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Harvest Estimates for Selected Marine Sport Fisheries in Southeast Alaska During 1992

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ABSTRACT

Creel surveys of the Juneau, Ketchikan, Sitka, Petersburg, Wrangell, and Craig/Klawock marine sport fisheries for chinook salmon *Oncorhynchus tshawytscha* were conducted during 1992. Estimates from these surveys were necessary to provide data for inseason management of the chinook salmon sport fishery in Southeast Alaska to meet an allocation determined by the Alaska Board of Fisheries. Dockside interviews of boat-parties or anglers completing trips were used to estimate angler effort for and total catch and harvest of chinook salmon. Harvest and total catches of other Pacific salmon and trout *Oncorhynchus* species, Pacific halibut *Hippoglossus stenolepis*, rockfish *Sebastes* species, and Dolly Varden *Salvelinus malma* were also estimated. In addition, harvests of crab and shrimp were estimated in Ketchikan, Petersburg, Wrangell, and Craig/Klawock; while harvest of crab was estimated in Juneau. The contributions of hatchery chinook salmon and coho salmon *Oncorhynchus kisutch* to these sport fisheries were estimated from coded wire tag recovery information. Chinook salmon harvested by selected remote lodges or charter boat operations were also voluntarily sampled for coded wire tags. Scale samples and lengths were taken from chinook salmon for age composition and length at age estimates in all fisheries except Sitka, where only lengths were taken. Lengths of Pacific halibut were taken to estimate total round weight of the harvest from existing length-weight relationships.

The estimated harvest of chinook salmon was 27,212 (standard error = 1,043), and the estimated catch was 57,596 (standard error = 1,978) in the boat sport fisheries monitored. Although not reported here, chinook harvests and hatchery contributions were expanded to obtain total harvests of chinook salmon in the Southeast region. An additional 235 chinook salmon were harvested from shore at Picnic Cove near Juneau. Harvests of chinook salmon were similar to the long-term averages in the Juneau and Ketchikan boat fisheries. The largest number of hatchery chinook salmon was harvested in Ketchikan, where an estimated 64 percent of the harvest was of hatchery origin and 46 percent was of Alaska hatchery origin. Hatcheries produced about 42 percent of the chinook salmon harvest in Juneau, with Southeast Alaska hatcheries contributing 25 percent of the total harvest. The estimated Alaska hatchery contribution of chinook salmon was 11 percent in Sitka, 43 percent in Petersburg, 6 percent in Wrangell, and 4 percent in Craig/Klawock. Hatcheries produced about 42 percent of the monitored chinook salmon harvest and 23 percent of the total harvest was of Alaska hatchery origin.

An estimated 46,860 (standard error = 3,806) coho salmon, 35,282 (standard error = 5,267) pink salmon *Oncorhynchus gorbuscha*, 36,185 (standard error = 1,596) Pacific halibut, and 13,984 (standard error = 971) rockfish were also harvested in the sampled marine boat fisheries. In Ketchikan and Juneau the total harvest of coho salmon was above average, and hatcheries produced 42 percent and 5 percent of the harvest, respectively. The Pacific halibut harvest of 9,265 (standard error = 829) in Juneau was below the long-term average, although the Ketchikan harvest of 10,254 (standard error = 1,039) was above average. The total rockfish harvest of 8,149 (standard error = 871) in Ketchikan was below average. Shellfish effort and Dungeness crab harvests were above average in the Juneau and Ketchikan fisheries.

KEY WORDS: Creel survey, angler effort and harvest, harvest per unit effort, age composition, length at age estimation, round weight, boat sport fishery, hatchery, enhancement, coded wire tag, chinook salmon, *Oncorhynchus tshawytscha*, coho salmon, *Oncorhynchus kisutch*, salmon, *Oncorhynchus*, Pacific halibut, *Hippoglossus stenolepis*, Dolly Varden, *Salvelinus malma*, rockfish, *Sebastes*, Dungeness crab, *Cancer magister*, Tanner crab, *Chionoecetes* species, king crab, *Paralithodes* species, Juneau, Ketchikan, Sitka, Petersburg, Wrangell, Craig, Klawock, Southeast Alaska.

INTRODUCTION

The waters of Southeast Alaska support important commercial, sport, personal use, and subsistence fisheries for a variety of salmonid, bottomfish, and shellfish species. The largest sport fishery in Southeast Alaska is the Juneau marine boat fishery, but other important marine boat sport fisheries occur around Ketchikan, Sitka, Petersburg, Wrangell, Prince of Wales Island, and Haines (Figure 1).

Data on sport harvests of important fish species in Southeast Alaska have been collected by both postal surveys and various on-site creel surveys. The Statewide Harvest Survey (SWHS) is a postal survey which has provided annual estimates of sport effort and harvest by area since 1977 (Mills 1992). This statewide survey has been an economical means of comprehensively monitoring often remote sport fisheries, and SWHS estimates are used for official regional and statewide sport harvests. The SWHS estimates, however, cannot be used directly for inseason management because the estimates for a given year are not available until the following summer.

Estimates from on-site creel surveys, however, can be used for inseason management and also can be used to gather a variety of other biological and fishery performance data. Creel surveys, however, are relatively expensive and usually less comprehensive than the SWHS. For instance, it is virtually impossible to survey all access points into the sport fishery for chinook salmon *Oncorhynchus tshawytscha* in Southeast Alaska, which remains open year round in nearly all marine waters. In fisheries where comparisons of harvest estimates from the SWHS and on-site creel surveys are possible, the two surveys have shown very similar results (Mills and Howe 1992).

Large increases in the on-site creel survey program in Southeast Alaska were necessary in 1992 to carefully monitor sport harvests of chinook salmon on an inseason basis. The Alaska Board of Fisheries allocated the Pacific Salmon Treaty catch quota for chinook salmon in Southeast Alaska between the sport and commercial fisheries in March of 1992. They also passed a chinook salmon management plan for the marine boat sport fishery in the Southeast Alaska/Yakutat area which required inseason monitoring of the sport fishery to ensure the allocation (41,310 chinook salmon in 1992) was not exceeded.

In order to monitor the entire Southeast Alaska chinook salmon fishery closely enough to ensure compliance with the sport allocation, it was determined that creel surveys needed to be conducted in the Ketchikan, Prince of Wales Island (Craig/Klawock), Petersburg, Wrangell, Sitka, and Juneau boat fisheries during the major portion of the fishery for chinook salmon. In 1991, 94% of the total sport harvest of chinook salmon of Southeast Alaska occurred in the SWHS areas represented by these fisheries (Mills 1992). Sport harvests in other SWHS areas (Haines/Skagway, Glacier Bay, and Yakutat) were determined to be too small and dispersed to be effectively monitored with on-site creel surveys. A popular shoreline fishery for chinook salmon at Picnic Cove (also known as False Outer Point) on the north end of Douglas Island near Juneau was also monitored with a creel survey.

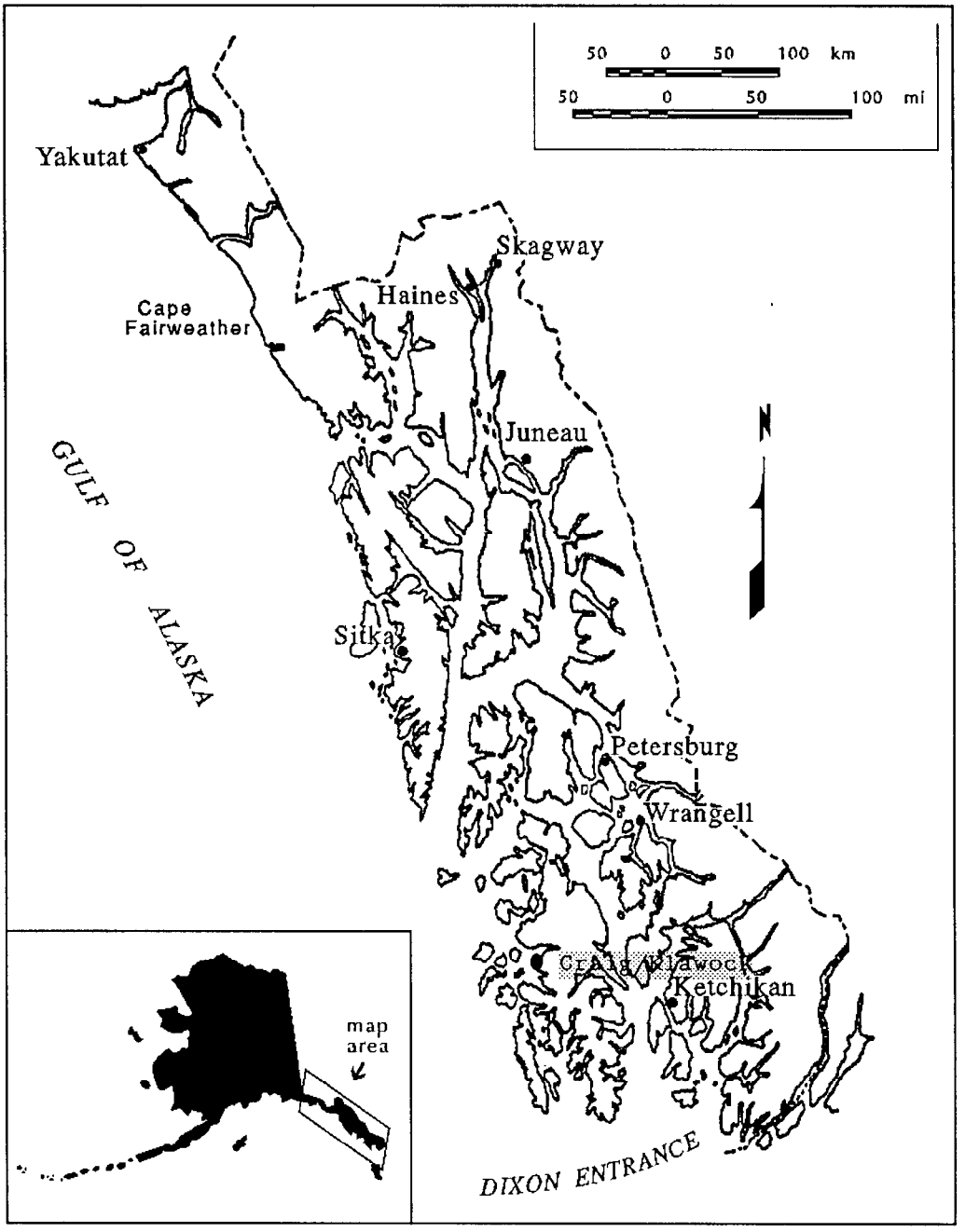

Figure 1. Location of Ketchikan, Juneau, Sitka, Petersburg, Wrangell, and Craig/Klawock in relationship to other major communities in Southeast Alaska.

In addition to total harvest estimates for the sport fishery, estimates of the number of Alaska hatchery chinook salmon taken were also necessary since most of this harvest does not count toward the sport allocation. Sampling of sport harvested chinook salmon for coded wire tags by creel samplers was necessary to provide this information as all hatchery releases of chinook salmon in Southeast Alaska are coded wire tagged. Lodges and charter boat operations were also contacted to try to obtain additional samples of coded wire tagged chinook salmon in voluntary sampling programs. Several terminal sport fisheries in freshwater for Alaska hatchery fish in the Petersburg and Juneau areas were not monitored with creel surveys as these harvests do not count toward the sport allocation, and post-season estimates from the SWHS will be adequate to document harvests within these fisheries.

Inseason estimates of the harvest of chinook salmon for the entire Southeast/Yakutat area were obtained by combining information from past SWHS and on-site creel surveys. This report, however, will only present information from the on-site creel surveys conducted in 1992 as the current estimates of total harvests will be revised when final SWHS estimates are completed. A report detailing inseason estimation methodology and final estimates of quota harvests and Alaska hatchery contributions of chinook salmon will be finalized after SWHS estimates for the 1992 fishery are obtained.

Creel survey information from the marine boat sport fisheries is used for a variety of other management and reporting purposes. Coho salmon *Oncorhynchus kisutch* harvests by the boat sport fisheries are also of special interest as coho salmon management has become another high priority within the region. Harvest per unit effort (HPUE) data for coho salmon in marine boat recreational fisheries, along with HPUE data from commercial troll and net fisheries, are used to monitor the relative abundance and migratory patterns of coho salmon into inside waters. Hatchery contributions for coho salmon harvested in these sport fisheries are also used for determinations of stock composition.

Creel survey effort and harvest information on the Pacific halibut *Hippoglossus stenolepis* fishery is also provided to the Alaska Board of Fisheries and the International Pacific Halibut Commission (IPHC) during their consideration of proposed changes to sport fishing regulations and in resolving allocation issues. Estimated weight of the sport catch of Pacific halibut in Alaska is also determined by the IPHC on an annual basis.

The personal use or sport harvest of shellfish is a very important activity for both residents of Southeast Alaska and visitors to the region. Shellfish harvest information is needed so that the Department, in conjunction with the Board of Fisheries, will have the necessary tools to take a more active role in managing these fisheries. Data from on-site creel surveys have been gathered on the harvest of shellfish in Southeast Alaska since 1988.

This report presents the findings of creel surveys of marine sport fisheries conducted in 1992 by the Division of Sport Fish of the Alaska Department of Fish and Game (ADF&G) in the Ketchikan, Juneau, Sitka, Petersburg, Wrangell, and Craig/Klawock areas. Results from creel surveys associated with a variety of roadside freshwater sport fisheries in Southeast Alaska are presented in other ADF&G Fisheries Data Series reports.

REGULATIONS

Sport fishing regulations during 1992 were identical to those described in Suchanek and Bingham (1992) with the following exceptions:

1) An emergency order reduced the chinook salmon bag limit for the Southeast Alaska (including Yakutat) marine boat sport fishery from two to one fish, and prohibited charter boat operators and crew from retaining chinook salmon while clients were on board. This emergency order was in effect from 15 May through 28 July 1992. After this period the bag limit returned to two fish, and the restriction on take of chinook salmon by charter boat operators and crew was dropped. The emergency order was issued to ensure that the 41,310 fish allocation to the sport fishery was not exceeded. The minimum size limit for chinook salmon is 28 inches.

2) Terminal harvest areas in saltwater near Juneau and Ketchikan were not opened by emergency order to the taking of small (less than 28 inches) chinook salmon.

General bag limits for salmon species other than chinook salmon remained at six fish per day, 12 in possession for fish 16 inches (41 cm) or more in length. The Pacific halibut bag limit also remained at two fish per day, four in possession. Anglers were limited to five rockfish per day, 10 in possession, only two fish per day (four in possession) of which could be yelloweye rockfish *Sebastes ruberrimus*. Areas adjacent to Ketchikan and Sitka were further restricted to a rockfish *Sebastes* species bag and possession limit of three fish per day, only one of which could be a yelloweye rockfish. The sport, personal use, and subsistence regulations for the harvest of crab in Southeast Alaska have been summarized by Suchanek and Bingham (1989 and 1990b).

OBJECTIVES

The primary goals of the 1992 Southeast Alaska marine boat sport fishery surveys were to obtain: (1) inseason estimates of the harvest of chinook salmon; and (2) estimates of the harvest of chinook salmon of Alaskan hatchery origin. To help measure program performance and achieve project goals, the following objectives were identified:

1. to estimate the total sport harvest of chinook salmon landed in the following marine boat sport fisheries during the noted time periods:

   a. Ketchikan from 27 April to 27 September 1992;
   b. Craig/Klawock from 11 May to 19 July 1992;
   c. Petersburg from 11 May to 19 July 1992;
   d. Wrangell from 11 May to 19 July 1992;
   e. Sitka from 11 May to 30 August 1992; and
   f. Juneau from 27 April to 27 September 1992;

   such that each individual estimate for the surveyed period was within ±20% of the true value 90% of the time;

2. to estimate the contribution of Alaska hatchery chinook salmon by coded wire tag lot to each of the fisheries noted above; such that the contribution estimate in relative terms[1] for each individual fishery was within ±20 percentage points of the true value 90% of the time;

3. to estimate the relative contribution of Alaska hatchery chinook salmon by coded wire tag lot from information voluntarily provided by remote lodges and charter boat operations; and

4. to estimate the total harvest and Alaska hatchery contribution of chinook salmon landed at the Picnic Cove (False Outer Point) shoreline fishery near Juneau from 27 April to 7 June 1992.

TASKS

In addition to meeting the primary objectives for monitoring the chinook salmon fishery (discussed above), there were also a number of additional tasks which addressed secondary data needs. To fulfill these data needs, additional tasks included:

1. estimating the biweekly harvest per unit effort for coho salmon in the Juneau and Ketchikan marine boat sport fisheries during 27 April to 27 September;

2. estimating the contribution of Alaska hatchery coho salmon by coded wire tag lot to the Juneau and Ketchikan marine boat sport fisheries during 27 April to 27 September;

3. estimating total sport angler effort, harvest and catch of coho salmon, pink salmon *O. gorbuscha*, chum salmon *O. keta*, sockeye salmon *O. nerka*, Pacific halibut, rockfish *Sebastes* species, and Dolly Varden *Salvelinus malma* by the Juneau and Ketchikan marine boat sport fisheries during 27 April to 27 September;

4. estimating the shellfish effort and harvest of Dungeness crab *Cancer magister*, tanner crab *Chionoecetes* spp., king crab *Paralithodes* spp. in the Juneau and Ketchikan marine boat sport fisheries during 27 April to 27 September; and shrimp landed by the Ketchikan marine boat fishery;

5. estimating the age composition and mean length-at-age of chinook salmon harvested in the Juneau and Ketchikan marine boat sport fisheries during 27 April to 27 September; and,

6. estimating the average weights of Pacific halibut harvested in the Juneau and Ketchikan marine boat sport fisheries from 27 April to 27 September.

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[1] Contributions in relative terms, equals the contribution estimate divided by the total harvest.

METHODS

Procedures for obtaining estimates associated with each of the study objectives were similar for each of the surveyed locations. The following sections detail the procedures that were common to multiple surveys.

Study Design

On-site Creel Survey Angler Effort, Catch, and Harvest Estimates:

Direct expansion creel surveys were conducted in the Ketchikan, Craig/Klawock, Petersburg, Wrangell, Sitka, and Juneau marine boat sport fisheries and the Picnic Cove marine shore fishery. The harvest of chinook salmon landed by sport anglers was estimated from information collected via stratified random multi-stage sample surveys. Strata were defined according to unique combinations of biweekly periods, type of day (e.g., weekday versus weekend-holiday), time of day (early versus late) and, in some instances, type of access location (e.g., heavy use versus low use harbors). Within any stratum, days to sample represented the first sampling stage, and were selected at random without replacement (WOR). The various access locations at which marine boat sport anglers land their harvested fish represented the second sampling stage. As such within any selected day within each stratum at least two harbors were selected at random WOR for surveying. A creel technician then attempted to interview all exiting boat-parties[2] at each of the selected access locations during the sampled days within each stratum. If all boat-parties could not be interviewed, any missed boat-parties were counted. Boat-parties represented the third sampling stage in these multi-stage designs.

For some of the surveys the structure of the 3-stage design was expanded to a 4-stage design, so that days and access locations still represented the first and second sampling stages, respectively, but periods within the sampling day represented the third sampling stage. For these surveys, boat-parties exiting the fishery within the surveyed period were counted and/or interviewed, and represented the fourth sampling stage. Individual anglers were interviewed at Picnic Cove, but they were treated identically to boat-parties for purposes of analysis.

Estimates of the harvest of chinook salmon were obtained by using standard direct expansion procedures for estimating totals in a multi-stage stratified survey. Harvest of other species by the surveyed anglers were estimated similarly. Additionally, total catches (caught and released as well as caught and kept) of all species of interest were estimated in a similar manner.

The procedures outlined in Bernard et al. (*In Prep*) were used to estimate the optimal sampling fractions for allocation of resources among the strata for the Ketchikan and Juneau surveys. Data from the most recent creel survey (1991) at each of these sites were used in estimating the sampling fractions. The actual

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[2] A boat-party is defined as all sport anglers in one boat exiting a fishery at an access location.

allocation of sampling resources was also dependent upon logistic and fiscal constraints in addition to the optimal fractions desired.

Sampling effort for the Petersburg, Wrangell, and Sitka surveys was allocated utilizing information gathered in the most recent (1989) creel survey conducted at each of these sites. Optimal allocation procedures were not followed since the design of the 1989 surveys at these sites differed too greatly from the design planned for 1992. Allocation of sampling effort at the Craig/Klawock site was conducted using professional opinion and some on-site information.

Predicted levels of relative precision were obtained for the Craig/Klawock, Petersburg, Wrangell, and Sitka surveys by using modified versions of the 1991 Ketchikan data set as proxies. Data from the 1989 surveys conducted at these sites were not used due to the differences in 1989 study designs from the designs planned in 1992, and due to the changes in the nature of the fishery.

Hatchery Contribution Estimates:

Creel technicians attempted to inspect each harvested chinook salmon for a missing adipose fin indicating the probable presence of an internal coded wire tag (CWT). The number of chinook salmon inspected for adipose finclips was recorded, and heads from chinook salmon with adipose finclips were collected and identified with a uniquely numbered cinch strap. Cinch strapped heads from chinook salmon were forwarded to the Fisheries, Rehabilitation, Enhancement, and Development (FRED) Division coded wire tag laboratory for eventual dissection, tag removal, and decoding.

Information from the sampling program as well as the coast-wide coded wire tag database was used to estimate the contributions of both Alaskan and non-Alaskan hatchery chinook salmon according to procedures described by Clark and Bernard (1987). The estimate of the variance and the standard error was obtained via the bootstrap estimation approach (Efron 1982), since in the sampling program, the total harvest was estimated, via the creel survey. Since not all hatchery releases from Oregon, Washington, and Idaho are coded wire tagged, the estimates of non-Alaskan contributions should be considered as minimal estimates.

Additional Coded Wire Tag Sampling:

After consulting with the Area Management Biologists to determine what charter boat operations would probably voluntarily sample their harvests of chinook salmon for coded wire tags, selected charter boat operations in remote areas of the Ketchikan, Prince of Wales, Juneau, Sitka, and Glacier Bay SWHS areas were contacted via letter to determine if they were interested in participating in this program. Charter operations responding were then sent procedures, data forms, and cinch straps necessary to record their sampled catches and mark heads properly.

A creel sampler was also hired to sample catches of chinook salmon for coded wire tags from boat parties returning to the Haines Small Boat Harbor in late June and July. Saturdays and Sundays only were sampled from approximately 1215 to no later than 2000. A similar sampling program was planned for the Skagway harbor, but due to problems hiring personnel, no sampling was done.

Biweekly Estimates of Coho Salmon Harvest Per Unit Effort:

Information collected during creel surveys of the Ketchikan and Juneau marine boat sport fisheries were used to calculate mean biweekly coho salmon harvest per unit effort (HPUE) of boat anglers in harvest per angler-hour. Harvest instead of total catch was used, because relatively few coho salmon were released, and those salmon released may not have been correctly identified to species. The estimates obtained by these procedures were indicative of the abundance of coho salmon. Mean HPUE from these fisheries was considered to be an index of abundance under the traditional linear model:

$$hpue_i = qN + \epsilon_i \quad (1)$$

where $hpue_i$ is the harvest per unit of effort during the ith boat-trip, N is abundance of the fish, q is the catchability coefficient, and ϵ is a random error with mean equal to zero and variance equal to σ^2. In this case, each boat-trip was considered a separate, replicated sample in a test fishery. All boat-parties interviewed within each week surveyed at each location were treated as equally weighted test samples (i.e., ignoring strata and sampling stages).

Age, Length, and Weight Estimates:

Estimates of Chinook Salmon Age Composition and Mean Length-at-Age. As time permitted, chinook salmon harvested by anglers surveyed in the sampled marine boat sport fisheries (with the exception of the Sitka fishery) were sampled for scales for age determination. For the estimation of age composition of the harvest and for the estimation of mean length-at age, all data collected from harvested chinook salmon within each of these fisheries was treated as one sample (i.e., ignoring internal stratification and sampling stages). Estimates of age composition and mean length-at-age were obtained using standard procedures.

Pacific Halibut Harvest by Weight. As time permitted, Pacific halibut landed by boat anglers interviewed in the sampled fisheries were sampled for length. Procedures as outlined by Quinn, et al. (1983), were used to convert the harvest and the mean length estimates to an estimate of the round weight of Pacific halibut harvested in these two fisheries.

Data Collection

Harvest Survey Projects:

Data collected from each boat-party interviewed included number of rods fished, hours fished, trip type (charter or non-charter), number of days in trip, location fished, target (e.g., salmon, Pacific halibut, or rockfish), and number of fish kept and/or released by species. Crab effort (boat-days fished) and harvest was recorded in all areas sampled except Sitka. In Ketchikan, Petersburg, Wrangell, and Craig/Klawock, numbers of shrimp harvested were also recorded in multiples of 10. All on-site interview data were recorded on ADF&G Marine Interview mark-sense forms (version 1.0).

In addition to interviewing boat-parties, creel technicians also sampled harvested fish as time allowed. Catches of chinook salmon and coho salmon checked for adipose finclips were recorded as "sampled", while catches not checked were recorded as "not sampled". Heads from adipose finclipped fish were collected and identified with a uniquely numbered cinch strap.

Three scales were taken from the preferred area (Welander 1940 and INPFC 1958) of each chinook salmon sampled. Scales were then mounted on gum cards, and impressions were made in cellulose acetates (Clutter and Whitesel 1956). The scales were then aged using procedures designed by Van Allen and McPherson (ADF&G Commercial Fisheries, Douglas, Alaska, personal communication). Lengths in millimeters (tip of snout to fork of tail) of these chinook salmon were also recorded.

Total lengths in millimeters from Pacific halibut sampled in the Juneau and Ketchikan fisheries were also recorded. All data recording procedures were outlined in detail in site-specific Creel Technician Manuals, and computer data files and analysis programs are listed in Appendix C1.

Data Analysis

Effort, Catch, and Harvest Estimates:

Estimates of angler effort, catch and harvest by species were calculated according to standard direct expansion equations for a stratified four-stage sampling design (Appendix A1). Mean effort, catch, or harvest of boat-parties interviewed during a sample were expanded by the number of boat-parties counted exiting the fishery during each sample to obtain the estimates for each sample. Means across sample periods were similarly expanded by the number of periods within a sampling day to obtain the estimates at a sampled access location (note that for some strata only one period was defined in the sampling day). Means across access locations within a sampled day were then expanded by the number of possible access locations to obtain the daily estimate of catch, effort, or harvest.

Finally, across day means were expanded by the number of days in a stratum to obtain the stratum estimates. Across stratum estimates of catch, effort, or harvest were obtained by summation across strata. Estimates of variance and standard errors were obtained according to the standard stratified four-stage sampling equations detailed in Appendix A1.

Coho Salmon Harvest Per Unit Effort Estimates:

Harvest per unit effort (HPUE) in terms of coho salmon harvested per angler-hour of effort was estimated for each week using the procedures outlined in Appendix A2. Harvest instead of total catch was used, because relatively few coho salmon were released and those salmon released may not have been correctly identified to species.

Estimates of Contributions of Coded Wire Tagged Stocks:

The contribution of chinook and coho salmon with a particular tag code to the marine fisheries surveyed was estimated using procedures outlined in Appendix A3, which essentially followed the approach proposed by Clark and Bernard (1987).

Age, Length, and Weight Estimates:

Age composition estimates were also obtained from the sample data (using procedures outlined in Cochran 1977).

Estimates of mean length by age group of chinook salmon sampled from the harvest were also calculated (following the procedures outlined by Sokal and Rohlf 1981). Each survey's entire sample was used in an unweighted fashion to obtain the length at age statistics.

Assumptions

The assumptions necessary for the estimates of angler effort, catch, harvest, and HPUE to be unbiased for these surveys were:

1. anglers accurately reported their hours of fishing effort and the number by species of fish released; and

2. no significant number of boat-parties returned between evening civil twilight and the beginning of early-day surveys, or at access locations other than those surveyed.

In addition to the above assumptions, the following conditions must be met for unbiased estimates of contributions of CWT stocks to the harvest:

3. the relative contribution of different stocks of salmon associated with a CWT release lot to the harvest did not vary appreciably within a biweekly period.

Similarly, the following assumption must be true for unbiased length-at-age and age composition estimates:

4. length-at-age and age composition did not vary substantially within the sampling season.

RESULTS

Detailed tables presenting total estimates of finfish effort, harvest, and catch for all species monitored at each area surveyed; as well as shellfish effort and harvest; can be found in Appendices B1 through B6. Appendices B7 through B12 present biweekly and total estimates and variances for effort, harvest, and catch for all species monitored for each boat fishery surveyed. Effort and chinook salmon harvest and catch for the Picnic Cove shore fishery is presented in Appendix B13. Detailed finfish effort and chinook salmon harvest results are presented here, while other fisheries are presented in less detail and primarily for the Juneau and Ketchikan areas.

Angler Effort

An estimated 873,421 (SE = 29,125) angler-hours of effort were expended in the six marine boat sport fisheries during the time periods sampled (Table 1). Seventy-three percent of the total effort in angler-hours was targeted on salmon in Ketchikan, 78% in Juneau, 64% in Sitka, 65% in Petersburg, 90% in Wrangell, and 73% in Craig/Klawock. Pacific halibut was the other major target species. Major salmon derbies in Ketchikan, Juneau, and Sitka substantially increased the amount of effort targeted on salmon, as 16%, 18%, and 24% of the total salmon fishing effort, respectively, occurred during these short time periods. A total of 5,563 angler-hours of effort was expended at the Picnic Cove shoreline fishery near Juneau.

Chinook Salmon Fisheries

An estimated 27,212 chinook salmon (SE = 1,043) were harvested in all the sampled marine boat sport fisheries (Table 2). Most of the chinook salmon harvested were at least 28 inches in length, but an estimated 75 small chinook salmon were harvested illegally. The total catch of 26,227 sublegal chinook salmon nearly equalled the total catch of 29,842 large chinook salmon. An additional 235 (SE = 46) large chinook salmon were harvested during the Picnic Cove shoreline fishery from 27 April through 7 June (Appendix B13).

The Ketchikan King Salmon Derby bolstered chinook salmon harvests in the Ketchikan marine fishery substantially as 18% of the harvest occurred during this event. Only about 9% of the total harvest of chinook salmon in the Juneau marine boat sport fishery was taken during the Juneau Golden North Salmon Derby, even though 18% of the total salmon fishing effort was expended during this event. A total of 825 chinook salmon were entered in the Ketchikan and Juneau derbies from a total harvest of 1,553 fish during the derby time periods. A total of 702 chinook salmon were entered in the Sitka Salmon Derby from a total harvest of 1,369 chinook salmon during the derby time periods, making it the largest derby in Southeast Alaska in terms of fish entered. A total of 206 chinook salmon were entered in the Petersburg Salmon Derby. The total harvest of chinook salmon during the derby time periods was not available.

About 18% of the chinook salmon harvested in the Ketchikan boat fishery were sampled for coded wire tags (Appendix B14). In the Juneau boat fishery, 18% of the estimated chinook salmon harvested were sampled, 23% in Sitka, 20% in Petersburg, 22% in Wrangell, and 25% in Craig/Klawock. At Picnic Cove, 58 chinook salmon were sampled for coded wire tags, but no tags were found in two heads from chinook salmon missing adipose fins.

An estimated 23% of the chinook salmon harvested in the marine boat fisheries were of Alaska hatchery origin (Table 3). Additional hatchery fish originated in Oregon, Washington, and British Columbia, and, in aggregate, 42% of the chinook salmon harvested in boat fisheries originated in hatcheries. The Ketchikan fishery had the highest percentage of Alaska hatchery fish (46%), and the overall hatchery contribution to the Ketchikan fishery totaled 64%. Most of the Alaskan hatchery chinook salmon taken in Ketchikan originated in Neets Bay,

Table 1. Summary of estimated total and derby angler effort by target for the Southeast Alaska marine boat sport fisheries during 1992.

Total Effort:

Sport Fishery	Time Period	Boat-hours	SE	Angler-hours by target: Salmon-hours	SE	Halibut-hours[a]	SE	Total Angler-hours[b]	SE	Percent Salmon-hours[c]
Ketchikan	4/27-9/27	100,493	6,038	192,269	12,100	69,366	5,585	261,635	15,951	73%
Juneau	4/27-9/27	146,126	8,875	303,065	18,448	84,782	6,976	388,498	23,139	78%
Sitka	5/11-8/30	45,729	2,184	74,183	4,186	40,756	2,298	115,031	5,439	64%
Petersburg	5/11-7/19	14,398	1,194	24,069	2,059	13,127	2,008	37,196	3,166	65%
Wrangell	5/11-7/19	18,246	1,377	43,423	3,740	4,726	738	48,149	3,859	90%
Craig/Klawock	5/11-7/19	8,595	624	16,830	1,629	6,083	591	22,912	1,979	73%
TOTAL		333,587	11,122	653,840	22,916	218,840	9,399	873,421	29,125	75%

Derby Effort:

Major Salmon Derbies	Time Period	Boat-hours	SE	Derby angler-hours by target: Salmon-hours	SE	Halibut-hours	SE	Total Angler-hours	SE	Percent of Salmon Fishery[d]
Ketchikan Derby	5/23-25, 30-31, 6/6-7	13,709	1,988	29,970	4,210	3,148	588	33,118	4,680	16%
Juneau Derby	8/7-9	20,179	2,729	55,467	8,284	2,611	965	58,102	5,892	18%
Sitka Derby	5/23-25, 5/30-31	7,293	764	17,782	2,520	1,120	122	18,903	2,521	24%
TOTAL		41,181	3,526	103,228	9,627	6,879	1,046	110,124	10,043	15%

[a] Includes hours fished for rockfish and other bottomfish.
[b] Includes all targeted and non-targeted effort.
[c] (salmon-hours ÷ total angler-hours) X 100.
[d] (Derby salmon-hours ÷ total salmon-hours) X 100.

Table 2. Summary of estimated catches and harvests of chinook salmon in the Southeast Alaska marine boat sport fisheries during 1992.

Total Chinook Salmon Catches and Harvests:

Sport Fishery	Time Period	Chinook > 28" Catch	Chinook > 28" Harvest	Chinook < 28" Catch	Chinook < 28" Harvest	Total Chinook Harvested Number	Total Chinook Harvested SE
Ketchikan	4/27-9/27	6,759	5,626	14,180	44	5,670	542
Juneau	4/27-9/27	7,211	7,098	8,333	16	7,114	614
Sitka	5/11-8/30	11,993	9,579	2,356	9	9,588	593
Petersburg	5/11-7/19	1,200	1,159	526	0	1,159	159
Wrangell	5/11-7/19	2,727	2,520	530	0	2,520	170
Craig/Klawock	5/11-7/19	1,479	1,155	302	6	1,161	111
TOTAL		31,369	27,137	26,227	75	27,212	1,043

Derby Chinook Salmon Harvests:

Major Salmon Derbies	Time Period	Chinook > 28" Entered	Chinook > 28" Total[a]	Chinook < 28" Entered	Chinook < 28" Total[a]	Total Chinook Harvested Number	Total Chinook Harvested SE	%[b]
Ketchikan King Salmon Derby	5/23-25, 5/30-31, 6/06-07	368	947	0	3	950	62	18
Juneau Golden North Salmon Derby	8/7-9	457	603	0	0	603	24	9
Sitka Salmon Derby	5/23-25, 5/30-31	702	1,369	0	0	1,369	65	15

[a] Includes entered and take-home harvests.
[b] (total derby harvest/total area harvest) X 100.

Table 3. Contributions of hatchery chinook salmon to sampled marine boat sport fisheries of Southeast Alaska, 1992.

Region or Hatchery	Marine Boat Sport Fishery: Craig/ Klawock (5/11- 7/19)	Juneau (4/27- 9/27)	Ketchikan (4/27- 9/27)	Petersburg (5/11- 7/19)	Sitka (5/11- 8/30)	Wrangell (5/11- 7/19)	Total
Oregon	0	200	0	0	0	0	200
Washington	0	26	44	0	100	0	170
British Columbia	189	970	980	0	2,882	0	5,021
Non-Alaskan total	189	1,196	1,024	0	2,982	0	5,391
SE	157	686	382	0	745	0	1,094
Alaska							
Burnett Inlet	0	5	51	0	0	0	56
Carroll Inlet	0	0	1,049	0	64	38	1,151
Crystal Lake	49	409	73	499	21	119	1,170
Deer Mountain	0	3	65	0	0	0	68
Hidden Falls	0	50	0	0	46	0	96
Jerry Meyers	0	9	0	0	0	0	9
Little Port Walter	0	77	0	3	17	0	97
Medvejie	0	0	0	0	868	0	868
Neets Bay	0	44	754	0	0	0	798
Port Armstrong	0	15	0	0	16	0	31
Sheldon Jackson	0	0	0	0	31	0	31
Snettisham	0	1,144	0	0	0	0	1,144
Tamgas Creek	0	0	530	0	28	0	558
Whitman Lake	0	6	82	0	1	0	89
Alaskan total	49	1,762	2,604	502	1,092	157	6,166
SE	48	254	476	199	244	79	631
Absolute Precision[a] ($\alpha = 0.10$)	79	419	783	327	401	130	1,038
% Absolute Precision[b]	7	6	14	28	4	5	4
All Areas Total	238	2,958	3,628	502	4,074	157	11,557
SE	164	731	610	199	784	79	1,263
Absolute Precision ($\alpha = 0.10$)	270	1,203	1,003	327	1,290	130	2,078
% Absolute Precision	23	17	18	28	13	5	8
Chinook Salmon Harvest	1,161	7,114	5,670	1,159	9,588	2,520	27,212
SE	111	614	542	159	593	170	1,043
% Alaska Hatchery	4	25	46	43	11	6	23
% Total Hatchery	20	42	64	43	42	6	42

[a] SE * 1.645.

[b] (Absolute Precision / Total Harvest) * 100.

Whitman Lake, and Carroll Inlet (release site only) hatcheries owned by Southern Southeast Regional Aquaculture Association. About 25% of the chinook salmon harvest in the Juneau boat fishery was of Alaska hatchery origin. Alaska hatchery fish taken in Juneau came primarily from the Crystal Lake and Snettisham hatcheries owned by ADF&G. A significant portion (43%) of the chinook salmon harvest in Petersburg came from the Crystal Lake hatchery.

Detailed contribution estimates by tag code are presented in the appendix for the Ketchikan fishery (Appendix B15), Juneau fishery (Appendix B16), Sitka fishery (Appendix B17), Petersburg fishery (Appendix B18), Wrangell fishery (Appendix B19), and the Craig/Klawock fishery (Appendix B20). In addition to the recoveries of hatchery origin fish, wild coded wire tagged chinook salmon were recovered from the Ketchikan and Sitka fisheries (Appendix B21). Total contributions of these tagged wild stocks could not be estimated as tagging fractions are unknown.

Twenty-eight remote charter operations were contacted by letter or in person to find out if they would voluntarily participate to collect coded wire tagged heads (Table 4). The specific names of charter operations contacted are not given to keep information collected confidential. Although most charter operations responding agreed to participate, the data from only a few operations were collected properly. Two operators agreed to participate, but since they indicated their number of salmon charters was to be extremely limited, they were not sent sampling gear as large numbers of fish need to be sampled to prove meaningful for coded wire tag analysis. Coded wire tag recoveries by tag code from the successfully participating lodges are listed in Appendix B22.

A total of 18 boat parties fishing for salmon returning to the Haines Small Boat Harbor during weekends from 27 June through 19 July were contacted by a sampler trying to obtain heads from coded wire tagged chinook salmon. Only two chinook salmon were sampled, and neither were missing adipose fins. Fishing for chinook salmon was reportedly extremely poor and salmon fishing effort was very small after 11 July, therefore, the sampling was terminated.

A total of 1,233 chinook salmon were successfully aged from the surveyed fisheries (Table 5 and Appendix B23). About 71% of the chinook salmon sampled at Craig/Klawock lacked a freshwater annulus (age-0.), which usually indicates non-Alaskan origin (Van Allen 1988). On the other hand, none of the Picnic Cove and only 3% of the sampled Petersburg harvest was of age-0. fish. Saltwater ages also varied considerably as an estimated 96% of the chinook salmon harvested during the Juneau Golden North Salmon Derby were age-.3 or less while only 42% of the chinook salmon sampled in the Ketchikan fishery were age-.3 or less. The total harvest across all surveyed fisheries consisted of 44% males and 56% females. Mean length at age of sampled chinook salmon for a given age class varied among the fisheries surveyed (Appendix B24).

Table 4. Summary of responses by remote lodges and charter vessel operations to requests for chinook salmon harvest information along with numbers of chinook salmon sampled and heads collected by operations successfully participating in the program.

SWHS Area	No. of Operations Contacted	Responses				Chinook Salmon Checked	Heads Collected
		No Response	Refused	Agreed	Data Provided		
Ketchikan	8	2	0	6	2	210	10
Prince of Wales	9	4	0	5	0	0	0
Sitka[a]	5	4	1	0	0	0	0
Juneau	3	1	0	2	0	0	0
Glacier Bay	3	0	0	3	1	29	0
Total	28	11	1	16	3	239	10

[a] This SWHS area includes operations in small villages on Chichagof Island.

Table 5. Summary of the age composition of chinook salmon sampled in selected marine sport fisheries in Southeast Alaska during 1992.

Freshwater Age Composition

Sport Fishery	Age 0. Sample Size	Age 0. Percent	Age 1. or more Sample Size	Age 1. or more Percent	Total Sampled
Ketchikan	140	30	335	70	475
Juneau non-derby	23	7	325	93	348
Juneau Derby[a]	21	15	118	85	139
Petersburg	3	3	89	97	92
Craig/Klawock	94	71	38	29	132
Picnic Cove	0	0	47	100	47
Total	281	23	952	77	1,233

Saltwater Age Composition

Sport Fishery	Age .3 or less Sample Size	Age .3 or less Percent	Age .4 or more Sample Size	Age .4 or more Percent	Total Sampled
Ketchikan	199	42	276	58	475
Juneau non-derby	215	62	133	38	348
Juneau Derby[a]	134	96	5	4	139
Petersburg	42	46	50	54	92
Craig/Klawock	79	60	53	40	132
Picnic Cove	14	30	33	70	47
Total	683	55	550	45	1,233

[a] Juneau Golden North Salmon Derby.

Coho Salmon Fisheries

Harvests of coho salmon in the sampled fisheries totaled an estimated 46,860 fish (SE = 3,806) (Table 6). Only small percentages of the coho salmon fisheries in Petersburg, Wrangell, and Craig/Klawock were monitored as surveys were discontinued by July 20. Substantial harvests of coho salmon probably also occurred in September in Sitka. The only monitored derby in which coho salmon were heavily targeted was the Juneau Golden North Salmon Derby, and an estimated 2,166 coho salmon (SE = 75) were taken during this event (Appendix B25).

Harvests of hatchery coho salmon were estimated by sampling from 16% of the coho salmon harvest for missing adipose fins (Appendix B25). Estimates of coho salmon hatchery contributions by tag code and time period are presented in Appendix B26 for the Ketchikan fishery, Appendix B27 for the Juneau fishery, Appendix B28 for the Sitka fishery, and Appendix B29 for the Craig/Klawock fishery. An estimated 11,778 (SE = 2,540) hatchery coho salmon were taken in all the sampled fisheries combined (Table 7). Wild stocks of coho salmon dominated the harvest in Juneau (5% hatchery), but significant portions of the harvest in Ketchikan (42%) and Sitka (29%) were of hatchery origin. All of the hatchery coho salmon in the sampled fisheries were produced by Southeast Alaska hatcheries. The Neets Bay hatchery contributed the most coho salmon to the Ketchikan fishery, while the Gastineau hatchery owned by Douglas Island Pink and Chum contributed the most coho salmon to the Juneau fishery. Additionally, some recoveries of coho salmon from wild stocks were obtained in the Ketchikan and Juneau fisheries (Appendix B30), and two of the wild coded wire tagged coho salmon recovered were from Canada. As tagging fractions are currently unknown, total contributions of these wild-tagged stocks were not estimated.

The HPUE for coho salmon for the Ketchikan, Juneau, and Sitka fisheries reached highs of 0.427 (SE = 0.044), 0.201 (SE = 0.023), and 0.241 (SE = 0.039) coho salmon per angler-hour of effort, respectively (Table 8). The peak in HPUE for coho salmon in both Juneau and Ketchikan occurred from 14-27 September, the last biweek of creel surveys. Ketchikan anglers experienced higher HPUE's for coho salmon than did Juneau anglers for nearly the entire season, although the HPUE's during the two August biweeks sampled in Sitka were higher than in Ketchikan.

Bottomfish Fisheries

Almost all of the bottomfish effort in Southeast Alaska is targeted on Pacific halibut, and an estimated 36,185 (SE = 1,596) were harvested in the sampled marine boat sport fisheries (Table 9). Substantial portions of the bottomfish fisheries were not monitored in locations other than Juneau, Ketchikan, and Sitka. Estimated average round weight of the Pacific halibut in the sampled fisheries ranged from 27.4 pounds in Ketchikan to 64.1 pounds in Wrangell (Table 10). About 1,128,800 pounds of Pacific halibut were taken in the sampled fisheries. Although the sampling period in Sitka was shorter than in Ketchikan or Juneau,

Table 6. Summary of estimated catch and harvest of coho salmon in the Southeast Alaska marine boat sport fisheries sampled during 1992.

Sport Fishery	Time Period	Harvest						Catch	
		Wild		Hatchery		Total			
		Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Ketchikan	4/27-9/27	13,100	2,061	9,588	2,510	22,688	3,248	24,651	3,399
Juneau	4/27-9/27	17,577	1,834	905	267	18,482	1,853	18,694	1,865
Sitka	5/11-8/30	3,072	633	1,264	286	4,336	695	4,510	705
Petersburg	5/11-7/19	0	0	0	0	0	0	0	0
Wrangell	5/11-7/19	6	24	0	0	6	24	17	10
Craig/ Klawock	5/11-7/19	1,327	125	21	17	1,348	126	1,388	128
TOTAL		35,082	2,834	11,778	2,540	46,860	3,806	49,260	3,943

Table 7. Contributions of hatchery coho salmon to sampled marine boat sport fisheries of Southeast Alaska, 1992.

Region or Hatchery	Craig/ Klawock (5/11- 7/19)	Juneau (4/27- 9/27)	Ketchikan (4/27- 9/27)	Petersburg (5/11- 7/19)	Sitka (5/11- 8/30)	Wrangell (5/11- 7/19)	Total
Alaska							
Burnett Inlet	0	0	33	0	0	0	33
Deer Mountain	0	0	838	0	0	0	838
Earl West Cove	0	0	0	0	55	0	55
Gastineau	0	900	0	0	0	0	900
Hidden Falls	0	0	0	0	57	0	57
Klawock	21	0	0	0	0	0	21
Medvejie	0	0	0	0	831	0	831
Nakat Inlet	0	0	39	0	0	0	39
Neets Bay	0	0	7,940	0	0	0	7,940
Port Armstrong	0	5	0	0	45	0	50
Sheldon Jackson	0	0	0	0	276	0	276
Tamgas Creek	0	0	335	0	0	0	335
Whitman Lake	0	0	403	0	0	0	403
Alaska Total	21	905	9,588	0	1,264	0	11,778
SE	17	267	2,510	0	286	0	2,540
Absolute Precision[a] (α = 0.10)	28	439	4,129	0	470	0	4,178
% Absolute Precision[b]	2	2	18	0	11	0	9
Coho Salmon Harvest	1,348	18,482	22,688	0	4,336	6	46,860
SE	126	1,853	3,248	0	695	24	3,806
% Alaska Hatchery	2	5	42	0	29	0	25

[a] SE * 1.645.

[b] (Absolute Precision / Total Harvest) * 100.

Table 8. Harvest per unit effort (HPUE) for coho salmon (harvest per angler-hour of effort) by biweekly period in the Ketchikan, Juneau, and Sitka marine boat sport fisheries during 1992.

	Harvest of coho salmon per angler-hour of effort[a]					
	Ketchikan		Juneau		Sitka	
Seasonal Period	HPUE	SE	HPUE	SE	HPUE	SE
6/08-6/21	0.010	0.002	0.000	0.000	0.000	0.000
6/22-7/05	0.028	0.004	0.001	0.000	0.004	0.001
7/06-7/19	0.049	0.007	0.016	0.002	0.032	0.005
7/20-8/02	0.042	0.007	0.031	0.004	0.039	0.007
8/03-8/16	0.044	0.006	0.025	0.004	0.080	0.012
8/17-8/30	0.167	0.013	0.155	0.010	0.241	0.039
8/31-9/13	0.352	0.023	0.193	0.013	[b]	[b]
9/14-9/27	0.427	0.044	0.201	0.023	[b]	[b]
All Periods	0.104	0.005	0.066	0.003	0.060	0.007

[a] Does not include derby effort or harvest.
[b] Survey ended 30 August 1992.

Table 9. Summary of estimated catch and harvest of Pacific halibut, rockfish, and lingcod in the Southeast Alaska marine boat sport fisheries sampled during 1992.

Sport Fishery	Time Period	Catch	SE	Harvest	SE
Pacific Halibut:					
Ketchikan	4/27-9/27	12,839	1,348	10,257	1,039
Juneau	4/27-9/27	11,819	1,114	9,265	829
Sitka	5/11-8/30	16,476	1,035	12,549	800
Petersburg	5/11-7/19	3,402	661	1,932	331
Wrangell	5/11-7/19	482	73	459	71
Craig/Klawock	5/11-7/19	1,909	206	1,723	161
	Total	46,927	2,154	36,185	1,596
Rockfish:					
Ketchikan	4/27-9/27	23,424	2,204	8,149	871
Juneau	4/27-9/27	682	132	646	131
Sitka	5/11-8/30	13,467	1,067	3,664	368
Petersburg	5/11-7/19	296	89	246	73
Wrangell	5/11-7/19	130	66	94	60
Craig/Klawock	5/11-7/19	4,899	537	1,182	971
	Total	42,898	2,512	13,984	971
Lingcod:					
Ketchikan	4/27-9/27	1,062	182	953	176
Juneau	4/27-9/27	8	5	8	5
Sitka	5/11-8/30	3,303	324	2,562	298
Petersburg	5/11-7/19	95	46	79	41
Wrangell	5/11-7/19	21	10	21	10
Craig/Klawock	5/11-7/19	298	61	287	55
	Total	4,787	380	3,910	352

Table 10. Average length, round weight, and total round weight for Pacific halibut harvested in sampled Southeast Alaska marine boat sport fisheries during 1992.

Sport Fishery	Survey Period	Sample Size	Total Length Mean (cm)	Total Length SE (cm)	Average Round Wt. (lbs)	Estimated Number Harvested	Estimated Total Round Weight (thousand lbs)
Ketchikan	4/27-9/27	409	93.4	1.1	27.4	10,257	281.0
Juneau	4/27-9/27	287	95.3	1.6	31.8	9,265	294.6
Sitka	5/11-8/30	660	98.2	0.8	31.5	12,549	395.3
Petersburg	5/11-7/19	186	101.9	2.2	39.6	1,932	76.5
Wrangell	5/11-7/19	23	120.2	6.7	64.1	459	29.4
Craig/Klawock	5/11-7/19	250	98.2	1.2	30.2	1,723	52.0
	Total	1,815	97.3	0.6	31.7	36,185	1,128.8

the total weight of the Pacific halibut harvest was more than 100,000 pounds greater than in either Juneau or Ketchikan.

Although rockfish are not a primary target of most Southeast Alaska marine boat sport anglers, an estimated 23,424 (SE = 2,204) rockfish were caught in the Ketchikan marine fishery (Table 9). Only 8,149 (SE = 871) of the rockfish caught were retained (35%). Sitka anglers retained an estimated 27% (3,664) of the 13,467 rockfish caught, and Craig/Klawock anglers retained an estimated 24% (1,182) of the 4,899 rockfish caught. Retention in Juneau, Petersburg, and Wrangell where few were caught, exceeded 70%.

Major species composition of the rockfish harvest was determined for the Ketchikan, Sitka, Petersburg, Wrangell, and Craig/Klawock fisheries (Table 11). Yelloweye rockfish (commonly called red snapper) were most frequently taken in all the fisheries sampled except for Sitka where black rockfish *S. melanops* were more common. Yelloweye rockfish comprised 51% (4,144) of the harvest in Ketchikan with quillback rockfish *S. maliger* coming in second at nearly 32%. Other species in the sport harvest included copper *S. caurinus*, dusky *S. ciliatus*, silvergrey *S. brevispinis*, and tiger *S. nigrocinctus* rockfish along with a variety of other unidentified species. Lingcod *Ophiodon elongatus* was another bottomfish species frequently harvested in the Sitka and Ketchikan fisheries (Table 9).

Other Salmonid Fisheries

Although not usually primary targets, other salmonids such as pink, chum, and sockeye salmon, and Dolly Varden were harvested in the sampled fisheries (Table 12). Pink salmon were taken in large numbers in Ketchikan and the estimated harvest totaled 28,878 (SE = 5,237). Only 5,585 pink salmon were harvested in Juneau as the retention rate was only 58% in comparison to the 76% observed in Ketchikan. Harvests of both chum and sockeye salmon were much less, totaling 1,656 chum salmon and 161 sockeye salmon for the sampled fisheries combined. Most of the 634 Dolly Varden harvested were taken by Juneau anglers.

Shellfish Fisheries

Shellfish effort and harvests of Dungeness, Tanner, and king crab were estimated for all of the marine boat sport fisheries except Sitka (Table 13). Shellfish effort in boat-days for the Juneau fishery (5,411 boat-days) was about four times that estimated for the Ketchikan fishery (1,387 boat-days). Since some effort was expended by divers, effort in boat-days is more comparable from fishery to fishery than effort in number of pots or rings fished. Substantial numbers of Dungeness, Tanner and king crabs were harvested in the Juneau fishery, but no king crab and very few Tanner crab were taken in the Ketchikan area. The majority of the shrimp harvest (130,720 shrimp, SE = 58,360) occurred in Ketchikan, but shrimp harvests were also estimated in Petersburg, Wrangell, and Craig/Klawock.

Table 11. Rockfish composition in sampled marine boat sport fisheries during 1992.[a]

Rockfish species	Ketchikan		Sitka		Petersburg		Wrangell		Craig/Klawock	
	Harvest[b]	%	Harvest[b]	%	Harvest[b]	%	Harvest[b]	%	Harvest[b]	%
Black	309	3.8	1,485	40.5	0	0.0	0	0.0	209	17.7
Copper	212	2.6	153	4.2	0	0.0	0	0.0	54	4.6
Dusky	86	1.1	26	0.7	0	0.0	0	0.0	0	0.0
Quillback	2,567	31.5	716	19.6	8	3.2	0	0.0	344	29.1
Silvergrey	551	6.8	298	8.1	27	11.0	0	0.0	9	0.7
Yelloweye	4,144	50.8	675	18.4	152	61.8	94	100.0	438	37.1
Tiger	32	0.4	---[c]	-.-[c]	0	0.0	0	0.0	25	2.1
Other	248	3.0	310	8.5	59	124.0	0	0.0	103	8.7
TOTAL	8,149		3,664		246		94		1,182	

[a] An estimated total of 646 rockfish were harvested in the Juneau marine boat sport fishery, and individual species were not identified.

[b] The unidentified rockfish harvest was allocated to species by expanding the appropriate percentage of harvest in the identified harvest to the total harvest (Since only three yelloweye were identified in Wrangell, this procedure was probably not valid for that fishery).

[c] Tiger rockfish were not identified in Sitka, but were included in the "Other" category.

Table 12. Summary of estimated total catch and harvest of pink salmon, chum salmon, sockeye salmon, and Dolly Varden in the Southeast Alaska marine boat sport fisheries sampled during 1992.

Sport Fishery	Time Period	Pink salmon		Chum salmon		Sockeye salmon		Dolly Varden	
		Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
Ketchikan	4/27-9/27	37,979	28,878	746	707	103	46	3	0
Juneau	4/27-9/27	9,548	5,585	681	604	81	81	630	525
Sitka	5/11-8/30	878	708	335	320	7	7	65	29
Petersburg	5/11-7/19	15	15	0	0	160	27	168	52
Wrangell	5/11-7/19	103	73	0	0	0	0	36	22
Craig/ Klawock	5/11-7/19	34	23	25	25	0	0	12	6
TOTAL		48,557	35,282	1,787	1,656	351	161	914	634

DISCUSSION

Effort, harvest and total catch estimates from the six creel surveys reported here should not be considered to be comprehensive estimates for the entire sport fishery within a given SWHS area. This is especially true for species other than chinook salmon in fisheries such as those in Petersburg, Wrangell, and Craig/Klawock which were monitored from 11 May through 19 July. Pacific halibut, coho salmon, and pink salmon are harvested in substantially larger numbers during 20 July through the end of September than during the period from 11 May through 19 July.

Even the chinook salmon estimates in the Juneau and Ketchikan fisheries are incomplete due to lack of monitoring of: 1) all harvests occurring during 1 January - 26 April and 28 September 28 - 31 December, 2) private moorages on the road system or remote moorages or docks inaccessible from the road system, 3) the night period from the end of civil twilight to the beginning of surveys at about 0800, and 4) boat parties which are not counted or interviewed due to being missed by creel samplers. Mills and Howe (1992) reported that SWHS estimates were generally about 10% higher than creel survey estimates for comparable surveys in Southeast Alaska.

As noted previously, on-site creel surveys provide data necessary for inseason management and they also can obtain very detailed fishery performance and biological information difficult to obtain with postal surveys. For inseason management, the usefulness of on-site surveys lies in their consistency of methods and coverage so that inseason estimates can be compared with SWHS and on-site creel estimates from previous years.

On-site creel surveys of the Juneau and other selected Southeast Alaska marine boat sport fisheries 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; Mecum and Suchanek 1986, 1987; Bingham et al. 1988; and Suchanek and Bingham 1989, 1990b, 1991, 1992). These reports also present some sporadic surveys of the Ketchikan fishery, although it has been monitored for the entire spring and summer season since 1984, except for a one year hiatus in 1985. The Petersburg and Wrangell fisheries were not surveyed in 1990 or 1991, but were consistently surveyed in the spring from 1983-1989.

The Juneau and Ketchikan marine boat fisheries have been consistently surveyed from approximately mid-April or early May through late September. Among year comparisons of angler effort and harvest for a given fishery are confounded by some variation in the time periods surveyed from year to year. Effort and harvest at either the beginning or the end of the survey season is small, however, in comparison to effort during the middle of the season. Among year comparisons are generally valid, but the variations in survey periods should be noted. Variances for the harvest estimates have only been generated since 1987 so it is not possible to do statistical comparisons with prior years. In the following discussion, it should be noted that in some instances, it might not be possible to show a statistical difference between years.

Table 13. Estimated effort for, and harvest of, Dungeness, king, and Tanner crab and shrimp in sampled Southeast Alaska marine boat sport fisheries during 1992.

		Effort		Dungeness	Tanner	King	Shrimp
Sport Fishery	Time Period	Boat-days	Standard error	Harvest	Harvest	Harvest	Harvest
Ketchikan	4/27-9/27	1,387	165	10,227	22	0	130,720
Juneau	4/27-9/27	5,411	600	12,675	1,034	5,673	---[a]
Petersburg	5/11-7/19	282	62	347	778	0	3,850
Wrangell	5/11-7/19	144	24	773	0	0	2,330
Craig/ Klawock	5/11-7/19	124	21	694	0	0	4,120
TOTAL		7,348	627	24,716	1,834	5,673	141,020

[a] Shrimp harvest not estimated in Juneau.

Angler Effort

Total effort in the Juneau fishery during 1992 (388,498 angler-hours) was lower than 1991 (394,275 angler-hours), but was 9% higher than the 1983-1991 average of 355,745 angler-hours; while in Ketchikan, total 1992 effort (261,635 angler-hours) was down from the record estimated effort in 1991 (343,698 angler-hours), although the total was about 5% above the 1984-1991 average of 249,064 angler-hours (Table 14). Average effort through 1991 (as determined from available data) for the Ketchikan fishery was about 70% of the Juneau average. In 1992 total effort in Ketchikan was 68% of that seen in Juneau.

In both Juneau and Ketchikan, the estimated amount of salmon effort was down from 1991 (the all-time high), but was still 10% and 5% above average, respectively. It appears that the reduced bag limit for chinook salmon may have reduced overall effort, although other factors may have played a part. In contrast, bottomfish effort in both the Juneau and Ketchikan was higher than in 1991 and totaled 4% above average. In Juneau and Ketchikan, 78% and 73% of the 1992 effort was targeted on salmon, respectively, which is very similar to long-term salmon-hour averages.

Chinook Salmon Fisheries

Due in part to both reductions in availability and bag limits, total harvests of chinook salmon for both the Juneau and Ketchikan marine boat fisheries were down from 1991 (Table 15). The Juneau harvest of 7,114 chinook salmon was 16% above the 1977-1991 average, but the Ketchikan harvest was less than half the 1991 harvest and was 88% of the 1984-1991 average. Harvest of chinook salmon in the Juneau Golden North Salmon Derby was only 78% of average even though the emergency order reducing the bag limit and restricting charter boat operators was rescinded before the derby started.

Relative hatchery contributions to both the Juneau and Ketchikan fisheries were similar to 1991 levels (Table 16). An estimated 42% of the 1992 chinook salmon harvest in Juneau originated in hatcheries compared to the 1983-1991 average of 20%. Similarly, in Ketchikan, an estimated 64% of the 1992 harvest originated in hatcheries in comparison to the average of 42%. Over time, both Alaskan and non-Alaskan hatchery fish are comprising a larger portion of the harvest, although it is the increases in Alaska hatchery chinook salmon which are of most value as most of these fish do not count toward U.S./Canada Pacific Salmon Treaty catch totals. An estimated 25% of the 1992 chinook salmon harvest in Juneau originated in Alaskan hatcheries, exceeding the 1983-1991 average of 16%. In Ketchikan, an estimated 46% of the 1992 harvest originated in Alaskan hatcheries in comparison to the average of 33%. This year was the first season that total harvest of wild and non-Alaskan hatchery fish taken by the sport fishery in Southeast Alaska was limited to a quota.

Table 14. Estimated angler effort in the Juneau and Ketchikan marine boat sport fisheries as determined by on-site creel surveys for comparable sample periods.

Sport Fishery	Year	Survey Dates	Salmon-hours		Bottomfish-hours		Total Angler-hours
			Estimate	Percent	Estimate	Percent	
Juneau	1983	4/17-10/01	236,344	74%	84,259	26%	320,603
	1984	4/29-9/29	246,732	77%	72,090	23%	318,822
	1985	4/15-9/29	269,077	79%	72,381	21%	341,458
	1986	4/14-10/05	240,921	76%	77,165	24%	318,086
	1987	3/16-9/27	307,124	76%	94,658	24%	401,840
	1988	4/11-9/25	254,196	72%	96,188	27%	351,247
	1989	4/24-9/24	287,676	77%	85,354	23%	373,504
	1990	4/23-9/23	300,167	78%	83,106	22%	383,976
	1991	4/15-9/29	324,788	82%	69,475	18%	394,275
		Average	274,114	77%	81,631	23%	355,745
	1992	4/27-9/27	301,588	78%	84,718	22%	388,498
		% of Average	110%		104%		109%
Ketchikan	1984	4/29-9/29	161,100	72%	62,625	28%	223,725
	1985	----------No comparable survey----------					
	1986	4/28-9/28	133,518	72%	51,208	28%	184,726
	1987	4/20-9/27	157,306	65%	84,954	35%	242,274
	1988	4/11-9/25	153,086	68%	71,611	32%	225,779
	1989	4/24-9/24	195,974	71%	79,958	29%	276,516
	1990	5/07-9/23	199,063	80%	49,347	20%	248,618
	1991	4/29-9/29	275,856	80%	67,842	20%	343,698
		Average	182,272	73%	66,792	27%	249,064
	1992	4/27-9/27	192,269	73%	69,366	27%	261,635
		% of Average	105%		104%		105%

Table 15. Estimated harvest of chinook salmon in the Juneau and Ketchikan marine boat sport fisheries as determined by on-site creel surveys for comparable sample periods.

Year	Juneau marine [a]	Juneau Golden North Derby	Ketchikan Marine
1977	4,845	516	---
1978	3,020	250	---
1979	4,644	1,077	---
1980	5,552	477	---
1981	4,165	873	---
1982	4,670	1,016	---
1983	4,316	872	---
1984	6,474	855	1,820
1985	8,133	1,222	---
1986	5,050	1,073	5,006
1987	8,893	1,005	4,723
1988	5,683	677	5,245
1989	7,074	609	5,752
1990	7,335	493	9,869
1991	12,234	522	12,730
Average	6,139	769	6,449
1992	7,114	603	5,670
% of Average	116%	78%	88%

[a] Includes Juneau Golden North Salmon Derby harvest.

Table 16. Estimated contributions of hatchery-produced chinook salmon to selected marine boat sport fisheries of Southeast Alaska as determined by on-site creel surveys, 1983-1992.

	Juneau Marine				Ketchikan Marine			
Year	Total	%	Alaska	%	Total	%	Alaska	%
1983	46	1	25	1	350	10	233	6
1984	577	9	444	7	432	24	333	18
1985	1,037	13	831	10	862	34	838	33
1986	1,032	20	918	18	2,226	44	1,638	33
1987	2,060	23	2,015	23	1,409	30	999	21
1988	1,210	21	979	17	1,747	33	1,405	27
1989	1,018	14	865	12	2,992	52	2,082	36
1990	2,011	27	1,584	22	6,023	61	4,511	46
1991[a]	4,279	37	2,957	26	8,373	66	7,035	55
Average	1,474	20	1,180	16	2,713	42	2,119	33
1992	2,958	42	1,762	25	3,628	64	2,604	46

[a] Juneau percentages for 1991 calculated without including 803 chinook salmon taken in strata which were not sampled for coded wire tags.

Coho Salmon Fisheries

The 1992 harvest of 22,688 coho salmon in the Ketchikan area was about half of the all time record harvest set in 1991, but was still 14% above the 1984-1991 average of 19,895 (Table 17). The Juneau area harvest of coho salmon (18,482 fish) was down from the high 1989-1991 harvest levels, but was still 19% above the 1977-1991 average of 15,524. The Juneau Golden North Salmon derby harvest of 2,166 coho salmon was only 84% of the 1977-1991 average of 2,565.

Harvest of coho salmon in both the Juneau and Ketchikan areas continues to be supplemented by hatchery contributions (Table 18). The estimated harvest of 905 (5% of total) hatchery coho salmon in Juneau was less than half the 1991 contribution, but was still greater than the 1983-1991 average of 663. The increase in hatchery coho salmon harvests in the Juneau area was mostly due to returns to the Gastineau Hatchery owned by Douglas Island Pink and Chum, Inc. These returns also generate a substantial shoreline fishery in Gastineau Channel for the returning coho salmon in September and October.

The Ketchikan fishery has been much more dependent upon hatchery coho salmon than the Juneau fishery. About 31% of the 1984 to 1991 Ketchikan harvest originated in hatcheries (Table 18). In 1992, the estimated harvest of 9,588 hatchery coho salmon in Ketchikan was about half of the 1991 contribution, although in relative terms, the 1992 hatchery contribution of 42% of the total harvest was about the same as in 1991.

Bottomfish Fisheries

The 1992 harvest of Pacific halibut in the Juneau fishery (9,265) was only about 72% of the 1983-1991 average (12,793). The Ketchikan harvest (10,257) was 14% above the 1984-1991 average of 8,971 (Table 19). Total estimated catch of Pacific halibut in the Juneau fishery (11,819) was only 65% of the 1983-1991 average (18,212) and near the record low set in 1991 (10,974). The 1992 catch of Pacific halibut in Ketchikan (12,839) was 22% above the 1984-1991 average (10,502), and was close to the record set in 1987 (13,883). Retention rates for Pacific halibut were above average in Juneau and below average in Ketchikan at 78% and 80%, respectively.

Rockfish harvests in the 1992 Ketchikan fishery were the lowest since 1986 (Table 20). Retention of rockfish was also the lowest recorded, decreasing from the 1986-1991 average of 48% to 35% in 1992. Targeted HPUE (as expressed in harvest per hour of bottomfish effort) for rockfish matched the all time low set in 1986, although the targeted CPUE (as expressed in catch per hour of all bottomfish effort) was only slightly below the 1986-1991 average during 1992. Non-targeted HPUE and CPUE for rockfish were below average.

Table 17. Estimated harvest of coho salmon in the Juneau and Ketchikan marine boat sport fisheries as determined by on-site creel surveys for comparable sample periods.

Year	Juneau Marine [a]	Juneau Golden North Derby	Ketchikan Marine
1977	13,084	3,625	---
1978	16,697	2,855	---
1979	10,150	3,224	---
1980	11,694	2,277	---
1981	8,661	1,174	---
1982	20,747	5,320	---
1983	12,662	2,964	---
1984	10,100	1,594	14,231
1985	17,138	2,919	---
1986	9,763	367	20,814
1987	17,610	3,056	10,464
1988	12,017	1,453	5,525
1989	23,819	3,173	10,781
1990	26,343	1,914	33,661
1991	22,379	2,567	43,789
Average	15,524	2,565	19,895
1992	18,482	2,166	22,688
% of Average	119%	84%	114%

[a] Includes Juneau Golden North Salmon Derby harvest.

Table 18. Estimated contributions of hatchery-produced coho salmon to selected marine boat sport fisheries of Southeast Alaska as determined by on-site creel surveys, 1983-1992.

	Juneau Marine		Ketchikan Marine	
Year	Total	Percent	Total	Percent
1983	227	2	---	---
1984	52	1	5,181	36
1985	1,353	8	---	---
1986	37	<1	3,200	15
1987	94	1	4,663	45
1988	262	2	292	5
1989	930	4	1,147	11
1990	482	2	9,515	28
1991[a]	2,526	12	18,627	43
Average	663	4	6,089	31
1992	905	5	9,588	42

[a] Juneau percentages for 1991 calculated without including 1,111 coho salmon taken in strata which were not sampled for coded wire tags.

Table 19. Estimated harvest and catch of Pacific halibut in the Juneau and Ketchikan marine boat sport fisheries, 1983-1992.

	Juneau Marine				Ketchikan Marine			
Year	Kept	Released	Total Catch	Percent Retained	Kept	Released	Total Catch	Percent Retained
1983	16,414	4,674	21,088	78	---	---	---	---
1984	14,609	9,100	23,709	62	8,913	748	9,661	92
1985	11,931	3,955	15,886	75	---	---	---	---
1986	13,132	6,868	20,000	66	8,208	1,577	9,785	84
1987	13,513	10,357	23,870	57	10,493	3,390	13,883	76
1988	12,672	5,027	17,699	72	7,317	1,338	8,655	85
1989	12,484	2,406	14,890	84	10,797	1,256	12,053	90
1990	11,774	4,018	15,792	75	7,419	1,281	8,700	85
1991	8,611	2,363	10,974	78	9,650	1,125	10,775	90
Average	12,793	5,419	18,212	70	8,971	1,531	10,502	85
1992	9,265	2,554	11,819	78	10,257	2,582	12,839	80
% of Avg.	72	47	65		114	169	122	

Table 20. Comparative effort and catch statistics for the Ketchikan rockfish sport fishery.

		Angler Effort		Total Rockfish Harvest and Catch				HPUE		CPUE	
Year	Survey Dates	Total Angler-hours	Bottomfish-hours	Harvest	Released	Total Catch	% Harvest	Targeted[a]	Non-targeted[b]	Targeted[c]	Non-targeted[d]
1984	4/29-9/29	223,725	62,625	9,805	---	---	---	0.16	0.04	---	---
1985[e]	4/15-6/30	---	---	---	---	---	---	---	---	---	---
1986	4/28-9/28	184,726	51,208	6,017	7,527	13,544	44	0.12	0.03	0.54	0.19
1987	4/20-9/27	242,274	84,954	18,591	27,539	46,130	40	0.22	0.08	0.26	0.07
1988	4/11-9/25	225,779	71,611	17,477	15,516	32,993	53	0.24	0.08	0.46	0.15
1989	4/24-9/24	276,516	79,958	11,224	6,742	17,966	62	0.14	0.04	0.22	0.06
1990	5/07-9/23	248,618	49,347	9,561	9,132	18,693	51	0.19	0.04	0.38	0.08
1991	4/29-9/29	343,698	67,842	12,442	10,714	23,156	54	0.18	0.04	0.34	0.07
Average		249,334	66,792	12,160	12,862	25,414	48	0.18	0.05	0.38	0.10
1992	4/27-9/27	261,635	69,366	8,149	15,272	23,424	35	0.12	0.03	0.34	0.09

[a] Rockfish harvest per bottomfish-hour of effort.
[b] Rockfish harvest per angler-hour of effort.
[c] Rockfish total catch per bottomfish-hour of effort.
[d] Rockfish total catch per angler-hour of effort.
[e] Data in 1985 not comparable since creel surveys extended only through 30 June instead of late September.

Shellfish Fisheries

Harvests of shellfish in the Juneau and Ketchikan areas have been consistently estimated with creel surveys since 1988 (Table 21). Estimated shellfish effort of 5,411 boat-days in the Juneau area was the highest recorded, as was the harvest of 5,673 king crab. Harvest of 1,034 Tanner crab in the Juneau area, however, was the lowest recorded; while the harvest of 12,675 Dungeness crab was only slightly lower than the record of 1991. In Ketchikan, shellfish effort of 1,387 boat-days was very similar to that seen in 1991, and well above the 1988-1991 average of 979 boat-days. Dungeness crab harvest in Ketchikan was the highest recorded at 10,227. Shrimp harvest in the Ketchikan area during 1992 was the highest recorded (130,720), although shrimp harvests are estimated with very poor precision.

CONCLUSIONS AND RECOMMENDATIONS

The primary goals of this project were to obtain estimates of the harvest and Alaska hatchery contributions of chinook salmon in selected sport fisheries of Southeast Alaska with specified levels of precision. Individual estimates of chinook harvest were within our relative precision goal of ±20% of the true value 90% of the time at all locations except Petersburg where the relative precision was ±23% (see Appendices B1 through B6). Similarly, contribution estimates of Alaska hatchery chinook salmon were within ±20 percentage points of absolute precision 90% of the time at all locations except Petersburg where absolute precision was ±28 (Table 3). Absolute precision of the Alaska hatchery contribution estimates at the other sites ranged from 4% to 14%. The Petersburg survey will need to be extensively redesigned in 1993 to obtain better levels of precision.

Significant changes have occurred in Southeast Alaska marine boat sport fisheries over the past decade. Wild stocks of fish have historically supported most of the sport fisheries, but increasing enhancement efforts have led to increases in harvests of hatchery chinook and coho salmon. In 1990, 1991, and 1992, over 60% of the chinook salmon taken in the Ketchikan area originated in hatcheries. These enhancement efforts are costly and catch monitoring through the use of on-site creel survey programs is one of the few means to evaluate the success of hatchery programs in producing fish for sport anglers. During 1992, the percent contribution of Alaskan hatchery chinook salmon to monitored marine boat sport fisheries averaged 23% and the total hatchery contribution averaged 42%. The number of hatchery coho salmon contributed to the Ketchikan, Juneau, and Sitka sport fisheries was also substantial. It is recommended that on-site creel surveys of marine boat fisheries be continued to evaluate and improve the effectiveness of stocking programs.

In March of 1992, the Alaska Board of Fisheries allocated the Southeast Alaska chinook salmon quota, established under the U.S./Canada Pacific Salmon Treaty,

Table 21. Comparison of estimated shellfish effort and harvest for the Juneau and Ketchikan marine boat fisheries, 1988-1992.

	1988	1989	1990	1991	Mean	1992
Juneau						
Effort (boat-days)	2,287	2,652	2,622	3,812	2,843	5,411
Dungeness Crab Harvest	6,459	8,356	6,289	13,433	8,634	12,675
Tanner Crab Harvest	3,042	3,369	1,883	1,294	2,397	1,034
King Crab Harvest	552	1,849	1,960	2,467	1,707	5,673
Ketchikan						
Effort (boat-days)	1,398	508	614	1,394	979	1,387
Dungeness Crab Harvest	9,043	2,688	3,367	7,631	5,682	10,227
Shrimp Harvest	27,643	12,730	17,130	69,450	31,738	130,720

between the commercial and sport fisheries. The board also adopted a management plan for the chinook salmon sport fishery which requires inseason management by the Department of Fish and Game to ensure the sport fishery does not exceed its allocation. In 1992, sampling of all major boat sport fisheries including those in Sitka, Petersburg, Wrangell, and Craig/Klawock was necessary to estimate the total Southeast Alaska sport harvest of chinook salmon so that the sport fishery could be effectively managed. These increased sampling efforts were also necessary to better document harvests of Alaska hatchery fish for catch reporting required by the Pacific Salmon Treaty. It is recommended that this expanded program be continued for the foreseeable future.

Data from marine boat surveys are also used for a variety of other purposes including preparation of position statements on proposed regulation changes and public information documents. It is recommended that the collection of current data on sport fisheries for coho salmon and Pacific halibut be continued to improve management planning for these species. It is also recommended that the estimation of the shellfish harvest as a component of the marine harvest studies be continued to provide valuable information for evaluating the performance of this fishery and for addressing potential regulation changes during Alaska Board of Fisheries meetings.

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APPENDIX A - DATA ANALYSIS PROCEDURES

Appendix A1. Data analysis procedures for angler effort, catch, and harvest estimates for the Ketchikan, Craig/Klawock, Petersburg, Wrangell, Sitka, and Juneau marine boat sport fishery and Picnic Cove shoreline surveys during 1992.

Harvest as well as catch by species along with angler effort was estimated by the following procedures for each stratum with days, locations, periods, and boat-parties as sampling units. Individual anglers instead of boat-parties were sampled at Picnic Cove, but the data were analyzed identically. First, the mean harvest of each species was obtained over all boat-parties interviewed during each sampled period at an access location within each sampled day:

$$\overline{n}_{hijo} = \frac{\sum_{k=1}^{m_{hijo}} n_{hijok}}{m_{hijo}} \; ; \qquad \text{(A1.1)}$$

where: n_{hijok} was the number of fish harvested by interviewed boat-party k during period o at access location j during sampled day i within stratum h; and m_{hijo} equaled the number of interviewed boat-parties during each sample.

Then the mean estimate was expanded over all counted boat-parties to obtain the harvest estimate for each sample:

$$\hat{N}_{hijo} = M_{hijo}\,\overline{n}_{hijo} \; ; \qquad \text{(A1.2)}$$

where: M_{hijo} equaled the number of boat-parties counted within each sample.

Then, the mean harvest by species was obtained over all periods sampled at each access location within each sampled day:

$$\overline{\hat{N}}_{hij} = \frac{\sum_{o=1}^{p_{hij}} \hat{N}_{hijo}}{p_{hij}} \; ; \qquad \text{(A1.3)}$$

where: p_{hij} was the number of periods sampled within each sampled access location.

Then this mean was expanded over all periods in each sampling day to obtain the harvest estimate for the access location within each sampled day:

$$\hat{N}_{hij} = P_{hij}\,\overline{\hat{N}}_{hij} \; ; \qquad \text{(A1.4)}$$

where: P_{hij} equaled the number of periods within the sampling day.

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Next the mean harvest over all access locations sampled within each sampled day was obtained:

$$\bar{\hat{N}}_{hi} = \frac{\sum_{j=1}^{q_{hi}} \hat{N}_{hij}}{q_{hi}} \quad ; \tag{A1.5}$$

where: q_{hi} equaled the number of access locations sampled during sampled day *i*.

The estimated harvest for the sampled day within each stratum was obtained by expanding by the number of access locations:

$$\hat{N}_{hi} = Q_{hi} \bar{\hat{N}}_{hi} \quad ; \tag{A1.6}$$

where: Q_{hi} equaled the total number of possible access locations available for sampling.

Then the stratum mean daily harvest was obtained:

$$\bar{\hat{N}}_{h} = \frac{\sum_{i=1}^{d_h} \hat{N}_{hi}}{d_h} \quad ; \tag{A1.7}$$

where: d_h equaled the number of days sampled within each stratum.

Finally, the estimated harvest for each stratum was obtained by expanding for days:

$$\hat{N}_{h} = D_h \bar{\hat{N}}_{h} \quad ; \tag{A1.8}$$

where: D_h equaled the total number of days in each stratum.

Estimates of catch of each species was obtained similarly by substituting the appropriate catch statistics for each species into equations (A1.1) through (A1.8), above. Similarly, the angler effort estimate was calculated by substitution.

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The variance of the stratum estimates of harvest was obtained using the standard four-stage equation (adapted from Cochran 1977):

$$\hat{V}[\hat{N}_h] = \left\{(1 - f_{1h})D_h^2 \frac{S_{1h}^2}{d_h}\right\} + \left\{f_{1h}\frac{D_h^2}{d_h^2}\sum_{i=1}^{d_h}(1 - f_{2hi})Q_{hi}^2\frac{S_{2hi}^2}{q_{hi}}\right\} + \left\{f_{1h}\frac{D_h^2}{d_h^2}\sum_{i=1}^{d_h}f_{2hi}\frac{Q_{hi}^2}{q_{hi}^2}\sum_{j=1}^{q_{hi}}(1 - f_{3hij})P_{hij}^2\frac{S_{3hij}^2}{p_{hij}}\right\} + \left\{f_{1h}\frac{D_h^2}{d_h^2}\sum_{i=1}^{d_h}f_{2hi}\frac{Q_{hi}^2}{q_{hi}^2}\sum_{j=1}^{q_{hi}}f_{3hij}\frac{P_{hij}^2}{p_{hij}^2}\sum_{o=1}^{p_{hij}}(1 - f_{4hijo})M_{hijo}^2\frac{s_{4hijo}^2}{m_{hij}}\right\} ; \quad \text{(A1.9)}$$

where: f_{1h}, f_{2hi}, f_{3hij}, and f_{4hijo} were the sampling fractions for days, access locations, sampling periods, and boat-parties respectively (i.e., $f_{1h} = d_h/D_h$; $f_{2hi} = q_{hi}/Q_{hi}$; $f_{3hij} = p_{hij}/P_{hij}$, $f_{4hijo} = m_{hijo}/M_{hijo}$); S_{1h}^2 equaled the among day variance component for the angler harvest estimate, which was obtained as;

$$S_{1h}^2 = \frac{\sum_{i=1}^{d_h}\left(\hat{N}_{hi} - \bar{\hat{N}}_h\right)^2}{d_h - 1} ; \quad \text{(A1.10)}$$

S_{2hi}^2 equaled the among access location (within day) variance component for the harvest estimate, obtained as;

$$S_{2hi}^2 = \frac{\sum_{j=1}^{q_{hi}}\left(\hat{N}_{hij} - \bar{\hat{N}}_{hi}\right)^2}{q_{hi} - 1} ; \quad \text{(A1.11)}$$

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s^2_{3hij} equaled the among sampling period variance component for the harvest estimate, obtained as;

$$s^2_{3hij} = \frac{\sum_{o=1}^{p_{hij}} (\hat{N}_{hijo} - \bar{\hat{N}}_{hij})^2}{p_{hij} - 1} \quad ; \qquad (A1.12)$$

and, s^2_{4hijo} equaled the among boat-party variance component for the harvest estimate, obtained as;

$$s^2_{4hijo} = \frac{\sum_{k=1}^{m_{hijo}} (n_{hijok} - \bar{n}_{hijo})^2}{m_{hijo} - 1} \quad . \qquad (A1.13)$$

Variances of the stratum estimates of catch by species and angler effort were obtained similarly, by substituting the appropriate catch and effort statistics into equations (A1.9) through (A1.13), above.

In applying these procedures for the low-use harbor survey at Sitka, as well as the entire surveys at Ketchikan and Juneau, and the derby sampling at Petersburg, only one period was defined within a sampling day. Note, that for strata in these surveys the angling day was generally split into two separate classifications: early and late day. Accordingly, the sampling day in these surveys was completely covered during any sample. Accordingly, $p_{hij} = P_{hij} = 1$, and $f_{3hij} = 1$, and as such the third-stage variance term in equation (A1.9) equaled zero.

Similarly, in applying these procedures to the Craig/Klawock and Sitka high-use harbor survey and the Picnic Cove shoreline survey only one location was defined. Accordingly $q_{hi} = Q_{hi} = 1$, and $f_{2hi} = 1$, and as such the second-stage variance term equaled zero.

Also note that during the various derby strata each derby day was defined as a separate stratum, so that $d_h = D_h = 1$, and $f_{1h} = 1$, and as such the first-stage variance term equaled zero. Finally, during many samples all exiting boat-parties were interviewed so that $m_{hijo} = M_{hijo}$ and $f_{4hijo} = 1$, and as such the fourth-stage variance term equaled zero.

Estimates of angler effort, catch and harvest by species and their variances across all strata, or select combinations of strata were obtained by summing the individual stratum estimates (assuming independence). Standard errors of the strata and total estimates were obtained simply by taking the square root of the appropriate variance estimate.

Appendix A2. Data analysis procedures for coho salmon harvest per unit effort estimates for the Ketchikan and Juneau marine boat sport fishery surveys during 1992.

Harvest per unit effort (HPUE) in terms of coho salmon harvested per angler-hour of effort was estimated for the Juneau and Ketchikan surveys by the following procedures for each biweek. The estimates of HPUE were obtained from unweighted means as follows, by first obtaining the mean HPUE for all anglers in each interviewed boat-party:

$$\overline{HPUE}_{hijok} = \frac{n_{hiojk}}{e_{hijok}\, v_{hijok}} \qquad (A2.1)$$

where n_{hijok} equaled the entire harvest of the interviewed boat-party k, from the sample during period o at access location j, during day i within stratum h; e_{hijok} was the effort (in boat-hours) of each interviewed boat-party; and v_{hijok} was the number of anglers in the interviewed boat-party.

The mean HPUE for the biweek was obtained over all boat-parties interviewed within each biweek:

$$\hat{HPUE} = \frac{\sum_{h=1}^{s}\sum_{i=1}^{d_h}\sum_{j=1}^{q_{hi}}\sum_{o=1}^{p_{hij}}\sum_{k=1}^{m_{hijo}} \overline{HPUE}_{hijok}}{m} \; ; \qquad (A2.2)$$

where m_{hijo} equaled the number of boat-parties interviewed; p_{hij} equaled the number of periods sampled at a sampled access location; q_{hi} equaled the number of access locations sampled during each day; d_h equaled the number of days sampled within each stratum; s equaled the number of strata within each biweekly period; and m equaled all the boat-parties interviewed within a biweekly period, obtained as:

$$m = \sum_{h=1}^{s}\sum_{i=1}^{d_h}\sum_{j=1}^{q_{hi}}\sum_{o=1}^{p_{hij}} m_{hijo} \; . \qquad (A2.3)$$

The variances of the biweekly estimates of HPUE were obtained by the following equation:

$$\hat{V}[\hat{HPUE}] = \frac{\sum_{h=1}^{s}\sum_{i=1}^{d_h}\sum_{j=1}^{q_{hi}}\sum_{o=1}^{p_{hij}}\sum_{k=1}^{m_{hij}} \left(\overline{HPUE}_{hijok} - \hat{HPUE}\right)^2}{m\,(m-1)} \; . \qquad (A2.4)$$

Standard errors were obtained by taking the square root of the variance estimates and dividing by the square root of the number of boat parties interviewed.

Appendix A3. Data analysis procedures for hatchery contributions for the Ketchikan, Craig/Klawock, Petersburg, Wrangell, Sitka, and Juneau surveys of the marine boat sport fishery during 1992.

Hatchery contributions were estimated for the surveys using the procedures outlined by Clark and Bernard (1987). Estimates were obtained on a biweekly basis, treating all strata within each biweek equally. As such, the relative contributions of the Alaskan hatchery releases of interest were assumed to be consistent from sampling stratum (except for derby strata) to the next within any biweekly period. Considering that anglers in general fished the same stocks of fish, regardless of the access location used within each survey, then this assumption should be valid.

A bootstrap procedure (Efron 1982) was used to estimate the variances and standard errors of these estimates within each biweekly period for all tag codes with a minimum number of recoveries of two tags per biweek. Approximate procedures adapted from Clark and Bernard (1987) and proposed by Conrad and Larson (1987) were used for variance estimates for tag codes with less than two recoveries per biweek. The equations presented in Clark and Bernard (1987) could not be used directly to estimate variances due to the presence of sampling error in the estimates of total harvest.

The notation used in the following equations essentially follows that used by Clark and Bernard (1987), with additional subscripts used to denote individual biweekly period values. The first step involved estimating the contribution to each biweekly period in the fishery of each particular tag code (using equation [10] from Clark and Bernard 1987):

$$\hat{n}_{1_A t} = \left(\frac{\hat{N}_t}{n_{2t}}\right)\left(\frac{a_{1t}}{a_{2t}}\right)\left(\frac{m_{1t}}{m_{2t}}\right)\left(\frac{m_{c_A t}}{\theta_A}\right) ; \qquad \text{(A3.1)}$$

where: $\hat{n}_{1_A t}$ equaled the estimated number of salmon from a hatchery release identified by the unique tag code A, harvested in biweek t; $\hat{N}_t$ was the estimated total harvest of salmon (one particular species only) for biweek t; n_{2t} is number of salmon (one particular species only) inspected for missing adipose fins from the sampled harvest in biweek t; a_{1t} was the number of salmon with a missing adipose fin which were counted and marked with a head strap from biweek t; a_{2t} equaled the number of salmon heads previously marked with a head strap which arrived at the tag lab, from fish originally sampled from biweek t; m_{1t} was the number of coded wire tags which were detected in the salmon heads at the tag lab, from those salmon sampled in biweek t; m_{2t} equaled the number of coded wire tags which were removed from the salmon heads and decoded, from those salmon sampled in biweek t; $m_{c_A t}$ equaled the number of coded wire tags dissected out of the salmon heads and decoded as the unique tag code A, originally sampled from biweek t; and θ_A was the proportion of a particular hatchery release which contained a coded wire tag of the unique tag code A.

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Estimates of across biweek contributions by tag code, as well as by combined tag codes (e.g., all Alaskan hatchery tag codes) were obtained by summing the estimates across biweeks and tag codes, as appropriate.

Variances for Contributions from Tag Codes with Multiple Recoveries. Bootstrapping was used to calculate the variance of the contribution estimate for all tag code-biweekly period combinations with at least two tag recoveries. The components of variance for the contribution estimate included components from the harvest estimation procedure (i.e., the creel survey) and the harvest sampling program. Estimated harvest was considered normally distributed and its variance was calculated in closed form (see equation (A1.9), Appendix A1, hence no simulation was involved). The bootstrap resampling involved estimation of the variance due to the harvest sampling program. Equation (A3.1) was first divided into three components (in the following presentation subscripts denoting biweekly periods and particular tag codes have been dropped):

$$N \left(\frac{m_1}{m_2} \frac{a_1}{a_2} \frac{m_c}{n_2} \right) \theta$$

The first component (N) was harvest as estimated from the creel survey, and the third component (θ) was obtained from the tag lab data base and was assumed to be known for the hatchery tag codes. The second component $[(m_1/m_2)(a_1/a_2)(m_c/n_2)]$ corresponds to statistics garnered through harvest sampling (and lab work); for convenience, M was defined as the result of the arithmetic operations in this second component. Each of these three components was the product of three distinct and independent programs.

The bootstrap was used to simulate the variation in the second component by resampling data from the harvest sampling program. Each fish counted in the harvest sampling program was placed into one of the following six categories depending on its progress through the program:

1. Adipose fin was present, therefore head was not retained;
2. Adipose fin was missing, either the head was strapped and sent to lab, but never arrived, or the head was not strapped or sent to the lab.;
3. Head arrived at lab, but contained no CWT;
4. Head contained a CWT, but tag was not decoded;
5. Tag was decoded, but did not carry the appropriate code; and
6. Tag did carry the appropriate code.

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A multinomial, empirical density distribution with six cells was created with the data from the harvest sampling program. Respective to the categories above, the probabilities of drawing a single sample from this distribution was calculated from the original data as follows:

$$\frac{n_2-a_1}{n_2} \quad \frac{a_1-a_2}{n_2} \quad \frac{a_2-m_1}{n_2} \quad \frac{m_1-m_2}{n_2} \quad \frac{m_2-m_c}{n_2} \quad \frac{m_c}{n_2}$$

The bootstrap technique began by drawing with replacement a sample of size n_2 from the empirical distribution according to the probabilities based on the original data. Once such a sample was drawn (call it sample b), the result was tallied to obtain a new set of statistics $\{a_1^*, a_2^*, m_1^*, m_2^*, m_c^*\}_b$ and a value of M_b. A total of B = 1,000 values of M_b were so generated, their values were used as an empirical distribution with mean $\bar{M}$ and variance $\hat{V}[\bar{M}]$. These statistics were calculated as:

$$V[\bar{M}] = \frac{\sum_{b=1}^{B}(M_b-\bar{M})^2}{B-1} \qquad \text{with} \quad \bar{M} = \frac{\sum_{b=1}^{B} M_b}{B} . \tag{A3.2}$$

Then the variance of $\hat{n}_1$ was estimated as:

$$\hat{V}[\hat{n}_1] = \theta^{-2}\left(\hat{V}[\bar{M}]\,\hat{N}^2 + \hat{V}[\hat{N}]\,M^2 - \hat{V}[\bar{M}]\,\hat{V}[\hat{N}]\right) . \tag{A3.3}$$

Variances for Contributions from Tag Codes with Single Recoveries. Estimates of the variance for contributions calculated from tag code recoveries with only one tag recovered in a biweekly period were estimated by following the approach proposed by Conrad and Larson (1987), in which the terms $\hat{N}_t$ and m_{c_At} were treated as random variates, and all other terms in equation (A3.1) were treated as constants (accordingly the approach first proposed by Goodman 1960 was used for the second major term of equation (A3.4)):

$$S^2_{\hat{n}_{1At}} = \left\{\left(\frac{1}{n_{2t}}\right)\left(\frac{a_{1t}}{a_{2t}}\right)\left(\frac{m_{1t}}{m_{2t}}\right)\left(\frac{1}{\theta_A}\right)\right\}^2 \left\{\hat{N}_t^2\, V[m_{c_At}] + m_{c_At}^2\, \hat{V}[\hat{N}_t] - \hat{V}[\hat{N}_t]\, V[m_{c_At}]\right\} \tag{A3.4}$$

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where: $\hat{V}[\hat{N}_t]$ equaled the estimated variance of overall harvest estimate for biweek t, obtained from the harvest sampling program; $V[m_{c_A t}]$ was the variance of "random variate" $m_{c_A t}$, approximated by the approach used by Clark and Bernard (1987; equation [12]);

$$V[m_{c_A t}] \approx \frac{n_{2t}(n_{2t}-1)a_{2t}(a_{2t}-1)m_{2t}(m_{2t}-1)\hat{n}_{1_A t}(\hat{n}_{1_A t}-1)\theta_A^2}{\hat{N}_t(\hat{N}_t-1)a_{1t}(a_{1t}-1)m_{1t}(m_{1t}-1)} + \frac{n_{2t}a_{2t}m_{2t}\hat{n}_{1_A t}\theta_A}{\hat{N}_t a_{1t}m_{1t}} - \left(\frac{n_{2t}a_{2t}m_{2t}\hat{n}_{1_A t}\theta_A}{\hat{N}_t a_{1t}m_{1t}}\right)^2 . \quad \text{(A3.5)}$$

The final step in calculating the variance of $\hat{n}_{1_A t}$ was to perform the following bias correction (Clark and Bernard 1987; equation [15]):

$$\hat{V}[\hat{n}_{1_A t}] = \left\{\frac{(\hat{N}_t-1)n_{2t}(a_{1t}-1)a_{2t}(m_{1t}-1)m_{2t}}{\hat{N}_t(n_{2t}-1)a_{1t}(a_{2t}-1)m_{1t}(m_{2t}-1)}\right\}\left\{S^2_{\hat{n}_{1_A t}}\right\}. \quad \text{(A3.6)}$$

Across Tag Code and Across Biweek Variances. Estimates of the variance of across biweek contributions by tag code, as well as by combined tag codes were obtained by summing the variances across the biweeks and tag codes, as appropriate. The resulting estimates of variance were assumed to be conservative in that the covariances among contribution estimates by tag code within each sampling biweek were assumed to be negative (Clark and Bernard 1987).

Standard errors (SE's) were obtained as the square root of the appropriate variance.

APPENDIX B - CREEL SURVEY STATISTICS

Appendix B1. Estimated effort, harvest, and total catches for the Ketchikan marine boat sport fishery, 27 April-27 September 1992.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	100,493	6,038	10%
Salmon-hours	192,269	12,100	10%
Halibut-hours	69,366	5,585	13%
Angler-hours	261,635	15,951	10%
Boat-Days	26,250	1,503	9%
Finfish Harvests[c]			
Total Large Chinook Salmon	5,626	542	16%
Derby Take-home	579	62	18%
Derby Entered	368	0	0%
Derby Take-home & Entered	947	62	11%
Total Small Chinook Salmon	44	19	71%
Derby Take-home & Entered	3	2	110%
Coho Salmon	22,688	3,248	24%
Chum Salmon	707	137	32%
Sockeye Salmon	46	18	64%
Pink Salmon	28,878	5,237	30%
Pacific Halibut	10,257	1,039	17%
Lingcod	953	176	30%
Total Rockfish	8,149	871	18%
Black Rockfish	136	43	52%
Copper Rockfish	93	54	96%
Dusky Rockfish	38	16	69%
Quillback Rockfish	1,128	194	28%
Silvergrey Rockfish	242	137	93%
Yelloweye Rockfish	1,821	230	21%
Tiger Rockfish	14	11	129%
Other Rockfish	109	56	85%
Unidentified Rockfish	4,568	594	21%
Finfish Total Catch[c]			
Small Chinook Salmon	14,180	1,215	14%
Large Chinook Salmon	6,759	642	16%
Coho Salmon	24,651	3,399	23%
Chum Salmon	746	140	31%
Sockeye Salmon	103	51	81%
Pink Salmon	37,979	6,467	28%
Pacific Halibut	12,839	1,358	17%
Dolly Varden	3	2	110%
Lingcod	1,062	182	28%
Total Rockfish	23,424	2,204	15%
Shellfish Effort and Harvest[c]			
Boat-days Fished	1,387	165	20%
Dungeness Crab Kept	10,227	1,473	24%
Tanner Crab Kept	22	20	150%
Shrimp Kept	130,720	58,360	73%

[a] Relative precision (α=0.10) = (SE * 1.645 / Estimate) * 100.

[b] Lingcod-hours and rockfish-hours not recorded.

[c] No Dolly Varden or king crab harvested, and no cutthroat or steelhead trout harvested or caught.

Appendix B2. Estimated effort, harvest, and total catches for the Juneau marine boat sport fishery, 27 April-27 September 1992.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	146,126	8,875	10%
Salmon-hours	301,588	18,067	10%
Halibut-hours	84,718	6,975	14%
Angler-hours	388,498	23,139	10%
Boat-days	34,997	2,189	10%
Finfish Harvests[c]			
Total Large Chinook Salmon	7,098	614	14%
Derby Take-home	146	24	27%
Derby Entered	457	0	0%
Derby Take-home & Entered	603	24	7%
Total Small Chinook Salmon	16	9	95%
Derby Take-home & Entered	0	0	0%
Coho Salmon	18,482	1,853	16%
Derby Take-home	596	75	21%
Derby Entered	1,570	0	0%
Derby Take-home & Entered	2,166	75	6%
Chum Salmon	604	73	20%
Derby Take-home	31	9	48%
Derby Entered	67	0	0%
Derby Take-home & Entered	98	9	15%
Sockeye Salmon	81	24	49%
Derby Take-home	3	2	110%
Derby Entered	24	0	0%
Derby Take-home & Entered	27	2	12%
Pink Salmon	5,585	537	16%
Derby Take-home	1,181	120	17%
Derby Entered	0	0	0%
Pacific Halibut	9,265	829	15%
Dolly Varden	525	123	39%
Lingcod	8	5	103%
Rockfish	646	131	33%
Finfish Total Catch[c]			
Small Chinook Salmon	8,333	902	18%
Large Chinook Salmon	7,211	633	14%
Coho Salmon	18,694	1,865	16%
Chum Salmon	681	75	18%
Sockeye Salmon	81	24	49%
Pink Salmon	9,548	875	15%
Pacific Halibut	11,819	1,114	16%
Dolly Varden	630	138	36%
Lingcod	8	5	10%
Rockfish	682	132	32%
Shellfish Effort and Harvest[b]			
Boat-days Fished	5,411	600	18%
Dungeness Crab Kept	12,675	2,101	27%
King Crab Kept	5,673	638	19%
Tanner Crab Kept	1,034	227	36%

[a] Relative precision (α=0.10) = (SE * 1.645 / Estimate) * 100.
[b] Lingcod-hours, rockfish-hours, and shrimp harvest not recorded.
[c] No cutthroat or steelhead trout harvested or caught.

Appendix B3. Estimated finfish effort, harvest, and total catches for the Sitka marine boat sport fishery, 11 May-30 August 1992.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	45,729	2,184	8%
Salmon-hours	74,183	4,186	9%
Halibut-hours	40,756	2,298	9%
Angler-hours	115,031	5,439	8%
Boat-days	14,276	714	8%
Finfish Harvests[c]			
Total Large Chinook Salmon	9,579	593	10%
Derby Take-home	667	65	16%
Derby Entered	702	0	0%
Derby Take-home & Entered	1,369	65	8%
Total Small Chinook Salmon	9	6	110%
Derby Take-home & Entered	0	0	0%
Coho Salmon	4,336	695	26%
Chum Salmon	320	96	49%
Sockeye Salmon	7	6	141%
Pink Salmon	708	151	35%
Pacific Halibut	12,549	800	10%
Dolly Varden	29	15	85%
Lingcod	2,562	298	19%
Kelp Greenling	35	18	85%
Total Rockfish	3,664	368	17%
Black Rockfish	796	207	43%
Copper Rockfish	82	23	46%
Dusky Rockfish	14	11	129%
Quillback Rockfish	384	81	35%
Silvergrey Rockfish	160	58	60%
Yelloweye Rockfish	362	79	36%
Other Rockfish	166	41	41%
Unidentified Rockfish	1,700	290	29%
Finfish Total Catch[c]			
Small Chinook Salmon	2,356	327	23%
Large Chinook Salmon	11,993	770	11%
Coho Salmon	4,510	705	26%
Chum Salmon	335	97	48%
Sockeye Salmon	7	6	141%
Pink Salmon	878	147	28%
Pacific Halibut	16,476	1,035	10%
Dolly Varden	65	14	35%
Lingcod	3,303	324	16%
Total Rockfish	13,467	1,067	13%

[a] Relative precision (α=0.10) = SE * 1.645 / Estimate) * 100.
[b] Lingcod-hours and rockfish-hours not recorded.
[c] No cutthroat or steelhead trout harvested or caught.

Appendix B4. Estimated effort, harvest, and total catches for the Petersburg marine boat sport fishery, 11 May-19 July 1992.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	14,398	1,194	14%
Salmon-hours	24,069	2,059	14%
Halibut-hours	13,127	2,008	25%
Angler-hours	37,196	3,166	14%
Boat-days	3,396	282	1%
Finfish Harvests[c]			
Total Large Chinook Salmon	1,159	159	23%
Derby Entered	206	0	0%
Sockeye Salmon	27	30	183%
Pink Salmon	15	10	110%
Pacific Halibut	1,932	331	28%
Dolly Varden	52	27	85%
Lingcod	79	41	85%
Total Rockfish	246	73	49%
Quillback Rockfish	8	7	144%
Silvergrey Rockfish	27	18	110%
Yelloweye Rockfish	152	54	58%
Other Rockfish	59	37	103%
Finfish Total Catch[c]			
Small Chinook Salmon	526	88	28%
Large Chinook Salmon	1,200	162	22%
Sockeye Salmon	160	177	182%
Pink Salmon	15	10	110%
Pacific Halibut	3,402	661	32%
Dolly Varden	168	68	67%
Lingcod	95	46	80%
Total Rockfish	296	89	49%
Shellfish Effort and Harvest[c]			
Boat-days Fished	282	62	36%
Dungeness Crab Kept	347	118	56%
Tanner Crab Kept	778	246	52%
Shrimp Kept	3,850	1,030	44%

[a] Relative precision (α=0.10) = (SE * 1.645 / Estimate) * 100.

[b] Lingcod-hours and rockfish-hours not recorded.

[c] No small chinook salmon or king crab harvested; no chum or coho salmon harvested or caught; no black, copper, dusky, or tiger rockfish harvested or caught, and no cutthroat or steelhead trout harvested or caught.

Appendix B5. Estimated effort, harvest, and total catches for the Wrangell marine boat sport fishery, 11 May-19 July 1992.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	18,246	1,377	12%
Salmon-hours	43,423	3,740	14%
Halibut-hours	4,726	738	26%
Angler-hours	48,149	3,859	13%
Boat-days	3,791	233	10%
Finfish Harvests[c]			
Total Large Chinook Salmon	2,520	170	11%
Coho Salmon	6	5	137%
Pink Salmon	73	27	61%
Pacific Halibut	459	71	25%
Dolly Varden	22	10	75%
Lingcod	21	10	78%
Total Rockfish	94	60	105%
Yelloweye Rockfish	3	2	110%
Unidentified Rockfish	91	60	108%
Finfish Total Catch[c]			
Small Chinook Salmon	530	85	26%
Large Chinook Salmon	2,727	190	11%
Coho Salmon	17	10	97%
Pink Salmon	103	45	72%
Pacific Halibut	482	73	25%
Dolly Varden	36	13	59%
Lingcod	21	10	78%
Total Rockfish	130	66	84%
Shellfish Effort and Harvest[c]			
Boat-days Fished	144	24	27%
Dungeness Crab Kept	773	168	36%
Shrimp Kept	2,330	920	65%

[a] Relative precision = (Standard error * 2 / Estimate) * 100.

[b] Lingcod-hours and rockfish-hours not recorded.

[c] No small chinook salmon, king crab, or Tanner crab harvested; no chum or sockeye salmon harvested or caught; no black, copper, dusky, quillback, silvergrey, or tiger rockfish identified as being harvested or caught; and no cutthroat or steelhead trout harvested or caught.

Appendix B6. Estimated effort, harvest, and total catches for the Craig/Klawock marine boat sport fishery, 11 May-19 July 1992.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	8,595	624	12%
Salmon-hours	16,830	1,629	16%
Halibut-hours	6,083	591	16%
Angler-hours	22,912	1,979	14%
Boat-days	2,574	154	10%
Finfish Harvests[c]			
Total Large Chinook Salmon	1,155	111	16%
Total Small Chinook Salmon	6	5	137%
Coho Salmon	1,348	126	15%
Chum Salmon	25	8	53%
Pink Salmon	23	7	50%
Pacific Halibut	1,723	161	15%
Dolly Varden	6	5	137%
Lingcod	287	55	32%
Total Rockfish	1,182	151	21%
Black Rockfish	143	38	44%
Copper Rockfish	37	22	98%
Quillback Rockfish	235	53	37%
Silvergrey Rockfish	6	3	82%
Yelloweye Rockfish	299	53	29%
Tiger Rockfish	17	11	106%
Other Rockfish	70	30	71%
Unidentified Rockfish	375	97	43%
Finfish Total Catch[c]			
Small Chinook Salmon	302	51	28%
Large Chinook Salmon	1,479	167	19%
Coho Salmon	1,388	128	15%
Chum Salmon	25	8	53%
Pink Salmon	34	9	44%
Pacific Halibut	1,909	206	18%
Dolly Varden	12	10	137%
Lingcod	298	61	34%
Total Rockfish	4,899	537	18%
Shellfish Effort and Harvest[c]			
Boat-days Fished	124	21	28%
Dungeness Crab Kept	694	175	41%
Shrimp Kept	4,120	1,975	79%

[a] Relative precision (α=0.10) = (SE * 1.645 / Estimate) * 100.
[b] Lingcod-hours and rockfish-hours not recorded.
[c] No king crab or Tanner crab harvested; and no sockeye salmon, dusky rockfish, cutthroat or steelhead trout harvested or caught.

Appendix B7. Estimated effort and catches for the Ketchikan marine boat sport fishery by seasonal period, 27 April-27 September 1992.

	Seasonal Period												
	27APR-10MAY92	11MAY-24MAY92	DERBY[a]	25MAY-07JUN92	08JUN-21JUN92	22JUN-05JUL92	06JUL-19JUL92	20JUL-02AUG92	03AUG-16AUG92	17AUG-30AUG92	31AUG-13SEP92	14SEP-27SEP92	TOTAL
Boat-hours Fished													
Estimate	1,469	2,700	13,709	4,126	12,157	11,696	11,037	8,164	9,733	14,203	8,909	2,590	100,493
Variance	222,261	419,450	3,953,645	931,171	4,153,273	3,684,991	2,487,213	2,216,379	5,849,342	6,045,907	5,289,739	1,201,033	36,454,404
Salmon-hours Fished													
Estimate	1,691	5,130	29,970	9,159	25,500	20,801	18,716	12,862	15,287	25,380	20,131	7,642	192,269
Variance	330,907	1,424,903	17,720,125	3,533,739	13,250,150	8,170,653	11,413,052	5,805,796	17,585,245	19,036,321	31,855,946	16,283,584	146,410,421
Halibut-hours Fished													
Estimate	1,417	720	3,148	2,066	5,487	10,072	9,863	7,781	11,836	13,583	2,439	954	69,366
Variance	349,350	79,740	346,149	599,073	1,697,002	3,723,286	3,744,984	2,514,483	8,627,430	8,627,681	457,456	426,653	31,193,287
Angler-hours Fished													
Estimate	3,108	5,850	33,118	11,225	30,987	30,873	28,579	20,643	27,123	38,963	22,570	8,596	261,635
Variance	1,073,724	2,146,955	21,904,164	6,917,904	22,815,756	20,166,665	22,322,063	14,119,055	42,003,492	45,255,126	33,893,764	21,810,707	254,429,375
Boat-days Fished													
Estimate	523	864	2,572	1,147	3,100	3,479	3,207	2,383	2,704	3,484	2,185	602	26,250
Variance	18,866	30,294	125,595	32,445	268,953	346,304	164,214	196,009	411,263	369,632	268,977	27,098	2,259,650
Large Chinook Salmon Harvested													
Estimate	12	225	947	714	1,701	1,142	392	298	107	88	0	0	5,626
Variance	48	11,304	3,791	112,918	52,513	98,150	5,577	5,443	1,927	1,679	0	0	293,350
Large Chinook Total Catch													
Estimate	12	225	1,200	877	1,891	1,357	642	347	107	101	0	0	6,759
Variance	48	11,304	14,134	171,886	74,091	111,831	16,981	8,315	1,927	2,105	0	0	412,622
Small Chinook Harvested													
Estimate	0	0	3	0	0	12	0	0	0	11	18	0	44
Variance	0	0	5	0	0	61	0	0	0	106	173	0	345
Small Chinook Total Catch													
Estimate	151	765	2,060	1,148	1,615	1,602	726	939	910	1,794	1,458	1,012	14,180
Variance	4,651	303,516	67,501	129,194	141,231	86,411	20,122	126,160	56,049	164,981	137,888	239,356	1,477,060
Coho Salmon Harvested													
Estimate	0	0	75	37	587	776	1,334	957	1,346	6,389	8,429	2,758	22,688
Variance	0	0	250	1,151	13,524	35,116	32,078	67,755	147,942	1,543,505	7,337,584	1,367,562	10,546,467
Coho Salmon Total Catch													
Estimate	0	0	91	173	641	906	1,475	1,067	1,354	7,017	8,899	3,028	24,651
Variance	0	0	370	10,084	11,580	74,067	39,053	83,537	147,173	1,650,662	7,988,116	1,550,099	11,554,741
Chum Salmon Harvested													
Estimate	0	0	0	0	14	62	137	215	90	112	61	16	707
Variance	0	0	0	0	35	770	3,384	11,154	1,149	1,136	1,019	139	18,786
Chum Salmon Total Catch													
Estimate	0	0	0	0	14	62	143	215	97	138	61	16	746
Variance	0	0	0	0	35	770	3,494	11,154	1,326	1,716	1,019	139	19,653

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	Seasonal Period											
	27APR-10MAY92	11MAY-24MAY92	DERBY[a]	25MAY-07JUN92	08JUN-21JUN92	22JUN-05JUL92	06JUL-19JUL92	20JUL-02AUG92	03AUG-16AUG92	17AUG-30AUG92	31AUG-13SEP92	14SEP-27SEP92	TOTAL
Sockeye Salmon Harvested													
Estimate	6	0	0	0	0	12	8	13	7	0	0	0	46
Variance	30	0	0	0	0	116	60	73	46	0	0	0	325
Sockeye Salmon Total Catch													
Estimate	6	0	0	0	0	12	8	19	7	51	0	0	103
Variance	30	0	0	0	0	116	60	91	46	2,276	0	0	2,619
Pink Salmon Harvest													
Estimate	0	18	25	0	203	906	9,625	4,958	7,327	5,164	652	0	28,878
Variance	0	306	65	0	788	94,751	10,499,023	731,705	13,934,998	2,113,553	55,437	0	27,430,626
Pink Salmon Total Catch													
Estimate	0	18	33	0	296	1,008	13,418	5,673	9,548	6,907	1,078	0	37,979
Variance	0	306	79	0	2,512	106,562	17,522,192	925,029	19,507,789	3,519,477	238,568	0	41,822,514
Pacific Halibut Harvested													
Estimate	41	108	365	441	1,262	1,805	1,352	1,046	1,544	2,048	245	0	10,257
Variance	565	1,800	8,298	71,684	137,783	266,171	107,969	53,855	151,839	274,427	5,458	0	1,079,849
Pacific Halibut Total Catch													
Estimate	65	126	440	802	2,041	2,138	1,437	1,165	1,751	2,513	361	0	12,839
Variance	1,957	954	12,149	286,522	404,716	327,268	119,767	88,155	185,056	403,549	14,744	0	1,844,837
Dolly Varden Total Catch													
Estimate	0	0	3	0	0	0	0	0	0	0	0	0	3
Variance	0	0	5	0	0	0	0	0	0	0	0	0	5
Lingcod Harvested													
Estimate	30	0	55	62	131	290	69	39	143	103	31	0	953
Variance	462	0	297	2,492	1,965	19,999	698	331	2,813	1,204	629	0	30,890
Lingcod Total Catch													
Estimate	30	0	71	62	152	313	79	63	143	114	31	4	1,062
Variance	462	0	501	2,492	3,235	20,520	677	506	2,813	1,166	629	22	33,023
Unidentified Rockfish Harvested													
Estimate	102	0	219	82	753	662	714	415	580	698	229	114	4,568
Variance	3,798	0	1,301	5,662	74,829	61,546	55,359	26,162	53,760	48,534	10,991	10,818	352,760
Unidentified Rockfish Total Catch													
Estimate	242	360	1,833	1,197	2,508	3,782	2,972	1,793	1,868	2,519	566	175	19,815
Variance	15,323	110,304	123,567	135,740	346,964	1,620,111	494,515	241,678	397,633	351,572	28,134	14,504	3,880,045
Black Rockfish Harvested													
Estimate	0	0	11	0	0	37	0	7	34	33	14	0	136
Variance	0	0	77	0	0	874	0	46	554	239	86	0	1,876
Copper Rockfish Harvested													
Estimate	0	0	0	0	0	51	0	0	25	17	0	0	93
Variance	0	0	0	0	0	2,276	0	0	532	135	0	0	2,943

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	Seasonal Period												
	27APR-10MAY92	11MAY-24MAY92	DERBY[a]	25MAY-07JUN92	08JUN-21JUN92	22JUN-05JUL92	06JUL-19JUL92	20JUL-02AUG92	03AUG-16AUG92	17AUG-30AUG92	31AUG-13SEP92	14SEP-27SEP92	TOTAL
Dusky Rockfish Harvested													
Estimate	0	0	9	0	0	6	0	0	23	0	0	0	38
Variance	0	0	57	0	0	25	0	0	181	0	0	0	263
Quillback Rockfish Harvested													
Estimate	27	18	28	14	181	152	219	177	93	178	18	23	1,128
Variance	165	306	123	194	6,845	3,147	8,335	7,007	1,123	9,828	173	272	37,518
Silvergrey Rockfish Harvested													
Estimate	0	0	14	0	149	4	6	0	11	58	0	0	242
Variance	0	0	76	0	18,043	13	25	0	45	545	0	0	18,747
Yelloweye Rockfish Harvested													
Estimate	6	0	101	50	154	428	202	137	375	346	15	7	1,821
Variance	30	0	1,080	578	3,044	15,486	2,159	2,291	16,967	11,177	52	46	52,910
Tiger Rockfish Harvested													
Estimate	0	0	2	0	12	0	0	0	0	0	0	0	14
Variance	0	0	3	0	126	0	0	0	0	0	0	0	129
Other Rockfish Harvested													
Estimate	12	54	3	0	0	9	11	7	6	7	0	0	109
Variance	120	2,754	6	0	0	59	108	46	28	46	0	0	3,167
All Rockfish Harvested													
Estimate	147	72	389	146	1,248	1,348	1,151	743	1,147	1,337	276	145	8,149
Variance	4,293	4,896	3,890	1,853	145,188	165,313	86,333	40,752	141,985	138,997	13,748	11,238	758,486
All Rockfish Total Catch													
Estimate	287	432	2,016	1,261	3,004	4,470	3,409	2,127	2,441	3,158	613	206	23,424
Variance	16,142	160,704	144,631	122,485	500,106	1,903,413	600,353	259,982	589,799	509,818	32,298	16,017	4,855,748
Shellfish Boat-days													
Estimate	83	63	77	12	47	58	192	152	224	295	106	78	1,387
Variance	1,598	774	340	141	280	693	4,106	3,044	2,824	11,045	1,266	1,258	27,368
Dungeness Crab Harvested													
Estimate	884	234	552	124	237	381	1,007	862	1,599	3,034	794	519	10,227
Variance	582,548	26,370	20,925	14,077	26,012	46,005	211,789	186,828	160,329	704,780	87,095	103,079	2,169,837
Tanner Crab Harvested													
Estimate	0	0	0	0	0	0	0	0	0	22	0	0	22
Variance	0	0	0	0	0	0	0	0	0	418	0	0	418
King Crab Harvested													
Estimate	0	0	0	0	0	0	0	0	0	0	0	0	0
Variance	0	0	0	0	0	0	0	0	0	0	0	0	0
Shrimp Harvested (X10)													
Estimate	107	0	272	0	260	569	935	497	242	8,547	508	1,135	13,072
Variance	3,499	0	47,167	0	32,254	86,347	398,475	59,913	35,442	32,626,216	207,955	566,224	34,063,492

[a] Derby held on 23-25 May, 30-31 May, and 6-7 June 1992.

Appendix B8. Estimated effort and catches for the Juneau marine boat sport fishery by seasonal period, 27 April-27 September 1992.

	Seasonal Period												
	27APR-10MAY92	11MAY-24MAY92	25MAY-07JUN92	08JUN-21JUN92	22JUN-05JUL92	06JUL-19JUL92	20JUL-02AUG92	03AUG-16AUG92	DERBY[a]	17AUG-30AUG92	31AUG-13SEP92	14SEP-27SEP92	TOTAL
Boat-hours Fished													
Estimate	5,451	10,548	11,445	14,664	16,843	14,207	14,800	7,009	20,179	18,760	8,894	3,326	146,126
Variance	1,582,349	3,970,986	7,446,874	24,052,444	9,495,003	4,860,925	4,446,195	4,501,814	7,894,696	7,645,734	2,402,587	467,598	78,767,205
Salmon-hours Fished													
Estimate	13,730	25,098	25,038	32,361	25,520	22,557	25,298	9,916	53,990	39,885	20,679	7,516	301,588
Variance	9,633,348	26,526,109	30,042,046	102,913,377	13,840,510	9,157,535	14,196,377	8,200,480	54,709,288	39,323,562	15,494,467	2,367,191	326,404,290
Halibut-hours Fished													
Estimate	112	1,193	2,719	6,424	16,128	15,737	15,494	7,250	2,546	14,945	1,267	903	84,718
Variance	5,649	227,306	931,528	8,309,715	13,218,891	7,111,797	4,021,515	4,614,719	145,225	9,913,079	84,034	68,081	48,651,539
Angler-hours Fished													
Estimate	13,842	26,311	27,757	38,788	41,648	38,294	41,135	17,144	58,102	55,086	21,956	8,435	388,498
Variance	9,780,929	28,825,964	34,713,895	165,850,040	49,772,263	29,888,974	29,754,108	24,287,333	72,608,650	70,505,811	16,443,771	2,968,876	535,400,614
Boat-days Fished													
Estimate	1,292	2,754	3,076	4,045	4,517	3,477	3,606	1,946	2,568	4,614	2,239	863	34,997
Variance	95,458	207,859	276,514	1,914,131	763,284	237,257	291,463	379,765	85,966	363,201	147,571	28,702	4,791,171
Large Chinook Salmon Harvested													
Estimate	423	726	881	1,456	732	836	620	96	603	576	112	37	7,098
Variance	17,935	29,097	124,974	157,374	7,855	12,373	14,091	1,559	593	7,790	2,726	218	376,585
Large Chinook Total Catch													
Estimate	423	726	881	1,484	743	883	628	96	622	576	112	37	7,211
Variance	17,935	29,097	124,974	176,946	8,310	16,697	14,314	1,559	680	7,790	2,726	218	401,246
Small Chinook Harvested													
Estimate	0	0	0	0	0	0	4	5	0	7	0	0	16
Variance	0	0	0	0	0	0	15	24	0	46	0	0	85
Small Chinook Total Catch													
Estimate	201	355	834	1,073	934	1,246	1,029	267	1,380	767	226	21	8,333
Variance	4,743	7,699	195,343	326,146	73,152	78,241	33,711	5,894	40,341	32,999	15,190	67	813,526
Coho Salmon Harvested													
Estimate	0	0	0	13	56	799	1,136	570	2,166	7,241	4,985	1,516	18,482
Variance	0	0	0	72	316	16,631	46,914	8,706	5,699	866,462	2,310,361	180,045	3,435,206
Coho Salmon Total Catch													
Estimate	0	0	0	13	64	803	1,162	580	2,211	7,327	5,014	1,520	18,694
Variance	0	0	0	72	311	17,044	48,857	9,698	7,818	902,965	2,311,276	182,044	3,480,085
Chum Salmon Harvested													
Estimate	0	0	0	0	109	197	64	55	31	123	21	4	604
Variance	0	0	0	0	340	1,439	546	707	89	1,995	200	13	5,329
Chum Salmon Total Catch													
Estimate	0	0	0	0	109	228	79	55	37	139	30	4	681
Variance	0	0	0	0	340	1,294	635	707	127	2,184	320	13	5,620

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Appendix B8. (Page 2 of 3).

	Seasonal Period											
	27APR-10MAY92	11MAY-24MAY92	25MAY-07JUN92	08JUN-21JUN92	22JUN-05JUL92	06JUL-19JUL92	20JUL-02AUG92	03AUG-16AUG92	DERBY[a]	17AUG-30AUG92	31AUG-13SEP92	14SEP-27SEP92	TOTAL
Sockeye Salmon Harvested													
Estimate	0	0	0	5	32	13	4	0	27	0	0	0	81
Variance	0	0	0	16	446	80	15	0	5	0	0	0	562
Sockeye Salmon Total Catch													
Estimate	0	0	0	5	32	13	4	0	27	0	0	0	81
Variance	0	0	0	16	446	80	15	0	5	0	0	0	562
Pink Salmon Harvest													
Estimate	0	0	0	5	612	1,083	1,204	570	1,181	851	75	4	5,585
Variance	0	0	0	16	71,812	80,408	52,561	26,773	14,479	41,173	911	13	288,146
Pink Salmon Total Catch													
Estimate	0	0	0	5	749	1,438	1,836	1,109	3,033	1,228	146	4	9,548
Variance	0	0	0	16	116,473	170,360	68,824	246,417	94,136	62,127	7,987	13	766,353
Pacific Halibut Harvested													
Estimate	11	60	271	671	1,446	2,118	1,533	998	454	1,484	167	52	9,265
Variance	103	1,912	12,700	161,227	177,695	103,398	45,590	96,382	10,922	73,744	3,216	410	687,299
Pacific Halibut Total Catch													
Estimate	11	120	517	761	1,856	2,967	1,791	1,402	557	1,600	181	56	11,819
Variance	103	7,376	73,839	207,849	258,742	272,535	58,158	254,778	13,076	90,450	3,123	507	1,240,536
Dolly Varden Total Catch													
Estimate	29	196	45	146	137	8	44	25	0	0	0	0	630
Variance	237	5,200	820	4,305	6,737	22	1,167	606	0	0	0	0	19,094
Lingcod Harvested													
Estimate	0	0	0	0	4	0	4	0	0	0	0	0	8
Variance	0	0	0	0	9	0	13	0	0	0	0	0	22
Lingcod Total Catch													
Estimate	0	0	0	0	4	0	4	0	0	0	0	0	8
Variance	0	0	0	0	9	0	13	0	0	0	0	0	22
All Rockfish Harvested													
Estimate	21	6	0	131	71	191	34	5	21	166	0	0	646
Variance	412	30	0	4,718	1,331	4,169	305	24	104	6,063	0	0	17,156
All Rockfish Total Catch													
Estimate	21	6	0	131	88	195	46	5	24	166	0	0	682
Variance	412	30	0	4,718	1,332	4,234	525	24	100	6,063	0	0	17,438
Shellfish Boat-days													
Estimate	80	256	549	552	675	984	725	388	52	726	306	118	5,411
Variance	577	3,801	87,732	75,478	81,185	15,307	10,510	13,524	165	65,730	5,708	840	360,557

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Appendix B8. (Page 3 of 3).

	Seasonal Period											
	27APR-10MAY92	11MAY-24MAY92	25MAY-07JUN92	08JUN-21JUN92	22JUN-05JUL92	06JUL-19JUL92	20JUL-02AUG92	03AUG-16AUG92	DERBY[a]	17AUG-30AUG92	31AUG-13SEP92	14SEP-27SEP92	TOTAL
Dungeness Crab Harvested													
Estimate	111	894	2,227	1,751	1,925	1,525	1,302	580	140	1,232	868	120	12,675
Variance	2,814	238,330	2,279,065	414,760	619,587	45,654	63,944	49,954	3,444	268,984	422,739	2,935	4,412,210
Tanner Crab Harvested													
Estimate	189	0	43	0	87	206	155	55	52	215	32	0	1,034
Variance	12,314	0	860	0	2,054	5,469	5,994	1,508	871	22,303	351	0	51,724
King Crab Harvested													
Estimate	0	0	0	0	627	1,850	1,233	655	132	651	525	0	5,673
Variance	0	0	0	0	85,351	88,785	81,894	56,292	4,476	48,788	41,277	0	406,863

[a] Derby held on 7-9 August 1992.

Appendix B9. Estimated effort and catches for the Sitka marine boat sport fishery by seasonal period, 11 May-30 August 1992.

	Seasonal Period									
	11MAY-24MAY92	DERBY[a]	25MAY-07JUN92	08JUN-21JUN92	22JUN-05JUL92	06JUL-19JUL92	20JUL-02AUG92	03AUG-16AUG92	17AUG-30AUG92	TOTAL
Boat-hours Fished										
Estimate	2,491	7,293	4,308	6,183	5,729	4,771	5,537	4,676	4,741	45,729
Variance	66,164	583,932	824,075	1,332,405	374,377	268,297	245,519	443,142	630,495	4,768,406
Salmon-hours Fished										
Estimate	3,842	17,782	7,121	11,275	8,356	6,084	5,578	6,765	7,380	74,183
Variance	244,508	6,348,657	1,426,403	5,594,924	1,110,969	370,778	411,875	462,683	1,547,1,046	17,518,508
Halibut-hours Fished										
Estimate	1,860	1,120	3,140	3,666	6,634	6,206	8,046	5,337	4,747	40,756
Variance	164,991	14,832	666,511	382,288	714,484	736,314	639,700	1,331,235	630,893	5,281,248
Angler-hours Fished										
Estimate	5,708	18,903	10,261	14,941	14,990	12,357	13,624	12,119	12,128	115,031
Variance	365,592	6,356,520	3,291,721	8,043,352	2,405,715	1,534,147	1,453,807	2,660,624	3,472,764	29,584,242
Boat-days Fished										
Estimate	814	1,557	1,366	2,123	2,164	1,509	1,806	1,392	1,545	14,276
Variance	8,875	24,957	126,582	103,686	73,862	26,254	25,955	33,899	85,820	509,890
Large Chinook Salmon Harvested										
Estimate	618	1,369	1,066	1,917	1,928	747	1,090	646	198	9,579
Variance	15,527	4,195	124,579	78,901	82,921	8,141	25,093	8,849	3,462	351,668
Large Chinook Total Catch										
Estimate	618	2,456	1,206	2,683	2,238	776	1,172	646	198	11,993
Variance	15,527	53,482	223,690	147,528	109,081	8,836	22,862	8,849	3,462	593,317
Small Chinook Harvested										
Estimate	0	0	0	9	0	0	0	0	0	9
Variance	0	0	0	34	0	0	0	0	0	34
Small Chinook Total Catch										
Estimate	50	319	80	790	443	109	273	81	211	2,356
Variance	672	3,334	1,052	73,412	17,021	809	4,304	1,063	5,424	107,091
Coho Salmon Harvested										
Estimate	0	2	0	0	30	416	422	820	2,646	4,336
Variance	0	3	0	0	141	14,489	13,062	12,339	443,307	483,341
Coho Salmon Total Catch										
Estimate	0	4	0	0	39	446	436	829	2,756	4,510
Variance	0	6	0	0	204	14,058	13,198	12,042	457,151	496,659
Chum Salmon Harvested										
Estimate	0	2	0	0	5	6	28	35	244	320
Variance	0	3	0	0	16	17	115	146	9,005	9,302
Chum Salmon Total Catch										
Estimate	0	7	0	6	9	6	28	35	244	335
Variance	0	9	0	30	63	17	115	146	9,005	9,385

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Appendix B9. (Page 2 of 3).

	Seasonal Period									
	11MAY-24MAY92	DERBY[a]	25MAY-07JUN92	08JUN-21JUN92	22JUN-05JUL92	06JUL-19JUL92	20JUL-02AUG92	03AUG-16AUG92	17AUG-30AUG92	TOTAL
Sockeye Salmon Harvested										
Estimate	0	0	0	0	0	7	0	0	0	7
Variance	0	0	0	0	0	42	0	0	0	42
Sockeye Salmon Total Catch										
Estimate	0	0	0	0	0	7	0	0	0	7
Variance	0	0	0	0	0	42	0	0	0	42
Pink Salmon Harvest										
Estimate	0	0	0	3	35	103	69	289	209	708
Variance	0	0	0	4	355	1,210	329	14,510	6,276	22,684
Pink Salmon Total Catch										
Estimate	0	0	0	5	40	132	143	334	224	878
Variance	0	0	0	8	374	1,741	1,820	11,177	6,473	21,593
Pacific Halibut Harvested										
Estimate	395	404	1,209	1,437	2,586	2,090	1,863	1,249	1,316	12,549
Variance	11,432	6,278	166,875	64,045	144,566	63,286	44,799	58,533	79,657	639,471
Pacific Halibut Total Catch										
Estimate	476	503	1,521	1,967	3,323	2,607	2,821	1,544	1,714	16,476
Variance	11,407	6,561	272,991	132,904	212,048	113,068	92,750	101,821	127,164	1,070,714
Dolly Varden Total Catch										
Estimate	0	7	36	12	0	5	0	5	0	65
Variance	0	0	101	72	0	16	0	17	0	206
Lingcod Harvested										
Estimate	87	117	447	274	232	419	267	394	325	2,562
Variance	1,293	928	16,956	9,994	3,417	11,950	2,052	32,963	8,979	88,532
Lingcod Total Catch										
Estimate	104	195	472	371	421	541	354	477	368	3,303
Variance	1,305	963	15,548	9,803	12,097	12,574	1,882	41,604	9,492	105,268
Unidentified Rockfish Harvested										
Estimate	73	100	197	44	310	216	269	238	253	1,700
Variance	1,927	3,223	20,645	466	17,499	8,771	9,257	9,219	13,215	84,222
Unidentified Rockfish Total Catch										
Estimate	326	1,064	1,144	1,103	2,158	1,419	1,713	1,237	1,325	11,489
Variance	7,265	86,999	183,137	27,560	154,718	59,820	154,809	80,250	183,549	938,107
Black Rockfish Harvested										
Estimate	34	73	210	129	20	191	114	12	13	796
Variance	927	373	2,146	10,126	90	18,786	10,458	54	51	43,011

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Appendix B9. (Page 3 of 3).

	Seasonal Period									
	11MAY-24MAY92	DERBY[a]	25MAY-07JUN92	08JUN-21JUN92	22JUN-05JUL92	06JUL-19JUL92	20JUL-02AUG92	03AUG-16AUG92	17AUG-30AUG92	TOTAL
Copper Rockfish Harvested										
Estimate	11	22	8	0	0	12	0	9	20	82
Variance	81	77	60	0	0	58	0	63	184	523
Dusky Rockfish Harvested										
Estimate	0	14	0	0	0	0	0	0	0	14
Variance	0	122	0	0	0	0	0	0	0	122
Quillback Rockfish Harvested										
Estimate	90	17	45	41	5	68	0	41	77	384
Variance	1,722	92	909	302	17	1,113	0	593	1,817	6,565
Silvergrey Rockfish Harvested										
Estimate	18	7	23	32	0	55	0	7	18	160
Variance	158	15	121	185	0	2,603	0	20	270	3,372
Yelloweye Rockfish Harvested										
Estimate	34	21	100	29	13	32	41	63	29	362
Variance	241	158	3,714	221	65	188	247	901	497	6,232
Other Rockfish Harvested										
Estimate	62	19	8	17	0	12	5	19	24	166
Variance	981	54	60	98	0	61	16	155	264	1,689
All Rockfish Harvested										
Estimate	321	274	591	291	349	585	429	390	434	3,664
Variance	4,170	2,954	35,417	14,130	17,285	19,834	8,208	14,222	19,068	135,288
All Rockfish Total Catch										
Estimate	574	1,251	1,538	1,351	2,197	1,788	1,873	1,389	1,506	13,467
Variance	13,229	75,602	195,504	48,191	156,403	105,789	240,251	96,288	207,472	1,138,729
Kelp Greenling Harvested										
Estimate	0	0	17	6	0	0	6	0	6	35
Variance	0	0	239	30	0	0	30	0	30	329

[a] Derby held on 23-25 May and 30-31 May 1992.

Appendix B10. Estimated effort and catches for the Petersburg marine boat sport fishery by seasonal period, 11 May-19 July 1992.

	Seasonal Period					
	11MAY92-24MAY92	25MAY92-07JUN92	08JUN92-21JUN92	22JUN92-05JUL92	06JUL92-19JUL92	TOTAL
Boat-hours Fished						
Estimate	4,205	3,203	2,307	2,976	1,707	14,398
Variance	279,604	601,146	139,406	203,313	202,456	1,425,925
Salmon-hours Fished						
Estimate	8,788	6,520	4,748	3,151	862	24,069
Variance	1,456,790	1,531,647	738,051	464,277	47,243	4,238,008
Halibut-hours Fished						
Estimate	1,589	1,977	947	4,944	3,670	13,127
Variance	387,157	1,297,478	93,546	1,042,927	1,211,766	4,032,874
Angler-hours Fished						
Estimate	10,377	8,497	5,695	8,095	4,532	37,196
Variance	1,810,124	4,482,761	897,547	1,333,593	1,501,628	10,025,653
Boat-days Fished						
Estimate	853	746	605	748	444	3,396
Variance	10,187	37,790	9,052	11,267	11,281	79,577
Large Chinook Salmon Harvested						
Estimate	239	301	323	189	107	1,159
Variance	5,020	5,399	7,748	1,898	5,290	25,355
Large Chinook Total Catch						
Estimate	252	309	331	201	107	1,200
Variance	5,126	5,875	7,652	2,150	5,290	26,093
Small Chinook Total Catch						
Estimate	119	204	115	33	55	526
Variance	1,941	2,128	1,239	665	1,766	7,739
Sockeye Salmon Harvested						
Estimate	0	0	0	27	0	27
Variance	0	0	0	871	0	871
Sockeye Salmon Total Catch						
Estimate	0	0	0	160	0	160
Variance	0	0	0	31,360	0	31,360
Pink Salmon Harvest						
Estimate	0	0	0	7	8	15
Variance	0	0	0	54	48	102
Pink Salmon Total Catch						
Estimate	0	0	0	7	8	15
Variance	0	0	0	54	48	102
Pacific Halibut Harvested						
Estimate	131	251	124	783	643	1,932
Variance	3,711	18,837	2,497	44,624	40,170	109,839
Pacific Halibut Total Catch						
Estimate	131	328	143	1,671	1,129	3,402
Variance	3,711	43,350	2,854	212,65	174,072	436,641
Dolly Varden Total Catch						
Estimate	84	22	13	33	16	168
Variance	2,482	478	151	1,361	192	4,664
Lingcod Harvested						
Estimate	0	0	0	31	48	79
Variance	0	0	0	486	1,168	1,654
Lingcod Total Catch						
Estimate	0	0	0	31	64	95
Variance	0	0	0	486	1,616	2,102

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	Seasonal Period					
	11MAY92-24MAY92	25MAY92-07JUN92	08JUN92-21JUN92	22JUN92-05JUL92	06JUL92-19JUL92	TOTAL
Unidentified Rockfish Total Catch						
Estimate	13	0	0	0	32	45
Variance	133	0	0	0	656	789
Quillback Rockfish Harvested						
Estimate	0	0	0	0	8	8
Variance	0	0	0	0	48	48
Silvergrey Rockfish Harvested						
Estimate	27	0	0	0	0	27
Variance	335	0	0	0	0	335
Yelloweye Rockfish Harvested						
Estimate	44	0	0	12	96	152
Variance	876	0	0	108	1,915	2,899
Other Rockfish Harvested						
Estimate	10	22	0	27	0	59
Variance	50	478	0	871	0	1,399
All Rockfish Harvested						
Estimate	81	22	0	39	104	246
Variance	1,579	478	0	979	2,315	5,351
All Rockfish Total Catch						
Estimate	99	22	0	39	136	296
Variance	1,766	478	0	979	4,763	7,986
Shellfish Boat-days						
Estimate	35	24	55	117	51	282
Variance	244	136	355	2,523	599	3,857
Dungeness Crab Harvested						
Estimate	43	52	39	213	0	347
Variance	587	882	518	11,890	0	13,877
Tanner Crab Harvested						
Estimate	85	22	367	164	140	778
Variance	3,564	478	33,128	8,332	15,007	60,509
Shrimp Harvested (X10)						
Estimate	69	6	63	147	100	385
Variance	2,310	18	1,096	4,610	2,548	10,582

Appendix B11. Estimated effort and catches for the Wrangell marine boat sport fishery by seasonal period, 11 May-19 July 1992.

	Seasonal Period					
	11MAY92-24MAY92	25MAY92-07JUN92	08JUN92-21JUN92	22JUN92-05JUL92	06JUL92-19JUL92	TOTAL
Boat-hours Fished						
Estimate	8,596	6,596	1,585	851	618	18,246
Variance	1,163,163	617,417	67,022	17,288	30,170	1,895,060
Salmon-hours Fished						
Estimate	21,704	15,994	3,528	1,275	922	43,423
Variance	8,791,505	4,586,394	341,095	45,501	222,105	13,986,600
Halibut-hours Fished						
Estimate	399	1,404	925	750	1,248	4,726
Variance	25,780	195,880	126,950	31,737	164,399	544,746
Angler-hours Fished						
Estimate	22,103	17,398	4,454	2,024	2,170	48,149
Variance	9,139,006	4,487,835	615,267	105,510	542,931	14,890,549
Boat-days Fished						
Estimate	1,715	1,320	383	222	151	3,791
Variance	23,169	25,224	4,054	1,096	924	54,467
Large Chinook Salmon Harvested						
Estimate	1,158	941	285	99	37	2,520
Variance	13,807	9,698	4,389	602	446	28,942
Large Chinook Total Catch						
Estimate	1,268	1,033	290	99	37	2,727
Variance	16,395	13,753	4,716	602	446	35,912
Small Chinook Total Catch						
Estimate	291	201	38	0	0	530
Variance	5,291	1,524	375	0	0	7,190
Coho Salmon Harvested						
Estimate	0	0	0	0	6	6
Variance	0	0	0	0	24	24
Coho Salmon Total Catch						
Estimate	0	11	0	0	6	17
Variance	0	73	0	0	24	97
Pink Salmon Harvested						
Estimate	0	0	0	0	73	73
Variance	0	0	0	0	734	734
Pink Salmon Total Catch						
Estimate	0	0	0	0	103	103
Variance	0	0	0	0	2,054	2,054
Pacific Halibut Harvested						
Estimate	74	135	84	36	130	459
Variance	625	915	792	138	2,629	5,099
Pacific Halibut Total Catch						
Estimate	77	145	84	41	135	482
Variance	631	1,040	792	146	2,706	5,315
Dolly Varden Total Catch						
Estimate	19	17	0	0	0	36
Variance	70	93	0	0	0	163
Lingcod Harvested						
Estimate	15	3	3	0	0	21
Variance	92	10	6	0	0	108
Lingcod Total Catch						
Estimate	15	3	3	0	0	21
Variance	92	10	6	0	0	108

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	Seasonal Period					
	11MAY92-24MAY92	25MAY92-07JUN92	08JUN92-21JUN92	22JUN92-05JUL92	06JUL92-19JUL92	TOTAL
Unidentified Rockfish Harvested						
Estimate	10	0	16	65	0	91
Variance	80	0	137	3,380	0	3,597
Unidentified Rockfish Total						
Estimate	10	6	46	65	0	127
Variance	80	31	797	3,380	0	4,288
Yelloweye Rockfish Harvested						
Estimate	0	0	0	3	0	3
Variance	0	0	0	6	0	6
All Rockfish Harvested						
Estimate	10	0	16	68	0	94
Variance	80	0	137	3,386	0	3,603
All Rockfish Total Catch						
Estimate	10	6	46	68	0	130
Variance	80	31	797	3,386	0	4,294
Shellfish Boat-days						
Estimate	27	28	56	25	8	144
Variance	98	109	268	90	26	591
Dungeness Crab Harvested						
Estimate	168	155	260	84	106	773
Variance	9,536	5,143	7,106	1,530	4,784	28,099
Shrimp Harvested (X10)						
Estimate	55	76	102	0	0	233
Variance	1,100	3,599	3,786	0	0	8,485

Appendix B12. Estimated effort and catches for the Craig/Klawock marine boat sport fishery by seasonal period, 11 May-19 July 1992.

	Seasonal Period					
	11MAY92-24MAY92	25MAY92-07JUN92	08JUN92-21JUN92	22JUN92-05JUL92	06JUL92-19JUL92	TOTAL
Boat-hours Fished						
Estimate	1,373	1,744	1,828	2,321	1,329	8,595
Variance	25,492	149,871	117,191	81,076	15,220	388,850
Salmon-hours Fished						
Estimate	2,345	3,567	3,720	4,810	2,388	16,830
Variance	116,165	996,866	706,530	737,715	97,196	2,654,472
Halibut-hours Fished						
Estimate	444	843	1,169	1,930	1,697	6,083
Variance	18,102	63,684	27,118	128,705	111,347	348,956
Angler-hours Fished						
Estimate	2,789	4,410	4,888	6,740	4,085	22,912
Variance	164,547	1,517,923	969,397	1,021,285	244,077	3,917,229
Boat-days Fished						
Estimate	440	512	615	623	384	2,574
Variance	3,404	10,169	2,891	5,649	1,577	23,690
Large Chinook Salmon Harvested						
Estimate	210	213	224	304	204	1,155
Variance	1,550	1,188	1,471	3,513	4,537	12,259
Large Chinook Total Catch						
Estimate	286	246	304	430	213	1,479
Variance	5,083	1,309	5,014	11,832	4,568	27,806
Small Chinook Harvested						
Estimate	0	0	0	6	0	6
Variance	0	0	0	26	0	26
Small Chinook Total Catch						
Estimate	99	39	68	76	20	302
Variance	939	290	888	446	62	2,625
Coho Salmon Harvested						
Estimate	0	0	35	857	456	1,348
Variance	0	0	154	11,059	4,773	15,986
Coho Salmon Total Catch						
Estimate	0	11	53	868	456	1,388
Variance	0	92	456	11,134	4,773	16,455
Chum Salmon Harvested						
Estimate	0	0	0	11	14	25
Variance	0	0	0	43	25	68
Chum Salmon Total Catch						
Estimate	0	0	0	11	14	25
Variance	0	0	0	43	25	68
Pink Salmon Harvested						
Estimate	0	0	3	20	0	23
Variance	0	0	5	51	0	56
Pink Salmon Total Catch						
Estimate	0	0	3	25	6	34
Variance	0	0	5	46	26	77
Pacific Halibut Harvested						
Estimate	45	216	412	538	512	1,723
Variance	409	1,265	3,667	8,093	12,454	25,888
Pacific Halibut Total Catch						
Estimate	45	227	446	645	546	1,909
Variance	409	1,295	6,527	17,772	16,527	42,530

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Appendix B12. (Page 2 of 2).

	Seasonal Period					
	11MAY92-24MAY92	25MAY92-07JUN92	08JUN92-21JUN92	22JUN92-05JUL92	06JUL92-19JUL92	TOTAL
Dolly Varden Total Catch						
Estimate	0	0	12	0	0	12
Variance	0	0	105	0	0	105
Lingcod Harvested						
Estimate	6	67	26	115	73	287
Variance	20	1,051	42	1,194	721	3,028
Lingcod Total Catch						
Estimate	6	67	26	126	73	298
Variance	20	1,051	42	1,868	721	3,702
Unidentified Rockfish Harvested						
Estimate	92	48	43	114	78	375
Variance	1,408	1,575	1,252	3,114	2,092	9,441
Unidentified Rockfish Total Catch						
Estimate	230	762	1,187	1,200	596	3,975
Variance	3,298	71,265	73,814	100,781	17,139	266,297
Black Rockfish Harvested						
Estimate	42	6	22	62	11	143
Variance	640	20	171	598	30	1,459
Copper Rockfish Harvested						
Estimate	25	6	0	0	6	37
Variance	417	26	0	0	20	463
Quillback Rockfish Harvested						
Estimate	70	14	39	36	76	235
Variance	1,166	76	169	245	1,168	2,824
Silvergrey Rockfish Harvested						
Estimate	0	3	0	3	0	6
Variance	0	5	0	5	0	10
Yelloweye Rockfish Harvested						
Estimate	36	34	72	70	87	299
Variance	356	200	710	374	1,121	2,761
Tiger Rockfish Harvested						
Estimate	0	3	0	3	11	17
Variance	0	5	0	5	103	113
Other Rockfish Harvested						
Estimate	20	0	28	22	0	70
Variance	62	0	700	166	0	928
All Rockfish Harvested						
Estimate	286	112	205	310	269	1,182
Variance	7,514	2,874	1,838	6,130	4,477	22,833
All Rockfish Total Catch						
Estimate	423	826	1,349	1,514	787	4,899
Variance	11,323	76,197	71,884	106,764	21,671	287,839
Shellfish Boat-days						
Estimate	8	17	18	36	45	124
Variance	31	49	98	195	50	423
Dungeness Crab Harvested						
Estimate	28	106	154	199	207	694
Variance	644	4,130	17,626	3,644	4,410	30,454
Shrimp Harvested (X10)						
Estimate	98	0	188	0	126	412
Variance	6,174	0	22,625	0	10,206	39,005

Appendix B13. Estimated effort and catches for the Picnic Cove marine sport fishery by seasonal period, 27 Apr-7 June 1992.

	Seasonal Period					
	27APR92-10MAY92	11MAY92-24MAY92	25MAY92-07JUN92	TOTAL	Standard Error	Relative Precision[a]
Angler-hours Fished					659	20%
Estimate	1,727	2,453	1,383	5,563		
Variance	113,428	120,631	200,023	434,081		
Large Chinook Salmon Harvest and Total Catch					46	32%
Estimate	84	130	21	235		
Variance	572	1,343	163	2,078		
Small Chinook Total Catch (none harvested)					18	48%
Estimate	5	46	11	62		
Variance	22	266	32	320		

[a] Relative precision (α=0.10) = (SE * 1.65 / Estimate) * 100.

Appendix B14. Numbers of chinook salmon examined for coded wire tags in Southeast Alaska marine boat sport fisheries in 1992.

		Large Chinook[a]			Small Chinook[b]		
Fishery	Seasonal Period	Estimated Harvest	Number Sampled	Percent	Estimated Harvest	Number Sampled	Percent
Ketchikan	4/27-6/21 Non-derby	2,652	278	10	0	0	0
	Derby Entered[c]	368	368	100	0	0	0
	Derby Take-Home[c]	579	169	29	3	0	0
	6/22-8/02	1,832	193	11	12	2	17
	8/03-9/27	195	15	8	29	1	3
	Total	5,626	1,023	18	44	3	7
Juneau	4/27-6/21	3,486	317	9	0	0	0
	6/22-8/02	2,188	328	15	4	1	25
	8/02-9/27 Non-derby	821	120	15	12	2	17
	Derby Entered[d]	457	457	100	0	0	0
	Derby Take-Home[d]	146	34	23	0	0	0
	Total	7,098	1,256	18	16	3	19
Sitka	5/11-6/21	3,601	559	16	9	2	22
	Derby Entered[e]	702	665	95	0	0	0
	Derby Take-Home[e]	667	213	32	0	0	0
	6/22-8/30	4,609	775	17	0	0	0
	Total	9,579	2,212	23	9	2	22
Petersburg	5/11-7/19	1,159	227	20	0	0	0
Wrangell	5/11-7/19	2,520	558	22	0	0	0
Craig/Klawock	5/11-7/19	1,155	288	25	6	1	17
All areas combined		27,137	5,564	21	75	9	12

[a] Chinook salmon at least 28 inches in total length.
[b] Chinook salmon <28 inches in total length.
[c] Derby held on 23-25 May, 30-31 May, and 6-7 June.
[d] Derby held 7-9 August.
[e] Derby held on 23-25 May and 30-31 May.

Appendix B15. Estimates of hatchery produced chinook salmon contributed to the Ketchikan marine boat sport fishery from 27 April to 27 September 1992.

Region	Agency[b]	Hatchery/ Release Site	Tag Code	Non-derby 4/27-6/21 Rec[c]	Non-derby 4/27-6/21 Con[d]	Non-derby 4/27-6/21 Var of Con[e]	Derby[a] Rec	Derby[a] Con	Derby[a] Var of Con	6/22-8/02 Rec	6/22-8/02 Con	6/22-8/02 Var of Con	8/03-9/27 Rec	8/03-9/27 Con	8/03-9/27 Var of Con	Total Rec	Total Con	Total Var of Con
Washington	COOP	Quinault	21-25-50										1	35	1,203	1	35	1,203
	NMFS	Bonneville	23-31-55	1	9	72										1	9	72
		Washington Total		1	9	72							1	35	1,203	2	44	1,275
British Columbia	CDFO	Tenderfoot Creek	02-14-27							1	12	190				1	12	190
		Robertson Creek	02-45-17				1	1								1	1	
			02-48-06	1	9	70										1	9	70
			02-49-52							1	227	51,626				1	227	51,626
			02-49-61				1	35	1,216							1	35	1,216
			02-53-28							1	219	48,060				1	219	48,060
			02-58-39				1	116	13,399							1	116	13,399
		Conuma River	02-55-03				1	12	132							1	12	132
			02-58-32	1	60	3,523				1	54	2,849				2	114	6,372
		Kitimat River	02-55-29				1	25	622							1	25	622
		Memekay River	02-63-01							1	15	221	1	15	224	2	30	445
		Nitinat River	02-54-02				1	147	21,364							1	147	21,364
		Pallant Creek	02-59-08				1	2	3							1	2	3
		Quinsam River	02-53-63							1	31	903				1	31	903
		B.C. Total		2	69	3,593	7	338	36,736	6	558	103,849	1	15	224	16	980	144,402
Alaska	AAI	Burnett Inlet	04-32-10							1	51	2,558				1	51	2,558
	ADFG	Crystal Lake	04-32-02	1	73	5,238										1	73	5,238
		Deer Mountain	04-30-26							1	12	133				1	12	133
			04-30-27				1	8	59							1	8	59
			04-30-31							1	30	896				1	30	896
			04-30-32				2	15	129							2	15	129
	MIC	Tamgas Creek	47-16-05	1	57	3,194				2	125	8,128				3	182	11,322
			47-16-39	1	19	356	2	4	5							3	23	361
			47-16-42	2	314	57,096	1	11	109							3	325	57,205

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Appendix B15. (Page 2 of 2).

Region	Agency[b]	Hatchery/ release site	Tag Code	Non-derby 4/27-6/21 Rec[c]	Non-derby 4/27-6/21 Con[d]	Non-derby 4/27-6/21 Var of Con[e]	Derby[a] Rec	Derby[a] Con	Derby[a] Var of Con	6/22-8/02 Rec	6/22-8/02 Con	6/22-8/02 Var of Con	8/03-9/27 Rec	8/03-9/27 Con	8/03-9/27 Var of Con	Total Rec	Total Con	Total Var of Con
Alaska (cont.)	SSRA	Carroll Inlet	04-31-01	2	169	14,210	6	107	2,883							8	276	17,043
			04-31-07	2	278	45,397	7	91	1,686	1	93	8,505				10	462	55,588
			04-31-41	1	72	5,068	3	24	171	1	64	4,099				5	160	9,338
			04-31-42	2	143	8,933	1	8	57							3	151	8,990
		Neets Bay	04-30-58				1	8	56	1	78	6,009				2	86	6,065
			04-30-59				2	59	1,658	1	78	6,009				3	137	7,667
			04-31-04				1	15	204							1	15	204
			04-31-47	3	170	10,054	2	30	567							5	200	10,621
			04-31-49	1	109	11,715	1	12	137	1	119	14,141				3	240	25,993
			04-32-52	1	76	5,717										1	76	5,717
		Whitman Lake	04-31-08				2	22	237	1	23	526				3	45	763
			04-31-44	1	9	79	4	10	29	2	18	161				7	37	269
		Alaska Total		18	1,489	167,057	36	424	7,937	13	691	51,165				67	2,604	226,159
		All Regions		21	1,567	170,722	43	762	44,673	19	1,249	155,014	2	50	1,427	85	3,628	371,836

[a] Derby held on 23-25 May, 30-31 May, and 6-7 June 1992.

[b] COOP = Washington Department of Fisheries - Cooperative. NMFS = National Marine Fisheries Service. CDFO = Canada Department of Fisheries and Oceans. AAI = Alaska Aquaculture Incorporated. ADFG = Alaska Department of Fish and Game. MIC = Metlakatla Indian Community. SSRA = Southern Southeast Regional Aquaculture Association.

[c] Rec = Number of fish recovered of noted tag code.

[d] Con = Estimated harvest (contribution) of the release of the noted tag code.

[e] Var of Con = Variance of the estimated harvest of the release of the noted tag code.

Appendix B16. Estimates of hatchery produced chinook salmon contributed to the Juneau marine boat sport fishery from 27 April to 27 September 1992.

Region	Agency[b]	Hatchery/ Release Site	Tag Code	Non-derby 4/27-6/21 Rec[c]	Con[d]	Var. of Con[e]	6/22-8/02 Rec	Con	Var. of Con	Non-derby 8/03-9/27 Rec	Con	Var. of Con	Derby[a] Rec	Con	Var. of Con	Total Rec	Con	Var. of Con
Oregon	ODFW	Clackamas	07-52-02							1	83	6,895				1	83	6,895
		Mckenzie	07-51-60							1	117	13,658				1	117	13,658
		Oregon Total								2	200	20,553				2	200	20,553
Washington	NMFS	Bonneville	23-26-18							1	5					1	5	
			23-31-22				1	7	43							1	7	43
	WDF	Lewis River	63-52-47							1	14	171				1	14	171
		Washington Total					1	7	43	2	19	171				3	26	214
British Columbia	CDFO	Kitimat River	02-04-32										1	12	129	1	12	129
			02-54-09										1	130	16,804	1	130	16,804
			02-55-33	1	28	755							1	2	1	2	30	756
		Nitinat River	02-54-02	1	642	412,280										1	642	412,280
		Pallant Creek	02-59-08				1	16	242							1	16	242
		Puntledge River	02-58-44										1	140	19,503	1	140	19,503
		B.C. Total		2	670	413,035	1	16	242				4	284	36,437	7	970	449,714
Alaska	AAI	Burnett Inlet	04-32-10										1	5	22	1	5	22
	ADFG	Crystal Lake	04-27-37				1	73	5,220							1	73	5,220
			04-27-38				1	66	4,233				2	19	157	3	85	4,390
			04-27-57				4	235	13,505							4	235	13,505
			04-32-02										2	16	118	2	16	118
		Deer Mountain	04-30-29										1	3	7	1	3	7
		Hidden Falls	04-28-28				1	15	212							1	15	212
			04-32-38							1	7		4	7	15	5	14	15
			04-32-39							2	15	99	3	6	15	5	21	114
		Jerry Myers	04-26-29	1	9	76										1	9	76
		Snettisham	04-01-010510										1	13	145	1	13	145
			04-29-61				1	12	138							1	12	138
			04-29-62				2	25	288				1	2	1	3	27	289
			04-30-01				2	41	794							2	41	794
			04-30-02	2	36	624										2	36	624
			04-30-03	1	27	684										1	27	684
			04-31-34				2	17	128							2	17	128
			04-31-36				2	16	104							2	16	104
			04-31-40				1	88	7,611							1	88	7,611
			04-31-58				2	16	117							2	16	117

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Region	Agency[b]	Hatchery/ Release Site	Tag Code	Non-derby 4/27-6/21 Rec[c]	Con[d]	Var. of Con[e]	6/22-8/02 Rec	Con	Var. of Con	8/03-9/27 Rec	Con	Var. of Con	Derby[a] Rec	Con	Var. of Con	Total Rec	Con	Var. of Con
Alaska	ADFG	Snettisham	04-31-59							1	102	10,216				1	102	10,216
(cont.)	(cont.)	(cont.)	04-31-60	3	81	2,284	7	114	1,965				2	5	6	12	200	4,255
			04-31-61				3	32	361	1	6	34	5	8	4	9	46	399
			04-31-62	1	27	734	2	39	699	1	21	441	3	8	13	7	95	1,887
			04-32-01	1	42	1,713	8	235	7,216	1	33	1,035	5	20	61	15	330	10,025
			04-37-63	1	17	282	2	15	110				2	2	0	5	34	392
			04-38-63	1	11	113	2	15	103				2	2	0	5	28	216
			04-39-63										1	1	0	1	1	0
			04-50-63				2	15	116							2	15	116
	AKI	Port Armstrong	04-32-14										1	3	5	1	3	5
			04-32-15							1	12	131				1	12	131
	NMFS	L. Port Walter	03-02-16							1	8	58				1	8	58
			03-02-17							1	7	40	1	1	0	2	8	40
			03-20-37										1	1		1	1	
			03-20-40	1	17	261	1	7	44							2	24	305
			03-20-45				1	7	48							1	7	48
			03-21-32							1	8	59				1	8	59
			03-22-01				1	7	46				1	1	0	2	8	46
			03-62-26										1	1	0	1	1	0
			03-62-28										1	1	0	1	1	0
			03-63-21										1	1	0	1	1	0
			03-63-23										1	1		1	1	
			03-63-24										2	2	0	2	2	0
			03-63-28				1	7	42							1	7	42
	SSRA	Neets Bay	04-31-47				1	44	1,934							1	44	1,934
		Whitman Lake	04-32-50										1	6	29	1	6	29
		Alaska Total		12	267	6,771	50	1,141	45,034	11	219	12,113	46	135	598	119	1,762	64,516
		All Regions		14	937	419,806	52	1,164	45,319	15	438	32,837	50	419	37,035	131	2,958	534,997

[a] Derby held on 7-9 August 1992.

[b] ODFW = Oregon Department of Fish and Wildlife. NMFS = National Marine Fisheries Service. WDF = Washington Department of Fisheries. CDFO = Canada Department of Fisheries and Oceans. AAI = Alaska Aquaculture Incorporated. ADFG = Alaska Department of Fish and Game. AKI = Armstrong Keta, Inc. SSRA = Southern Southeast Regional Aquaculture Association.

[c] Rec = Number of fish recovered of noted tag code.

[d] Con = Estimated harvest (contribution) of the release of the noted tag code.

[e] Var. of Con = Variance of the estimated harvest of the release of the noted tag code.

Appendix B17. Estimates of hatchery produced chinook salmon contributed to the Sitka marine boat sport fishery from 11 May to 30 August 1992.

Region	Agency[b]	Hatchery/ Release Site	Tag Code	Derby[a]			Non-derby 5/11-6/21			6/22-8/30			Total		
				Rec[c]	Con[d]	Var. of Con[e]	Rec	Con	Var. of Con	Rec	Con	Var. of Con	Rec	Con	Var. of Con
Washington	COOP	Quinault National	21-28-35	1	4	12							1	4	12
	MAKA	Hoko River Pond	21-19-07							1	9	72	1	9	72
	NMFS	Mixed Columbia R.	23-20-48	1	1	0							1	1	0
			23-25-50							1	5	18	1	5	18
			23-28-11							1	8	54	1	8	54
			23-28-28	1	4	11						-	1	4	11
			23-31-41							1	7	41	1	7	41
	QDNR	Quinault Lake	21-22-19							1	24	571	1	24	571
		Salmon River Pond	21-31-44				1	13	159	1	13	145	2	26	304
	QUIL	Soleduck Hatchery	21-19-59	1	1	0							1	1	0
	WDF	Humptulips Hatchery	63-52-35							1	11	115	1	11	115
		Washington Total		4	10	23	1	13	159	7	77	1,016	12	100	1,198
British Columbia	CDFO	Clayoquot	02-49-21	2	5	11	2	14	81				4	19	92
			02-49-22	1	1	0	1	9	67				2	10	67
			02-49-24				1	8	56	1	5	18	2	13	74
		Conuma River	02-43-25				1	54	2,900				1	54	2,900
			02-55-03							1	18	305	1	18	305
			02-55-05	1	40	1,558				1	59	3,448	2	99	5,006
			02-58-32							1	37	1,362	1	37	1,362
			02-59-15	2	20	215							2	20	215
		Fort Babine	02-49-34							1	7	39	1	7	39
		Gold River	02-62-35							1	48	2,293	1	48	2,293
		Kitimat River	02-55-34	1	10	94							1	10	94
		Marble River	02-53-02							1	5	25	1	5	25
			02-53-03							1	8	55	1	8	55
		Nitinat River	02-48-19	1	45	1,940	1	230	52,874				2	275	54,814
			02-58-09				1	322	103,619				1	322	103,619
		Pallant Creek	02-59-09	1	3	4				1	11	107	2	14	111
		Robertson Creek	02-01-48				1	5	24				1	5	24
			02-01-50				1	5	24				1	5	24
			02-43-11	1	13	146							1	13	146
			02-43-61							1	294	86,017	1	294	86,017
			02-48-02				1	89	7,870				1	89	7,870
			02-48-03				1	5	24				1	5	24
			02-48-04	1	1	0	1	5	24				2	6	24
			02-48-05				1	5	24				1	5	24
			02-49-58				1	306	93,524				1	306	93,524
			02-49-59	1	91	8,237							1	91	8,237
			02-49-60							1	165	27,208	1	165	27,208
			02-53-27	3	60	1,151							3	60	1,151

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Region	Agency[b]	Hatchery/ Release Site	Tag Code	Derby[a] Rec[c]	Derby[a] Con[d]	Derby[a] Var. of Con[e]	Non-derby 5/11-6/21 Rec	Non-derby 5/11-6/21 Con	Non-derby 5/11-6/21 Var. of Con	6/22-8/30 Rec	6/22-8/30 Con	6/22-8/30 Var. of Con	Total Rec	Total Con	Total Var. of Con
British Columbia (cont.)	CDFO (cont.)	Robertson Creek (cont.)	02-53-28	1	51	2,590							1	51	2,590
			02-56-60				1	5	24				1	5	24
			02-57-04				1	5	24				1	5	24
			02-58-36							1	279	77,743	1	279	77,743
			02-58-37	1	46	2,109							1	46	2,109
			02-58-38	2	368	69,879							2	368	69,879
			02-60-55	1	72	5,062							1	72	5,062
			02-60-57	1	41	1,650							1	41	1,650
		Tenderfoot Creek	02-04-48							1	10	86	1	10	86
		Terrace CDP SKNA	02-49-42	2	2	0							2	2	0
		B.C. Total		23	869	94,646	16	1,067	261,159	13	946	198,706	52	2,882	554,511
Alaska	ADFG	Crystal Lake	04-32-02	1	21	427							1	21	427
	AKI	Port Armstrong	04-32-14				1	16	230				1	16	230
	MIC	Tamgas Creek	47-16-13				1	28	1,054				1	28	1,054
	NMFS	Little Port Walter	03-20-27	1	1	0	1	9	65				2	10	65
			03-20-42				1	5	24				1	5	24
			03-21-16	1	1	0							1	1	0
			03-63-17	1	1	0							1	1	0
	NSRA	Hidden Falls	04-29-56				1	46	2,054				1	46	2,054
		Medvejie	04-28-14	1	5	18							1	5	18
			04-30-12	10	144	2,661	7	492	37,924				17	636	40,585
			04-30-13	1	5	21	1	26	673				2	31	694
			04-34-26	1	10	88	2	126	8,163				3	136	8,251
			04-34-28	1	9	81							1	9	81
			04-34-31							1	51	2,520	1	51	2,520
	SJ	Sheldon Jackson	04-20-14	2	2	0							2	2	0
			04-30-09	2	5	12							2	5	12
			04-32-21				1	24	574				1	24	574
	SSRA	Carroll Inlet	04-31-42	1	9	71				1	55	2,943	2	64	3,014
		Whitman Lake	04-31-44	1	1	0							1	1	0
		Alaska Total		24	214	3,379	16	772	50,761	2	106	5,463	42	1,092	59,603
		All Regions		51	1,093	98,048	33	1,852	312,079	22	1,129	205,185	106	4,074	615,312

[a] Derby held on 23-25 May and 30-31 May 1992.

[b] COOP = Washington Department of Fisheries - Cooperative. MAKA = Makah Indian Tribe. NMFS = National Marine Fisheries Service. QDNR = Quinault Department of Natural Resources. QUIL = Quillayute Indian Tribe. WDF = Washington Department of Fisheries. CDFO = Canada Department of Fisheries and Oceans. ADFG = Alaska Department of Fish and Game. AKI = Armstrong Keta, Inc. MIC = Metlakatla Indian Community. NSRA = Northern Southeast Regional Aquaculture Association. SJ = Sheldon Jackson College. SSRA = Southern Southeast Regional Aquaculture Association.

[c] Rec = Number of fish recovered of noted tag code.

[d] Con = Estimated harvest (contribution) of the release of the noted tag code.

[e] Var. of Con = Variance of the estimated harvest of the release of the noted tag code.

Appendix B18. Estimates of hatchery produced chinook salmon contributed to the Petersburg marine boat sport fishery from 11 May to 19 July 1992.

Region	Agency[a]	Hatchery/ Release Site	Tag Code	Rec[b]	Con[c]	Var. of Con[d]
Alaska	ADFG	Crystal Lake	04-27-37	2	126	7,800
			04-27-38	1	71	4,972
			04-29-60	4	302	26,739
	NMFS	L. Port Walter	03-21-35	1	3	4
		Alaska Total		8	502	39,515
		All Regions		8	502	39,515

[a] ADFG = Alaska Department of Fish and Game. NMFS = National Marine Fisheries Service.
[b] Rec = Number of fish recovered of noted tag code.
[c] Con = Estimated harvest (contribution) of the release of the noted tag code.
[d] Var. of Con = Variance of the estimated harvest ot the release of the noted tag code.

Appendix B19. Estimates of hatchery produced chinook salmon contributed to the Wrangell marine boat sport fishery from 11 May to 19 July 1992.

Region	Agency[a]	Hatchery/ Release Site	Tag Code	Rec[b]	Con[c]	Var. of Con[d]
Alaska	ADFG	Crystal Lake	04-30-04	1	49	2,379
			04-32-02	2	70	2,430
	SSRA	Carroll Inlet	04-31-42	1	38	1,384
		Alaska Total		4	157	6,193
		All Regions		4	157	6,193

[a] ADFG = Alaska Department of Fish and Game. SSRA = Southern Southeast Regional Aquaculture Association.
[b] Rec = Number of fish recovered of noted tag code.
[c] Con = Estimated harvest (contribution) of the release of the noted tag code.
[d] Var. of Con = Variance of the estimated harvest ot the release of the noted tag code.

Appendix B20. Estimates of hatchery produced chinook salmon contributed to the Craig/Klawock marine boat sport fishery from 11 May to 19 July 1992.

Region	Agency[a]	Hatchery/ Release Site	Tag Code	Rec[b]	Con[c]	Var. of Con[d]
British Columbia	CDFO	Big Qualicum River	02-63-24	1	4	16
		Conuma River	02-55-03	2	25	252
		Robertson Creek	02-56-53	1	4	15
			02-58-37	1	156	24,226
		B.C. Total		5	189	24,509
Alaska	ADFG	Crystal Lake	04-30-04	1	49	2,347
		Alaska Total		1	49	2,347
		All Regions		6	238	26,856

[a] CDFO = Canada Department of Fisheries and Oceans. ADFG = Alaska Department of Fish and Game.
[b] Rec = Number of fish recovered of noted tag code.
[c] Con = Estimated harvest (contribution) of the release of the noted tag code.
[d] Var. of Con = Variance of the estimated harvest ot the release of the noted tag code.

Appendix B21. Estimates of the number of wild coded wire tagged chinook salmon contributed to sampled marine boat sport fisheries of Southeast Alaska, 1992.

KETCHIKAN

				Non-derby 4/27-9/27			Derby[a]			Total		
Region	Agency[b]	Release Site	Tag Code	Rec[c]	Con[d]	Var of Con[e]	Rec	Con	Var of Con	Rec	Con	Var of Con
Alaska	ADFG	Unuk River	04-29-33	1	9	70	2	2	0	3	11	70
		Alaska Total		1	9	70	2	2	0	3	11	70
		All Regions		1	9	70	2	2	0	3	11	70

SITKA

				Derby[f]			Total		
Region	Agency[b]	Release Site	Tag Code	Rec[c]	Con[d]	Var of Con[e]	Rec	Con	Var of Con
Washington	WDF	Hanford Reach	65-52-52	1	1	0	1	1	0
		Washington Total		1	1	0	1	1	0
		All Regions		1	1	0	1	1	0

[a] Derby held on 23-25 May, 30-31 May, and 6-7 June 1992.
[b] ADFG = Alaska Department of Fish and Game. WDF = Washington Department of Fisheries.
[c] Rec = Number of fish recovered of noted tag code.
[d] Con = Estimated number of recoveries of the noted tag code, not corrected for tagging fraction.
[e] Var of Con = Variance of the estimated recoveries of the noted tag code, not corrected for tagging fraction.
[f] Derby held on 23-25 May and 30-31 May 1992.

Appendix B22. Summary of coded wire tag recoveries from sampling programs at remote lodges and charter vessel operations.

Ketchikan Lodge A - 136 fish sampled, 4 heads collected, 3 valid tags:

Region	Hatchery	Tag Code	Recoveries
British Columbia	Memekay River	02-50-10	1
	Quinsam River	02-47-37	1
	Robertson Creek	02-53-26	1

Ketchikan Lodge B - 74 fish sampled, 6 heads collected, 5 valid tags:

Region	Hatchery	Tag Code	Recoveries
British Columbia	Kitimat River	02-54-09	1
	Tenderfoot	02-04-45	1
Southeast Alaska	Neets Bay	04-31-47	1
		04-31-49	1
	WILD - Unuk River	04-29-33	1

Glacier Bay Lodge A - 29 fish sampled, no heads collected.

Appendix B23. Age composition of chinook salmon from selected Southeast Alaska sport fisheries, 1992.

Sport Fishery			Brood Year 1989 0.2	1989 1.1	1988 0.3	1988 1.2	1987 0.4	1987 1.3	1986 0.5	1986 1.4	1984 2.3	1984 1.5	1984 2.4	Sample Size
Ketchikan	Males	n			6	5	1	15		14				41
		Percent			14.6	12.2	2.4	36.6		34.1				
		S.E.[a]			5.6	5.2	2.4	7.6		7.5				
	Females	n	1		6		8	17	1	12				45
		Percent	2.2		13.3		17.8	37.8	2.2	26.7				
		S.E.[a]	2.2		5.1		5.8	7.3	2.2	6.7				
	Total[b]	n	4		60	11	68	123	8	200	1			475
		Percent	0.8	0.0	12.6	2.3	14.3	25.9	1.7	42.1	0.2			
		S.E.[a]	0.4	0.0	1.5	0.7	1.6	2.0	0.6	2.3	0.2			
Juneau	Males	n			3	1	1	30		27			1	63
		Percent			4.8	1.6	1.6	47.6		42.9			1.6	
		S.E.[a]			2.7	1.6	1.6	6.3		6.3			1.6	
	Females	n			3			36		40				79
		Percent			3.8			45.6		50.6				
		S.E.[a]			2.2			5.6		5.7				
	Total[b]	n			17	3	6	194		122	1	3	2	348
		Percent			4.9	0.9	1.7	55.7		35.1	0.3	0.9	0.6	
		S.E.[a]			1.2	0.5	0.7	2.7		2.6	0.3	0.5	0.4	
Juneau Derby	Males	n						5						5
		Percent						100.0						
		S.E.[a]												
	Females	n			1	1		10						12
		Percent			8.3	8.3		83.3						
		S.E.[a]			8.3	8.3		11.2						
	Total[b]	n			19	9	2	106		3				139
		Percent			13.7	6.5	1.4	76.3		2.2				
		S.E.[a]			2.9	2.1	1.0	3.6		1.2				

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Sport Fishery			Brood Year 1989 0.2	1989 1.1	1988 0.3	1988 1.2	1987 0.4	1987 1.3	1986 0.5	1986 1.4	1985 2.3	1985 1.5	1985 2.4	Sample Size
Petersburg	Males	n						12		13				25
		Percent						48.0		52.0				
		S.E.[a]						10.2		10.2				
	Females	n			1			8		15		1		25
		Percent			4.0			32.0		60.0		4.0		
		S.E.[a]			4.0			9.5		10.0		4.0		
	Total[b]	n			2		1	40		47		2		92
		Percent			2.2		1.1	43.5		51.1		2.2		
		S.E.[a]			1.5		1.1	5.2		5.2		1.5		
Craig/ Klawock	Males	n			13	1	12	5		2				33
		Percent			39.4	3.0	36.4	15.2		6.1				
		S.E.[a]			8.6	3.0	8.5	6.3		4.2				
	Females	n	1		19		13	8	1	9				51
		Percent	2.0		37.3		25.5	15.7	2.0	17.6				
		S.E.[a]	2.0		6.8		6.2	5.1	2.0	5.4				
	Total[b]	n	5		50	1	38	23	1	14				132
		Percent	3.8		37.9	0.8	28.8	17.4	0.8	10.6				
		S.E.[a]	1.7		4.2	0.8	4.0	3.3	0.8	2.7				

[a] SE in percent.
[b] Includes sexed and unsexed chinook salmon.

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Appendix B24. Length at age in millimeters (from tip of snout to fork-of-tail) by sex for chinook salmon from selected Southeast Alaska sport fisheries, 1992.

Sport Fishery			Brood Year 1989 0.2	1989 1.1	1988 0.3	1988 1.2	1987 0.4	1987 1.3	1986 0.5	1986 1.4	1984 2.3	1984 1.5	1984 2.4	Sample Size
Ketchikan	Males	Mean			811	734	980	871		1,001				
		SE			23	15		19		22				
		n			6	5	1	15		14				41
	Females	Mean	790		841		915	883	880	954				
		SE			27		25	13		16				
		n	1		6		8	17	1	12				45
	Total[a]	Mean	734		824	739	925	872	930	981	865			
		SE	23		8	10	9	6	30	5				
		n	4		59	10	68	123	8	200	1			473
Juneau	Males	Mean			820	680	990	794		977			920	
		SE			36			12		16				
		n			3	1	1	30		26			1	62
	Females	Mean			748			802		897				
		SE			31			10		10				
		n			3			36		40				79
	Total[a]	Mean			787	690	921	773		923	890	1,027	955	
		SE			20	10	25	5		7		29	35	
		n			17	3	6	193		121	1	3	2	346
Juneau Derby	Males	Mean						840						
		SE						32						
		n						5						5
	Females	Mean			815			792						
		SE						14						
		n			1			10						11
	Total[a]	Mean			781	707	865	770		813				
		SE			14	9	15	6		55				
		n			19	8	2	106		3				138

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Sport Fishery			Brood Year 1989 0.2	1989 1.1	1988 0.3	1988 1.2	1987 0.4	1987 1.3	1986 0.5	1986 1.4	1986 2.3	1985 1.5	1985 2.4	Sample Size
Petersburg	Males	Mean						812		950				
		SE						24		20				
		n						12		13				25
	Females	Mean			790			864		918		844		
		SE						18		19				
		n			1			8		15		1		25
	Total[a]	Mean			827		870	805		933		917		
		SE			37			12		11		73		
		n			2		1	40		47		2		92
Craig/ Klawock	Males	Mean			872	740	935	910		955				
		SE			17		17	29		25				
		n			13	1	12	5		2				33
	Females	Mean	870		850		940	861	930	976				
		SE			12		18	38		23				
		n	1		19		13	8	1	9				51
	Total[a]	Mean	732		859	740	949	875	930	996				
		SE	35		8		10	17		21				
		n	5		50	1	38	23	1	14				132

[a] Includes sexed and unsexed chinook salmon.

Appendix B25. Numbers of coho salmon examined for coded wire tags in Southeast Alaska marine boat sport fisheries in 1992.

Fishery	Seasonal Period	Coho Salmon Estimated Harvest	Coho Salmon Number Sampled	Coho Salmon Percent
Ketchikan	4/27-8/02 non-derby	3,691	378	10
	Derby Entered[a]	0	0	0
	Derby Take-Home[a]	75	14	19
	8/03-9/27	18,922	1,987	11
	Total	22,688	2,379	10
Juneau	4/27-8/02	2,004	325	16
	8/02-9/27 non-derby	14,312	2,140	15
	Derby Entered[b]	1,570	1,563	99
	Derby Take-Home[b]	596	132	22
	Total	18,482	4,160	23
Sitka	5/11-6/21	0	0	0
	Derby Entered[c]	0	0	0
	Derby Take-Home[c]	2	0	0
	6/22-8/30	4,334	667	15
	Total	4,336	667	15
Wrangell	5/11-7/19	6	2	33
Craig/Klawock	5/11-7/19	1,348	370	27
All areas combined		46,860	7,578	16

[a] Derby held on 23-25 May, 30-31 May, and 6-7 June.
[b] Derby held 7-9 August.
[c] Derby held on 23-25 May and 30-31 May.

Appendix B26. Estimates of hatchery produced coho salmon contributed to the Ketchikan marine boat sport fishery from 27 April to 27 September 1992.

Region	Agency[a]	Hatchery/ Release Site	Tag Code	Non-derby 4/27-8/02 Rec[b]	Con[c]	Var. of Con[d]	8/03-9/27 Rec	Con	Var. of Con	Total Rec	Con	Var. of Con
Alaska	AAI	Burnett Inlet	04-36-32	1	17	284	1	16	246	2	33	530
	ADFG	Deer Mountain	04-01-010508	1	21	421				1	21	421
			04-33-30	2	56	1,726	1	19	353	3	75	2,079
			04-35-20	3	48	864				3	48	864
			04-35-21	4	72	1,353				4	72	1,353
			04-35-22	9	116	1,698				9	116	1,698
			04-35-23				1	17	267	1	17	267
			04-35-24	1	15	224				1	15	224
			04-35-25	3	36	464				3	36	464
			04-35-26	12	148	1,884				12	148	1,884
			04-35-27	7	157	3,348				7	157	3,348
			04-35-28	4	90	1,957	1	25	593	5	115	2,550
			04-35-29	1	9	79	1	9	68	2	18	147
	MIC	Tamgas Creek	47-16-11				1	227	51,358	1	227	51,358
			47-16-49				1	108	11,676	1	108	11,676
	SSRA	Nakat Inlet	04-34-60				1	39	1,513	1	39	1,513
		Neets Bay	04-34-48				5	3,813	3,757,460	5	3,813	3,757,460
			04-34-51				3	2,185	1,618,514	3	2,185	1,618,514
			04-34-52				1	272	73,888	1	272	73,888
			04-34-53				2	495	125,915	2	495	125,915
			04-34-54				1	107	11,455	1	107	11,455
			04-34-61				2	1,070	573,665	2	1,070	573,665
		Whitman Lake	04-34-55				1	147	21,536	1	147	21,536
			04-34-56				2	256	36,810	2	256	36,810
		All Regions		48	785	14,302	25	8,803	6,285,317	73	9,588	6,299,619

[a] AAI = Alaska Aquaculture Incorporated. ADFG = Alaska Department of Fish and Game. MIC = Metlakatla Indian Community. SSRA = Southern Southeast Regional Aquaculture Association.

[b] Rec = Number of fish recovered of noted tag code.

[c] Con = Estimated harvest (contribution) of the release of the noted tag code.

[d] Var. of Con = Variance of the estimated harvest of the release of the noted tag code.

Appendix B27. Estimates of hatchery produced coho salmon contributed to the Juneau marine boat sport fishery from 27 April to 27 September 1992.

Region	Agency[b]	Hatchery/ Release Site	Tag Code	Non-derby 8/03-9/27 Rec[c]	Con[d]	Var. of Con[e]	Derby[a] Rec	Con	Var. of Con	Total Rec	Con	Var. of Con
Alaska	AKI	Port Armstrong	04-36-21				1	5	21	1	5	21
	DIPC	Gastineau	04-36-10	1	92	8,304	1	11	114	2	103	8,418
			04-36-11	3	206	13,940	1	11	119	4	217	14,059
			04-36-12	1	78	6,048				1	78	6,048
			04-36-13	3	265	24,656				3	265	24,656
			04-36-14	1	78	5,969				1	78	5,969
			04-36-15	2	159	12,293				2	159	12,293
		All Regions		11	878	71,210	3	27	254	14	905	71,464

[a] Derby held on 7-9 August 1992.
[b] AKI = Armstrong Keta, Inc. DIPC = Douglas Island Pink and Chum.
[c] Rec = Number of fish recovered of noted tag code.
[d] Con = Estimated harvest (contribution) of the release of the noted tag code.
[e] Var. of Con = Variance of the estimated harvest of the release of the noted tag code.

Appendix B28. Estimates of hatchery produced coho salmon contributed to the Sitka marine boat sport fishery from 27 April to 27 September 1992.

Region	Agency[a]	Hatchery/ Release Site	Tag Code	Non-derby 8/03-9/27 Rec[b]	Con[c]	Var. of Con[d]	Total Rec	Con	Var. of Con
Alaska	AKI	Port Armstrong	04-36-21	1	45	1,956	1	45	1,956
	NSRA	Hidden Falls	04-35-45	1	57	3,227	1	57	3,227
		Medvejie	04-35-38	18	831	66,523	18	831	66,523
	SJ	Sheldon Jackson	04-31-38	2	21	218	2	21	218
			04-34-33	6	142	4,218	6	142	4,218
			04-34-34	6	113	2,424	6	113	2,424
	SSRA	Earl West Cove	04-34-57	1	55	2,964	1	55	2,964
		All Regions		35	1,264	81,530	35	1,264	81,530

[a] AKI = Armstrong Keta, Inc. NSRA = Northern Southeast Regional Aquaculture Association. SJ = Sheldon Jackson College. SSRA = Southern Southeast Regional Aquaculture Association.
[b] Rec = Number of fish recovered of noted tag code.
[c] Con = Estimated harvest (contribution) of the release of the noted tag code.
[d] Var. of Con = Variance of the estimated harvest of the release of the noted tag code.

Appendix B29. Estimates of hatchery-produced coho salmon contributed to the Craig/Klawock marine boat sport fishery from 11 May to 19 July 1992.

Region	Agency[a]	Hatchery/ Release Site	Tag Code	Rec[b]	Con[c]	Var. of Con[d]
Alaska	ADFG	Klawock	04-35-06	1	17	269
			04-35-09	1	4	11
		All Regions		2	21	280

[a] ADFG = Alaska Department of Fish and Game.
[b] Rec = Number of fish recovered of noted tag code.
[c] Con = Estimated harvest (contribution) of the release of the noted tag code.
[d] Var. of Con = Variance of the estimated harvest of the release of the noted tag code.

Appendix B30. Estimates of the number of wild coded wire tagged coho salmon contributed to Southeast Alaska marine boat sport fisheries from 27 April to 27 September 1992.

					Non-derby 8/03-9/27			Derby[a]			Total		
Fishery	Region	Agency[b]	Release Site	Tag Code	Rec[c]	Con[d]	Var. of Con[e]	Rec	Con	Var. of Con	Rec	Con	Var. of Con
Ketchikan	British Columbia	CDFO	Lachmach River	08-08-01	1	11	102				1	11	102
	Alaska	ADFG	Hugh Smith Lake	04-36-02	2	24	282				2	24	282
			Ketchikan Fishery - All Regions		3	35	384				3	35	384
Juneau	Alaska	ADFG	Auke Lake	04-28-47	2	15	108				2	15	108
			Tatsamenie Lake	04-31-09				1	1	0	1	1	0
			Berners River	04-29-44	2	16	130				2	16	130
				04-31-06	1	7	45				1	7	45
			Taku River	04-28-49				1	1	0	1	1	0
			Juneau Fishery - All Regions		5	38	283	2	2	0	7	40	283

[a] Juneau derby held on 7-9 August 1992.
[b] ADFG = Alaska Department of Fish and Game. CDFO = Canada Department of Fisheries and Oceans.
[c] Rec = Number of fish recovered of noted tag code.
[d] Con = Estimated number of recoveries of the noted tag code, not corrected for tagging fraction.
[e] Var. of Con = Variance of the estimated recoveries of the noted tag code, not corrected for tagging fraction.

APPENDIX C - DATA FILES

Appendix C1. Computer data files and analysis programs developed for the 1992 Southeast Alaskan marine boat sport fishery survey. Data files (*.DTA and *.DAT) are archived with the Alaska Department of Fish and Game, Division of Sport Fish, Research and Technical Services Unit, 333 Raspberry Road, Anchorage, Alaska 99518-1599.

Effort, Catch, and Harvest Estimation Files	
A0810M_2.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Ketchikan, 1992
C0820N_2.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Petersburg, 1992
C0810M_2.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Wrangell, 1992
B7600M_2.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Craig and Klawock, 1992
E0810M_2.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Juneau, 1992
D0810M_2.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Sitka, 1992
E003M_2.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Picnic Cove, Juneau, 1992
????92.SAS	SAS programs to create basic interview SAS save files from mark-sense data files. '???' stands for each site respectively: KMC for Ketchikan, CMC for Craig-Klawock, PMC for Petersburg, WMC for Wrangell, SMC for Sitka, JMC for Juneau, and JRS for Juneau Roadside - Picnic Cove.
????92ESS.SAS	SAS programs to create revised interview SAS save files from files created by ?MS92.SAS. Revised files have stratification information added to them, have non fin-fish (i.e., shellfish) data removed, and/or have multi-line interviews collapsed to one record per interview. See above for explanation of '?'.

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Effort, Catch, and Harvest Estimation Files (continued)	
????92MSM.SAS	SAS programs to create SAS save files with only the sampling information associated with each sample for each survey from files created by ?MC92ESS.SAS. See above for explanation of '?'
????92EST.SAS	SAS programs to estimate effort, catch, and harvest with associated variances using SAS save files created by ?MC92ESS.SAS and ?MC92MSM.SAS. Program operates on one species at a time as determined by inputs in temporary input data files 'SPECLIST.DAT'. See above for explanation of '?'
Coded Wire Tag Contribution Estimation Files	
SPORTBAS.DAT	Data file from tag lab with sampling information for each biweekly period at each fishery.
SPORTCON.DAT	Data file from tag lab with recovery information for each adipose fin clipped coho and chinook salmon sampled.
CWT92CHK.SAS	SAS program to compare SPORTCON.DTA & SPORTBAS.DTA for consistency errors.
SEW92VBN.SAS	SAS program to create creel estimate file for combining with tag data.
SEN92CWT.SAS	SAS program to do basic estimates & output file for CWT3.EXE.
CWT3.EXE	Compiled PASCAL program to conduct bootstrap resampling procedures on capture histories for hatchery contribution estimation.
SEN92CUP.SAS	SAS program to update main CWT estimate databases with bootstrap variances.
SEN92CO1.SAS	SAS program to summarize contributions across tag codes for main tables.
SEN92CWP.SAS	SAS program to list tags, contributions, and variances for Appendices.
Age-weight-length (AWL) Files	
A0810AA2.DTA	Data file (ASCII) containing chinook salmon AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Ketchikan, 1992
B7620AA2.DTA	Data file (ASCII) containing chinook salmon AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Craig/Klawock, 1992

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Age-weight-length (AWL) Files (continued)	
C0820AB2.DTA	Data file (ASCII) containing chinook salmon AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Petersburg, 1992
D081CHI2.DTA	Data file (ASCII) containing chinook salmon AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Sitka, 1992
E0810AB2.DTA	Data file (ASCII) containing chinook salmon AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Juneau, 1992
E0810AC2.DTA	Data file (ASCII) containing chinook salmon AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded during the Juneau derby, 1992
E0030AA2.DTA	Data file (ASCII) containing chinook salmon AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded during the Picnic Cove roadside fishery, 1992
A0810AA2.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Ketchikan, 1992
B7520AA2.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Craig/Klawock, 1992
C0810AA2.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Wrangell, 1992
C0820AA2.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Petersburg, 1992
D081HAL2.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Sitka, 1992
E0810AA2.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Juneau, 1992
REF92CHI.SAS	SAS program to reformat chinook salmon AWL data
LF92CHI.SAS	SAS program to summarize chinool salmon AWL data
REF92HAL.SAS	SAS program to reformat halibut AWL data
LF92HAL.SAS	SAS program to summarize halibut AWL data