.000000
TARGETED HPUE			VARIANCE	0	1,976	TARGETED HPUE		
ESTIMATE	0.0159	0.0340	COHO SALMON KEPT			ESTIMATE	0.0000	0.0000
VARIANCE	0.000394	0.000502	ESTIMATE	0	0	VARIANCE	0.000000	0.000000
PACIFIC HALIBUT RELEASED			VARIANCE	0	0	CHUM SALMON KEPT		
ESTIMATE	0	68	SMALL CHINOOK SALMON KEPT			ESTIMATE	0	0
VARIANCE	0	4,446	ESTIMATE	0	0	VARIANCE	0	0
			VARIANCE	0	0	NON-TARGETED HPUE		
						VARIANCE	0.000000	0.000000
						TARGETED HPUE		
						ESTIMATE	0.0000	0.0000
						VARIANCE	0.000000	0.000000
						CHUM SALMON RELEASED		
						ESTIMATE	0	0
						VARIANCE	0	0

-Continued-

Appendix Table 30. Estimated angler effort, catch, harvest, and harvest per unit effort (HPUE) by species with estimated variances by sampling period, for the 1987 Haines area marine boat harvest survey (Continued).

	SEASONAL PERIOD STRATUM	
	04 MAY-14 JUN	15 JUN-12 JUL
<u>LOW USE ACCESS</u>		
<u>LOCATIONS ONLY</u>		
(Continued)		
SOCKEYE SALMON KEPT		
ESTIMATE	0	0
VARIANCE	0	0
NON-TARGETED HPUE		
ESTIMATE	0.0000	0.0000
VARIANCE	0.000000	0.000000
TARGETED HPUE		
ESTIMATE	0.0000	0.0000
VARIANCE	0.000000	0.000000
SOCKEYE SALMON RELEASED		
ESTIMATE	0	0
VARIANCE	0	0
DOLLY VARDEN KEPT		
ESTIMATE	0	23
VARIANCE	0	494
NON-TARGETED HPUE		
ESTIMATE	0.0000	0.0102
VARIANCE	0.000000	0.000118
DOLLY VARDEN RELEASED		
ESTIMATE	0	0
VARIANCE	0	0
ROCKFISH KEPT		
ESTIMATE	0	0
VARIANCE	0	0
NON-TARGETED HPUE		
ESTIMATE	0.0000	0.0000
VARIANCE	0.000000	0.000000
ROCKFISH RELEASED		
ESTIMATE	0	0
VARIANCE	0	0

Appendix Table 31. Estimated contribution of hatchery produced chinook salmon to the Haines marine boat sport fishery from 20 April to 12 July 1987.

Region	Agency ¹	Hatchery/ Release Site	Tag Code	Non-Derby		Derby		Total	
				4/20-7/12		5/23-25,30-31		4/20-7/12	
				Recov	Contr	Recov.	Contr.	Recov	Contr
Southeast Alaska	ADF&G	Little Port Walter	031811	1	14			1	14

¹ ADF&G = Alaska Department of Fish and Game

Appendix Table 32. Estimated angler effort and harvest of selected Alaska marine boat sport fisheries during 1987. Does not include the estimates for the Yes Bay Lodge fishery.

Fishery	Time Period	Boat- hours	Rod- hours	Salmon- hours	Bottom- fish- hours	Large Chinook Salmon		Small Chinook Salmon		Pacific Halibut		Coho Salmon	Pink Salmon	Chum Salmon	Sockeye Salmon	Dolly Varden	Rockfish	
						Re- Kept	Re- Leased	Re- Kept	Re- Leased	Re- Kept	Re- Leased						Kept	Kept
Ketchikan	4/20 - 9/27	95,818	242,274	157,306	84,954	4,415	118	308	16,775	10,493	3,390	10,464	7,646	235	114	---	18,591	27,539
Petersburg	4/20 - 9/13	15,557	35,501	21,906	11,665	1,398	214	3	340	1,595	1,375	210	310	44	31	0	81	285
Wrangell	4/20 - 9/13	20,851	51,355	38,895	14,461	1,213	261	5	261	1,894	100	192	275	0	24	5	268	25
Sitka ²	4/20 - 9/13	24,129	58,814	33,130	24,266	2,354	0	112	4,084	8,314	7,214	1,185	1,327	73	223	---	3,469	14,444
Juneau	3/16 - 9/27	154,827	401,840	307,124	94,658	8,656	318	230	6,198	13,513	10,357	17,610	12,219	715	227	893	1,720	533
Haines	4/20 - 7/12	10,887	26,594	22,850	3,773	1,094	0	4	1,828	292	97	0	0	0	0	101	0	0
TOTAL		322,069	816,378	581,211	233,777	19,130	911	662	29,486	36,101	22,533	29,661	21,777	1,067	619	999	24,129	42,826

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¹ Dolly Varden harvest was not estimated for the Ketchikan and Sitka fisheries during 1987.

² Does not include the estimated 952 ling cod harvested by Sitka anglers in 1987.

Appendix Table 33. Sampled chinook salmon harvest rates (fish retained per rod-hour of non-targeted effort) in the Juneau marine sport fishery, 1960 to 1987.¹

Period	1	2	3	4	5	6	7	8	9	10	11	12	13	Seasonal Mean ²
Dates ²	4/15- 4/30	5/01- 5/14	5/15- 5/28	5/29- 6/11	6/12- 6/25	6/26- 7/09	7/10- 7/23	7/24- 8/06	8/07- 8/20	8/21- 9/03	9/04- 9/17	9/18- 10/01	10/02- 10/15	05/01- 09/03
1960	---	.092	.047	.072	.063	.065	.033	.020	.031	.008	.000	---	---	.049
1961	---	.051	.064	.060	.034	.036	.029	.035	.020	.005	---	---	---	.036
1962	---	.022	.033	.030	.014	.003	.014	.034	.008	.015	---	---	---	.016
1963	---	.090	.089	.086	.048	.060	.045	.030	.019	.020	.013	---	---	.046
1964	---	.075	.070	.065	.053	.045	.078	.039	.022	.013	---	---	---	.054
1965	---	.055	.069	.059	.028	.027	.037	.032	.014	.013	---	---	---	.035
1966	---	.000	.036	.026	.033	.027	.020	.022	.028	.034	---	---	---	.029
1967	---	.008	.031	.045	.035	.032	.025	.019	.012	.018	---	---	---	.030
1968	---	---	---	.028	.033	.036	.048	.035	.028	.023	---	---	---	.037
1969	---	---	---	.036	.047	.048	.034	.033	.030	---	---	---	---	.038
1970	---	---	---	.046	.025	.016	.028	.015	.017	.013	---	---	---	.021
1971	---	.014	.041	.052	.038	.032	.034	.033	.040	.027	.015	---	---	.015
1972	---	---	---	.016	.031	.023	.033	.029	.049	.024	.028	---	---	.029
1973	---	.050	.029	.032	.035	.048	.057	.029	.012	.023	---	---	---	.030
1974	---	.007	.017	.015	.036	.031	.017	.018	.014	.017	.017	---	---	.020
1975	---	.030	.018	.034	.022	.018	.030	.007	.007	.002	.004	.004	---	.012
1976	---	.023	.026	.024	.030	.020	.016	.007	.006	.006	.003	.002	.000	.013
1977	---	.015	.032	.023	.025	.011	.016	.010	.001	.003	.003	.000	---	.016
1978	---	.037	.029	.024	.023	.008	.004	.005	.001	.004	.002	.000	---	.013
1979	---	.032	.037	.019	.016	.009	.021	.010	.004	.008	.004	.001	---	.015
1980	---	.028	.036	.033	.024	.019	.013	.014	.010	.008	.010	.009	---	.019
1981	---	.036	.024	.025	.020	.013	.016	.009	.007	.008	.006	.004	---	.016
1982	---	.019	.023	.029	.015	.024	.014	.012	.008	.019	.019	.027	---	.017
1983	.002	.016	.020	.012	.020	.014	.018	.010	.008	.009	.012	.007	---	.013
1984	---	.019	.029	.019	.023	.035	.031	.022	.015	.012	.011	.024	---	.023
1985	.021	.033	.023	.023	.024	.019	.032	.044	.031	.009	.011	.010	---	.026
1986	.004	.013	.021	.013	.011	.011	.023	.038	.012	.009	.006	.007	---	.016
1987	.000	.020	.008	.018	.017	.027	.041	.025	.033	.014	.012	.004	---	.025

¹ Excludes derby data.

² Actual dates for each period may slightly vary between years.

Appendix Table 34. Sampled coho salmon harvest rates (fish retained per rod-hour of non-targeted effort) in the Juneau marine sport fishery, 1960 to 1987.¹

Period	1	2	3	4	5	6	7	8	9	10	11	12	13	Seasonal Mean ²
Dates ²	4/15- 4/30	5/01- 5/14	5/15- 5/28	5/29- 6/11	6/12- 6/25	6/26- 7/09	7/10- 7/23	7/24- 8/06	8/07- 8/20	8/21- 9/03	9/04- 9/17	9/18- 10/01	10/02- 10/15	05/01- 09/03
1960	---	.000	.000	.003	.002	.003	.009	.055	.065	.092	.034	---	---	.045
1961	---	.000	.000	.000	.001	.006	.042	.079	.054	.100	---	---	---	.056
1962	---	.000	.000	.000	.010	.002	.014	.034	.086	.126	---	---	---	.052
1963	---	.000	.000	.002	.006	.020	.044	.102	.145	.121	.143	---	---	.086
1964	---	.000	.001	.002	.004	.035	.041	.099	.095	.131	---	---	---	.080
1965	---	.000	.000	.015	.007	.026	.074	.093	.114	.108	---	---	---	.083
1966	---	.000	.000	.001	.002	.019	.028	.049	.085	.063	---	---	---	.049
1967	---	.000	.000	.000	.006	.015	.019	.034	.074	.063	---	---	---	.041
1968	---	---	---	.000	.061	.072	.119	.143	.149	.232	---	---	---	.133
1969	---	---	---	.000	.012	.026	.030	.081	.099	---	---	---	---	.059
1970	---	---	---	.002	.002	.021	.042	.057	.100	.106	---	---	---	.065
1971	---	.000	.000	.002	.005	.013	.038	.080	.087	.073	.196	---	---	.058
1972	---	---	---	.000	.051	.093	.102	.237	.127	.133	.120	---	---	.142
1973	---	---	.000	.005	.006	.023	.023	.034	.061	.096	---	---	---	.047
1974	---	.000	.002	.001	.008	.044	.066	.087	.089	.092	.133	---	---	.076
1975	---	.000	.000	.004	.002	.025	.036	.061	.097	.066	.081	.060	---	.059
1976	---	.000	.000	.002	.006	.029	.040	.054	.063	.079	.065	.060	.005	.053
1977	---	.000	.001	.000	.013	.044	.081	.068	.058	.056	.045	.016	---	.061
1978	---	.000	.000	.000	.015	.065	.092	.129	.143	.106	.065	.055	---	.107
1979	---	.000	.000	.000	.002	.014	.037	.039	.043	.090	.078	.003	---	.041
1980	---	.000	.000	.001	.001	.015	.047	.068	.089	.083	.057	.060	---	.055
1981	---	.000	.000	.000	.000	.021	.034	.046	.085	.101	.067	.018	---	.034
1982	---	.000	.000	.002	.007	.069	.084	.112	.147	.153	.105	.031	---	.113
1983	.000	.000	.000	.000	.002	.003	.034	.054	.078	.109	.102	.061	---	.063
1984	---	.000	.000	.000	.002	.009	.027	.024	.060	.138	.096	.017	---	.050
1985	.000	.000	.000	.000	.002	.032	.067	.061	.082	.135	.097	.076	---	.073
1986	.000	.000	.000	.000	.001	.002	.003	.019	.074	.110	.066	.023	---	.043
1987	.000	.000	.000	.000	.001	.018	.049	.077	.068	.089	.065	.025	---	.059

¹ Excludes derby data.

² Actual dates for each period may slightly vary between years.

Appendix Table 35. Summary of harvest and hatchery contribution for chinook and coho salmon in selected Alaska marine boat sport fisheries during 1987.

Fishery	Time Period	Chinook Salmon			Coho Salmon		
		Harvest	Contribution		Harvest	Contribution	
			Number	%		Number	%
Ketchikan	4/20 - 9/27	4,723	1,409	30	10,464	4,663	45
Yes Bay	5/20 - 6/30	375	102	27	1	0	0
Petersburg	4/20 - 9/13	1,401	670	48	210	0	0
Wrangell	4/20 - 9/13	1,218	5	<1	192	36	19
Sitka	4/20 - 9/13	2,466	150	6	1,185	57	5
Juneau	3/16 - 9/27	8,886	2,060	23	17,610	94	1
Haines	4/20 - 7/12	1,098	14	1	0	0	---
	TOTAL	20,167	4,410	22	29,662	4,850	16

Appendix Table 36. Estimated angler effort and catches, with variances for the Thomas Basin Terminal Harvest Area (THA) recreational fishery for the 15 June - 2 August period.

	TOTAL
EFFORT (ROD-HOURS)	
POINT ESTIMATE	1,951
ESTIMATED VARIANCE	280,374
SMALL CHINOOK SALMON KEPT	
POINT ESTIMATE	0
ESTIMATED VARIANCE	0
LARGE CHINOOK SALMON KEPT	
POINT ESTIMATE	64
ESTIMATED VARIANCE	2,113
SMALL CHINOOK SALMON RELEASED	
POINT ESTIMATE	0
ESTIMATED VARIANCE	0
LARGE CHINOOK SALMON RELEASED	
POINT ESTIMATE	0
ESTIMATED VARIANCE	0

Appendix Table 37. Estimated angler effort and catches, with variances for the Blind Slough Terminal Harvest Area (THA) recreational fishery for the 1 June - 27 July 1987 period.

	SEASONAL PERIOD								TOTAL
	01JUN87- 07JUN87	08JUN87- 14JUN87	15JUN87- 21JUN87	22JUN87- 28JUN87	29JUN87- 05JUL87	06JUL87- 12JUL87	13JUL87- 19JUL87	20JUL87- 26JUL87	
EFFORT (ROD-HOURS)									
POINT ESTIMATE	154	279	459	980	747	912	357	668	4,555
ESTIMATED VARIANCE	670	4,679	1,125	95,735	42,395	22,235	7,265	31,401	205,505
SMALL CHINOOK SALMON KEPT									
POINT ESTIMATE	0	18	36	34	48	28	8	0	173
ESTIMATED VARIANCE	0	70	102	138	366	175	18	0	869
LARGE CHINOOK SALMON KEPT									
POINT ESTIMATE	0	3	46	106	116	146	84	84	585
ESTIMATED VARIANCE	0	1	247	886	1,761	2,809	763	341	6,808
SMALL CHINOOK SALMON RELEASED									
POINT ESTIMATE	2	2	26	24	70	23	5	8	159
ESTIMATED VARIANCE	1	1	541	90	776	376	1	60	1,846
LARGE CHINOOK SALMON RELEASED									
POINT ESTIMATE	0	0	2	18	24	79	54	324	502
ESTIMATED VARIANCE	0	0	1	143	176	2,456	344	7,385	10,506
COHO SALMON KEPT									
POINT ESTIMATE	0	0	0	0	0	0	0	3	3
ESTIMATED VARIANCE	0	0	0	0	0	0	0	5	5
PINK SALMON KEPT									
POINT ESTIMATE	0	0	0	0	0	0	0	3	3
ESTIMATED VARIANCE	0	0	0	0	0	0	0	5	5
CHUM SALMON KEPT									
POINT ESTIMATE	0	0	0	0	0	0	0	0	0
ESTIMATED VARIANCE	0	0	0	0	0	0	0	0	0
DOLLY VARDEN KEPT									
POINT ESTIMATE	26	0	15	0	4	0	8	0	54
ESTIMATED VARIANCE	606	0	59	0	12	0	48	0	724
CUTTHROAT TROUT KEPT									
POINT ESTIMATE	29	0	12	6	12	0	8	0	68
ESTIMATED VARIANCE	247	0	15	15	44	0	48	0	369

Appendix Table 38. Weekly harvest per unit effort (HPUE) by species for the Blind Slough Terminal Harvest Area (THA) recreational fishery for the 1 June - 27 July 1987 period.

WEEK	ROD- HOURS	LARGE CHINOOK SALMON		SMALL CHINOOK SALMON		COHO SALMON	PINK SALMON	CHUM SALMON	DOLLY VARDEN	CUTTHROAT TROUT
		----- KEPT	----- RELE	----- KEPT	----- RELE					
6/01-6/07	76.0	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.105	0.184
6/08-6/14	116.0	0.017	0.000	0.060	0.009	0.000	0.000	0.000	0.000	0.000
6/15-6/21	187.0	0.107	0.005	0.064	0.037	0.000	0.000	0.000	0.027	0.016
6/22-6/28	426.0	0.113	0.016	0.026	0.021	0.000	0.000	0.000	0.000	0.009
6/29-7/05	297.8	0.151	0.034	0.050	0.094	0.000	0.000	0.000	0.003	0.010
7/06-7/12	298.3	0.144	0.070	0.023	0.023	0.000	0.000	0.000	0.000	0.000
7/13-7/19	163.0	0.294	0.209	0.012	0.018	0.000	0.000	0.000	0.012	0.012
7/20-7/26	211.3	0.128	0.459	0.000	0.009	0.005	0.005	0.000	0.000	0.000

Appendix Table 39. Descriptions of sport fisheries along the Juneau road system surveyed in 1987.

Fishery	Description
<u>Saltwater beaches</u>	
Echo Cove	(end of Glacier Highway-Mile 40 or 64.4 km) Fishery extends along the east side and south end of cove for about one-half mile (0.8 km).
North Bridget Cove	(Glacier Highway-Mile 37 or 59.5 km) The cove is located 200 yards (183 m) from the parking area and fishery occurs in small cove.
Sunshine Cove	(Glacier Highway-Mile 36 or 57.9 km) This fishery extends for about 400 yards (366 m) around cove and is accessible just off highway.
Sunrise Beach	(Glacier Highway-Mile 35.5 or 57.1 km) Small beach fishery is accessible just off highway along rocky shore.
End of Road Bluffs	(Glacier Highway-Mile 33 or 53.1 km) Small fishery along bluffs accessible from steep trails from two parking lots.
Eagle Beach	(Glacier Highway-Mile 27 or 43.4 km); Extends for one-half mile (0.8 km) adjacent to Eagle Beach picnic area.
Scout Camp	(parking lot accessible from mile (0.8 km) long access road extending west from Glacier Highway-Mile 26 or 41.8 km) Beach accessible by two mile (3.2 km) hike from parking lot. Beach fished extends for about one-half mile (0.8 km).
Amalga Harbor	(parking lot accessible from mile (1.6 km) long access road extending west from Glacier Highway-Mile 24 or 38.6 km) Fishery occurs from boat launch area north one-quarter mile (0.4 km) to mouth of Peterson Creek.
Shrine Island	(located at Shrine of St. Therese, Glacier Highway-Mile 23 or 37.0 km) Fishery occurs from rocks around Shrine Island.
Point Louisa	(accessible from road in Auke Village Campground at Glacier Highway-Mile 14.5 or 23.3 km) Fishery occurs from rocks for 300 yards (274 m) along point.
Auke Bay Floats	(Glacier Highway-Mile 13 or 20.9 km) Fishery occurs from docks in Auke Bay which includes Government Dock, Auke Launch Ramp, and Dehart's Marina.
Auke Creek Mouth	(Glacier Highway-Mile 12 or 19.3 km) Fishery occurs along beach at mouth of Auke Creek. Fishing in Auke Creek is closed.
Sheep Creek Mouth	(Thane Road-Mile 5 or 8.0 km) Fishery occurs in saltwater as creek is closed to salmon fishing and area around nearby weir is often closed to fishing.
Kowee Creek Mouth	(North Douglas Highway-Mile 0 or 0 km) Fishery occurs primarily in saltwater within 100 yards (91 m) of mouth of Kowee Creek.
North Douglas Boat Ramp	(North Douglas Highway-Mile 9 or 14.5 km) Fishery is dispersed for about a mile (0.8 km) east and west of boat launch ramp.
Picnic Cove	(North Douglas Highway-Mile 10 or 16.1 km) Fishing dispersed along 300 yards (274 m) of cove immediately off parking area.
Bay View Subdivision	(channel located near subdivision accessed from road at North Douglas Highway-Mile 8 or 12.9 km) Fishery is dispersed along channel for about 400 yards (366 m).

-Continued-

Appendix Table 39. Descriptions of sport fisheries along the Juneau road system surveyed in 1987 (Continued).

Fishery	Description
<u>Freshwater Streams and Lakes</u>	
Cowee Creek	(Glacier Highway-Mile 39 or 62.8 km) Fishing occurs from 300 yards (274 m) above bridge to about a mile (1.6 km) below bridge.
Peterson Creek	(Glacier Highway-Mile 24 or 38.6 km) Fishery is dispersed from gorge one mile (1.6 km) upstream of highway bridge to mouth, a distance of about 2.5 miles (4.0 km). This fishery includes the salt chuck just upstream of the mouth.
Auke Lake	(Glacier Highway-Mile 12 or 19.3 km and Back Loop Road)--Fishery accessible from mouth of Lake Creek as well as from parking lot on Glacier Highway.
Montana Creek	<p>Divided into three different areas: Lower, Middle, and Upper.</p> <p>Lower area -- The lower area is accessed from the Brotherhood Bridge (Glacier Highway-Mile 10 or 16.1 km) by a trail which follows the Mendenhall River about one mile (1.6 km) upstream to the mouth of the creek. The lower area includes the mouth of the creek and upstream approximately 200 yards (183 m) and also the area approximately 100 yards (91 m) downstream in the Mendenhall River.</p> <p>Middle area -- Includes waters 200 yards (183 m) both upstream and downstream from the Back Loop Bridge crossing of the creek.</p> <p>Upper area - Creek accessed from parking areas distributed along Montana Creek Road from approximately "the gorge" to the end of the road (about 3 miles or 4.8 km).</p>
Twin Lakes	(Egan Expressway-Mile 3 or 4.8 km) Fishery occurs in both north and south basins of lake in scattered locations along the Old Glacier highway.
Salmon Creek	(Egan Expressway-Mile 3 or 4.8 km) Fishery accessible from main Twin Lakes parking lot or from lot on west side of expressway. Fishery extends from freshwater several hundred yards upstream from Egan Expressway bridge to saltwater which begins at bridge. Much of freshwater portion of creek closed when a weir is in place.
Fish Creek	(North Douglas Highway-Mile 8 or 12.9 km) Creek flows into Fritz Cove on north end of Douglas Island. Fishery extends from saltwater area at mouth upstream 0.5 mile (0.8 km) to 200 yards (183 m) above highway bridge.

Appendix Table 40. Estimated angler effort and catches for the Juneau roadside recreational fishery survey by area for 1987.

	SEASONAL PERIOD					TOTAL	SEASONAL PERIOD					TOTAL
	20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87			20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87		
<u>ECHO COVE</u>						<u>COWEE CREEK</u>						
ROD-HOURS	405	4,451	0	---	4,855	487	2,473	890	1,221	5,071		
SMALL CHINOOK SALMON KEPT	0	0	---	---	0	0	0	0	0	0		
COHO SALMON KEPT	0	0	---	---	0	0	0	110	0	110		
COHO SALMON RELEASED	0	0	---	---	0	0	0	0	0	0		
PINK SALMON KEPT	0	1,252	---	---	1,252	0	893	0	0	893		
PINK SALMON RELEASED	0	28	---	---	28	0	2,785	441	0	3,226		
CHUM SALMON KEPT	0	0	---	---	0	0	300	0	0	300		
CHUM RELEASED	0	0	---	---	0	0	343	0	0	343		
DOLLY VARDEN KEPT	117	189	---	---	306	0	120	264	93	477		
DOLLY VARDEN RELEASED	0	219	---	---	219	0	521	0	10	532		
CUTTHROAT KEPT	0	0	---	---	0	0	0	0	0	0		
CUTTHROAT RELEASED	0	0	---	---	0	0	0	0	0	0		
PACIFIC HALIBUT KEPT	0	0	---	---	0	0	0	0	0	0		
PACIFIC HALIBUT RELEASED	0	0	---	---	0	0	0	0	0	0		
STEELHEAD KEPT	0	0	---	---	0	0	0	0	0	0		
STEELHEAD RELEASED	0	0	---	---	0	0	0	0	0	0		
JACK OR SMALL COHO SALMON KEPT	0	0	---	---	0	0	0	0	8	8		
JACK OR SMALL COHO SALMON RELEASED	0	0	---	---	0	0	0	0	44	44		
<u>NORTH BRIDGET COVE</u>						<u>SUNSHINE COVE</u>						
ROD-HOURS	68	91	0	---	158	1,177	1,413	110	---	2,700		
SMALL CHINOOK SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
COHO SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
COHO SALMON RELEASED	0	0	0	---	0	0	0	0	---	0		
PINK SALMON KEPT	0	242	0	---	242	0	82	0	---	82		
PINK SALMON RELEASED	0	0	0	---	0	0	0	0	---	0		
CHUM SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
CHUM RELEASED	0	0	0	---	0	0	0	0	---	0		
DOLLY VARDEN KEPT	30	0	0	---	30	329	216	0	---	546		
DOLLY VARDEN RELEASED	15	0	0	---	15	86	134	0	---	220		
CUTTHROAT KEPT	8	0	0	---	8	0	0	0	---	0		
CUTTHROAT RELEASED	0	0	0	---	0	0	0	0	---	0		
PACIFIC HALIBUT KEPT	0	0	0	---	0	0	0	0	---	0		
PACIFIC HALIBUT RELEASED	0	0	0	---	0	0	0	0	---	0		
STEELHEAD KEPT	0	0	0	---	0	0	0	0	---	0		
STEELHEAD RELEASED	0	0	0	---	0	0	0	0	---	0		
JACK OR SMALL COHO SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
JACK OR SMALL COHO SALMON RELEASED	0	0	0	---	0	0	0	0	---	0		

-Continued-

Appendix Table 40. Estimated angler effort and catches for the Juneau roadside recreational fishery survey by area for 1987 (Continued).

	SEASONAL PERIOD					TOTAL	SEASONAL PERIOD					TOTAL
	20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87			20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87		
<u>SUNRISE BEACH</u>						<u>END OF ROAD BLUFFS</u>						
ROD-HOURS	0	961	0	---	961	ROD-HOURS	0	91	0	---	91	
SMALL CHINOOK SALMON KEPT	---	0	---	---	0	SMALL CHINOOK SALMON KEPT	---	0	---	---	0	
COHO SALMON KEPT	---	0	---	---	0	COHO SALMON KEPT	---	0	---	---	0	
COHO SALMON RELEASED	---	0	---	---	0	COHO SALMON RELEASED	---	0	---	---	0	
PINK SALMON KEPT	---	330	---	---	330	PINK SALMON KEPT	---	0	---	---	0	
PINK SALMON RELEASED	---	0	---	---	0	PINK SALMON RELEASED	---	0	---	---	0	
CHUM SALMON KEPT	---	0	---	---	0	CHUM SALMON KEPT	---	0	---	---	0	
CHUM RELEASED	---	0	---	---	0	CHUM RELEASED	---	0	---	---	0	
DOLLY VARDEN KEPT	---	0	---	---	0	DOLLY VARDEN KEPT	---	0	---	---	0	
DOLLY VARDEN RELEASED	---	0	---	---	0	DOLLY VARDEN RELEASED	---	0	---	---	0	
CUTTHROAT KEPT	---	0	---	---	0	CUTTHROAT KEPT	---	0	---	---	0	
CUTTHROAT RELEASED	---	46	---	---	46	CUTTHROAT RELEASED	---	0	---	---	0	
PACIFIC HALIBUT KEPT	---	0	---	---	0	PACIFIC HALIBUT KEPT	---	0	---	---	0	
PACIFIC HALIBUT RELEASED	---	0	---	---	0	PACIFIC HALIBUT RELEASED	---	0	---	---	0	
STEELHEAD KEPT	---	0	---	---	0	STEELHEAD KEPT	---	0	---	---	0	
STEELHEAD RELEASED	---	0	---	---	0	STEELHEAD RELEASED	---	0	---	---	0	
JACK OR SMALL COHO SALMON KEPT	---	0	---	---	0	JACK OR SMALL COHO SALMON KEPT	---	0	---	---	0	
JACK OR SMALL COHO SALMON RELEASED	---	0	---	---	0	JACK OR SMALL COHO SALMON RELEASED	---	0	---	---	0	
<u>EAGLE BEACH</u>						<u>SCOUT CAMP</u>						
ROD-HOURS	101	60	0	---	161	ROD-HOURS	2,315	240	0	---	2,555	
SMALL CHINOOK SALMON KEPT	0	0	---	---	0	SMALL CHINOOK SALMON KEPT	0	0	---	---	0	
COHO SALMON KEPT	0	0	---	---	0	COHO SALMON KEPT	0	0	---	---	0	
COHO SALMON RELEASED	0	0	---	---	0	COHO SALMON RELEASED	0	0	---	---	0	
PINK SALMON KEPT	0	0	---	---	0	PINK SALMON KEPT	0	0	---	---	0	
PINK SALMON RELEASED	0	0	---	---	0	PINK SALMON RELEASED	0	137	---	---	137	
CHUM SALMON KEPT	0	0	---	---	0	CHUM SALMON KEPT	0	0	---	---	0	
CHUM RELEASED	0	0	---	---	0	CHUM RELEASED	0	0	---	---	0	
DOLLY VARDEN KEPT	0	0	---	---	0	DOLLY VARDEN KEPT	125	0	---	---	125	
DOLLY VARDEN RELEASED	0	0	---	---	0	DOLLY VARDEN RELEASED	349	411	---	---	761	
CUTTHROAT KEPT	0	0	---	---	0	CUTTHROAT KEPT	0	0	---	---	0	
CUTTHROAT RELEASED	0	0	---	---	0	CUTTHROAT RELEASED	0	0	---	---	0	
PACIFIC HALIBUT KEPT	0	0	---	---	0	PACIFIC HALIBUT KEPT	0	0	---	---	0	
PACIFIC HALIBUT RELEASED	0	0	---	---	0	PACIFIC HALIBUT RELEASED	0	0	---	---	0	
STEELHEAD KEPT	0	0	---	---	0	STEELHEAD KEPT	0	0	---	---	0	
STEELHEAD RELEASED	0	0	---	---	0	STEELHEAD RELEASED	0	0	---	---	0	
JACK OR SMALL COHO SALMON KEPT	0	0	---	---	0	JACK OR SMALL COHO SALMON KEPT	0	0	---	---	0	
JACK OR SMALL COHO SALMON RELEASED	0	0	---	---	0	JACK OR SMALL COHO SALMON RELEASED	0	0	---	---	0	

-Continued-

Appendix Table 40. Estimated angler effort and catches for the Juneau roadside recreational fishery survey by area for 1987 (Continued).

	SEASONAL PERIOD					TOTAL	SEASONAL PERIOD					TOTAL
	20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87			20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87		
<u>AMALGA HARBOR</u>						<u>PETERSON CREEK</u>						
ROD-HOURS	832	181	0	---	1,013	1,388	181	1,400	363	3,333		
SMALL CHINOOK SALMON KEPT	0	0	---	---	0	0	0	0	0	0		
COHO SALMON KEPT	0	0	---	---	0	0	118	0	0	118		
COHO SALMON RELEASED	0	0	---	---	0	0	394	0	0	394		
PINK SALMON KEPT	0	0	---	---	0	0	0	0	0	0		
PINK SALMON RELEASED	0	0	---	---	0	0	181	39	0	221		
CHUM SALMON KEPT	0	0	---	---	0	0	0	0	0	0		
CHUM RELEASED	0	0	---	---	0	0	0	0	0	0		
DOLLY VARDEN KEPT	48	0	---	---	48	0	0	158	174	332		
DOLLY VARDEN RELEASED	144	0	---	---	144	1,340	0	79	61	1,480		
CUTTHROAT KEPT	0	0	---	---	0	0	0	79	0	79		
CUTTHROAT RELEASED	0	0	---	---	0	0	0	0	0	0		
PACIFIC HALIBUT KEPT	0	0	---	---	0	0	0	0	0	0		
PACIFIC HALIBUT RELEASED	0	0	---	---	0	0	0	0	0	0		
STEELHEAD KEPT	0	0	---	---	0	0	0	0	0	0		
STEELHEAD RELEASED	0	0	---	---	0	56	0	0	0	56		
JACK OR SMALL COHO SALMON KEPT	0	0	---	---	0	0	0	0	0	0		
JACK OR SMALL COHO SALMON RELEASED	0	0	---	---	0	0	0	0	90	90		
<u>SHRINE ISLAND</u>						<u>POINT LOUISA</u>						
ROD-HOURS	785	2,348	595	---	3,728	988	4,149	0	---	5,137		
SMALL CHINOOK SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
COHO SALMON KEPT	0	43	0	---	43	0	0	0	---	0		
COHO SALMON RELEASED	0	43	0	---	43	0	0	0	---	0		
PINK SALMON KEPT	0	677	0	---	677	0	695	0	---	695		
PINK SALMON RELEASED	0	43	0	---	43	0	909	0	---	909		
CHUM SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
CHUM RELEASED	0	0	0	---	0	0	0	0	---	0		
DOLLY VARDEN KEPT	125	0	0	---	125	126	51	0	---	177		
DOLLY VARDEN RELEASED	97	43	0	---	141	415	354	0	---	768		
CUTTHROAT KEPT	0	0	0	---	0	0	0	0	---	0		
CUTTHROAT RELEASED	0	0	0	---	0	0	0	0	---	0		
PACIFIC HALIBUT KEPT	0	0	0	---	0	0	0	0	---	0		
PACIFIC HALIBUT RELEASED	0	0	0	---	0	0	0	0	---	0		
STEELHEAD KEPT	0	0	0	---	0	0	0	0	---	0		
STEELHEAD RELEASED	0	0	0	---	0	0	0	0	---	0		
JACK OR SMALL COHO SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
JACK OR SMALL COHO SALMON RELEASED	0	0	0	---	0	0	0	0	---	0		

-Continued-

Appendix Table 40. Estimated angler effort and catches for the Juneau roadside recreational fishery survey by area for 1987 (Continued).

	SEASONAL PERIOD					TOTAL	SEASONAL PERIOD					TOTAL
	20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87			20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87		
<u>AUKE BAY FLOATS</u>						<u>AUKE CREEK MOUTH</u>						
ROD-HOURS	0	0	450	---	450	0	538	0	---	538		
SMALL CHINOOK SALMON KEPT	---	---	0	---	0	---	0	---	---	0		
COHO SALMON KEPT	---	---	0	---	0	---	0	---	---	0		
COHO SALMON RELEASED	---	---	0	---	0	---	0	---	---	0		
PINK SALMON KEPT	---	---	0	---	0	---	175	---	---	175		
PINK SALMON RELEASED	---	---	0	---	0	---	201	---	---	201		
CHUM SALMON KEPT	---	---	0	---	0	---	0	---	---	0		
CHUM RELEASED	---	---	0	---	0	---	0	---	---	0		
DOLLY VARDEN KEPT	---	---	0	---	0	---	0	---	---	0		
DOLLY VARDEN RELEASED	---	---	0	---	0	---	0	---	---	0		
CUTTHROAT KEPT	---	---	0	---	0	---	0	---	---	0		
CUTTHROAT RELEASED	---	---	0	---	0	---	0	---	---	0		
PACIFIC HALIBUT KEPT	---	---	0	---	0	---	0	---	---	0		
PACIFIC HALIBUT RELEASED	---	---	257	---	257	---	0	---	---	0		
STEELHEAD KEPT	---	---	0	---	0	---	0	---	---	0		
STEELHEAD RELEASED	---	---	0	---	0	---	0	---	---	0		
JACK OR SMALL COHO SALMON KEPT	---	---	0	---	0	---	0	---	---	0		
JACK OR SMALL COHO SALMON RELEASED	---	---	0	---	0	---	0	---	---	0		
<u>AUKE LAKE</u>						<u>MONTANA CREEK (UPPER)</u>						
ROD-HOURS	0	0	0	---	0	101	180	165	147	593		
SMALL CHINOOK SALMON KEPT	---	---	---	---	---	0	0	0	0	0		
COHO SALMON KEPT	---	---	---	---	---	0	0	0	0	0		
COHO SALMON RELEASED	---	---	---	---	---	0	0	0	0	0		
PINK SALMON KEPT	---	---	---	---	---	0	0	0	0	0		
PINK SALMON RELEASED	---	---	---	---	---	0	0	0	0	0		
CHUM SALMON KEPT	---	---	---	---	---	0	0	0	0	0		
CHUM RELEASED	---	---	---	---	---	0	0	0	0	0		
DOLLY VARDEN KEPT	---	---	---	---	---	0	103	0	24	127		
DOLLY VARDEN RELEASED	---	---	---	---	---	0	1,749	0	0	1,749		
CUTTHROAT KEPT	---	---	---	---	---	0	0	0	0	0		
CUTTHROAT RELEASED	---	---	---	---	---	0	0	0	0	0		
PACIFIC HALIBUT KEPT	---	---	---	---	---	0	0	0	0	0		
PACIFIC HALIBUT RELEASED	---	---	---	---	---	0	0	0	0	0		
STEELHEAD KEPT	---	---	---	---	---	0	0	0	0	0		
STEELHEAD RELEASED	---	---	---	---	---	0	0	0	0	0		
JACK OR SMALL COHO SALMON KEPT	---	---	---	---	---	0	0	0	24	24		
JACK OR SMALL COHO SALMON RELEASED	---	---	---	---	---	0	0	0	0	0		

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-Continued-

Appendix Table 40. Estimated angler effort and catches for the Juneau roadside recreational fishery survey by area for 1987 (Continued).

	SEASONAL PERIOD					TOTAL	SEASONAL PERIOD					TOTAL
	20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87			20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87		
<u>MONTANA CREEK (MIDDLE)</u>						<u>MONTANA CREEK (LOWER)</u>						
ROD-HOURS	34	218	0	0	251	0	446	488	538	1,472		
SMALL CHINOOK SALMON KEPT	---	0	---	0	0	---	0	0	0	0		
COHO SALMON KEPT	---	0	---	0	0	---	0	0	26	26		
COHO SALMON RELEASED	---	0	---	0	0	---	0	0	0	0		
PINK SALMON KEPT	---	0	---	0	0	---	0	0	0	0		
PINK SALMON RELEASED	---	0	---	0	0	---	0	0	0	0		
CHUM SALMON KEPT	---	0	---	0	0	---	0	0	0	0		
CHUM RELEASED	---	0	---	0	0	---	0	0	0	0		
DOLLY VARDEN KEPT	---	54	---	0	54	---	0	55	56	111		
DOLLY VARDEN RELEASED	---	218	---	0	218	---	0	0	71	71		
CUTTHROAT KEPT	---	0	---	0	0	---	0	0	93	93		
CUTTHROAT RELEASED	---	0	---	0	0	---	0	0	11	11		
PACIFIC HALIBUT KEPT	---	0	---	0	0	---	0	0	0	0		
PACIFIC HALIBUT RELEASED	---	0	---	0	0	---	0	0	0	0		
STEELHEAD KEPT	---	0	---	0	0	---	0	0	0	0		
STEELHEAD RELEASED	---	0	---	0	0	---	0	0	0	0		
JACK OR SMALL COHO SALMON KEPT	---	0	---	0	0	---	0	0	162	162		
JACK OR SMALL COHO SALMON RELEASED	---	0	---	0	0	---	0	0	105	105		
<u>TWIN LAKES</u>						<u>SALMON CREEK</u>						
ROD-HOURS	504	675	0	---	1,179	0	600	0	0	600		
SMALL CHINOOK SALMON KEPT	0	0	---	---	0	---	0	---	---	0		
COHO SALMON KEPT	0	0	---	---	0	---	0	---	---	0		
COHO SALMON RELEASED	0	0	---	---	0	---	0	---	---	0		
PINK SALMON KEPT	0	0	---	---	0	---	136	---	---	136		
PINK SALMON RELEASED	0	0	---	---	0	---	91	---	---	91		
CHUM SALMON KEPT	0	0	---	---	0	---	45	---	---	45		
CHUM RELEASED	0	0	---	---	0	---	91	---	---	91		
DOLLY VARDEN KEPT	0	348	---	---	348	---	0	---	---	0		
DOLLY VARDEN RELEASED	0	0	---	---	0	---	181	---	---	181		
CUTTHROAT KEPT	0	0	---	---	0	---	0	---	---	0		
CUTTHROAT RELEASED	0	0	---	---	0	---	0	---	---	0		
PACIFIC HALIBUT KEPT	0	0	---	---	0	---	0	---	---	0		
PACIFIC HALIBUT RELEASED	0	0	---	---	0	---	0	---	---	0		
STEELHEAD KEPT	0	0	---	---	0	---	0	---	---	0		
STEELHEAD RELEASED	0	0	---	---	0	---	0	---	---	0		
JACK OR SMALL COHO SALMON KEPT	352	137	---	---	489	---	0	---	---	0		
JACK OR SMALL COHO SALMON RELEASED	228	240	---	---	468	---	0	---	---	0		

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-Continued-

Appendix Table 40. Estimated angler effort and catches for the Juneau roadside recreational fishery survey by area for 1987 (Continued).

	SEASONAL PERIOD					TOTAL	SEASONAL PERIOD					TOTAL
	20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87			20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87		
<u>SHEEP CREEK</u>						<u>KOWEE CREEK</u>						
ROD-HOURS	504	5,450	488	---	6,442	235	0	0	---	235		
SMALL CHINOOK SALMON KEPT	0	0	0	---	0	0	---	---	---	0		
COHO SALMON KEPT	0	0	0	---	0	0	---	---	---	0		
COHO SALMON RELEASED	0	0	0	---	0	0	---	---	---	0		
PINK SALMON KEPT	0	10,120	785	---	10,905	0	---	---	---	0		
PINK SALMON RELEASED	0	7,639	1,923	---	9,563	0	---	---	---	0		
CHUM SALMON KEPT	0	26	0	---	26	0	---	---	---	0		
CHUM RELEASED	0	185	0	---	185	0	---	---	---	0		
DOLLY VARDEN KEPT	0	185	38	---	223	469	---	---	---	469		
DOLLY VARDEN RELEASED	65	211	0	---	276	0	---	---	---	0		
CUTTHROAT KEPT	0	0	0	---	0	0	---	---	---	0		
CUTTHROAT RELEASED	0	0	0	---	0	0	---	---	---	0		
PACIFIC HALIBUT KEPT	0	0	0	---	0	0	---	---	---	0		
PACIFIC HALIBUT RELEASED	0	0	0	---	0	0	---	---	---	0		
STEELHEAD KEPT	0	0	0	---	0	0	---	---	---	0		
STEELHEAD RELEASED	0	0	0	---	0	0	---	---	---	0		
JACK OR SMALL COHO SALMON KEPT	0	0	0	---	0	0	---	---	---	0		
JACK OR SMALL COHO SALMON RELEASED	0	0	0	---	0	0	---	---	---	0		
<u>FISH CREEK</u>						<u>NORTH DOUGLAS BOAT RAMP</u>						
ROD-HOURS	117	675	1,043	---	1,835	38	376	165	---	579		
SMALL CHINOOK SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
COHO SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
COHO SALMON RELEASED	0	0	0	---	0	0	0	0	---	0		
PINK SALMON KEPT	0	109	320	---	429	0	0	0	---	0		
PINK SALMON RELEASED	0	295	1,140	---	1,435	0	0	0	---	0		
CHUM SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
CHUM RELEASED	0	0	0	---	0	0	0	0	---	0		
DOLLY VARDEN KEPT	0	291	0	---	291	0	0	0	---	0		
DOLLY VARDEN RELEASED	0	1,127	0	---	1,127	0	0	0	---	0		
CUTTHROAT KEPT	0	0	0	---	0	0	0	0	---	0		
CUTTHROAT RELEASED	0	0	0	---	0	0	0	0	---	0		
PACIFIC HALIBUT KEPT	0	0	0	---	0	0	0	0	---	0		
PACIFIC HALIBUT RELEASED	0	0	0	---	0	0	0	0	---	0		
STEELHEAD KEPT	0	0	0	---	0	0	0	0	---	0		
STEELHEAD RELEASED	0	0	0	---	0	0	0	0	---	0		
JACK OR SMALL COHO SALMON KEPT	0	0	0	---	0	0	0	0	---	0		
JACK OR SMALL COHO SALMON RELEASED	0	0	0	---	0	0	0	0	---	0		

-Continued-

Appendix Table 40. Estimated angler effort and catches for the Juneau roadside recreational fishery survey by area for 1987 (Continued).

	SEASONAL PERIOD					TOTAL	SEASONAL PERIOD					TOTAL
	20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87			20APR87- 21JUN87	22JUN87- 09AUG87	10AUG87- 13SEP87	14SEP87- 11OCT87		
<u>PICNIC COVE</u>						<u>BAY VIEW SUBDIVISION</u>						
ROD-HOURS	1,274	2,746	323	---	4,342	114	0	0	---	114		
SMALL CHINOOK SALMON KEPT	0	87	0	---	87	0	---	---	---	0		
COHO SALMON KEPT	0	0	0	---	0	0	---	---	---	0		
COHO SALMON RELEASED	0	0	0	---	0	0	---	---	---	0		
PINK SALMON KEPT	0	392	30	---	422	0	---	---	---	0		
PINK SALMON RELEASED	0	0	0	---	0	0	---	---	---	0		
CHUM SALMON KEPT	0	0	0	---	0	0	---	---	---	0		
CHUM RELEASED	0	0	0	---	0	0	---	---	---	0		
DOLLY VARDEN KEPT	79	87	0	---	166	29	---	---	---	29		
DOLLY VARDEN RELEASED	221	118	54	---	392	128	---	---	---	128		
CUTTHROAT KEPT	0	0	0	---	0	0	---	---	---	0		
CUTTHROAT RELEASED	0	0	0	---	0	0	---	---	---	0		
PACIFIC HALIBUT KEPT	0	0	0	---	0	0	---	---	---	0		
PACIFIC HALIBUT RELEASED	0	0	0	---	0	0	---	---	---	0		
STEELHEAD KEPT	0	0	0	---	0	0	---	---	---	0		
STEELHEAD RELEASED	0	0	0	---	0	0	---	---	---	0		
JACK OR SMALL COHO SALMON KEPT	0	0	0	---	0	0	---	---	---	0		
JACK OR SMALL COHO SALMON RELEASED	0	0	0	---	0	0	---	---	---	0		

Appendix Table 41. Estimated angler effort and catches for the Haines roadside recreational fishery by area during the 13 July - 1 November 1987 period.

	SEASONAL PERIOD								TOTAL
	13JUL87- 26JUL87	27JUL87- 09AUG87	10AUG87- 23AUG87	24AUG87- 07SEP87	08SEP87- 20SEP87	21SEP87- 04OCT87	05OCT87- 18OCT87	19OCT87- 01NOV87	
<u>CHILKOOT RIVER BELOW</u>									
<u>WEIR</u>									
ROD-HOURS	1,877	4,391	4,715	4,232	1,372	576	277	0	17,441
COHO KEPT	0	0	0	0	0	90	0	---	90
COHO RELEASED	0	0	0	0	0	0	0	---	0
JACK OR SMALL COHO KEPT	0	0	0	0	0	0	0	---	0
RELEASED	0	0	0	0	0	0	0	---	0
PINK KEPT	112	312	2,124	2,229	918	0	0	---	5,696
PINK RELEASED	0	35	998	1,854	611	0	0	---	3,497
SOCKEYE KEPT	164	441	364	13	0	0	0	---	982
SOCKEYE RELEASED	0	4	0	0	0	0	0	---	4
CHUM KEPT	0	0	0	0	4	56	0	---	60
CHUM RELEASED	0	0	0	7	0	0	0	---	7
DOLLY VARDEN KEPT	98	230	136	423	105	0	0	---	992
DOLLY VARDEN RELEASED	30	9	145	103	0	0	0	---	286
CUTTHROAT KEPT	0	0	0	0	0	0	0	---	0
CUTTHROAT RELEASED	0	0	0	0	0	0	0	---	0
<u>CHILKOOT RIVER ABOVE</u>									
<u>WEIR</u>									
ROD-HOURS	1,401	1,678	840	954	210	1,200	1,555	19	7,857
COHO KEPT	0	0	0	0	6	116	148	0	270
COHO RELEASED	0	0	0	0	0	0	6	0	6
JACK OR SMALL COHO KEPT	0	0	0	0	0	18	0	0	18
RELEASED	0	0	0	0	0	0	0	0	0
PINK KEPT	73	31	53	59	0	0	0	0	216
PINK RELEASED	0	0	0	10	0	0	0	0	10
SOCKEYE KEPT	20	0	0	5	0	0	0	0	25
SOCKEYE RELEASED	0	0	0	0	0	0	0	0	0
CHUM KEPT	0	0	0	0	0	0	0	0	0
CHUM RELEASED	0	0	0	0	0	0	0	0	0
DOLLY VARDEN KEPT	1,051	1,248	1,101	1,078	499	604	261	63	5,905
DOLLY VARDEN RELEASED	328	47	375	271	223	272	89	0	1,604
CUTTHROAT KEPT	20	0	0	5	0	18	0	0	44
CUTTHROAT RELEASED	0	0	0	0	0	0	0	0	0

-Continued-

Appendix Table 41. Estimated angler effort and catches for the Haines roadside recreational fishery by area during the 13 July - 1 November 1987 period (Continued).

	SEASONAL PERIOD								TOTAL
	13JUL87- 26JUL87	27JUL87- 09AUG87	10AUG87- 23AUG87	24AUG87- 07SEP87	08SEP87- 20SEP87	21SEP87- 04OCT87	05OCT87- 18OCT87	19OCT87- 01NOV87	
<u>LUTAK INLET</u>									
ROD-HOURS	275	869	526	54	7	0	0	0	1,732
COHO KEPT	0	0	0	0	0	---	---	---	0
COHO RELEASED	0	0	0	0	0	---	---	---	0
JACK OR SMALL COHO KEPT	0	0	0	0	0	---	---	---	0
RELEASED	0	0	0	0	0	---	---	---	0
PINK KEPT	20	27	226	0	0	---	---	---	273
PINK RELEASED	0	0	0	0	0	---	---	---	0
SOCKEYE KEPT	0	0	0	0	0	---	---	---	0
SOCKEYE RELEASED	0	0	0	0	0	---	---	---	0
CHUM KEPT	0	0	0	0	0	---	---	---	0
CHUM RELEASED	0	0	0	0	0	---	---	---	0
DOLLY VARDEN KEPT	0	116	0	0	0	---	---	---	116
DOLLY VARDEN RELEASED	0	12	80	0	0	---	---	---	92
CUTTHROAT KEPT	0	0	0	0	0	---	---	---	0
CUTTHROAT RELEASED	0	0	0	0	0	---	---	---	0
<u>CHILKAT RIVER</u>									
ROD-HOURS	---	---	---	---	84	992	1,931	210	3,217
COHO KEPT	---	---	---	---	0	0	29	51	81
COHO RELEASED	---	---	---	---	0	0	5	0	5
JACK OR SMALL COHO KEPT	---	---	---	---	0	0	0	0	0
RELEASED	---	---	---	---	0	0	0	0	0
PINK KEPT	---	---	---	---	0	0	0	0	0
PINK RELEASED	---	---	---	---	0	0	0	0	0
SOCKEYE KEPT	---	---	---	---	0	0	0	0	0
SOCKEYE RELEASED	---	---	---	---	0	0	0	0	0
CHUM KEPT	---	---	---	---	16	398	838	50	1,302
CHUM RELEASED	---	---	---	---	8	0	43	0	51
DOLLY VARDEN KEPT	---	---	---	---	0	11	0	0	11
DOLLY VARDEN RELEASED	---	---	---	---	0	0	0	0	0
CUTTHROAT KEPT	---	---	---	---	0	0	0	0	0
CUTTHROAT RELEASED	---	---	---	---	0	0	0	0	0

Appendix Table 42. Estimated angler effort and catches for the Yakutat roadside recreational fishery by area during the 6 April - 31 May, 15 June - 9 August, and 17 August - 11 October 1987 periods.

	SEASONAL PERIOD												TOTAL
	STEELHEAD FISHERY SURVEY				CHINOOK SALMON FISHERY SURVEY				COHO SALMON FISHERY SURVEY				
	06APR87- 19APR87	20APR87- 03MAY87	04MAY87- 17MAY87	18MAY87- 31MAY87	15JUN87- 28JUN87	29JUN87- 12JUL87	13JUL87- 26JUL87	27JUL87- 09AUG87	17AUG87- 30AUG87	31AUG87- 13SEP87	14SEP87- 27SEP87	28SEP87- 11OCT87	
<u>SITUK RIVER-LOWER LANDING</u>													
ROD-HOURS	2,730	5,062	1,344	0	76	1,127	996	967	1,799	4,119	885	120	19,225
STEELHEAD KEPT	104	97	78	0	0	0	0	0	0	0	0	0	279
STEELHEAD RELEASED	405	2,687	511	0	6	0	0	0	0	6	0	0	3,615
CHINOOK (>16 IN) KEPT	---	---	---	---	0	64	11	0	0	0	0	0	75
CHINOOK (>16 IN) RELEASED	---	---	---	---	17	216	17	6	0	0	0	0	256
CHINOOK (<16 IN) KEPT	---	---	---	---	0	283	14	22	0	0	0	0	319
CHINOOK (<16 IN) RELEASED	---	---	---	---	0	62	28	0	0	0	0	0	90
SOCKEYE KEPT	---	---	---	---	0	546	185	28	0	0	0	0	759
SOCKEYE RELEASED	---	---	---	---	0	140	28	14	0	0	0	0	182
PINK KEPT	---	---	---	---	0	0	325	305	108	35	0	0	773
PINK RELEASED	---	---	---	---	0	0	146	328	444	95	0	0	1,013
COHO KEPT	---	---	---	---	0	0	0	20	450	1,085	185	30	1,770
COHO RELEASED	---	---	---	---	0	0	0	14	118	233	0	0	365
DOLLY VARDEN KEPT	0	0	22	0	0	126	140	62	11	0	6	6	373
DOLLY VARDEN RELEASED	0	0	73	0	0	34	218	179	84	56	0	0	644
RAINBOW KEPT	0	0	0	0	0	0	0	6	0	0	0	0	6
RAINBOW RELEASED	0	0	11	0	0	0	0	0	0	0	0	0	11

-Continued-

Appendix Table 42. Estimated angler effort and catches for the Yakutat roadside recreational fishery by area during the 6 April - 31 May, 15 June - 9 August, and 17 August - 11 October 1987 periods (Continued).

	SEASONAL PERIOD												TOTAL
	STEELHEAD FISHERY SURVEY				CHINOOK SALMON FISHERY SURVEY				COHO SALMON FISHERY SURVEY				
	06APR87- 19APR87	20APR87- 03MAY87	04MAY87- 17MAY87	18MAY87- 31MAY87	15JUN87- 28JUN87	29JUN87- 12JUL87	13JUL87- 26JUL87	27JUL87- 09AUG87	17AUG87- 30AUG87	31AUG87- 13SEP87	14SEP87- 27SEP87	28SEP87- 11OCT87	
<u>SITUK RIVER-9 MILE BRIDGE</u>													
ROD-HOURS	0	399	735	196	---	126	336	224	---	---	---	---	2,016
STEELHEAD KEPT	0	56	56	0	---	0	0	0	---	---	---	---	112
STEELHEAD RELEASED	0	14	168	0	---	0	0	0	---	---	---	---	182
CHINOOK (>16 IN) KEPT	---	---	---	---	---	0	0	0	---	---	---	---	0
CHINOOK (>16 IN) RELEASED	---	---	---	---	---	0	14	0	---	---	---	---	14
CHINOOK (<16 IN) KEPT	---	---	---	---	---	0	0	0	---	---	---	---	0
CHINOOK (<16 IN) RELEASED	---	---	---	---	---	0	0	0	---	---	---	---	0
SOCKEYE KEPT	---	---	---	---	---	0	112	28	---	---	---	---	140
SOCKEYE RELEASED	---	---	---	---	---	0	0	0	---	---	---	---	0
PINK KEPT	---	---	---	---	---	0	0	0	---	---	---	---	0
PINK RELEASED	---	---	---	---	---	0	0	0	---	---	---	---	0
COHO KEPT	---	---	---	---	---	0	0	0	---	---	---	---	0
COHO RELEASED	---	---	---	---	---	0	0	0	---	---	---	---	0
DOLLY VARDEN KEPT	0	0	56	224	---	0	28	0	---	---	---	---	308
DOLLY VARDEN RELEASED	0	0	168	168	---	0	98	14	---	---	---	---	448
RAINBOW KEPT	0	0	0	0	---	0	0	0	---	---	---	---	0
RAINBOW RELEASED	0	0	0	28	---	0	0	0	---	---	---	---	28

-Continued-

Appendix Table 42. Estimated angler effort and catches for the Yakutat roadside recreational fishery by area during the 6 April - 31 May, 15 June - 9 August, and 17 August - 11 October 1987 periods (Continued).

	SEASONAL PERIOD												TOTAL
	STEELHEAD FISHERY SURVEY				CHINOOK SALMON FISHERY SURVEY				COHO SALMON FISHERY SURVEY				
	06APR87- 19APR87	20APR87- 03MAY87	04MAY87- 17MAY87	18MAY87- 31MAY87	15JUN87- 28JUN87	29JUN87- 12JUL87	13JUL87- 26JUL87	27JUL87- 09AUG87	17AUG87- 30AUG87	31AUG87- 13SEP87	14SEP87- 27SEP87	28SEP87- 11OCT87	
<u>LOST RIVER-TAWAH CREEK</u>													
ROD-HOURS	---	---	---	---	---	---	---	---	56	2,421	3,133	1,131	6,741
STEELHEAD KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
STEELHEAD RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0
CHINOOK (>16 IN) KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
CHINOOK (>16 IN) RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0
CHINOOK (<16 IN) KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
CHINOOK (<16 IN) RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0
SOCKEYE KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
SOCKEYE RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0
PINK KEPT	---	---	---	---	---	---	---	---	0	6	6	0	12
PINK RELEASED	---	---	---	---	---	---	---	---	0	24	11	0	35
COHO KEPT	---	---	---	---	---	---	---	---	6	1,045	470	318	1,839
COHO RELEASED	---	---	---	---	---	---	---	---	0	80	22	12	114
DOLLY VARDEN KEPT	---	---	---	---	---	---	---	---	0	6	0	0	6
DOLLY VARDEN RELEASED	---	---	---	---	---	---	---	---	0	21	6	0	27
RAINBOW KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
RAINBOW RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0

-Continued-

Appendix Table 42. Estimated angler effort and catches for the Yakutat roadside recreational fishery by area during the 6 April - 31 May, 15 June - 9 August, and 17 August - 11 October 1987 periods (Continued).

	SEASONAL PERIOD												TOTAL
	STEELHEAD FISHERY SURVEY				CHINOOK SALMON FISHERY SURVEY				COHO SALMON FISHERY SURVEY				
	06APR87- 19APR87	20APR87- 03MAY87	04MAY87- 17MAY87	18MAY87- 31MAY87	15JUN87- 28JUN87	29JUN87- 12JUL87	13JUL87- 26JUL87	27JUL87- 09AUG87	17AUG87- 30AUG87	31AUG87- 13SEP87	14SEP87- 27SEP87	28SEP87- 11OCT87	
<u>ANKAU LAGOON</u>													
ROD-HOURS	---	---	---	---	---	---	---	---	1,846	2,398	1,421	950	6,615
STEELHEAD KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
STEELHEAD RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0
CHINOOK (>16 IN) KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
CHINOOK (>16 IN) RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0
CHINOOK (<16 IN) KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
CHINOOK (<16 IN) RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0
SOCKEYE KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
SOCKEYE RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0
PINK KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
PINK RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0
COHO KEPT	---	---	---	---	---	---	---	---	424	806	98	48	1,377
COHO RELEASED	---	---	---	---	---	---	---	---	0	268	80	0	347
DOLLY VARDEN KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
DOLLY VARDEN RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0
RAINBOW KEPT	---	---	---	---	---	---	---	---	0	0	0	0	0
RAINBOW RELEASED	---	---	---	---	---	---	---	---	0	0	0	0	0