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Harvest Estimates for Selected Marine Sport Fisheries in Southeast Alaska During 1993

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ABSTRACT

Creel surveys of the Juneau, Ketchikan, Sitka, Petersburg, and Wrangell marine sport fisheries for chinook salmon *Oncorhynchus tshawytscha* were conducted during 1993. 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, and Wrangell; harvest of crab was estimated in Juneau. Contributions of hatchery chinook salmon and coho salmon *Oncorhynchus kisutch* to these sport fisheries were estimated from coded wire tag recovery information, and a coded wire tag sampling program was conducted at Craig on Prince of Wales Island. 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 and Craig, 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 31,920 (SE = 1,442), and the estimated catch was 47,928 (SE = 2,018) in the boat sport fisheries monitored. Harvests of chinook salmon were higher than the long-term average in the Juneau fishery, but lower in the Ketchikan fishery. The largest number of Alaska hatchery chinook salmon was harvested in Ketchikan, where an estimated 42% of the harvest was of Alaska hatchery origin and 65% was of hatchery origin. Hatcheries produced about 18% of the chinook salmon harvest in Juneau, with Southeast Alaska hatcheries contributing 17% of the total harvest. The estimated Alaska hatchery contribution of chinook salmon was 11% in Sitka, 20% in Petersburg, and 10% in Wrangell. Hatcheries produced about 41% of the monitored chinook salmon harvest and 18% of the total harvest was of Alaska hatchery origin.

An estimated 48,790 (SE = 3,283) coho salmon, 38,336 (SE = 5,404) pink salmon *Oncorhynchus gorbuscha*, 33,795 (SE = 1,498) Pacific halibut, and 15,496 (SE = 1,237) rockfish were also harvested in the sampled marine boat fisheries. In Juneau, the total harvest of coho salmon was about average; in Ketchikan, it was below average. Hatcheries produced 10% and 23% of the harvest, respectively. The Pacific halibut harvest of 6,928 (SE = 650) in Juneau was well below the long-term average, although the Ketchikan harvest of 12,783 (SE = 1,057) was the highest recorded. The total rockfish harvest of 10,573 (SE = 1,151) 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*, king crab, *Paralithodes*, Juneau, Ketchikan, Sitka, Petersburg, Wrangell, Craig, 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 both by postal surveys and various onsite 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 1993). 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 onsite 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 onsite creel surveys are possible, the two surveys have shown very similar results (Mills and Howe 1992).

Expansion of the onsite creel survey program in Southeast Alaska was necessary beginning in 1992 to 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 and 1993) was not exceeded.

In order to monitor the entire Southeast Alaska chinook salmon fishery with adequate precision to ensure compliance with the sport allocation, it was determined that creel surveys were needed in the Ketchikan, Petersburg, Wrangell, Sitka, and Juneau boat fisheries during the major portion of the fishery for chinook salmon. In 1992, 86% of the total sport harvest of chinook salmon of Southeast Alaska occurred in the SWHS areas represented by these fisheries (Mills 1993). Sport harvests in other SWHS areas (Haines/Skagway, Glacier Bay, Yakutat, and Craig/Klawock) were determined to be too small and dispersed to be effectively monitored with onsite creel surveys.

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 a portion of 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

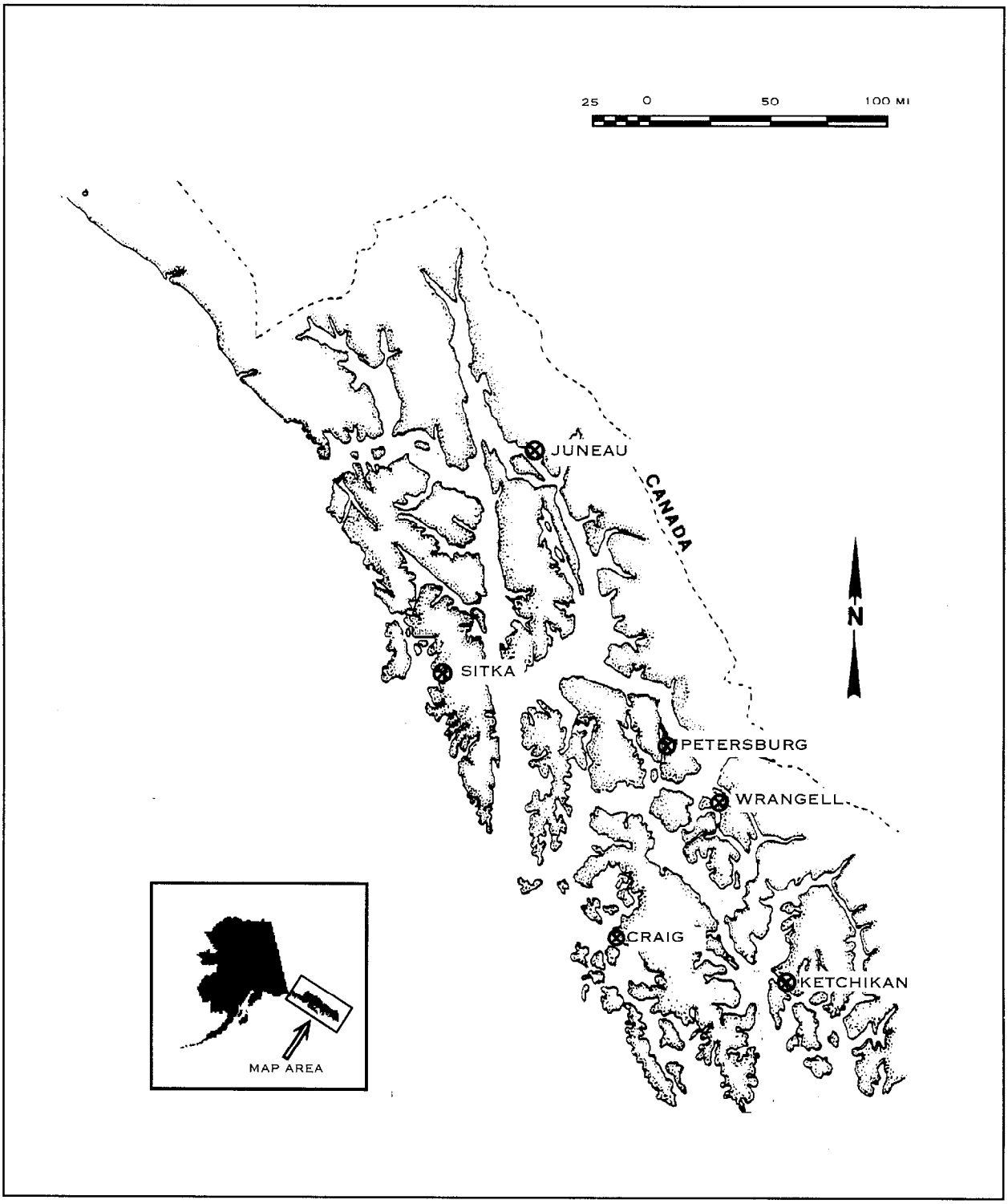

Figure 1. Location of Juneau, Sitka, Petersburg, Wrangell, Ketchikan, and Craig in Southeast Alaska

in fresh water 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 onsite creel surveys. This report, however, will present only information from the onsite creel surveys conducted in 1993, as 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 1993 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 reported to 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 onsite 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 boat sport fisheries conducted in 1993 by the Division of Sport Fish of the Alaska Department of Fish and Game (ADF&G) in the Ketchikan, Juneau, Sitka, Petersburg, and Wrangell areas. Results from creel surveys associated with a variety of roadside sport fisheries in Southeast Alaska are presented in other ADF&G Fishery Data Series reports.

REGULATIONS

Sport fishing regulations during 1993 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 sport fishery from two to one fish, prohibited charter boat operators and crew from retaining chinook salmon while clients were on board, and banned the use of downriggers for all anglers. This emergency order was in effect from 17 June through 15

August 1993. The downrigger ban was rescinded on 16 August 1993, but the bag limit remained at one fish, and the restriction on take of chinook salmon by charter boat operators and crew was retained until the emergency order expired on 31 December 1993. The emergency orders were 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. No terminal harvest areas in salt water were 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 *Sebastes* species per day, 10 in possession, of which only two fish per day (four in possession) could be yelloweye rockfish *Sebastes ruberrimus*. Areas adjacent to Ketchikan and Sitka were further restricted to a rockfish 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; 1990).

OBJECTIVES

The primary goals of the 1993 Southeast Alaska marine boat sport fishery surveys were (a) to obtain inseason estimates of the harvest of chinook salmon; and (b) to estimate the harvest of chinook salmon of Alaskan hatchery origin. To help measure program performance and achieve project goals, the following objectives were identified:

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

   - Ketchikan from 26 April to 26 September 1993;
   - Petersburg from 10 May to 18 July 1993;
   - Wrangell from 10 May to 18 July 1993;
   - Sitka from 26 April to 26 September 1993; and
   - Juneau from 26 April to 26 September 1993;

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

2. estimate 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 ±25 percentage points of the true value 90% of the time;

3. estimate relative contribution of Alaska hatchery chinook salmon by coded wire tag lot to the Craig marine boat sport fishery from 10 May to 29 August, such that the total relative contribution estimate is within ±25 percentage points of the true value 90% of the time; and

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

4. estimate the contribution of Alaska hatchery coho salmon by coded wire tag lot to the fisheries in Ketchikan, Sitka, and Juneau, such that the contribution estimate in relative terms for each individual fishery is within ±25 percentage points of the true value 90% of the time.

TASKS

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

1. estimating the biweekly harvest per unit effort (HPUE) for coho salmon in Juneau and Ketchikan marine boat sport fisheries during 26 April to 26 September;

2. estimating contribution of Alaska hatchery coho salmon by coded wire tag lot to Juneau and Ketchikan marine boat sport fisheries during 26 April to 26 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, and Dolly Varden *Salvelinus malma* by Juneau and Ketchikan marine boat sport fisheries during 26 April to 26 September;

4. estimating the shellfish effort and harvest of Dungeness crab *Cancer magister*, Tanner crab *Chionoecetes* spp., king crab *Paralithodes* spp., in Juneau and Ketchikan marine boat sport fisheries during 26 April to 26 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 Juneau and Ketchikan marine boat sport fisheries during 26 April to 26 September; and,

6. estimating the average weights of Pacific halibut harvested in Juneau and Ketchikan marine boat sport fisheries from 26 April to 26 September.

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

Onsite Creel Survey Angler Effort, Catch, and Harvest Estimates:

Direct expansion creel surveys were conducted in the Ketchikan, Petersburg, Wrangell, Sitka, and Juneau marine boat sport fisheries. 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).

Two general sampling designs were used within each stratum. For the Ketchikan and Juneau surveys a three-stage sample survey was conducted. Within any stratum for these two surveys, 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. During each sampled day, a creel technician 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 three-stage surveys.

Four-stage sample surveys were conducted at Petersburg, Wrangell, and Sitka. For these surveys, access locations to sample represented the first sampling stage, with days within each stratum at each sampled location representing the second stage sampling units. Periods within the sampling day represented the third sampling stage. At some sites and for some strata only one sampling period existed, for these strata at any sampled day-location combination the entire period was sampled. Minimally, two periods were sampled for each day-location combination for strata with more than one period per sampling day. Finally, boat-parties to interview represented the fourth sampling stage units in these surveys.

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 surveys. Data from the most recent creel survey (1992) at each of these sites were used in estimating the sampling fractions. The actual allocation of sampling resources was also dependent upon logistical and fiscal constraints in addition to the optimal fractions desired.

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. These heads were forwarded to the Commercial Fisheries Management and Development (CFMD) 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

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

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 and Tibshirani 1993), 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:

A technician sampled catches of chinook and coho salmon for coded wire tags from boat parties returning to the Craig harbors from 10 May through 29 August. Sampling was conducted from 1100 hours to 2000 hours Thursday through Sunday.

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 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.

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:

$$hpue_k = q N + \epsilon_k \qquad (1)$$

where $hpue_k$ is the harvest per unit of effort during the kth angler-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 angler-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 and Craig fisheries) 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 sampled fisheries were sampled for length. Procedures as outlined by Quinn et al. (1983) were used to convert harvest and mean length estimates to an estimate of the round weight of Pacific halibut harvested.

Data Collection

Data collected from each boat-party interviewed included number of rods fished, hours fished, trip type (charter or non-charter), number of days fished 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, and Wrangell, 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, INPFC 1958) of each chinook salmon sampled. Scales were then mounted on gum cards, and impressions were made in cellulose acetate (Clutter and Whitesel 1956). The scales were then aged using procedures designed by Van Alen 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 recorded.

Total lengths in millimeters from Pacific halibut sampled 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:

Four-stage Designs. Estimates of angler effort, catch and harvest by species for the surveys at Petersburg, Wrangell, and Sitka were calculated according to standard direct expansion equations for stratified four-stage sampling designs (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.

Three-stage Designs. Estimates of angler effort, catch and harvest by species for the surveys at Juneau and Ketchikan were calculated according to standard direct expansion equations for stratified three-stage designs. The estimation procedure is similar to that described above for the surveys with four-stage designs with appropriate simplifications and reordering of calculations (see Appendix A2 for details).

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 biweek using the procedures outlined in Appendix A3. 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 A4, which essentially followed the approach proposed by Clark and Bernard (1987). Estimates of the relative contribution of chinook salmon with particular tag code to the Craig marine fishery was estimated by the procedures outlined in Appendix A5.

Age, Length, and Weight Estimates:

Age composition estimates were also calculated 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 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 B5. Appendices B6 through B10 present biweekly and total estimates and variances for effort, harvest, and catch for all species monitored for each boat fishery surveyed. Detailed finfish effort and chinook salmon harvest results are presented here primarily for the Juneau and Ketchikan areas, while other fisheries are presented in less detail.

Angler Effort

An estimated 847,295 (SE = 29,907) angler-hours of effort were expended in the five marine boat sport fisheries during the time periods sampled (Table 1). Seventy-two percent of the total effort in angler-hours was targeted on salmon in Ketchikan, 77% in Juneau, 71% in Sitka, 72% in Petersburg, and 90% in Wrangell; 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 22%, 11%, and 19% of the total salmon fishing effort, respectively, occurred during these short time periods.

Chinook Salmon Fisheries

An estimated 31,920 chinook salmon (SE = 1,442) 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 27 small (< 28 inches) chinook salmon were also harvested. The total catch of 13,221 small chinook salmon was less than half the total catch of 34,707 large chinook salmon.

Harvest of chinook salmon in the Ketchikan King Salmon Derby composed 30% of the total chinook salmon harvest in the Ketchikan marine fishery. Only about 3% of the chinook salmon harvest in the Juneau marine boat sport fishery was taken during the Juneau Golden North Salmon Derby, even though 11% of the total salmon fishing effort was expended during this event. A total of 870 chinook salmon was entered in Ketchikan and Juneau derbies from a harvest of 1,803 fish during the derby time periods; 1,851 chinook salmon were entered in the Sitka Salmon Derby from a total harvest of 3,051 chinook salmon during the derby time period, making it the largest derby in Southeast Alaska in terms of fish entered. A total of 455 chinook salmon was entered in the Petersburg Salmon Derby.

About 26% of the estimated harvest of chinook salmon in the Ketchikan boat fishery was sampled for coded wire tags (Appendix B11). In the Juneau boat fishery, 14% of the estimated harvest of chinook salmon was sampled, 24% in Sitka, 34% in Petersburg, and 23% in Wrangell.

An estimated 18% of the chinook salmon harvested in the marine boat fisheries was of Alaska hatchery origin (Table 3). Additional hatchery fish originated from

Table 1. Summary of estimated total and derby angler effort by target for the Southeast Alaska marine boat sport fisheries during 1993.

Total effort by target

Time period:	Ketchikan 4/26-9/26	Juneau 4/26-9/26	Sitka 4/26-9/26	Petersburg 5/10-7/18	Wrangell 5/10-7/18	Total
Boat-hours	105,573	140,214	61,376	7,907	20,323	335,393
SE	7,394	8,831	2,770	832	1,564	11,978
Salmon-hours	198,960	270,838	107,184	13,782	44,731	635,495
SE	15,119	18,192	5,940	1,315	4,197	24,722
Bottomfish-hours[a]	78,002	78,820	44,480	5,380	5,185	211,867
SE	6,285	6,800	2,573	991	769	9,692
Angler-hours[b]	276,969	349,965	151,289	19,162	49,917	847,295
SE	18,207	22,012	16,453	1,970	4,297	29,907
% Salmon-hours[c]	72	77	71	72	90	75

Derby effort by target

Time period:	Ketchikan 5/29-31 6/05-06 6/12-13	Juneau 8/13-15	Sitka 5/29-31 6/05-06	Petersburg 5/28-31	Total
Boat-hours	19,877	11,404	9,724	1,184	42,189
SE	2,640	1,858	1,701	257	3,658
Salmon-hours	43,496	29,214	20,408	2,675	95,793
SE	6,024	5,022	3,632	593	8,664
Bottomfish-hours	8,523	884	1,814	30	11,251
SE	825	238	274	0	901
Angler-hours	52,025	30,098	22,222	2,705	107,050
SE	6,520	5,104	3,846	593	9,149
% of Salmon fishery[d]	22	11	19	19	15

[a] Includes hours fished for halibut, 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 1993.

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	4/26-9/26	5,908	5,274	6,470	3	5,277	477
Juneau	4/26-9/26	8,498	8,332	4,868	5	8,337	797
Sitka	4/26-9/26	15,704	13,779	1,265	0	13,779	1,058
Petersburg	5/10-7/18	1,839	1,804	264	19	1,823	168
Wrangell	5/10-7/18	2,758	2,704	354	0	2,704	267
TOTAL		34,707	31,893	13,221	27	31,920	1,442

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	5/29-31 6/05-06 6/12-13	645	1,560	0	0	1,560	115	30
Juneau Golden North Salmon Derby	8/13-15	225	243	0	0	243	10	3
Sitka Salmon Derby	5/29-31 6/05-06	1,851	3,051	0	0	3,051	114	22
Petersburg Salmon Derby	5/28-31	455		0	0	455		25

[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, 1993.

	Marine boat sport fishery					
Region or hatchery	Juneau (4/26-9/26)	Ketchikan (4/26-9/26)	Petersburg (5/10-7/18)	Sitka (4/26-9/26)	Wrangell (5/10-7/18)	Total
Oregon	0	0	0	4	0	4
Washington	2	0	0	103	10	115
British Columbia	63	1,191	23	5,776	0	7,053
Non-Alaskan total	65	1,191	23	5,883	10	7,172
SE	35	700	21	1,402	9	1,567
Alaska						
Burnett Inlet	0	0	0	0	122	122
Carroll Inlet	64	509	0	0	43	616
Crystal Lake	9	68	329	32	108	546
Deer Mountain	0	133	0	0	0	133
Hidden Falls	56	0	0	18	0	74
Jerry Meyers	5	0	0	0	0	5
Little Port Walter	77	9	2	15	0	103
Medvejie	0	18	0	1,151	0	1,169
Neets Bay	0	1,193	21	188	0	1,402
Port Armstrong	35	0	0	32	0	67
Snettisham	1,122	0	0	30	0	1,152
Tamgas Creek	78	235	0	0	0	313
Whitman Lake	0	69	6	2	0	77
Alaskan total	1,446	2,234	358	1,468	273	5,779
SE	217	450	124	335	104	623
Absolute precision[a] (α = 0.10)	357	740	204	551	171	1,025
% Absolute precision[b]	4	14	11	4	6	3
All areas total	1,511	3,425	381	7,351	283	12,951
SE	219	833	126	1,441	105	1,687
Absolute precision (α = 0.10)	360	1,370	207	2,370	173	2,775
% Absolute precision	4	26	11	17	6	9
Chinook Salmon Harvest	8,337	5,277	1,823	13,779	2,704	31,920
SE	797	477	168	1,058	267	1,442
% Alaska Hatchery	17	42	20	11	10	18
% Total Hatchery	18	65	21	53	10	41

[a] SE * 1.645.

[b] (absolute precision / total harvest) * 100.

in Oregon, Washington, and British Columbia, and, in aggregate, 41% of the chinook salmon harvested in boat fisheries originated in hatcheries. The Ketchikan fishery had the highest percentage of Alaska hatchery fish (42%), and the overall hatchery contribution to the Ketchikan fishery totaled 65%. Most of the Alaskan hatchery chinook salmon taken in Ketchikan originated in Neets Bay and Carroll Inlet (release site only) hatcheries operated by the Southern Southeast Regional Aquaculture Association. About 17% 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 Snettisham hatchery operated by ADF&G. A significant portion (18%) of the chinook salmon harvest in Petersburg came from the Crystal Lake hatchery.

Detailed contribution estimates by tag code are presented in appendices for the Ketchikan fishery (Appendix B12), Juneau fishery (Appendix B13), Sitka fishery (Appendix B14), Petersburg fishery (Appendix B15), and the Wrangell fishery (Appendix B16). In addition to the recoveries of hatchery origin fish, wild coded wire tagged chinook salmon were recovered from the Ketchikan and Sitka fisheries (Appendix B18). Total contributions of these tagged wild stocks could not be estimated, as tagging fractions are unknown.

A total of 958 chinook salmon (Appendix B11) was examined for adipose finclips at the Craig marine boat sport fishery. The tag codes recovered and the relative contribution to the fishery are presented in Appendix B17.

Remote charter operations were contacted by letter or in person to find out if they would voluntarily participate to collect coded wire tagged heads. 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 two operations were collected properly. Coded wire tag recoveries by tag code from the successfully participating lodges are listed in Appendix B19.

A total of 1,708 chinook salmon was successfully aged from the surveyed fisheries (Table 4 and Appendix B20). About 13% of the chinook salmon sampled lacked a freshwater annulus (age-0.), which usually indicates non-Alaskan origin (Van Alen 1988). Saltwater ages varied considerably; an estimated 85% of chinook salmon harvested during the Juneau Golden North Salmon Derby were age-.3 or less, wheras only 43% of chinook salmon sampled in the Ketchikan fishery were age-.3 or less. The total harvest across all surveyed fisheries consisted of 38% males and 62% females. Mean length-at-age of sampled chinook salmon varied among the fisheries surveyed (Appendix B21).

Coho Salmon Fisheries

Harvests of coho salmon in the sampled fisheries totaled an estimated 48,790 fish (SE = 3,283) (Table 5). Only small percentages of the coho salmon fisheries in Petersburg, and Wrangell were monitored, as surveys were discontinued by July 20. The only monitored derby in which coho salmon were heavily targeted was the Juneau Golden North Salmon Derby, and an estimated 2,031 coho salmon (SE = 81) were taken during this event (Appendix B2).

Harvests of hatchery coho salmon were estimated from a sample of 22% of the coho salmon harvest (Appendix B22). Estimates of coho salmon hatchery contributions by tag code and time period are presented in Appendix B23 for the Ketchikan fishery, Appendix B24 for the Juneau fishery, and Appendix B25 for the Sitka

Table 4. Summary of the age composition of chinook salmon sampled in selected marine sport fisheries in Southeast Alaska during 1993.

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	186	26	517	74	703
Juneau non-derby	11	3	402	97	413
Juneau Derby[a]	8	13	52	87	60
Petersburg	21	7	265	93	286
Wrangell	2	1	147	99	149
Haines	0	0	97	100	97
Total	228	13	1,480	87	1,708

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	301	43	402	57	703
Juneau non-derby	127	31	286	69	413
Juneau Derby[a]	51	85	9	15	60
Petersburg	40	14	246	86	286
Wrangell	18	12	131	88	149
Haines	39	40	58	60	97
Total	576	34	1,132	66	1,708

[a] Juneau Golden North Salmon Derby.

Table 5. Summary of estimated catch and harvest of coho salmon in the Southeast Alaska marine boat sport fisheries surveyed during 1993.

		Harvest							
		Wild		Hatchery		Total		Catch	
Sport fishery	Time period	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Ketchikan	4/26-9/26	14,378	2,433	4,325	1,240	18,703	2,731	23,332	3,319
Juneau	4/26-9/26	14,344	1,458	1,577	244	15,921	1,478	16,688	1,493
Sitka	4/26-9/26	12,516	995	1,650	379	14,166	1,064	14,613	1,078
Petersburg	5/10-7/18	0	0	0	0	0	0	0	0
Wrangell	5/10-7/18	0	0	0	0	0	0	0	0
TOTAL		41,238	3,006	7,552	1,319	48,790	3,283	54,633	3,796

fishery. An estimated 7,552 (SE = 1,319) hatchery coho salmon were taken in all the sampled fisheries combined (Table 6). Wild stocks of coho salmon dominated the harvest in all areas, but hatchery contributions ranged from 10% in Juneau to 12% in Sitka and 23% in Ketchikan. Some hatchery coho salmon taken in Sitka and Ketchikan originated in British Columbia hatcheries. The Neets Bay hatchery contributed the most coho salmon to the Ketchikan fishery, whereas the Gastineau hatchery owned by Douglas Island Pink and Chum, Inc., contributed the most coho salmon to the Juneau fishery. Additionally, some recoveries of coho salmon from wild stocks were obtained in the Juneau and Sitka fisheries (Appendix B27). As tagging fractions are currently unknown, total contributions of these wild-tagged stocks were not estimated.

A total 2,041 coho salmon (Appendix B22) from the Craig marine boat sport fishery were examined for adipose finclips. The tag codes recovered and the relative contribution to the fishery are presented in Appendix B26. About 22% of the coho salmon harvested in Craig were from hatcheries, with the Klawock hatchery contributing 12% of the harvest.

The HPUE for coho salmon for the Ketchikan, Juneau, and Sitka fisheries reached highs of 0.266 (SE = 0.028), 0.150 (SE = 0.013), and 0.326 (SE = 0.057) coho salmon per angler-hour of effort, respectively (Table 7). The peak in HPUE for coho salmon occurred in late August in Sitka, early September in Juneau and late September in Ketchikan, and Sitka anglers experienced higher HPUE's for coho salmon than did Juneau and Ketchikan anglers for nearly the entire season.

Bottomfish Fisheries

Most of the bottomfish effort in Southeast Alaska is targeted on Pacific halibut, and an estimated 33,795 (SE = 1,498) were harvested in the sampled marine boat sport fisheries (Table 8). Substantial portions of the bottomfish fisheries were only monitored in Juneau, Ketchikan, and Sitka. Estimated average round weight of the Pacific halibut in the sampled fisheries ranged from 24.4 pounds in Ketchikan to 37.9 pounds in Sitka (Table 9). About 1,051,500 pounds of Pacific halibut were taken in the sampled fisheries, with about 46% of this harvest taken in Sitka.

Although rockfish are not a primary target of most Southeast Alaska marine boat sport anglers, an estimated 39,948 (SE = 2,298) rockfish were caught in the marine boat sport fisheries surveyed (Table 8). Only 15,496 (SE = 1,237) of the rockfish caught were retained (39%). Sitka anglers retained an estimated 29% (3,666) of the 12,857 rockfish caught. Retention in Juneau, Petersburg, and Wrangell where few were caught, exceeded 80%.

Major species composition of the rockfish harvest was determined for the Ketchikan, Sitka, Petersburg, and Wrangell fisheries (Table 10). Yelloweye rockfish (commonly called red snapper) were most frequently taken in Ketchikan (39.4%) and black rockfish *S. melanops* were most often taken in Sitka (36.8%). Quillback rockfish *S. maliger* composed 36.9% of the rockfish harvest in Ketchikan and 22.4% in Sitka. 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 8).

Table 6. Contributions of hatchery coho salmon to sampled marine boat sport fisheries of Southeast Alaska, 1993.

Region or hatchery	Marine boat sport fishery			Total
	Juneau (4/26-9/26)	Ketchikan (4/26-9/26)	Sitka (4/26-9/26)	
British Columbia	0	89	164	253
Non-Alaskan total	0	89	164	253
SE	0	79	164	182
Alaska				
Deer Mountain	0	511	0	511
Gastineau	1,577	0	0	1,577
Hidden Falls	0	0	137	137
Klawock	0	0	15	15
Medvejie	0	0	711	711
Nakat Inlet	0	69	0	69
Neets Bay	0	3,176	0	3,176
Sheldon Jackson	0	0	261	261
Tamgas Creek	0	377	229	606
Whitman Lake	0	103	133	236
Alaska total	1,577	4,236	1,486	7,299
SE	244	1,238	342	1,307
Absolute precision[a] (α = 0.10)	401	2,037	563	2,150
% absolute precision[b]	3	11	4	4
All areas total	1,577	4,325	1,650	7,552
SE	244	1,240	379	1,319
Absolute precision[a] (α = 0.10)	401	2,040	123	2,170
% absolute precision[b]	3	11	4	4
Coho salmon harvest	15,921	18,703	14,166	48,790
SE	1,478	2,731	1,064	3,283
% Alaska hatchery	10	23	10	15
% Total hatchery	10	23	12	15

[a] SE * 1.645.

[b] (Absolute precision / total harvest) * 100.

Table 7. 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 1993.

	Harvest of coho salmon per angler-hour of effort[a]					
	Ketchikan		Juneau		Sitka	
Seasonal period	HPUE	SE	HPUE	SE	HPUE	SE
6/07-6/20	0.002	0.001	0.001	0.000	0.008	0.002
6/21-7/04	0.019	0.003	0.004	0.001	0.024	0.007
7/05-7/18	0.037	0.005	0.031	0.010	0.075	0.011
7/19-8/01	0.061	0.012	0.039	0.005	0.180	0.025
8/02-8/15	0.063	0.015	0.048	0.007	0.229	0.024
8/16-8/29	0.143	0.017	0.132	0.014	0.326	0.057
8/30-9/12	0.120	0.015	0.150	0.013	0.223	0.039
9/13-9/26	0.266	0.028	0.136	0.022	0.257	0.054
All periods	0.089	0.004	0.068	0.003	0.165	0.008

[a] Does not include derby effort or harvest.

Table 8. Summary of estimated catch and harvest of Pacific halibut, rockfish, and lingcod in the Southeast Alaska marine boat sport fisheries sampled during 1993.

Sport fishery	Time period	Total catch	SE	Harvest	SE
Pacific halibut:					
Ketchikan	4/26-9/26	17,226	1,528	12,783	1,057
Juneau	4/26-9/26	9,580	927	6,928	650
Sitka	4/26-9/26	17,009	1,080	12,720	811
Petersburg	5/10-7/18	1,058	297	786	182
Wrangell	5/10-7/18	609	111	578	110
	Total	45,482	2,112	33,795	1,498
Rockfish:					
Ketchikan	4/26-9/26	25,765	1,921	10,573	1,151
Juneau	4/26-9/26	985	173	945	173
Sitka	4/26-9/26	12,857	1,246	3,666	408
Petersburg	5/10-7/18	198	86	198	86
Wrangell	5/10-7/18	143	41	114	39
	Total	39,948	2,298	15,496	1,237
Lingcod:					
Ketchikan	4/26-9/26	1,376	187	1,275	182
Juneau	4/26-9/26	8	5	4	4
Sitka	4/26-9/26	2,411	242	1,963	197
Petersburg	5/10-7/18	0	0	0	0
Wrangell	5/10-7/18	0	0	0	0
	Total	3,795	306	3,242	268

Table 9. Average length, round weight, and total round weight for Pacific halibut harvested in sampled Southeast Alaska marine boat sport fisheries during 1993.

Sport fishery	Survey period	Sample size	Total length		Average round wt. (lbs.)	Estimated number harvested	Estimated total round weight (thousand lbs)
			Mean (cm)	SE (cm)			
Ketchikan	4/26-9/26	740	89.9	0.8	24.4	12,783	311.9
Juneau	4/26-9/26	103	94.0	2.9	31.9	6,928	221.0
Sitka	4/26-9/26	432	102.5	1.2	37.9	12,720	482.1
Petersburg	5/10-7/18	80	89.2	3.0	25.6	786	20.1
Wrangell	5/10-7/18	21	97.3	2.8	27.0	578	16.4
Craig	5/10-8/29	556	92.6	0.8	25.7		
	Total	1,932	93.8	0.5	28.3	33,795	1,051.5

Table 10. Rockfish composition in sampled marine boat sport fisheries during 1993[a].

Rockfish species	Ketchikan		Sitka		Petersburg		Wrangell	
	Harvest[b]	%	Harvest[b]	%	Harvest[b]	%	Harvest[b]	%
Black	672	6.4	1,347	36.8	0	0.0	0	0.0
Copper	364	3.4	125	3.4	0	0.0	0	0.0
Dusky	91	0.9	23	0.6	53	26.8	0	0.0
Quillback	3,899	36.9	822	22.4	0	0.0	0	0.0
Silvergrey	221	2.1	190	5.2	0	0.0	0	0.0
Yelloweye	4,171	39.4	1,024	27.9	47	23.7	16	14.3
Tiger	82	0.8	---[c]	-.-[c]	0	0.0	0	0.0
Other	1,073	10.1	135	3.7	98	49.5	98	85.7
TOTAL	10,573		3,666		198		114	

[a] An estimated total of 945 rockfish was 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.

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

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 11). Pink salmon were taken in large numbers in Ketchikan, and the estimated harvest totaled 34,352 (SE = 5,393). Only 2,911 (SE = 305) pink salmon were harvested in Juneau, as the retention rate was only 57% in comparison to the 76% observed in Ketchikan. Harvests of both chum and sockeye salmon were much less, totaling 6,372 chum salmon and 287 sockeye salmon for the sampled fisheries combined. About 66% of the 395 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 12). Shellfish effort in boat-days for the Juneau fishery (6,013 boat-days) was about three times that estimated for the Ketchikan fishery (1,973 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 or Tanner crabs were taken in the Ketchikan area. The majority of the shrimp harvest (37,060 shrimp, SE = 10,420) occurred in Ketchikan, but shrimp harvests were also estimated in Petersburg and Wrangell.

DISCUSSION

As noted previously, onsite 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 onsite surveys lies in their consistency of methods and coverage so that inseason estimates can be compared with SWHS and onsite creel estimates from previous years.

Effort, harvest and total catch estimates from the five creel surveys reported here should not be considered to be representative of the total Southeast Alaska marine boat sport fisheries. This number is best estimated by the SWHS. This is especially true for species other than chinook salmon in fisheries at Petersburg and Wrangell, where surveys occurred from 10 May through 18 July. Pacific halibut, coho salmon, and pink salmon are harvested in substantially larger numbers during 19 July through the end of September than during the period from 10 May through 18 July.

The estimates for chinook salmon in the Juneau and Ketchikan fisheries are incomplete because there were no surveys of (1) all harvests occurring during 1 January-25 April and 28 September-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 hours, 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 from the same geographic areas in Southeast Alaska.

Table 11. 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 1993.

		Pink salmon		Chum salmon		Sockeye salmon		Dolly Varden	
Sport fishery	Time period	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
Ketchikan	4/26-9/26	44,959	34,352	2,462	1,967	182	160	0	0
Juneau	4/26-9/26	5,137	2,911	1,019	943	93	67	378	261
Sitka	4/26-9/26	1,856	1,069	4,546	3,462	60	60	84	77
Petersburg	5/10-7/18	0	0	0	0	0	0	53	53
Wrangell	5/10-7/18	4	4	0	0	0	0	4	4
TOTAL		51,956	38,336	8,027	6,372	335	287	519	395

Table 12. Estimated effort for, and harvest of, Dungeness crab, king crab, Tanner crab and shrimp in sampled Southeast Alaska marine boat sport fisheries during 1993.

		Effort					
Sport fishery	Time period	Boat-days	Standard error	Dungeness harvest	Tanner harvest	King harvest	Shrimp harvest
Ketchikan	4/26-9/26	1,973	262	8,897	0	0	37,060
Juneau	4/26-9/26	6,013	443	11,980	1,557	8,963	---[a]
Petersburg	5/10-7/18	141	47	557	70	0	2,560
Wrangell	5/10-7/18	240	58	818	0	0	4,780
Total		8,367	520	22,252	1,627	8,963	44,400

[a] Shrimp harvest not estimated in Juneau.

On-site creel surveys of the Juneau and other selected Southeast Alaska marine boat sport fisheries have been conducted every year since 1960 (Schmidt et al. 1973; Schmidt and Robards 1974, 1975; Mattson 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; Suchanek and Bingham 1989, 1990, 1991, 1992; and Hubartt et al. 1993). 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, either at the beginning or the end of the survey season, are 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.

Angler Effort

Total effort in the Juneau fishery during 1993 (349,965 angler-hours) was 10% lower than in 1992 (388,498 angler-hours) and 3% lower than the 1983-1992 average of 359,231 angler-hours. In Ketchikan, total 1993 effort (276,969 angler-hours) was up 6% from the estimated effort in 1992 (261,635 angler-hours), and 10% above the 1984-1992 average of 250,871 angler-hours (Table 13). Average effort through 1992 (as determined from available data) for the Ketchikan fishery was about 70% of the Juneau average. In 1993 total effort in Ketchikan was 79% of that seen in Juneau.

In Juneau the estimated amount of salmon effort was 2% below average, while salmon effort in Ketchikan was 8% above average. Bottomfish effort in Juneau was 4% below average, while bottomfish effort in Ketchikan was 16% above the 1984-92 average. In Juneau and Ketchikan, 77% and 72% of the 1993 effort was targeted on salmon, respectively, which is very similar to long-term salmon-hour averages. The ban on downriggers may have affected salmon fishing effort in Juneau during 1993, while below average catch rates for Pacific halibut may have affected bottomfish effort.

Chinook Salmon Fisheries

Total harvests of chinook salmon for the Juneau marine boat fishery were up from 1992, but the Ketchikan harvest was down (Table 14). The Juneau harvest of 8,337 chinook salmon was 34% above the 1977-1992 average, but the Ketchikan harvest was 17% below the 1984-1992 average. Harvest of chinook salmon in the Juneau Golden North Salmon Derby was only 32% of average, as late season chinook salmon harvests were well below average.

Relative hatchery contributions to the Juneau fishery were lower than in 1992, whereas contributions to the Ketchikan fishery were similar to 1992 (Table 15). An estimated 18% of the 1993 harvest of chinook salmon in Juneau originated in

Table 13. Estimated angler effort in the Juneau and Ketchikan marine boat sport fisheries as determined by onsite 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
	1992	4/27-9/27	301,588	78%	84,718	22%	388,498
		Average	276,861	77%	81,939	23%	359,231
	1993	4/26-9/26	270,838	77%	78,820	23%	349,965
		% of Average	98%		96%		97%
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
	1992	4/27-9/27	192,269	73%	69,366	27%	261,635
		Average	183,522	73%	67,114	27%	250,871
	1993	4/26-9/26	198,960	72%	78,002	28%	276,969
		% of Average	108%		116%		110%

Table 14. Estimated harvest of chinook salmon in the Juneau and Ketchikan marine boat sport fisheries as determined by onsite 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
1992	7,114	603	5,670
Average	6,200	759	6,352
1993	8,337	243	5,277
% of Average	134%	32%	83%

[a] Includes Juneau golden North Salmon Derby harvest.

Table 15. Estimated contributions of hatchery-produced chinook salmon to Juneau and Ketchikan marine boat sport fisheries as determined by onsite creel surveys, 1983-1993.

	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
1992	2,958	42	1,762	25	3,628	64	2,604	46
Average	1,623	22	1,238	17	2,804	44	2,168	34
1993	1,511	18	1,446	17	3,425	65	2,234	42

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

hatcheries, compared to the 1983-1992 average of 22%. In Ketchikan, an estimated 65% of the 1993 harvest originated in hatcheries, in comparison to the average of 44%. Harvests of Alaska hatchery chinook salmon are of most value, as most of these fish do not count toward U.S./Canada Pacific Salmon Treaty catch totals. An estimated 17% of the 1993 chinook salmon harvest in Juneau originated in Alaskan hatcheries, equaling the 1983-1992 average. In Ketchikan, an estimated 42% of the 1993 harvest originated in Alaskan hatcheries, in comparison to the average of 34%. This year was the second season that total harvest of wild and non-Alaskan hatchery fish taken by the sport fishery in Southeast Alaska was limited to a quota.

Coho Salmon Fisheries

The 1993 harvest of 18,703 coho salmon in the Ketchikan area was less than the 1992 harvest and 8% below the 1984-1992 average of 20,244 (Table 16). The Juneau area harvest of coho salmon (15,921 fish) was down from the 1992 harvest, but was still about average. The Juneau Golden North Salmon derby harvest of 2,031 coho salmon was only 20% below the 1977-1992 average of 2,541.

Harvest of coho salmon in both the Juneau and Ketchikan areas continues to be supplemented by hatchery contributions (Table 17). The estimated harvest of 1,577 (10% of total) hatchery coho salmon in Juneau was greater than the 1992 contribution and more than double the 1983-1992 average of 687. The increase in hatchery coho salmon harvests in the Juneau area was mostly due to returns to the DIPAC Gastineau Hatchery. These returns also generate a substantial shoreline fishery in Gastineau Channel for coho salmon returning in September and October.

The Ketchikan fishery has been much more dependent upon hatchery coho salmon than the Juneau fishery. About 32% of the 1984 to 1992 Ketchikan harvest originated in hatcheries (Table 17). In 1993, the estimated harvest of 4,325 hatchery coho salmon and the 1993 hatchery contribution of 23% in Ketchikan were both below average.

Bottomfish Fisheries

The 1993 harvest of Pacific halibut in the Juneau fishery (6,928) was only about 56% of the 1983-1992 average of 12,441 (Table 18). The Ketchikan harvest (12,783) was 40% above the 1984-1992 average of 9,132. Total estimated catch of Pacific halibut in the Juneau fishery (9,580) was only 55% of the 1983-1992 average (17,573) and broke the record low set in 1991 (10,974). The 1993 catch of Pacific halibut in Ketchikan (17,226) was 60% above the 1984-1992 average (10,794), and broke the record set in 1987 (13,883). Retention rates for Pacific halibut were above average in Juneau and below average in Ketchikan at 72% and 74%, respectively.

Rockfish harvests in the 1993 Ketchikan fishery (10,573) were 9% below the 1984-1992 average of 11,658 (Table 19). Retention of rockfish at 41% was below the 1986-1992 average of 46%. Targeted and non-targeted HPUE and CPUE for rockfish were all slightly below average.

Shellfish Fisheries

Harvests of shellfish in the Juneau and Ketchikan areas have been consistently estimated with creel surveys since 1988 (Table 20). The estimated shellfish effort of 6,013 boat-days in the Juneau area was the highest recorded, as was the

Table 16. Estimated harvest of coho salmon in the Juneau and Ketchikan marine boat sport fisheries as determined by onsite 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
1992	18,482	2,166	22,688
Average	15,709	2,541	20,244
1993	15,921	2,031	18,703
% of Average	101%	80%	92%

[a] Includes Juneau Golden North Salmon Derby harvest.

Table 17. Estimated contributions of hatchery-produced coho salmon to selected marine boat sport fisheries of Southeast Alaska as determined by onsite creel surveys, 1983-1993.

	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
1992	905	5	9,588	42
Average	687	4	6,527	32
1993	1,577	10	4,325	23

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

Table 18. Estimated harvest and catch of Pacific halibut in the Juneau and Ketchikan marine boat sport fisheries, 1983-1993.

	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
1992	9,265	2,554	11,819	78	10,257	2,582	12,839	80
Average	12,441	5,132	17,573	71	9,132	1,662	10,794	85
1993	6,928	2,652	9,580	72	12,783	4,443	17,226	74
% of Avg.	56	52	55		140	267	160	

Table 19. Comparative effort and catch statistics for the Ketchikan rockfish sport fishery.

Year	Survey dates	Angler effort: Total angler-hours	Angler effort: Bottomfish-hours	Total rockfish harvest and catch: Harvest	Released	Total catch	% Harvest	HPUE: Targeted[a]	HPUE: Non-targeted[b]	CPUE: Targeted[c]	CPUE: 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
1992	4/27-9/27	261,635	69,366	8,149	15,272	23,424	35	0.12	0.03	0.34	0.09
Average		250,871	67,114	11,658	13,206	25,129	46	0.17	0.05	0.37	0.10
1993	4/26-9/26	276,969	78,002	10,573	15,192	25,765	41	0.14	0.04	0.33	0.09
% of Avg.		110	116	91	115	103		82	80	89	90

[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.

Table 20. Comparison of estimated shellfish effort and harvest for the Juneau and Ketchikan marine boat fisheries, 1988-1993.

	1988	1989	1990	1991	1992	Mean	1993
Juneau							
Effort (boat-days)	2,287	2,652	2,622	3,812	5,411	3,357	6,013
Dungeness crab harvest	6,459	8,356	6,289	13,433	12,675	9,442	11,980
Tanner crab harvest	3,042	3,369	1,883	1,294	1,034	2,124	1,557
King crab harvest	552	1,849	1,960	2,467	5,673	2,500	8,963
Ketchikan							
Effort (boat-days)	1,398	508	614	1,394	1,387	1,060	1,973
Dungeness crab harvest	9,043	2,688	3,367	7,631	10,227	6,591	8,897
Shrimp harvest	27,643	12,730	17,130	69,450	130,720	51,535	37,060

harvest of 8,963 king crab. Harvest of 1,557 Tanner crab in the Juneau area was below average, while the harvest of 11,980 Dungeness crab was above average. In Ketchikan, shellfish effort of 1,973 boat-days was the highest recorded, and 86% above the 1988-1992 average of 1,060 boat-days. The Dungeness crab harvest in Ketchikan (8,897) was above the 1988-1992 average of 6,951. Shrimp harvest in the Ketchikan area during 1993 (37,060) was below average, 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 for management of the fisheries. Individual estimates of chinook harvest were within our relative precision goal of ±20% of the true value 90% of the time at all locations (see Appendices B1 through B5). Similarly, contribution estimates of Alaska hatchery chinook salmon were within ±20 percentage points of absolute precision 90% of the time at all locations (Table 3). Absolute precision of the Alaska hatchery contribution estimates at all sites ranged from 4% to 14%.

Several 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. For example, in 1990 to 1993, 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 onsite creel survey programs is one of the few means to evaluate the success of hatchery programs in producing fish for sport anglers. During 1993, the percent contribution of Alaskan hatchery chinook salmon to monitored marine boat sport fisheries averaged 18% and the total hatchery contribution averaged 41%. The number of hatchery coho salmon contributed to the Ketchikan, Juneau, Sitka, and Craig sport fisheries was greater than 10% of the harvest. It is recommended that onsite creel surveys of marine boat fisheries be continued to evaluate 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, 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 to ensure the sport fishery does not exceed its allocation. In 1993, sampling of all major boat sport fisheries, including those in Ketchikan, Juneau, Sitka, Petersburg, and Wrangell, was necessary to estimate the total Southeast Alaska sport harvest of chinook salmon so that the sport fishery could be effectively managed. These 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.

Data from marine boat surveys are used for a variety of other purposes, including preparation of position statements on proposed regulation changes and public information documents. It is recommended that 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 estimation of the shellfish harvest as a component of the marine harvest studies be continued to provide 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 1993 angler effort, catch, and harvest estimates for Petersburg, Wrangell, and Sitka marine boat sport fisheries.

Harvest as well as catch by species along with angler effort was estimated by the following procedures for each stratum with locations, days, periods, and boat-parties as sampling units for the surveys conducted at Petersburg, Wrangell, and Sitka. First, the mean harvest of each species was obtained over all boat-parties interviewed during each sampled period for a sampled day at an access location:

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

where: n_{hjiok} was the number of fish harvested by interviewed boat-party k during period o during sampled day i at access location j within stratum h; and m_{hjio} 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:

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

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

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

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

where: p_{hji} was the number of periods sampled within each sampled day.

Then this mean was expanded over all periods at each location to obtain the harvest estimate for the day at each access location:

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

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

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Next the mean harvest over all days sampled at each access location was obtained:

$$\overline{\hat{N}}_{hj} = \frac{\sum_{i=1}^{d_{hj}} \hat{N}_{hji}}{d_{hj}} \quad ; \tag{A1.5}$$

where: d_{hj} equaled the days sampled for access location j.

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

$$\hat{N}_{hj} = D_{hj}\,\overline{\hat{N}}_{hj} \quad ; \tag{A1.6}$$

where: D_{hj} equaled the total number of possible days available for sampling.

Then the stratum mean harvest over all sampled access locations was obtained:

$$\overline{\hat{N}}_{h} = \frac{\sum_{j=1}^{q_h} \hat{N}_{hj}}{q_h} \quad ; \tag{A1.7}$$

where: q_h equaled the number of access locations sampled within each stratum.

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

$$\hat{N}_{h} = Q_h\,\overline{\hat{N}}_{h} \quad ; \tag{A1.8}$$

where: Q_h equaled the total number of access locations 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):

$$\hat{V}[\hat{N}_h] = \left\{(1 - f_{1h})Q_h^2 \frac{S_{1h}^2}{q_h}\right\} + \left\{f_{1h}\frac{Q_h^2}{q_h^2}\sum_{j=1}^{q_h}(1 - f_{2hj})D_{hj}^2\frac{S_{2hj}^2}{d_{hj}}\right\} + \left\{f_{1h}\frac{Q_h^2}{q_h^2}\sum_{j=1}^{q_h}f_{2hj}\frac{D_{hj}^2}{d_{hj}^2}\sum_{i=1}^{d_{hj}}(1 - f_{3hji})P_{hji}^2\frac{S_{3hji}^2}{p_{hji}}\right\} + \left\{f_{1h}\frac{Q_h^2}{q_h^2}\sum_{j=1}^{q_h}f_{2hj}\frac{D_{hj}^2}{d_{hj}^2}\sum_{i=1}^{d_{hj}}f_{3hji}\frac{P_{hji}^2}{p_{hji}^2}\sum_{o=1}^{p_{hji}}(1 - f_{4hjio})M_{hjio}^2\frac{s_{4hjio}^2}{m_{hjio}}\right\} ; \quad \text{(A1.9)}$$

where: f_{1h}, f_{2hj}, f_{3hji}, and f_{4hjio} were the sampling fractions for access locations, days, sampling periods, and boat-parties respectively (i.e., $f_{1h} = q_h/Q_h$; $f_{2hj} = d_{hj}/D_{hj}$; $f_{3hji} = p_{hji}/P_{hji}$, $f_{4hjio} = m_{hjio}/M_{hjio}$); S_{1h}^2 equaled the among access location variance component for the angler harvest estimate, which was obtained as

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

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

$$S_{2hj}^2 = \frac{\sum_{i=1}^{d_{hj}}\left(\hat{N}_{hji} - \bar{\hat{N}}_{hj}\right)^2}{d_{hj} - 1} ; \quad \text{(A1.11)}$$

-continued-

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

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

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

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

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 some of the strata (for example during the derby at Petersburg) only one period was defined within a sampling day. The sampling day in these surveys was completely covered during any sample. Accordingly, $p_{hji} = P_{hji} = 1$, and $f_{3hji} = 1$, and as such the third-stage variance term in equation (A1.9) equaled zero.

Similarly, in applying these procedures to some strata (for example the heavy use harbor strata at Petersburg) only one location was defined. Accordingly, $q_h = Q_h = 1$, and $f_{1h} = 1$, and as such the first-stage variance term equaled zero.

Also note that during many of the derby strata each derby day was defined as a separate stratum, so that $d_{hj} = D_{hj} = 1$, and $f_{2hj} = 1$, and as such the second-stage variance term equaled zero. Finally, during many samples all exiting boat-parties were interviewed so that $m_{hjio} = M_{hjio}$ and $f_{4hjio} = 1$, 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 1993 angler effort, catch, and harvest estimates for Ketchikan and Juneau marine boat sport fisheries.

Estimates of angler effort, and catch and harvest by species for the surveys conducted at Juneau and Ketchikan were obtained by the procedures appropriate to a stratified three-stage random sample survey with days, locations, and boat-parties as sampling units. First, the mean harvest of each species was obtained over all boat-parties interviewed at each sampled access location within each sampled day:

$$\overline{n}_{hij} = \frac{\sum_{k=1}^{m_{hij}} n_{hijk}}{m_{hij}} \quad ; \tag{A2.1}$$

where: n_{hijk} was the number of fish harvested by interviewed boat-party k at access location j during sampled day i within stratum h; and m_{hij} 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 sampled location within a day:

$$\hat{N}_{hij} = M_{hij}\,\overline{n}_{hij} \quad ; \tag{A2.2}$$

where: M_{hij} 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:

$$\overline{\hat{N}}_{hi} = \frac{\sum_{j=1}^{q_{hi}} \hat{N}_{hij}}{q_{hi}} \quad ; \tag{A2.3}$$

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 then obtained by expanding by the number of access locations:

$$\hat{N}_{hi} = Q_{hi}\,\overline{\hat{N}}_{hi} \quad ; \tag{A2.4}$$

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

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Then the stratum mean daily harvest was obtained:

$$\overline{\hat{N}}_h = \frac{\sum_{i=1}^{d_h} \hat{N}_{hi}}{d_h} \quad ; \tag{A2.5}$$

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:

$$\hat{N}_h = D_h \overline{\hat{N}}_h \quad ; \tag{A2.6}$$

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 (A2.1) through (A2.6), above. Similarly, the angler effort estimate was calculated by substitution.

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

$$\hat{V}[\hat{N}_h] = \left\{(1 - f_{1h}) D_h^2 \frac{S_{1h}^2}{d_h}\right\} + \left\{f_{1h} \frac{D_h^2}{d_h^2} \sum_{i=1}^{d_h} (1 - f_{2hi}) Q_{hi}^2 \frac{S_{2hi}^2}{q_{hi}}\right\} + \left\{f_{1h} \frac{D_h^2}{d_h^2} \sum_{i=1}^{d_h} f_{2hi} \frac{Q_{hi}^2}{q_{hi}^2} \sum_{j=1}^{q_{hi}} (1 - f_{3hij}) M_{hij}^2 \frac{s_{3hij}^2}{m_{hij}}\right\} \quad ; \tag{A2.7}$$

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

$$S_{1h}^2 = \frac{\sum_{i=1}^{d_h} \left(\hat{N}_{hi} - \overline{\hat{N}}_h\right)^2}{d_h - 1} \quad ; \tag{A2.8}$$

-continued-

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

$$S^2_{2hi} = \frac{\sum_{j=1}^{q_{hi}} \left(\hat{N}_{hij} - \bar{\hat{N}}_{hi}\right)^2}{q_{hi} - 1} \quad ; \tag{A2.9}$$

and s^2_{3hij} equaled the among boat-party variance component for the harvest estimate, obtained as

$$s^2_{3hij} = \frac{\sum_{k=1}^{m_{hij}} \left(n_{hijk} - \bar{n}_{hij}\right)^2}{m_{hij} - 1} \quad . \tag{A2.10}$$

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 (A2.7) through (A2.10), above.

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 A3. Data analysis procedures for 1993 coho salmon harvest per unit effort estimates for Ketchikan and Juneau marine boat sport fishery surveys.

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:

$$\overline{HPUE}_{hijk} = \frac{n_{hijk}}{e_{hijk} v_{hijk}} \qquad (A3.1)$$

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

$$\hat{HPUE} = \frac{\sum_{h=1}^{s} \sum_{i=1}^{d_h} \sum_{j=1}^{q_{hi}} \sum_{k=1}^{m_{hij}} \overline{HPUE}_{hijk}}{m} \; ; \qquad (A3.2)$$

where m_{hij} equaled the number of boat-parties interviewed; 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:

$$m = \sum_{h=1}^{s} \sum_{i=1}^{d_h} \sum_{j=1}^{q_{hi}} m_{hij} \; . \qquad (A3.3)$$

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

$$\hat{V}[\hat{HPUE}] = \frac{\sum_{h=1}^{s} \sum_{i=1}^{d_h} \sum_{j=1}^{q_{hi}} \sum_{k=1}^{m_{hij}} \left(\overline{HPUE}_{hijk} - \hat{HPUE} \right)^2}{m\,(m-1)} \; . \qquad (A3.4)$$

Standard errors were obtained by taking the square root of the variance estimates.

Appendix A4. Data analysis procedures for 1993 hatchery contributions for Ketchikan, Petersburg, Wrangell, Sitka, and Juneau surveys of the marine boat sport fishery.

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 and Tibshirani 1993) 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):

$$\hat{n}_{1_A t} = \left(\frac{\hat{N}_t}{n_{2t}}\right)\left(\frac{a_{1t}}{a_{2t}}\right)\left(\frac{m_{1t}}{m_{2t}}\right)\left(\frac{m_{c_A t}}{\theta_A}\right) \; ; \qquad \text{(A4.1)}$$

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) in Appendix A1 or equation (A2.7) in Appendix A2), hence no simulation was involved. The bootstrap resampling involved estimation of the variance due to the harvest sampling program. Equation (A4.1) 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 $\overline{M}$ and variance $\hat{V}[\overline{M}]$. These statistics were calculated as:

$$V[\overline{M}] = \frac{\sum_{b=1}^{B}\left(M_b-\overline{M}\right)^2}{B-1} \qquad \text{with} \quad \overline{M} = \frac{\sum_{b=1}^{B} M_b}{B} \; . \tag{A4.2}$$

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

$$\hat{V}[\hat{n}_1] = \theta^{-2}\left(\hat{V}[\overline{M}]\,\hat{N}^2 + \hat{V}[\hat{N}]\,M^2 - \hat{V}[\overline{M}]\,\hat{V}[\hat{N}]\right) . \tag{A4.3}$$

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 (A4.1) were treated as constants (accordingly the approach first proposed by Goodman (1960) was used for the second major term of equation (A4.4)):

$$S^2_{\hat{n}_{1At}} = \left\{\left(\frac{1}{n_{2t}}\right)\left(\frac{a_{1t}}{a_{2t}}\right)\left(\frac{m_{1t}}{m_{2t}}\right)\left(\frac{1}{\theta_A}\right)\right\}^2 \left\{\hat{N}_t^2\, V[m_{c_At}] + m_{c_At}^2\,\hat{V}[\hat{N}_t] - \hat{V}[\hat{N}_t]\,V[m_{c_At}]\right\} \tag{A4.4}$$

-continued-

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]);

$$V[m_{c_A t}] \approx \frac{n_{2t}(n_{2t}-1)a_{2t}(a_{2t}-1)m_{2t}(m_{2t}-1)\hat{n}_{1_A t}(\hat{n}_{1_A t}-1)\theta_A^2}{\hat{N}_t(\hat{N}_t-1)a_{1t}(a_{1t}-1)m_{1t}(m_{1t}-1)} + \frac{n_{2t}a_{2t}m_{2t}\hat{n}_{1_A t}\theta_A}{\hat{N}_t a_{1t}m_{1t}} - \left(\frac{n_{2t}a_{2t}m_{2t}\hat{n}_{1_A t}\theta_A}{\hat{N}_t a_{1t}m_{1t}}\right)^2 . \quad \text{(A4.5)}$$

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]):

$$\hat{V}[\hat{n}_{1_A t}] = \left\{\frac{(\hat{N}_t-1)n_{2t}(a_{1t}-1)a_{2t}(m_{1t}-1)m_{2t}}{\hat{N}_t(n_{2t}-1)a_{1t}(a_{2t}-1)m_{1t}(m_{2t}-1)}\right\}\left\{S^2_{\hat{n}_{1_A t}}\right\}. \quad \text{(A4.6)}$$

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 A5. Data analysis procedures for relative hatchery contributions for the Craig survey of the marine boat sport fishery during 1993.

The estimates of relative contribution by coded wire tag code for Alaskan hatchery fish for the Craig survey were estimated by adapting the equations presented in Clark and Bernard (1987). These estimates represent the proportion of harvested fish of the particular tag code. The adaptation to equation [10] from Clark and Bernard 1987 involved dividing both sides of the equation by the unestimated total harvest value (i.e., $\hat{N}_t$ in equation (A4.1), in Appendix A4). The resulting term on the left-hand side of the equation is $\hat{n}_{1_A} / \hat{N}$ (without the biweek subscript) which is defined as the relative contribution ($\hat{p}_{c_A}$), and was calculated by:

$$\hat{p}_{c_A} = \left(\frac{1}{n_2}\right)\left(\frac{a_1}{a_2}\right)\left(\frac{m_1}{m_2}\right)\left(\frac{m_{c_A}}{\theta_A}\right) \; ; \qquad \text{(A5.1)}$$

where: $\hat{p}_{c_A}$ equaled the estimated proportion of salmon from a hatchery release identified by the unique tag code *A*, harvested in the sampled fishery; and all other terms are as defined in Appendix A4 (without the biweek subscripts).

As was done in the estimation of the absolute contributions (see Appendix A4) the variance of $\hat{p}_{c_A}$ was estimated by bootstrapping the harvest sampling data (i.e., generation of B replications of $\{a_1^*, a_2^*, m_1^*, m_2^*, m_c^*\}$ and M) resulting in the bootstrap estimate of $\overline{M}$ and $\hat{V}[\overline{M}]$, by equation (A4.2). Then the variance of $\hat{p}_{c_A}$ was estimated by:

$$\hat{V}[\hat{p}_{c_A}] = \frac{\hat{V}[\overline{M}]}{\theta_A^2} . \qquad \text{(A5.2)}$$

APPENDIX B - CREEL SURVEY STATISTICS

Appendix B1. Estimated effort, harvest, and total catches for the Ketchikan marine boat sport fishery, 26 April-26 September 1993.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	105,573	7,394	12%
Salmon-hours	198,960	15,119	13%
Halibut-hours	78,002	6,285	13%
Angler-hours	276,969	18,207	11%
Boat-Days	28,305	1,972	11%
Finfish Harvests[c]			
Total Large Chinook Salmon	5,274	477	15%
Derby Take-home	915	115	21%
Derby Entered	645	0	0%
Derby Take-home & Entered	1,560	115	12%
Total Small Chinook Salmon	3	0	0%
Coho Salmon	18,703	2,731	24%
Chum Salmon	1,967	358	30%
Sockeye Salmon	160	57	59%
Pink Salmon	34,352	5,393	26%
Pacific Halibut	12,783	1,057	14%
Lingcod	1,275	182	23%
Total Rockfish	10,573	1,151	18%
Black Rockfish	442	138	52%
Copper Rockfish	239	116	80%
Dusky Rockfish	60	22	61%
Quillback Rockfish	2,563	535	34%
Silvergrey Rockfish	145	50	57%
Yelloweye Rockfish	2,741	313	19%
Tiger Rockfish	54	30	92%
Other Rockfish	705	191	45%
Unidentified Rockfish	3,623	521	24%
Finfish Total Catch[c]			
Small Chinook Salmon	6,470	854	22%
Large Chinook Salmon	5,908	649	18%
Coho Salmon	23,332	3,319	23%
Chum Salmon	2,462	459	31%
Sockeye Salmon	182	59	53%
Pink Salmon	44,959	6,358	23%
Pacific Halibut	17,226	1,528	15%
Lingcod	1,376	187	22%
Total Rockfish	25,765	1,921	12%
Shellfish Effort and Harvest[c]			
Boat-days Fished	1,973	262	22%
Dungeness Crab Kept	8,897	1,419	26%
Shrimp Kept	37,060	10,420	46%

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

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

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

Appendix B2. Estimated effort, harvest, and total catches for the Juneau marine boat sport fishery, 26 April-26 September 1993.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	140,214	8,831	10%
Salmon-hours	270,838	18,192	11%
Halibut-hours	78,820	6,800	14%
Angler-hours	349,965	22,012	10%
Boat-days	33,740	1,930	9%
Finfish Harvests[c]			
Total Large Chinook Salmon	8,332	797	16%
Derby Take-home	18	10	92%
Derby Entered	225	0	0%
Derby Take-home & Entered	243	10	7%
Total Small Chinook Salmon	5	4	132%
Coho Salmon	15,921	1,478	15%
Derby Take-home	398	81	34%
Derby Entered	1,633	0	0%
Derby Take-home & Entered	2,031	81	7%
Chum Salmon	943	123	22%
Derby Take-home	17	6	58%
Derby Entered	74	0	0%
Derby Take-home & Entered	91	6	11%
Sockeye Salmon	67	19	47%
Derby Take-home	3	2	110%
Derby Entered	13	0	0%
Derby Take-home & Entered	16	2	21%
Pink Salmon	2,911	305	17%
Derby Take-home	238	73	51%
Pacific Halibut	6,928	650	15%
Dolly Varden	261	57	36%
Lingcod	4	4	165%
Rockfish	945	173	30%
Finfish Total Catch[c]			
Small Chinook Salmon	4,868	773	26%
Large Chinook Salmon	8,498	813	16%
Coho Salmon	16,688	1,493	15%
Chum Salmon	1,019	124	20%
Sockeye Salmon	93	24	43%
Pink Salmon	5,137	580	19%
Pacific Halibut	9,580	927	16%
Dolly Varden	378	69	30%
Lingcod	8	5	103%
Rockfish	985	173	29%
Shellfish Effort and Harvest[b]			
Boat-days Fished	6,013	443	12%
Dungeness Crab Kept	11,980	1,538	21%
King Crab Kept	8,963	1,313	24%
Tanner Crab Kept	1,557	303	32%

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

Appendix B3. Estimated effort, harvest, and total catches for the Sitka marine boat sport fishery, 26 April-26 September 1993.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	61,376	2,770	7%
Salmon-hours	107,184	5,940	9%
Halibut-hours	44,480	2,573	10%
Angler-hours	151,829	7,490	8%
Boat-days	16,453	708	7%
Finfish Harvests[c]			
Total Large Chinook Salmon	13,779	1,058	13%
Derby Take-home	1,200	114	16%
Derby Entered	1,851	0	0%
Derby Take-home & Entered	3,051	114	6%
Coho Salmon	14,166	1,064	12%
Chum Salmon	3,462	554	26%
Sockeye Salmon	60	28	77%
Pink Salmon	1,069	157	24%
Pacific Halibut	12,720	811	11%
Dolly Varden	77	46	99%
Lingcod	1,963	197	17%
Total Rockfish	3,666	408	18%
Black Rockfish	538	176	54%
Copper Rockfish	50	32	106%
Dusky Rockfish	9	6	110%
Quillback Rockfish	328	87	44%
Silvergrey Rockfish	76	32	69%
Yelloweye Rockfish	409	60	24%
Other Rockfish	54	18	55%
Unidentified Rockfish	2,203	332	25%
Finfish Total Catch[c]			
Small Chinook Salmon	1,265	197	26%
Large Chinook Salmon	15,704	1,227	13%
Coho Salmon	14,613	1,078	12%
Chum Salmon	4,546	646	23%
Sockeye Salmon	60	28	77%
Pink Salmon	1,856	248	22%
Pacific Halibut	17,009	1,080	10%
Dolly Varden	84	47	92%
Lingcod	2,411	242	17%
Rockfish	12,857	1,246	16%

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

[b] Lingcod-hours, rockfish-hours, and shellfish effort and harvest not recorded.

[c] No small chinook harvested and no steelhead trout or cutthroat trout harvested or caught.

Appendix B4. Estimated effort, harvest, and total catches for the Petersburg marine boat sport fishery, 10 May-18 July 1993.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	7,907	832	17%
Salmon-hours	13,782	1,315	16%
Halibut-hours	5,380	991	30%
Angler-hours	19,162	1,970	17%
Boat-days	1,881	168	15%
Finfish Harvests[c]			
Total Large Chinook Salmon	1,804	168	15%
Derby Entered	455	0	0%
Total Small Chinook Salmon	19	11	96%
Pacific Halibut	786	182	38%
Dolly Varden	53	36	112%
Total Rockfish	198	86	72%
Dusky Rockfish	53	45	140%
Yelloweye Rockfish	47	20	70%
Other Rockfish	98	55	93%
Finfish Total Catch[c]			
Small Chinook Salmon	264	51	32%
Large Chinook Salmon	1,834	172	15%
Pacific Halibut	1,058	297	46%
Dolly Varden	53	36	112%
Total Rockfish	198	86	72%
Shellfish Effort and Harvest[c]			
Boat-days Fished	141	47	55%
Dungeness Crab Kept	557	236	70%
Tanner Crab Kept	70	65	153%
Shrimp Kept	2,560	513	33%

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

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

[c] No coho salmon, chum salmon, sockeye salmon, pink salmon, lingcod, Dolly Varden, steelhead trout, cutthroat trout, black rockfish, copper rockfish, quillback rockfish, silvergrey rockfish, tiger rockfish, unidentified rockfish or king crab harvested or caught.

Appendix B5. Estimated effort, harvest, and total catches for the Wrangell marine boat sport fishery, 10 May-18 July 1993.

	Estimate	Standard Error	Relative Precision[a]
Finfish Effort[b]			
Boat-hours	20,323	1,564	13%
Salmon-hours	44,731	4,197	15%
Halibut-hours	5,185	769	24%
Angler-hours	49,917	4,297	14%
Boat-days	3,732	249	11%
Finfish Harvests[c]			
Total Large Chinook Salmon	2,704	267	16%
Pink Salmon	4	3	124%
Pacific Halibut	578	110	31%
Dolly Varden	4	3	124%
Total Rockfish	114	39	56%
Yelloweye Rockfish	5	4	132%
Other Rockfish	30	23	126%
Unidentified Rockfish	80	28	58%
Finfish Total Catch[c]			
Small Chinook Salmon	354	126	59%
Large Chinook Salmon	2,758	272	16%
Pink Salmon	4	3	124%
Pacific Halibut	609	111	30%
Dolly Varden	4	3	124%
Steelhead	5	4	132%
Total Rockfish	143	41	47%
Shellfish Effort and Harvest[c]			
Boat-days Fished	240	58	40%
Dungeness Crab Kept	818	175	35%
Shrimp Kept	4,780	680	23%

[a] Relative precision = (Standard error * 1.645 / Estimate) * 100.

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

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

Appendix B6. Estimated effort, harvest and catch for the Ketchikan marine boat sport fishery by seasonal period, 26 April - 26 September, 1993.

Seasonal-period	Boat-hours Estimate	Boat-hours Variance	Salmon-hours Estimate	Salmon-hours Variance	Halibut-hours Estimate	Halibut-hours Variance	Angler-hours Estimate	Angler-hours Variance
26Apr-09May	1,563	183,048	1,927	381,692	1,121	32,868	3,048	478,581
10May-23May	7,362	1,455,307	11,998	3,989,852	3,878	388,131	15,876	5,763,550
24May-06Jun	5,806	1,355,083	11,992	5,236,234	3,303	764,743	15,295	8,358,956
Derby[a]	19,877	6,968,913	43,496	36,289,898	8,523	680,099	52,025	42,516,886
07Jun-20Jun	7,423	931,273	13,929	4,002,366	5,188	931,494	19,117	6,177,386
21Jun-04Jul	6,698	912,441	12,121	9,755,306	7,321	1,358,111	19,442	10,493,385
05Jul-18Jul	14,348	2,900,313	23,592	7,084,443	17,886	8,483,126	41,479	21,387,197
19Jul-01Aug	6,271	5,052,891	12,102	28,635,145	6,337	7,318,054	18,439	46,667,019
02Aug-15Aug	5,544	254,370	10,257	5,732,179	6,400	2,991,149	16,657	3,753,937
16Aug-29Aug	12,719	17,343,301	24,119	61,385,128	9,117	10,940,309	33,236	87,654,639
30Aug-12Sep	9,026	10,103,993	15,248	33,859,436	7,270	5,341,818	22,518	63,241,896
13Sep-26Sep	8,936	7,207,642	18,179	32,237,566	1,658	267,713	19,837	34,985,435
Total	105,573	54,668,575	198,960	228,589,245	78,002	39,497,615	276,969	331,478,867

Seasonal-period	Boat-days Estimate	Boat-days Variance	Large Chinook Salmon-Total Catch Estimate	Large Chinook Salmon-Total Catch Variance	Large Chinook Salmon-Harvested Estimate	Large Chinook Salmon-Harvested Variance	Small Chinook Salmon-Total Catch Estimate	Small Chinook Salmon-Total Catch Variance
26Apr-09May	640	21,369	46	890	46	890	6	30
10May-23May	1,949	78,959	563	31,858	563	31,858	368	25,971
24May-06Jun	1,679	103,653	883	101,526	844	105,930	496	14,098
Derby[a]	3,855	211,819	1,599	14,603	1,560	13,170	834	14,183
07Jun-20Jun	1,955	63,778	1,011	32,974	1,002	32,471	422	6,930
21Jun-04Jul	1,883	69,424	397	7,223	358	4,939	334	6,534
05Jul-18Jul	4,264	260,515	523	16,472	516	16,636	569	12,480
19Jul-01Aug	1,920	488,750	281	25,243	193	16,443	63	1,622
02Aug-15Aug	1,932	112,549	538	189,328	125	4,130	372	28,681
16Aug-29Aug	3,501	1,418,516	31	512	31	512	995	222,217
30Aug-12Sep	2,100	451,961	19	332	19	332	786	79,994
13Sep-26Sep	2,627	609,170	17	105	17	105	1,225	316,138
Total	28,305	3,890,463	5,908	421,066	5,274	227,416	6,470	728,878

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Seasonal period	Coho Salmon Total Catch Estimate	Coho Salmon Total Catch Variance	Coho Salmon Harvested Estimate	Coho Salmon Harvested Variance	Pink Salmon Total Catch Estimate	Pink Salmon Total Catch Variance	Pink Salmon Harvested Estimate	Pink Salmon Harvested Variance
26Apr-09May	0	0	0	0	0	0	0	0
10May-23May	0	0	0	0	0	0	0	0
24May-06Jun	13	161	0	0	0	0	0	0
Derby[a]	14	21	9	11	3	5	3	5
07Jun-20Jun	50	394	50	394	18	184	18	184
21Jun-04Jul	395	26,708	380	26,306	1,566	392,151	1,355	332,504
05Jul-18Jul	2,106	98,543	1,994	94,372	10,987	6,987,905	9,718	6,895,171
19Jul-01Aug	2,089	1,750,194	1,553	899,949	5,490	6,432,414	5,023	5,977,475
02Aug-15Aug	1,132	199,670	1,066	196,942	9,832	13,198,044	8,310	11,056,499
16Aug-29Aug	6,684	2,464,459	5,044	1,534,582	10,832	11,117,322	7,548	4,382,605
30Aug-12Sep	4,140	1,235,947	2,570	577,074	2,032	611,778	1,245	209,436
13Sep-26Sep	6,709	5,240,522	6,037	4,128,844	4,199	1,686,420	1,132	227,233
Total	23,332	11,016,619	18,703	7,458,474	44,959	40,426,223	34,352	29,081,112

Seasonal period	Chum Salmon Total Catch Estimate	Chum Salmon Total Catch Variance	Chum Salmon Harvested Estimate	Chum Salmon Harvested Variance	Sockeye Salmon Total Catch Estimate	Sockeye Salmon Total Catch Variance	Sockeye Salmon Harvested Estimate	Sockeye Salmon Harvested Variance
26Apr-09May	0	0	0	0	0	0	0	0
10May-23May	0	0	0	0	0	0	0	0
24May-06Jun	0	0	0	0	0	0	0	0
Derby[a]	23	31	23	31	9	16	9	16
07Jun-20Jun	5	22	5	22	0	0	0	0
21Jun-04Jul	16	45	16	45	37	1,315	37	1315
05Jul-18Jul	271	7,940	271	7,940	136	2,185	114	1869
19Jul-01Aug	95	3,531	95	3531	0	0	0	0
02Aug-15Aug	361	68,533	361	68533	0	0	0	0
16Aug-29Aug	311	11,186	275	7719	0	0	0	0
30Aug-12Sep	473	31,968	425	22174	0	0	0	0
13Sep-26Sep	907	86,987	496	18465	0	0	0	0
Total	2,462	210,243	1,967	128,460	182	3,516	160	3,200

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Seasonal-period	---Pacific Halibut--- -----Total Catch----- Estimate	Variance	---Pacific Halibut--- ------Harvested------ Estimate	Variance	-------Rockfish------- ------Total Catch----- Estimate	Variance	-------Rockfish------- -------Harvested------ Estimate	Variance
26Apr-09May	146	7,506	118	12,126	828	62,456	334	15,146
10May-23May	402	5,586	380	4,782	2,191	227,061	774	92,057
24May-06Jun	1,567	422,231	664	101,363	1,527	91,114	233	8,173
Derby[a]-----	1,798	69,767	1,510	50,741	2,889	131,155	870	16,560
07Jun-20Jun	1,191	94,268	874	51,939	1,948	159,487	824	83,094
21Jun-04Jul	1,653	88,228	1,189	57,118	2,341	160,095	836	27,339
05Jul-18Jul	4,276	388,218	3,325	248,531	4,599	701,740	2,208	175,180
19Jul-01Aug	1,073	179,651	977	130,434	1,939	563,998	810	115,627
02Aug-15Aug	1,545	339,761	1,148	151,328	2,232	327,983	1,021	246,256
16Aug-29Aug	2,097	448,354	1,649	255,308	2,800	971,108	1,416	390,544
30Aug-12Sep	1,417	290,712	888	53,653	2,085	278,929	1,149	151,874
13Sep-26Sep	61	757	61	757	386	13,995	98	2,150
Total	17,226	2,335,039	12,783	1,118,080	25,765	3,689,121	10,573	1,324,000

Seasonal-period	-------Lingcod------- -----Total Catch----- Estimate	Variance	--------Lingcod------- -------Harvested------ Estimate	Variance	--Quillback Rockfish-- -------Harvested------ Estimate	Variance	----Dusky Rockfish---- -------Harvested------ Estimate	Variance
26Apr-09May	28	756	0	0	206	19,878	0	0
10May-23May	145	6,463	123	6,067	49	712	0	0
24May-06Jun	163	8,773	163	8,773	28	245	0	0
Derby[a]-----	189	2,038	158	1,656	210	3,154	14	37
07Jun-20Jun	122	2,746	122	2,746	317	19,676	18	184
21Jun-04Jul	101	1,783	101	1,783	165	4,368	0	0
05Jul-18Jul	282	4,495	282	4,495	210	5,692	0	0
19Jul-01Aug	17	114	8	60	167	6,340	12	137
02Aug-15Aug	77	2,995	66	2,885	415	59,767	8	60
16Aug-29Aug	113	2,956	113	2,956	622	152,340	0	0
30Aug-12Sep	87	1,111	87	1,111	135	12,286	0	0
13Sep-26Sep	52	569	52	569	39	1,444	8	60
Total	1,376	34,799	1,275	33,101	2,563	285,902	60	478

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Seasonal-period	Copper Rockfish Harvested Estimate	Copper Rockfish Harvested Variance	Black Rockfish Harvested Estimate	Black Rockfish Harvested Variance	Tiger Rockfish Harvested Estimate	Tiger Rockfish Harvested Variance	Yelloweye Rockfish Harvested Estimate	Yelloweye Rockfish Harvested Variance
26Apr-09May	0	0	0	0	0	0	122	1,562
10May-23May	42	1,186	0	0	0	0	93	1,648
24May-06Jun	0	0	0	0	0	0	122	3,087
Derby[a]	25	126	41	169	0	0	242	3,673
07Jun-20Jun	0	0	22	497	0	0	244	9,103
21Jun-04Jul	8	26	27	275	4	14	215	5,245
05Jul-18Jul	138	11,991	62	563	7	47	586	28,544
19Jul-01Aug	0	0	45	1,757	23	500	183	10,250
02Aug-15Aug	8	60	140	8,863	20	352	146	5,865
16Aug-29Aug	8	60	18	274	0	0	436	22,470
30Aug-12Sep	10	89	87	6,724	0	0	309	5,941
13Sep-26Sep	0	0	0	0	0	0	43	524
Total	239	13,538	442	19,122	54	913	2,741	97,912

Seasonal-period	Silvergrey Rockfish Harvested Estimate	Silvergrey Rockfish Harvested Variance	Other Rockfish Harvested Estimate	Other Rockfish Harvested Variance	Unidentified Rockfish Total Catch Estimate	Unidentified Rockfish Total Catch Variance	Unidentified Rockfish Harvested Estimate	Unidentified Rockfish Harvested Variance
26Apr-09May	0	0	0	0	500	18,952	6	30
10May-23May	7	46	17	110	1,982	208,025	565	81,172
24May-06Jun	0	0	17	256	1,349	101,263	67	1,415
Derby[a]	30	411	25	160	2,301	71,574	281	4,182
07Jun-20Jun	29	216	135	3,055	1,180	46,909	59	1,050
21Jun-04Jul	15	251	65	1,312	1,842	124,451	337	6,818
05Jul-18Jul	0	0	259	22,323	3,337	347,021	945	62,267
19Jul-01Aug	23	500	0	0	1,484	347,338	356	18,818
02Aug-15Aug	8	60	10	88	1,477	66,206	267	22,478
16Aug-29Aug	33	990	138	8,731	1,546	270,843	162	7,833
30Aug-12Sep	0	0	39	366	1,496	174,860	570	65,135
13Sep-26Sep	0	0	0	0	296	6,172	8	60
Total	145	2,474	705	36,401	18,790	1,783,614	3,623	271,258

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Seasonal-period	Shellfish Boat-days Estimate	Shellfish Boat-days Variance	Shellfish Pots or Rings Estimate	Shellfish Pots or Rings Variance	Crab Boat-days Estimate	Crab Boat-days Variance	Crab Pots or Rings Estimate	Crab Pots or Rings Variance
26Apr-09May	92	324	248	14,021	84	311	232	14,011
10May-23May	93	792	175	2,200	82	780	159	2,141
24May-06Jun	55	1,096	77	1,514	44	1,067	55	1,397
Derby[a]	138	799	259	2,730	105	366	217	2,052
07Jun-20Jun	82	722	189	5,525	50	190	136	4,543
21Jun-04Jul	197	6,216	354	15,022	116	1,431	206	3,800
05Jul-18Jul	353	12,639	565	25,444	257	8,514	398	16,848
19Jul-01Aug	184	6,528	776	180,526	61	1,590	105	4,265
02Aug-15Aug	168	4,243	437	39,407	99	2,225	286	27,178
16Aug-29Aug	270	7,937	630	50,709	217	3,582	492	19,665
30Aug-12Sep	154	3,362	327	9,572	87	502	212	3,585
13Sep-26Sep	187	24,057	344	75,589	187	24,057	344	75,589
Total	1,973	68,715	4,381	422,259	1,389	44,615	2,842	175,074

Seasonal-period	Dungeness Crab Total Catch Estimate	Dungeness Crab Total Catch Variance	Dungeness Crab Harvested Estimate	Dungeness Crab Harvested Variance	Shrimp Total Catch Estimate	Shrimp Total Catch Variance	Shrimp Harvested Estimate	Shrimp Harvested Variance
26Apr-09May	1,880	1,026,720	380	8,220	0	0	0	0
10May-23May	1,608	331,024	467	10,097	380	8,570	380	8,570
24May-06Jun	248	53,831	132	15,312	220	4,400	220	4,400
Derby[a]	2,503	290,903	913	41,352	1,900	175,800	1,900	175,800
07Jun-20Jun	1,260	479,170	463	65,497	50	220	50	220
21Jun-04Jul	2,633	1,421,645	916	94,669	4,150	538,310	4,120	537,040
05Jul-18Jul	3,067	1,492,758	1,155	247,457	5,260	373,550	5,070	335,190
19Jul-01Aug	1,070	882,958	281	52,973	18,670	8,694,500	18,670	8,694,500
02Aug-15Aug	3,891	5,775,131	1,276	597,237	1,820	203,690	1,820	203,690
16Aug-29Aug	4,623	3,584,501	1,381	288,924	1,650	163,020	1,650	163,020
30Aug-12Sep	2,589	1,147,152	587	29,786	3,180	730,790	3,180	730,790
13Sep-26Sep	3,138	5,374,605	946	561,627	0	0	0	0
Total	28,510	21,860,398	8,897	2,013,151	37,280	10,892,850	37,060	10,853,220

[a] Derby held on 29-31 May, 5-6 June, and 12-13 June.

Appendix B7. Estimated effort, harvest and catch for the Juneau marine boat sport fishery by seasonal period, 26 April - 26 September, 1993.

Seasonal-period	Boat-hours Estimate	Boat-hours Variance	Salmon-hours Estimate	Salmon-hours Variance	Halibut-hours Estimate	Halibut-hours Variance	Angler-hours Estimate	Angler-hours Variance
26Apr-09May	8,556	3,691,471	18,719	19,987,543	18	288	18,737	19,973,724
10May-23May	20,236	28,917,233	47,255	127,956,165	711	162,867	47,995	136,582,040
24May-06Jun	14,467	9,720,428	33,117	55,038,095	1,646	266,671	34,762	60,604,072
07Jun-20Jun	14,153	4,485,779	29,140	22,285,778	6,514	1,768,185	35,654	27,613,657
21Jun-04Jul	12,093	5,520,545	15,603	7,918,884	14,556	9,484,550	30,187	31,050,067
05Jul-18Jul	13,051	2,797,692	13,121	3,636,669	18,634	6,091,125	31,992	16,506,563
19Jul-01Aug	7,339	1,719,832	10,541	2,525,113	8,249	3,282,713	18,791	9,894,411
Derby[a]	11,404	3,450,480	29,214	25,224,726	884	56,881	30,098	26,050,576
02Aug-15Aug	9,442	8,436,535	13,812	18,513,209	11,814	18,035,309	25,638	69,886,407
16Aug-29Aug	13,918	2,928,719	29,221	10,774,629	7,821	1,493,644	37,042	17,676,957
30Aug-12Sep	13,269	5,996,725	26,816	35,804,808	7,417	5,558,049	34,234	67,147,504
13Sep-26Sep	2,286	317,955	4,279	1,295,906	556	41,659	4,835	1,534,785
Total	140,214	77,983,394	270,838	330,961,525	78,820	46,241,941	349,965	484,520,763

Seasonal-period	Boat-days Estimate	Boat-days Variance	Large Chinook Salmon-Total Catch Estimate	Large Chinook Salmon-Total Catch Variance	Large Chinook Salmon-Harvested Estimate	Large Chinook Salmon-Harvested Variance	Small Chinook Salmon-Total Catch Estimate	Small Chinook Salmon-Total Catch Variance
26Apr-09May	2,137	195,278	768	31,720	759	30,409	163	4,681
10May-23May	4,641	1,057,114	2,153	88,391	2,153	88,391	428	31,493
24May-06Jun	3,320	530,975	2,092	147,864	2,078	147,701	327	4,990
07Jun-20Jun	3,293	198,660	1,842	336,043	1,838	335,662	460	15,880
21Jun-04Jul	3,072	349,046	377	6,605	373	6,586	58	419
05Jul-18Jul	3,440	249,140	170	1,694	148	1,231	99	1,527
19Jul-01Aug	2,162	129,505	128	1,048	128	1,048	165	1,116
Derby[a]	1,573	49,563	246	85	243	92	477	9,508
02Aug-15Aug	2,685	422,250	126	1,563	126	1,563	169	3,357
16Aug-29Aug	3,423	187,757	464	43,288	354	19,174	1,554	183,100
30Aug-12Sep	3,282	326,468	126	2,625	126	2,625	968	340,710
13Sep-26Sep	712	29,937	6	0	6	0	0	0
Total	33,740	3,725,693	8,498	660,926	8,332	634,482	4,868	596,781

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Seasonal-period	Small Chinook Salmon Harvested Estimate	Small Chinook Salmon Harvested Variance	Coho Salmon Total Catch Estimate	Coho Salmon Total Catch Variance	Coho Salmon Harvested Estimate	Coho Salmon Harvested Variance	Pink Salmon Total Catch Estimate	Pink Salmon Total Catch Variance
26Apr-09May	0	0	0	0	0	0	0	0
10May-23May	5	18	5	18	5	18	0	0
24May-06Jun	0	0	0	0	0	0	0	0
07Jun-20Jun	0	0	34	169	34	169	0	0
21Jun-04Jul	0	0	173	4,347	164	4,510	176	4,024
05Jul-18Jul	0	0	755	22,847	755	22,847	1,279	50,458
19Jul-01Aug	0	0	993	32,091	984	31,781	1,009	67,398
Derby[a]	0	0	2,106	7,861	2,031	6,624	983	66,790
02Aug-15Aug	0	0	1,548	272,764	1,525	265,486	345	16,934
16Aug-29Aug	0	0	5,340	841,123	4,928	769,303	1,111	124,690
30Aug-12Sep	0	0	4,932	967,306	4,739	1,009,803	227	5,804
13Sep-26Sep	0	0	802	79,661	756	73,699	7	42
Total	5	18	16,688	2,228,187	15,921	2,184,240	5,137	336,140

Seasonal-period	Pink Salmon Harvested Estimate	Pink Salmon Harvested Variance	Chum Salmon Total Catch Estimate	Chum Salmon Total Catch Variance	Chum Salmon Harvested Estimate	Chum Salmon Harvested Variance	Sockeye Salmon Total Catch Estimate	Sockeye Salmon Total Catch Variance
26Apr-09May	0	0	0	0	0	0	0	0
10May-23May	0	0	71	3145	71	3145	0	0
24May-06Jun	0	0	22	103	22	103	0	0
07Jun-20Jun	0	0	147	2813	144	2892	7	37
21Jun-04Jul	116	3,515	78	954	75	968	28	319
05Jul-18Jul	1,008	29,286	284	4,366	269	4,325	5	18
19Jul-01Aug	760	31,964	90	927	77	862	4	13
Derby[a]	238	5,369	97	50	91	32	16	5
02Aug-15Aug	255	10,661	18	141	10	92	8	50
16Aug-29Aug	372	8,584	127	1159	99	900	17	105
30Aug-12Sep	155	3,784	85	1727	85	1727	8	52
13Sep-26Sep	7	42	0	0	0	0	0	0
Total	2,911	93,205	1,019	15,385	943	15,046	93	599

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Seasonal-period	Sockeye Salmon Harvested Estimate	Sockeye Salmon Harvested Variance	Dolly Varden Total Catch Estimate	Dolly Varden Total Catch Variance	Dolly Varden Harvested Estimate	Dolly Varden Harvested Variance	Pacific Halibut Total Catch Estimate	Pacific Halibut Total Catch Variance
26Apr-09May	0	0	16	240	16	240	0	0
10May-23May	0	0	17	144	17	144	42	834
24May-06Jun	0	0	36	121	30	109	160	3,770
07Jun-20Jun	7	37	88	760	83	621	556	16,718
21Jun-04Jul	11	114	76	1,141	42	584	1,603	102,140
05Jul-18Jul	5	18	57	1,452	53	1,433	2,467	176,800
19Jul-01Aug	4	13	9	59	9	59	1,366	95,580
Derby[a]	16	5	17	67	3	5	228	2,932
02Aug-15Aug	8	50	15	199	0	0	1,366	350,314
16Aug-29Aug	8	60	8	60	0	0	1,045	50,508
30Aug-12Sep	8	52	39	508	8	52	658	58,840
13Sep-26Sep	0	0	0	0	0	0	89	1,146
Total	67	349	378	4,751	261	3,247	9,580	859,582

Seasonal-period	Pacific Halibut Harvested Estimate	Pacific Halibut Harvested Variance	Lingcod Total Catch Estimate	Lingcod Total Catch Variance	Lingcod Harvested Estimate	Lingcod Harvested Variance	Rockfish Total Catch Estimate	Rockfish Total Catch Variance
26Apr-09May	0	0	0	0	0	0	0	0
10May-23May	38	829	0	0	0	0	0	0
24May-06Jun	88	1,948	0	0	0	0	0	0
07Jun-20Jun	394	7,522	4	9	0	0	55	808
21Jun-04Jul	986	52,618	0	0	0	0	89	1,160
05Jul-18Jul	1,612	70,683	0	0	0	0	521	20,445
19Jul-01Aug	1,009	50,418	4	13	4	13	64	626
Derby[a]	204	2,904	0	0	0	0	26	98
02Aug-15Aug	996	130,862	0	0	0	0	136	3,963
16Aug-29Aug	911	43,558	0	0	0	0	46	776
30Aug-12Sep	627	60,222	0	0	0	0	48	2,031
13Sep-26Sep	63	910	0	0	0	0	0	0
Total	6,928	422,474	8	22	4	13	985	29,907

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Seasonal-period	Rockfish Harvested Estimate	Rockfish Harvested Variance	Shellfish Boat-days Estimate	Shellfish Boat-days Variance	Shellfish Pots or Rings Estimate	Shellfish Pots or Rings Variance	Dungeness Crab Total Catch Estimate	Dungeness Crab Total Catch Variance
26Apr-09May	0	0	111	3,434	201	7,950	58	2,122
10May-23May	0	0	233	10,313	432	37,699	367	68,955
24May-06Jun	0	0	289	12,780	530	29,147	1,201	160,517
07Jun-20Jun	55	808	407	6,064	779	23,180	972	117,068
21Jun-04Jul	74	770	616	18,607	1,213	91,253	2,022	252,430
05Jul-18Jul	511	20,795	1,054	31,962	2,177	176,802	2,630	979,367
19Jul-01Aug	64	626	817	21,334	1,917	136,312	1,273	102,472
Derby[a]	11	50	63	306	129	1,498	193	20,168
02Aug-15Aug	136	3,963	776	25,081	1,533	87,587	1,182	100,299
16Aug-29Aug	46	776	663	16,822	1,309	74,541	916	243,082
30Aug-12Sep	48	2,031	606	9,336	1,294	51,123	1,093	318,999
13Sep-26Sep	0	0	378	40,022	785	134,115	86	2,989
Total	945	29,819	6,013	196,061	12,299	851,207	11,993	2,368,468

Seasonal-period	Dungeness Crab Harvested Estimate	Dungeness Crab Harvested Variance	King Crab Total Catch Estimate	King Crab Total Catch Variance	King Crab Harvested Estimate	King Crab Harvested Variance	Tanner Crab Catch and Harvest Estimate	Tanner Crab Catch and Harvest Variance
26Apr-09May	58	2,122	0	0	0	0	44	1,804
10May-23May	367	68,955	0	0	0	0	160	23,200
24May-06Jun	1,201	160,517	0	0	0	0	33	640
07Jun-20Jun	959	112,642	0	0	0	0	104	2,857
21Jun-04Jul	2,022	252,430	563	108,674	563	108,674	196	8,245
05Jul-18Jul	2,630	979,367	2,265	421,384	2,181	370,249	169	2,656
19Jul-01Aug	1,273	102,472	2,303	477,876	2,303	477,876	233	5,963
Derby[a]	193	20,168	44	178	44	178	11	54
02Aug-15Aug	1,182	100,299	1,381	432,694	1,381	432,694	174	7,973
16Aug-29Aug	916	243,082	1,095	210,976	1,095	210,976	118	2,931
30Aug-12Sep	1,093	318,999	613	42,052	613	42,052	295	35,325
13Sep-26Sep	86	2,989	783	80,073	783	80,073	20	178
Total	11,980	2,364,042	9,047	1,773,907	8,963	1,722,772	1,557	91,826

[a] Derby held on 13-15 August.

Appendix B8. Estimated effort, harvest and catch for the Sitka marine boat sport fishery by seasonal period, 26 April - 26 September, 1993.

Seasonal-period	Boat-hours Estimate	Boat-hours Variance	Salmon-hours Estimate	Salmon-hours Variance	Halibut-hours Estimate	Halibut-hours Variance	Angler-hours Estimate	Angler-hours Variance
26Apr-09May	2,387	276,481	4,304	1,244,395	596	42,424	4,915	1,270,971
10May-23May	4,993	530,080	8,609	1,325,468	1,873	166,801	10,508	1,990,489
Derby[a]	9,724	2,892,910	20,408	13,194,764	1,814	75,290	22,222	14,793,795
24May-06Jun	3,027	274,424	5,586	1,481,801	1,209	127,226	6,795	2,289,305
07Jun-20Jun	9,919	1,367,242	18,454	8,246,340	7,182	1,151,445	25,644	13,241,949
21Jun-04Jul	6,454	460,157	10,955	2,753,204	6,034	625,525	17,031	5,170,730
05Jul-18Jul	6,488	318,289	8,957	1,686,171	7,639	546,227	16,596	2,407,183
19Jul-01Aug	4,588	207,060	7,014	627,079	4,666	407,783	11,687	1,593,486
02Aug-15Aug	4,908	704,222	8,051	2,792,353	6,917	2,957,385	14,968	10,024,378
16Aug-29Aug	5,616	549,331	10,495	1,759,626	3,873	294,347	14,368	2,875,887
30Aug-12Sep	2,414	44,074	3,188	81,146	2,088	154,022	5,275	247,713
13Sep-26Sep	858	49,126	1,163	88,528	589	69,851	1,820	199,565
Total	61,376	7,673,396	107,184	35,280,875	44,480	6,618,326	151,829	56,105,451

Seasonal-period	Boat-days Estimate	Boat-days Variance	Large Chinook Salmon-Total Catch Estimate	Large Chinook Salmon-Total Catch Variance	Large Chinook Salmon-Harvested Estimate	Large Chinook Salmon-Harvested Variance	Small Chinook Salmon-Total Catch Estimate	Small Chinook Salmon-Total Catch Variance
26Apr-09May	834	39,463	715	61,556	585	34,480	94	4,322
10May-23May	1,570	52,517	1,311	43,561	1,154	30,520	103	869
Derby[a]	1,877	137,077	3,518	82,070	3,051	13,024	148	1,161
24May-06Jun	852	10,356	1,308	115,692	1,074	60,990	66	1,326
07Jun-20Jun	2,669	137,445	5,468	1,093,225	4,850	886,803	200	2,483
21Jun-04Jul	1,878	28,619	1,725	67,443	1,469	53,459	155	1,912
05Jul-18Jul	1,820	20,573	519	10,849	468	8,324	85	1,953
19Jul-01Aug	1,369	20,484	340	5,448	340	5,448	58	353
02Aug-15Aug	1,135	22,950	545	20,577	533	20,552	6	18
16Aug-29Aug	1,448	19,639	234	4,903	234	4,903	173	15,976
30Aug-12Sep	704	7,009	21	399	21	399	126	7,182
13Sep-26Sep	297	4,441	0	0	0	0	51	1,066
Total	16,453	500,573	15,704	1,505,723	13,779	1,118,902	1,265	38,621

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Seasonal period	Coho Salmon Total Catch Estimate	Coho Salmon Total Catch Variance	Coho Salmon Harvested Estimate	Coho Salmon Harvested Variance	Pink Salmon Total Catch Estimate	Pink Salmon Total Catch Variance	Pink Salmon Harvested Estimate	Pink Salmon Harvested Variance
26Apr-09May	0	0	0	0	0	0	0	0
10May-23May	0	0	0	0	0	0	0	0
Derby[a]	39	157	27	86	6	0	6	0
24May-06Jun	0	0	0	0	0	0	0	0
07Jun-20Jun	222	2,195	197	1,525	44	459	37	273
21Jun-04Jul	418	21,003	394	17,219	125	3,176	77	977
05Jul-18Jul	1,654	182,537	1,496	175,662	291	5,659	151	1,490
19Jul-01Aug	2,316	126,591	2,207	119,571	421	10,956	271	6,449
02Aug-15Aug	3,450	330,124	3,410	329,696	261	4,712	159	1,685
16Aug-29Aug	4,854	405,484	4,801	400,586	660	36,177	324	13,602
30Aug-12Sep	1,114	55,861	1,109	56,491	44	244	44	244
13Sep-26Sep	546	38,321	525	32,010	4	12	0	0
Total	14,613	1,162,273	14,166	1,132,846	1,856	61,395	1,069	24,720

Seasonal period	Chum Salmon Total Catch Estimate	Chum Salmon Total Catch Variance	Chum Salmon Harvested Estimate	Chum Salmon Harvested Variance	Sockeye Salmon Catch and Harvest Estimate	Sockeye Salmon Catch and Harvest Variance	Dolly Varden Total Catch Estimate	Dolly Varden Total Catch Variance
26Apr-09May	0	0	0	0	0	0	0	0
10May-23May	10	83	0	0	10	81	0	0
Derby[a]	52	630	52	630	0	0	3	6
24May-06Jun	6	30	6	30	0	0	0	0
07Jun-20Jun	78	879	78	879	0	0	29	714
21Jun-04Jul	35	184	27	128	0	0	47	1,445
05Jul-18Jul	39	443	39	443	28	308	0	0
19Jul-01Aug	932	111,416	664	44,693	22	402	0	0
02Aug-15Aug	1,380	93,774	1,155	72,815	0	0	0	0
16Aug-29Aug	1,824	201,755	1,362	186,036	0	0	0	0
30Aug-12Sep	179	7,660	68	1550	0	0	5	22
13Sep-26Sep	11	100	11	100	0	0	0	0
Total	4,546	416,954	3,462	307,304	60	791	84	2,187

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Seasonal-period	Dolly Varden Harvested Estimate	Dolly Varden Harvested Variance	Pacific Halibut Total Catch Estimate	Pacific Halibut Total Catch Variance	Pacific Halibut Harvested Estimate	Pacific Halibut Harvested Variance	Lingcod Total Catch Estimate	Lingcod Total Catch Variance
26Apr-09May	0	0	110	2,515	93	2,226	103	2,188
10May-23May	0	0	378	8,881	271	5,264	299	17,714
Derby[a]	3	6	470	3,041	388	2,620	242	2,383
24May-06Jun	0	0	246	8,988	240	9,546	60	1,236
07Jun-20Jun	29	714	2,851	252,631	2,165	127,733	311	7,237
21Jun-04Jul	40	1,400	2,893	238,552	2,163	127,186	329	7,683
05Jul-18Jul	0	0	2,805	152,101	2,063	99,667	331	3,134
19Jul-01Aug	0	0	1,960	107,037	1,400	63,266	248	4,505
02Aug-15Aug	0	0	2,595	289,883	1,866	165,462	231	6,787
16Aug-29Aug	0	0	1,747	69,116	1,517	38,869	131	1,534
30Aug-12Sep	5	22	845	29,538	482	14,038	110	4,296
13Sep-26Sep	0	0	109	4,308	72	2,364	16	105
Total	77	2,142	17,009	1,166,591	12,720	658,241	2,411	58,802

Seasonal-period	Lingcod Harvested Estimate	Lingcod Harvested Variance	Rockfish Total Catch Estimate	Rockfish Total Catch Variance	Rockfish Harvested Estimate	Rockfish Harvested Variance	Quillback Rockfish Harvested Estimate	Quillback Rockfish Harvested Variance
26Apr-09May	70	2,079	423	14,550	92	5,669	22	457
10May-23May	119	1,652	1,164	93,869	223	5,888	62	975
Derby[a]	155	1,272	1,884	522,276	313	4,023	18	229
24May-06Jun	60	1,236	438	45,006	120	11,136	0	0
07Jun-20Jun	293	6,635	1,717	136,380	427	20,625	72	3,622
21Jun-04Jul	301	7,507	1,712	258,216	336	12,111	33	566
05Jul-18Jul	294	2,480	1,644	130,328	679	14,493	61	984
19Jul-01Aug	211	3,753	1,428	101,759	532	39,018	20	179
02Aug-15Aug	228	6,712	991	63,772	384	27,743	19	117
16Aug-29Aug	115	1,229	276	5,639	164	4,252	0	0
30Aug-12Sep	110	4,296	966	178,203	343	21,361	0	0
13Sep-26Sep	7	42	214	3,099	53	499	21	399
Total	1,963	38,893	12,857	1,553,097	3,666	166,818	328	7,528

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Seasonal-period	Dusky Rockfish Harvested Estimate	Dusky Rockfish Harvested Variance	Copper Rockfish Harvested Estimate	Copper Rockfish Harvested Variance	Black Rockfish Harvested Estimate	Black Rockfish Harvested Variance	Silvergrey Rockfish Harvested Estimate	Silvergrey Rockfish Harvested Variance
26Apr-09May	0	0	0	0	56	2,856	0	0
10May-23May	0	0	0	0	8	48	36	669
Derby[a]	0	0	6	26	36	264	0	0
24May-06Jun	0	0	0	0	48	1,344	0	0
07Jun-20Jun	4	14	0	0	93	1,846	7	45
21Jun-04Jul	0	0	0	0	32	290	19	197
05Jul-18Jul	5	22	5	22	35	907	0	0
19Jul-01Aug	0	0	34	970	45	572	14	83
02Aug-15Aug	0	0	0	0	27	342	0	0
16Aug-29Aug	0	0	5	16	0	0	0	0
30Aug-12Sep	0	0	0	0	158	22,444	0	0
13Sep-26Sep	0	0	0	0	0	0	0	0
Total	9	36	50	1,034	538	30,913	76	994

Seasonal-period	Yelloweye Rockfish Harvested Estimate	Yelloweye Rockfish Harvested Variance	Other Rockfish Harvested Estimate	Other Rockfish Harvested Variance	Unidentified Rockfish Total Catch Estimate	Unidentified Rockfish Total Catch Variance	Unidentified Rockfish Harvested Estimate	Unidentified Rockfish Harvested Variance
26Apr-09May	0	0	0	0	344	12,282	13	71
10May-23May	30	194	13	138	1,006	85,375	74	1,986
Derby[a]	32	29	18	47	1,774	487,690	203	2,310
24May-06Jun	0	0	0	0	390	41,694	72	4,896
07Jun-20Jun	37	573	15	101	1,488	91,099	198	5,883
21Jun-04Jul	49	311	8	56	1,572	221,920	195	8,200
05Jul-18Jul	65	486	0	0	1,467	99,798	508	17,207
19Jul-01Aug	70	621	0	0	1,238	80,734	349	35,609
02Aug-15Aug	35	100	0	0	902	65,735	304	27,997
16Aug-29Aug	59	823	0	0	213	4,899	101	3,521
30Aug-12Sep	32	488	0	0	777	73,901	154	1,768
13Sep-26Sep	0	0	0	0	193	3,456	32	478
Total	409	3,625	54	342	11,364	1,268,583	2,203	109,926

[a] Derby held on 29 - 31 May and 5 - 6 June.

Appendix B9. Estimated effort, harvest, and catch for the Petersburg marine boat sport fishery by seasonal period, 10 May - 18 July, 1993.

Seasonal-period	Boat-hours Estimate	Boat-hours Variance	Salmon-hours Estimate	Salmon-hours Variance	Halibut-hours Estimate	Halibut-hours Variance	Angler-hours Estimate	Angler-hours Variance
10May-23May	949	39,699	1,685	115,688	413	59,651	2,098	232,130
Derby[a]	1,184	66,203	2,675	352,091	30	0	2,705	352,091
24May-06Jun	1,810	431,745	2,820	727,303	1,220	453,300	4,040	2,202,913
07Jun-20Jun	2,210	83,579	4,970	376,432	775	73,949	5,745	588,707
21Jun-04Jul	1,253	57,155	1,537	156,049	1,764	253,562	3,301	366,500
05Jul-18Jul	501	13,479	95	2,058	1,178	142,308	1,273	139,866
Total	7,907	691,860	13,782	1,729,621	5,380	982,770	19,162	3,882,207

Seasonal-period	Boat-days Estimate	Boat-days Variance	Large Chinook Salmon Total Catch Estimate	Large Chinook Salmon Total Catch Variance	Large Chinook Salmon Harvested Estimate	Large Chinook Salmon Harvested Variance	Small Chinook Salmon Total Catch Estimate	Small Chinook Salmon Total Catch Variance
10May-23May	256	1,873	235	4,491	207	3,105	25	239
Derby[a]	242	2,598	455	0	455	0	20	54
24May-06Jun	420	13,140	270	6,940	270	6,940	75	1,010
07Jun-20Jun	494	5,934	704	13,851	704	13,851	119	1,128
21Jun-04Jul	343	4,075	168	4,324	161	4,269	25	191
05Jul-18Jul	126	606	7	28	7	28	0	0
Total	1,881	28,226	1,839	29,634	1,804	28,193	264	2,622

Seasonal-period	Small Chinook Harvested Estimate	Small Chinook Harvested Variance	Pacific Halibut Total Catch Estimate	Pacific Halibut Total Catch Variance	Pacific Halibut Harvested Estimate	Pacific Halibut Harvested Variance	Rockfish Catch and Harvest Estimate	Rockfish Catch and Harvest Variance
10May-23May	0	0	63	2,723	63	2,723	4	9
Derby[a]	0	0	17	42	11	54	0	0
24May-06Jun	15	110	125	6,680	125	6,734	70	2,610
07Jun-20Jun	4	9	193	5,577	193	5,577	98	4,594
21Jun-04Jul	0	0	277	18,834	235	12,002	14	168
05Jul-18Jul	0	0	383	54,575	159	5,973	12	68
Total	19	119	1,058	88,431	786	33,009	198	7,449

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Seasonal-period	Dolly Varden Catch and Harvest Estimate	Dolly Varden Catch and Harvest Variance	Dusky Rockfish Catch and Harvest Estimate	Dusky Rockfish Catch and Harvest Variance	Yelloweye Rockfish Catch and Harvest Estimate	Yelloweye Rockfish Catch and Harvest Variance	Other Rockfish Catch and Harvest Estimate	Other Rockfish Catch and Harvest Variance
10May-23May	0	0	4	9	0	0	0	0
Derby[a]	0	0	0	0	0	0	0	0
24May-06Jun	0	0	0	0	0	0	70	2,610
07Jun-20Jun	0	0	49	2,058	21	184	28	420
21Jun-04Jul	0	0	0	0	14	168	0	0
05Jul-18Jul	53	1,269	0	0	12	68	0	0
Total	53	1,269	53	2,067	47	420	98	3,030

Seasonal-period	Shellfish Boat-days Estimate	Shellfish Boat-days Variance	Shellfish Pots or Rings Estimate	Shellfish Pots or Rings Variance	Dungeness Crab Catch and Harvest Estimate	Dungeness Crab Catch and Harvest Variance	Tanner Crab Catch and Harvest Estimate	Tanner Crab Catch and Harvest Variance
10May-23May	32	143	126	3,100	259	19,091	70	4,200
Derby[a]	0	0	0	0	0	0	0	0
24May-06Jun	10	90	10	90	60	3,240	0	0
07Jun-20Jun	46	1,072	119	8,338	238	33,523	0	0
21Jun-04Jul	28	672	14	168	0	0	0	0
05Jul-18Jul	25	261	18	219	0	0	0	0
Total	141	2,238	287	11,915	557	55,854	70	4,200

Seasonal-period	Shrimp Catch and Harvest Estimate	Shrimp Catch and Harvest Variance
10May-23May	110	790
Derby[a]	0	0
24May-06Jun	0	0
07Jun-20Jun	1,050	94,500
21Jun-04Jul	0	0
05Jul-18Jul	1,400	168,000
Total	2,560	263,290

[a] Petersburg derby held on 28-31 May. Because of sampling problems, all derby estimates are probably low.

Appendix B10. Estimated effort, harvest, and catch for the Wrangell marine boat sport fishery by seasonal period, 10 May - 18 July, 1993.

Seasonal-period	Boat-hours Estimate	Boat-hours Variance	Salmon-hours Estimate	Salmon-hours Variance	Halibut-hours Estimate	Halibut-hours Variance	Angler-hours Estimate	Angler-hours Variance
10May-23May	7,891	1,265,717	19,520	10,473,657	241	8,163	19,762	10,483,737
24May-06Jun	8,673	846,225	19,437	5,740,169	1,595	183,827	21,032	5,627,694
07Jun-20Jun	1,656	246,395	3,566	1,215,671	572	42,514	4,139	1,606,952
21Jun-04Jul	877	47,015	1,207	71,831	708	135,620	1,915	347,093
05Jul-18Jul	1,226	41,258	1,001	113,089	2,069	221,925	3,069	399,474
Total	20,323	2,446,610	44,731	17,614,417	5,185	592,049	49,917	18,464,950

Seasonal-period	Boat-days Estimate	Boat-days Variance	Large Chinook Salmon Total Catch Estimate	Large Chinook Salmon Total Catch Variance	Large Chinook Salmon Harvested Estimate	Large Chinook Salmon Harvested Variance	Small Chinook Salmon Total Catch Estimate	Small Chinook Salmon Total Catch Variance
10May-23May	1,534	33,352	1,123	25,440	1,110	25,180	56	832
24May-06Jun	1,442	19,105	1,045	24,899	1,012	22,793	124	2,229
07Jun-20Jun	323	4,770	525	22,450	525	22,450	165	12,848
21Jun-04Jul	195	3,510	55	890	47	682	9	12
05Jul-18Jul	238	1,400	10	40	10	40	0	0
Total	3,732	62,137	2,758	73,719	2,704	71,145	354	15,921

Seasonal-period	Pink Salmon Catch and Harvest Estimate	Pink Salmon Catch and Harvest Variance	Dolly Varden Catch and Harvest Estimate	Dolly Varden Catch and Harvest Variance	Steelhead Total Catch Estimate	Steelhead Total Catch Variance	Halibut Total Catch Estimate	Halibut Total Catch Variance
10May-23May	0	0	4	12	5	20	75	575
24May-06Jun	0	0	0	0	0	0	208	2,843
07Jun-20Jun	0	0	0	0	0	0	86	2,197
21Jun-04Jul	4	12	0	0	0	0	34	294
05Jul-18Jul	0	0	0	0	0	0	206	6,470
Total	4	12	4	12	5	20	609	12,379

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Seasonal-period	Halibut Harvested Estimate	Halibut Harvested Variance	Rockfish Total Catch Estimate	Rockfish Total Catch Variance	Rockfish Harvested Estimate	Rockfish Harvested Variance	Yelloweye Rockfish Catch and Harvest Estimate	Yelloweye Rockfish Catch and Harvest Variance
10May-23May	61	523	49	821	34	732	5	20
24May-06Jun	201	2,645	29	134	20	110	0	0
07Jun-20Jun	86	2,197	0	0	0	0	0	0
21Jun-04Jul	24	174	22	136	17	136	0	0
05Jul-18Jul	206	6,470	43	568	43	568	0	0
Total	578	12,009	143	1,659	114	1,546	5	20

Seasonal-period	Other Rockfish Catch and Harvest Estimate	Other Rockfish Catch and Harvest Variance	Unidentified Rockfish Total Catch Estimate	Unidentified Rockfish Total Catch Variance	Unidentified Rockfish Harvested Estimate	Unidentified Rockfish Harvested Variance	Shellfish Boat-days Estimate	Shellfish Boat-days Variance
10May-23May	25	500	19	101	4	12	44	181
24May-06Jun	5	16	25	126	16	94	73	353
07Jun-20Jun	0	0	0	0	0	0	83	2,632
21Jun-04Jul	0	0	22	136	17	136	8	24
05Jul-18Jul	0	0	43	568	43	568	32	128
Total	30	516	109	931	80	810	240	3,318

Seasonal-period	Shellfish Pots or Rings Estimate	Shellfish Pots or Rings Variance	Crab Boat-days Estimate	Crab Boat-days Variance	Crab Pots or Rings Estimate	Crab Pots or Rings Variance	Dungeness Crab Total Catch Estimate	Dungeness Crab Total Catch Variance
10May-23May	92	1,130	22	54	47	329	86	2,368
24May-06Jun	113	990	73	353	113	990	453	20,825
07Jun-20Jun	62	676	63	1,152	52	356	279	26,252
21Jun-04Jul	12	60	8	24	12	60	44	1,212
05Jul-18Jul	32	128	23	38	23	38	88	788
Total	311	2,984	189	1,621	247	1,773	950	51,445

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Seasonal-period	Dungeness Crab Harvested Estimate	Dungeness Crab Harvested Variance	Shrimp Catch and Harvest Estimate	Shrimp Catch and Harvest Variance
10May-23May	82	2,356	1,880	69,780
24May-06Jun	404	13,899	0	0
07Jun-20Jun	204	12,302	2,000	320,000
21Jun-04Jul	40	1,200	0	0
05Jul-18Jul	88	788	900	72,000
Total	818	30,545	4,780	461,780

Appendix B11. Numbers of chinook salmon examined for coded wire tags in Southeast Alaska marine boat sport fisheries in 1993.

		Large Chinook[a]			Small Chinook[b]		
Fishery	Seasonal Period	Estimated Harvest	Number Sampled	Percent	Estimated Harvest	Number Sampled	Percent
Ketchikan	4/26-6/20	2,455	295	12	0	0	0
	Derby Entered[c]	645	645	100	0	0	0
	Derby Take-Home[c]	915	290	32	0	0	0
	6/21-8/01	1,067	133	12	0	0	0
	8/02-9/26	192	24	13	3	3	100
	Total	5,274	1,387	26	3	3	100
Juneau	4/26-6/20	6,828	775	11	5	1	5
	6/21-8/01	649	86	13	0	0	0
	8/02-9/26	612	97	16	0	0	0
	Derby Entered[d]	225	214	95	0	0	0
	Derby Take-Home[d]	18	6	33	0	0	0
	Total	8,332	1,178	14	5	1	20
Sitka	4/26-6/20	7,663	867	11	0	0	0
	Derby Entered[e]	1,851	1,635	88	0	0	0
	Derby Take-Home[e]	1,200	388	32	0	0	0
	6/21-8/01	2,277	301	13	0	0	0
	8/02-9/26	788	84	11	0	0	0
	Total	13,779	3,275	24	0	0	0
Petersburg	5/10-7/18	1,349	206	15	15	2	13
	Derby Entered[f]	455	406	89	0	0	0
	Total	1,804	612	34	15	2	13
Wrangell	5/10-7/18	2,704	619	23	0	0	0
Craig	5/10-8/29		958			0	
All areas combined (except Craig)		31,893	7,071	22	23	6	26

[a] Chinook salmon at least 28 inches in total length.
[b] Chinook salmon <28 inches in total length.
[c] Derby held on 29-31 May, 5-6 June, and 12-13 June.
[d] Derby held 13-15 August.
[e] Derby held on 29-31 May and 5-6 June.
[f] Derby held on 28-31 May.

Appendix B12. Estimates of hatchery produced chinook salmon contributed to the Ketchikan marine boat sport fishery from 26 April to 26 September 1993.

Region	Agency[b]	Hatchery/ Release Site	Tag Code	Non-derby 4/26-6/20			Derby[a]			Non-derby 6/22-8/01			Non-derby 8/02-9/26			Total		
				Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance	Rec	Con	Variance	Rec	Con	Variance
British Columbia	CDFO	Clayoquot CDP	02-49-24							1	26	841				1	26	841
		Conuma River	02-06-58							1	30	854				1	30	854
			02-58-31				1	3	8							1	3	8
			02-59-15				1	18	314							1	18	314
		Kincolith CDP	02-52-29				1	4	11							1	4	11
		Kitimat River	02-04-33	1	99	9,698										1	99	9,698
			02-54-09				1	30	887							1	30	887
		Marble River PIP	02-04-61				1	4	13							1	4	13
		Nitinat River	02-58-08				1	137	18,532							1	137	18,532
		Quinsam River	02-03-54	1	115	13,258	1	28	766							2	143	14,024
		Robertson Creek	02-01-49				1	3	5							1	3	5
			02-08-18				1	1	1							1	1	1
			02-56-53				1	1	0							1	1	0
			02-58-38							1	667	445,198				1	667	445,198
		San Juan River CDP	02-52-62	1	7	39										1	7	39
		Tenderfoot Creek	02-11-30										1	8	67	1	8	67
			02-14-24										1	7	65	1	7	65
		Terrace CDP	02-60-45				1	3	7							1	3	7
		B.C. Total		3	221	22,995	11	232	20,544	3	723	446,893	2	15	132	19	1,191	490,564
Alaska	ADF&G	Crystal Lake	04-32-02	1	68	4,548										1	68	4,548
		Deer Mountain	04-30-27	1	15	204	3	6	8							4	21	212
			04-30-28	1	14	195	1	1	0							2	15	195
			04-30-29				1	3	7							1	3	7

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Region	Agency[b]	Hatchery/ release site	Tag Code	Non-derby 4/26-6/20			Derby[a]			Non-derby 6/22-8/01			Non-derby 8/02-9/26			Total		
				Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance	Rec	Con	Variance	Rec	Con	Variance
Alaska (cont.)	ADF&G	Deer Mountain	04-30-30	1	21	411										1	21	411
			04-30-31				1	3	7							1	3	7
			04-30-32				1	9	69							1	9	69
			04-33-19	1	36	1,274										1	36	1,274
			04-33-21				1	2	1							1	2	1
			04-33-23	1	21	415	1	2	1							2	23	416
	MIC	Tamgas Creek	47-16-04				1	3	7							1	3	7
			47-16-05				3	19	104							3	19	104
			47-16-09				3	29	253	1	111	12,286				4	140	12,539
			47-16-42	1	73	5,242										1	73	5,242
	NMFS	Little Port Walter	03-62-31				1	1	0							1	1	0
			03-63-29										1	8	66	1	8	66
	NSRA	Medvejie	04-34-27				1	9	72							1	9	72
			04-34-31				1	9	71							1	9	71
	SSRA	Carroll Inlet	04-31-41	1	54	2,838	3	24	171							4	78	3,009
			04-31-42	2	219	27,304	2	35	748							4	254	28,052
			04-32-49	1	130	16,747				1	47	2,139				2	177	18,886
		Neets Bay	04-30-58				2	16	112							2	16	112
			04-30-59				4	32	22							4	32	22
			04-31-47	3	172	11,191	3	19	102							6	191	11,293
			04-31-49				2	53	1,748							2	53	1,748
			04-32-52				9	92	1,080							9	92	1,080
			04-32-55	1	96	9,139	6	86	1,159	1	71	4,926				8	253	15,224
			04-33-03				1	12	133							1	12	133
			04-33-04				2	24	266							2	24	266
			04-33-05	1	66	4,320	2	43	1,145	2	304	84,706				5	413	90,171
			04-33-06	1	82	6,698	2	20	178							3	102	6,876
			04-35-07				1	5	21							1	5	21

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Region	Agency[b]	Hatchery/ release site	Tag Code	Non-derby 4/26-6/20			Derby[a]			Non-derby 6/22-8/01			Non-derby 8/02-9/26			Total		
				Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance	Rec	Con	Variance	Rec	Con	Variance
Alaska (cont.)	SSRA	Whitman Lake	04-31-44				1	1	0							1	1	0
			04-32-50	3	28	247				1	16	236				4	44	483
			04-35-04	1	9	72				1	15	225				2	24	297
		Alaska Total		21	1,104	90,845	59	558	7,485	7	564	104,518	1	8	66	88	2,234	202,914
		All Regions		24	1,325	113,840	70	790	28,029	10	1,287	551,411	3	23	198	107	3,425	693,478

[a] Derby held on 29-31 May, 5-6 June, and 12-13 June 1993.

[b] CDFO = Canada Department of Fisheries and Oceans. ADF&G = Alaska Department of Fish and Game. MIC = Metlakatla Indian Community. NMFS = National Marine Fisheries Service. NSRA = Northern Southeast Regional Aquaculture Association. 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] Variance = Variance of the estimated harvest of the release of the noted tag code.

Appendix B13. Estimates of hatchery produced chinook salmon contributed to the Juneau marine boat sport fishery from 26 April to 26 September 1993.

		Hatchery/		Non-derby 4/26-6/20			Derby[a]			Non-derby 6/22-8/01			Non-derby 8/02-9/26			Total		
Region	Agency[b]	Release Site	Tag Code	Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance	Rec	Con	Variance	Rec	Con	Variance
British Columbia	CDFO	Clayoquot CDP	02-01-28	1	20	364										1	20	364
		Kitimat River	02-04-34				1	26	627							1	26	627
		Snootli Creek	02-14-29				1	17	267							1	17	267
		B.C. Total		1	20	364	2	43	894							3	63	1,258
Washington	WDF	Similkameen Pond	63-07-59				1	2	2							1	2	2
		Washington Total					1	2	2							1	2	2
Alaska	ADF&G	Crystal Lake	04-36-04				1	9	65							1	9	65
		Jerry Myers	04-34-47										1	5	18	1	5	18
		Snettisham	04-25-63							1	12	130				1	12	130
			04-31-36							1	8	57				1	8	57
			04-31-58	1	9	72										1	9	72
			04-31-60	5	100	2,155										5	100	2,155
			04-31-61	1	11	120				2	23	291				3	34	411
			04-31-62	4	84	2,095										4	84	2,095
			04-32-01	9	302	12,014				1	27	711				10	329	12,725
			04-33-42	1	32	985							1	27	730	2	59	1,715
			04-33-43										1	22	469	1	22	469
			04-33-44	1	34	1,133	2	7	19							3	41	1,152
			04-33-56							1	26	641				1	26	641
			04-33-59				2	18	149							2	18	149
			04-33-60							1	34	1,133	1	35	1,211	2	69	2,344
			04-34-03										1	40	1,595	1	40	1,595
			04-34-10	4	122	4,095	3	13	41	2	60	1,848				9	195	5,984
			04-34-15							1	54	2,904				1	54	2,904
			04-37-63	2	22	235										2	22	235
	AKI	Port Armstrong	04-32-12	1	32	965										1	32	965
			04-36-19				1	3	7							1	3	7

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Region	Agency[b]	Hatchery/ release site	Tag Code	Non-derby 4/26-6/20 Rec[c]	Con[d]	Variance[e]	Derby[a] Rec	Con	Variance	Non-derby 6/22-8/01 Rec	Con	Variance	Non-derby 8/02-9/26 Rec	Con	Variance	Total Rec	Con	Variance
Alaska (cont.)	MIC	Tamgas	47-16-09	1	78	6,048										1	78	6,048
	NMFS	Little Port Walter	03-01-16				2	2	0							2	2	0
			03-01-19				1	1	0							1	1	0
			03-02-17				2	2	0							2	2	0
			03-02-19										1	7	44	1	7	44
			03-02-23	1	5											1	5	
			03-21-38				1	1	0							1	1	0
			03-21-41				1	1	0							1	1	0
			03-22-01				1	1	0				1	7	46	2	8	46
			03-22-05				2	2	0				1	12	126	3	14	126
			03-22-13				1	1	0							1	1	0
			03-22-15				1	1	0				1	7	43	2	8	43
			03-62-38				1	1	0							1	1	0
			03-63-29							1	11	121	1	7	42	2	18	162
			03-63-30	1	8	59										1	8	59
	NSRA	Hidden Falls	04-28-15				1	9	64							1	9	64
			04-32-38	1	13	147	1	1	0	1	7	40				3	21	187
			04-32-39				1	1	0	2	15	92				3	16	92
			04-35-48	1	9	68	1	1	0							2	10	68
	SSRA	Carroll Inlet	04-32-49							1	64	4,056				1	64	4,056
		Alaska Total		34	861	30,191	26	75	345	15	341	12,023	10	169	4,324	85	1,446	46,883
		All Regions		35	881	30,555	29	120	1,241	15	341	12,023	10	169	4,324	89	1,511	48,143

[a] Derby held on 13-15 August 1993.

[b] CDFO = Canada Department of Fisheries and Oceans. WDF = Washington Department of Fisheries. ADF&G = Alaska Department of Fish and Game. AKI = Armstrong Keta, Inc. MIC = Metlakatla Indian Community. NMFS = National Marine Fisheries Service. NSRA = Northern Southeast Regional Aquaculture Association. 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] Variance = Variance of the estimated harvest of the release of the noted tag code.

Appendix B14. Estimates of hatchery produced chinook salmon contributed to the Sitka marine boat sport fishery from 26 April to 26 September 1993.

		Hatchery/		Non-derby 4/26-6/20			Derby[a]			Non-derby 6/22-8/01			Non-derby 8/02-9/26			Total		
Region	Agency[b]	Release Site	Tag Code	Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance	Rec	Con	Variance	Rec	Con	Variance
British Columbia	CDFO	Clayoquot CDP	02-01-28	1	25	580										1	25	580
			02-01-30				1	2	3							1	2	3
			02-49-23	1	8	56										1	8	56
		Conuma River	02-06-53	1	8	55										1	8	55
			02-06-54				1	30	882							1	30	882
			02-06-56										1	94	8,732	1	94	8,732
			02-06-57				2	14	87							2	14	87
			02-06-58				1	7	43							1	7	43
			02-15-46							1	108	11,478				1	108	11,478
			02-58-30				1	32	996							1	32	996
			02-59-15	1	91	8,125	1	6	35							2	97	8,160
		Gold River PIP	02-01-27				1	7	42							1	7	42
			02-49-40				1	19	324							1	19	324
			02-62-36	1	104	10,825										1	104	10,825
			02-62-37	1	135	18,083										1	135	18,083
		Kitimat River	02-54-09				2	71	2,449							2	71	2,449
		Marble River PIP	02-04-63										1	19	346	1	19	346
			02-53-02	1	10	94										1	10	94
		Masset CDP	02-05-16				1	1	0							1	1	0
		Nitinat River	02-06-32	1	176	30,678										1	176	30,678
			02-06-35				1	52	2,608							1	52	2,608
			02-58-08	1	357	126,852										1	357	126,852
		Oweekeno CDP	02-59-63	1	38	1,427										1	38	1,427
		P.Hardy/ Stephens CDP	02-53-05	1	10	93										1	10	93
		Puntledge River	02-04-40				1	21	426							1	21	426
		Quesnel River	02-56-32				1	4	12							1	4	12

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Region	Agency[b]	Hatchery/ release site	Tag Code	Non-derby 4/26-6/20 Rec[c]	Non-derby 4/26-6/20 Con[d]	Non-derby 4/26-6/20 Variance[e]	Derby[a] Rec	Derby[a] Con	Derby[a] Variance	Non-derby 6/22-8/01 Rec	Non-derby 6/22-8/01 Con	Non-derby 6/22-8/01 Variance	Non-derby 8/02-9/26 Rec	Non-derby 8/02-9/26 Con	Non-derby 8/02-9/26 Variance	Total Rec	Total Con	Total Variance
British Columbia (cont.)	CDFO	Robertson Creek	02-01-45				1	1	0							1	1	0
			02-01-46	1	9	67	1	3	8							2	12	75
			02-01-47				1	1	0							1	1	0
			02-01-49				1	1	0							1	1	0
			02-01-53	1	17	258	2	4	8							3	21	266
			02-02-31				2	2	0							2	2	0
			02-04-42	2	44	1,016	2	4	4							4	48	1,020
			02-06-45				1	32	1,017							1	32	1,017
			02-06-46				3	131	5,602	1	357	127,415				4	488	133,017
			02-08-18	1	11	115	1	2	1							2	13	116
			02-09-48				1	30	861	1	189	35,633				2	219	36,494
			02-09-50				1	41	1,637							1	41	1,637
			02-49-60				1	41	1,674							1	41	1,674
			02-50-14	1	223	49,559										1	223	49,559
			02-58-36							1	571	326,044				1	571	326,044
			02-58-37	1	727	527,673	1	52	2,605							2	779	530,278
			02-58-38				2	136	9,163							2	136	9,163
			02-58-39	1	628	394,335										1	628	394,335
			02-60-55	2	593	181,842	2	65	2,046							4	658	183,888
			02-60-56				3	402	69,069							3	402	69,069
		San Juan River CDP	02-53-01	1	9	68	1	1	0							2	10	68
		B.C Total		22	3,223	1,351,801	42	1,215	101,602	4	1,225	500,570	2	113	9,078	70	5,776	1,963,051
Oregon	ODFW	Salmon River	07-54-59				1	4	9							1	4	9
		Ore. Total					1	4	9							1	4	9
Washington	NMFS	Bonneville Hatchery	23-24-52	1	9	78										1	9	78
			23-26-29	1	10	88										1	10	88
			23-31-11				1	1	0							1	1	0
			23-31-21				1	1	0							1	1	0
	QDNR	Quinault Lake Hatchery	21-22-19										1	30	863	1	30	863

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Appendix B14. (Page 3 of 4).

Region	Agency[b]	Hatchery/ release site	Tag Code	Non-derby 4/26-6/20 Rec[c]	Non-derby 4/26-6/20 Con[d]	Non-derby 4/26-6/20 Variance[e]	Derby[a] Rec	Derby[a] Con	Derby[a] Variance	Non-derby 6/22-8/01 Rec	Non-derby 6/22-8/01 Con	Non-derby 6/22-8/01 Variance	Non-derby 8/02-9/26 Rec	Non-derby 8/02-9/26 Con	Non-derby 8/02-9/26 Variance	Total Rec	Total Con	Total Variance
Washington (cont.)	QDNR	Salmon River Pond	21-31-44				1	5	25							1	5	25
	WDF	Eastbank Hatchery	63-56-14										1	11	106	1	11	106
		Humptulips Hatchery	63-07-56				1	12	139							1	12	139
			63-52-59				1	8	54							1	8	54
		Similkameen Pond	63-07-59										1	16	242	1	16	242
		Wash. Total		2	19	166	5	27	218				3	57	1,211	10	103	1,595
Alaska	ADF&G	Crystal Lake	04-27-37				1	11	119							1	11	119
			04-27-38				1	11	110							1	11	110
			04-32-02				1	10	83							1	10	83
		Snettisham	04-31-40				1	15	202							1	15	202
			04-31-59				1	15	201							1	15	201
	AKI	Port Armstrong	04-32-14	1	23	493										1	23	493
			04-32-15				1	9	80							1	9	80
	NMFS	Little Port Walter	03-02-16				1	1	0							1	1	0
			03-20-40				1	1	0							1	1	0
			03-21-14				1	1	0							1	1	0
			03-21-31				1	1	0							1	1	0
			03-21-32				2	2	0							2	2	0
			03-62-26				3	4	1							3	4	1
			03-62-28				1	1	0							1	1	0
			03-63-23				1	1	0							1	1	0
			03-63-31				1	3	8							1	3	8
	NSRA	Hidden Falls	04-29-55				1	11	116							1	11	116
			04-29-56				1	7	40							1	7	40
		Medvejie	04-07-03	1	222	49,026	1	44	1,917							2	266	50,943
			04-30-12				5	85	1,780							5	85	1,780
			04-30-13	2	77	2,696	7	40	185							9	117	2,881
			04-34-26	2	155	1,240	2	21	199							4	176	1,439
			04-34-29				1	11	100							1	11	100

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Appendix B14. (Page 4 of 4).

Region	Agency[b]	Hatchery/ release site	Tag Code	Non-derby 4/26-6/20 Rec[c]	Non-derby 4/26-6/20 Con[d]	Non-derby 4/26-6/20 Variance[e]	Derby[a] Rec	Derby[a] Con	Derby[a] Variance	Non-derby 6/22-8/01 Rec	Non-derby 6/22-8/01 Con	Non-derby 6/22-8/01 Variance	Non-derby 8/02-9/26 Rec	Non-derby 8/02-9/26 Con	Non-derby 8/02-9/26 Variance	Total Rec	Total Con	Total Variance
Alaska	NSRA	Medvejie	04-34-30				1	11	100							1	11	100
(cont.)			04-34-31	3	233	19,092	4	61	1,140	2	171	15,275				9	465	35,507
			04-35-42							1	16	250				1	16	250
			04-36-26				1	4	13							1	4	13
	SSRA	Neets Bay	04-30-59	1	102	10,247										1	102	10,247
			04-33-05	1	86	7,334										1	86	7,334
		Whitman Lake	04-32-50				1	2	1							1	2	1
		Alaska Total		11	898	90,128	43	383	6,395	3	187	15,525				57	1,468	112,048
		All Regions		35	4,140	1,442,095	91	1,629	108,224	7	1,412	516,095	5	170	10,289	138	7,351	2,076,703

[a] Derby held on 29-31 May, and 5-6 June 1993.

[b] CDFO = Canada Department of Fisheries and Oceans. ODFW = Oregon Department of Fish and Wildlife. NMFS = National Marine Fisheries Service. QDNR = Quinault Department of Natural Resources. WDF = Washington Department of Fisheries. ADF&G = Alaska Department of Fish and Game. AKI = Armstrong Keta, Inc. NSRA = Northern Southeast Regional Aquaculture Association. 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] Variance = Variance of the estimated harvest of the release of the noted tag code.

Appendix B15. Estimates of hatchery produced chinook salmon contributed to the Petersburg marine boat sport fishery from 10 May to 18 July 1993.

				Derby[a]			Non-derby 5/10-7/18			Total		
Region	Agency[b]	Hatchery/ Release Site	Tag Code	Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance
British Columbia	CDFO	Quinsam River	02-03-58	1	22	443				1	22	443
		Sooke River PIP	02-05-20	1	1	0				1	1	0
		B.C. Total		2	23	443				2	23	443
Alaska	ADFG	Crystal Lake	04-27-37	3	33	324	1	71	5,053	4	104	5,377
			04-27-38	2	21	200	2	117	6,796	4	138	6,996
			04-27-57	2	18	149				2	18	149
			04-32-02	2	18	150	1	51	2,557	3	69	2,707
	NMFS	Little Port Walter	03-02-17	1	1	0				1	1	0
			03-21-41	1	1	0				1	1	0
	SSRA	Neets Bay	04-31-47	1	7	44				1	7	44
			04-33-04	1	14	169				1	14	169
		Whitman Lake	04-31-44				1	6	28	1	6	28
		Alaska Total		13	113	1,036	5	245	14,434	18	358	15,470
		All Regions		15	136	1,479	5	245	14,434	20	381	15,913

[a] Derby held on 28 - 31 May 1993.

[b] CDFO = Canada Department of Fisheries and Oceans. ADFG = Alaska Department of Fish and Game. NMFS = National Marine Fisheries Service. 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] Variance = Variance of the estimated harvest of the release of the noted tag code.

Appendix B16. Estimates of hatchery produced chinook salmon contributed to the Wrangell marine boat sport fishery from 10 May to 18 July 1993.

Region	Agency[a]	Hatchery /Release Site	Tag Code	Rec[b]	Con[c]	Variance
Washington	WDF	Similkameen Pond	63-07-59	1	10	88
		Washington Total		1	10	88
Alaska	AAI	Burnett Inlet	04-34-41	3	122	5,119
	ADFG	Crystal Lake	04-32-02	3	108	3,947
	SSRA	Carroll Inlet	04-32-49	1	43	1,811
		Alaska Total		7	273	10,877
		All Regions		8	283	10,965

[a] WDF = Washington Department of Fisheries. AAI = Alaska Aquaculture Incorporated. 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] Variance = Variance of the estimated harvest of the release of the noted tag code.

Appendix B17. Estimates of hatchery produced chinook salmon contributed to 958 chinook salmon sampled from the Craig marine boat sport fishery from 10 May to 18 July 1993.

Region	Agency[a]	Hatchery /Release Site	Tag Code	Rec[b]	Con[c]	Variance[d]	Relative Contribution
Washington	MAKA	Hoko River Pond	21-18-29	1	1	0	0.1%
	QDNR	Quinault Lake Hatchery	21-28-22	1	4	13	0.4%
		Washington Total		2	4	13	0.5%
British Columbia	CDFO	Conuma River	02-06-57	1	6	31	0.6%
			02-58-31	2	2	0	0.2%
			02-59-15	1	5	25	0.5%
		Marble River PIP	02-53-02	1	1	0	0.1%
		Nitinat River	02-06-30	1	21	422	2.2%
			02-06-31	1	21	410	2.2%
			02-06-35	1	44	1,892	4.6%
			02-14-56	1	21	426	2.2%
		Oweekeno CDP	02-59-63	1	5	19	0.5%
		Pallant Creek	02-59-08	2	5	6	0.5%
		Robertson Creek	02-01-45	1	1		0.1%
			02-01-48	1	1		0.1%
			02-01-49	1	1		0.1%
			02-06-48	1	42	1,759	4.4%
			02-09-48	1	25	623	2.6%
			02-56-54	1	1		0.1%
			02-58-36	1	60	3,500	6.3%
			02-58-37	1	44	1,890	4.6%
			02-60-55	1	28	741	2.9%
		San Juan River CDP	02-51-46	2	2	0	0.2%
		B.C. Total		23	336	11,744	35.0%
Alaska	AKI	Port Armstrong	04-32-15	1	3	5	0.3%
	SSRA	Neets Bay	04-33-04	1	12	133	1.3%
		Alaska Total		2	15	138	1.6%
		All Regions		27	356	11,895	37.2%

[a] MAKA = Makah Indian Tribe. QDNR = Quinault Department of Natural Resources. CDFO = Canada Department of Fisheries and Oceans. AKI = Armstrong Keta Inc. 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] Variance = Variance of the estimated harvest of the release of the noted tag code.

Appendix B18. Estimates of the number of wild coded wire tagged chinook salmon contributed to sampled marine boat sport fisheries of Southeast Alaska, 1993.

Ketchikan

				Non-derby 4/26-9/26			Derby[a]			Total		
Region	Agency[b]	Release Site	Tag Code	Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance
Washington	WDF	Hanford Reach Stock	63-52-52				1	3	8	1	3	8
		Washington Total					1	3	8	1	3	8
		All Regions					1	3	8	1	3	8

Sitka

				Non-derby 4/26-9/26			Derby[a]			Total		
Region	Agency[b]	Release Site	Tag Code	Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance
Washington	WDF	Hanford Reach Stock	63-52-52				1	1	0	1	1	0
		Lewis River Stock	63-04-56	1	9	76				1	9	76
		Washington Total		1	9	76	1	1	0	2	10	76
		All Regions		1	9	76	1	1	0	2	10	76

[a] Ketchikan derby held on 29-31 May, 5-6 June, and 12-13 June. Sitka derby held on 29-31 May and 5-6 June.

[b] WDF = Washington Department of Fisheries.

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

[d] Con = Estimated harvest of fish with the noted tag code, not corrected for tagging fraction.

[e] Variance = Variance of the estimated harvest of fish with the noted tag code, not corrected for tagging fraction.

Appendix B19. Summary of coded wire tag recoveries from voluntary sampling programs at remote lodges and charter vessel operations.

Ketchikan Lodge B - 260 fish sampled, 9 heads collected, 9 valid tags

Region	Agency	Hatchery	Tag Code	Number of Recoveries	1/Tagging Fraction
Alaska	ADFG	Crystal Lake	04-27-37	1	9.738
			04-34-08	1	10.467
	SSRA	Neets Bay	04-30-58	1	7.987
			04-32-52	2	8.558
			04-32-55	1	14.407
			04-33-04	1	12.050
			04-33-06	2	9.933

Prince of Wales - Lodge A - 762 fish sampled, 13 heads collected, 10 valid tags

Region	Agency	Hatchery	Tag Code	Number of Recoveries	1/Tagging Fraction
Washington	NMFS	Bonneville	23-24-54	1	1.076
British Columbia	CDFO	Clayoquot CDP	02-01-28	1	1.928
		Conuma River	02-06-56	1	9.614
		Kincolith CDP	02-62-53	1	1.007
		Masset CDP	02-05-17	1	1.000
		Robertson Creek	02-04-42	1	1.742
			02-06-48	1	42.444
		Snootli Creek	02-59-56	1	33.724
Alaska	ADFG	Crystal Lake	04-27-38	1	9.381
	NSRA	Medvejie	04-34-27	1	8.988

Appendix B20. Age composition of chinook salmon from selected Southeast Alaska sport fisheries, 1993.

Sport Fishery			Brood Year 1990	1989		1988			1987			1986		Sample Size
			0.2	0.3	1.2	0.4	1.3	2.2	0.5	1.4	2.3	1.5	2.4	
Ketchikan	Males	n		6	1	4	8		1	11	1		1	33
		Percent		18.2	3.0	12.1	24.2		3.0	33.3	3.0		3.0	
		S.E.[a]		6.8	3.0	5.8	7.6		3.0	8.3	3.0		3.0	
	Females	n	2	6	1	6	9			14	1			39
		Percent	5.1	15.4	2.6	15.4	23.1			35.9	2.6			
		S.E.[a]	3.6	5.9	2.6	5.9	6.8			7.8	2.6			
	Total[b]	n	7	78	9	99	205		2	292	2	7	2	703
		Percent	1.0	11.1	1.3	14.1	29.2		0.3	41.5	0.3	1.0	0.3	
		S.E.[a]	0.4	1.2	0.4	1.3	1.7		0.2	1.9	0.2	0.4	0.2	
Juneau	Males	n			1		28			43	1	1		74
		Percent			1.4		37.8			58.1	1.4	1.4		
		S.E.[a]			1.4		5.7			5.8	1.4	1.4		
	Females	n		1	2	3	26			101		7		140
		Percent		0.7	1.4	2.1	18.6			72.1		5.0		
		S.E.[a]		0.7	1.0	1.2	3.3			3.8		1.8		
	Total[b]	n		3	10	7	111	1	1	267	2	11		413
		Percent		0.7	2.4	1.7	26.9	0.2	0.2	64.6	0.5	2.7		
		S.E.[a]		0.4	0.8	0.6	2.2	0.2	0.2	2.4	0.3	0.8		
Juneau Derby	Males	n		2			5							7
		Percent		28.6			71.4							
		S.E.[a]		18.4			18.4							
	Females	n	1			1	6			1	1			10
		Percent	10.0			10.0	60.0			10.0	10.0			
		S.E.[a]	10.0			10.0	16.3			10.0	10.0			
	Total[b]	n	1	5	2	2	42			6	1	1		60
		Percent	1.7	8.3	3.3	3.3	70.0			10.0	1.7	1.7		
		S.E.[a]	1.7	3.6	2.3	2.3	6.0			3.9	1.7	1.7		

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Sport Fishery			Brood Year 1990 0.2	1989 0.3	1989 1.2	1988 0.4	1988 1.3	1987 2.2	1987 0.5	1987 1.4	1987 2.3	1986 1.5	1986 2.4	Sample Size
Petersburg	Males	n					2			11				13
		Percent					15.4			84.6				
		S.E.[a]					10.4			10.4				
	Females	n		1		1	2			22				26
		Percent		3.8		3.8	7.7			84.6				
		S.E.[a]		3.8		3.8	5.3			7.2				
	Total[b]	n		7		13	33		1	229		3		286
		Percent		2.4		4.5	11.5		0.3	80.1		1.0		
		S.E.[a]		0.9		1.2	1.9		0.3	2.4		0.6		
Wrangell	Males	n					2			10		1		13
		Percent					15.4			76.9		7.7		
		S.E.[a]					10.4			12.2		7.7		
	Females	n					1			24				25
		Percent					4.0			96.0				
		S.E.[a]					4.0			4.0				
	Total[b]	n	1	1			16			127		4		149
		Percent	0.7	0.7			10.7			85.2		2.7		
		S.E.[a]	0.7	0.7			2.5			2.9		1.3		
Haines	Males	n			5		21			17				43
		Percent			11.6		48.8			39.5				
		S.E.[a]			4.9		7.7			7.5				
	Females	n					13			38		2		53
		Percent					24.5			71.7		3.8		
		S.E.[a]					6.0			6.2		2.6		
	Total[b]	n			5		34			56		2		97
		Percent			5.2		35.1			57.7		2.1		
		S.E.[a]			2.3		4.9			5.0		1.5		

[a] SE in percent.

[b] Includes sexed and unsexed chinook salmon.

Appendix B21. Length-at-age in millimeters (from tip of snout to fork-of-tail) by sex for chinook salmon from selected Southeast Alaska sport fisheries, 1993.

Sport Fishery			Brood Year 1990 0.2	1989 0.3	1989 1.2	1988 0.4	1988 1.3	1988 2.2	1987 0.5	1987 1.4	1987 2.3	1986 1.5	1986 2.4	Sample Size
Ketchikan	Males	Mean		821	762	968	884		1105	985	949		1050	
		SE		25		43	15			23				
		n		6	1	4	8		1	11	1		1	33
	Females	Mean	762	883	740	900	882			937	944			
		SE	66	17		15	17			14				
		n	2	6	1	6	9			14	1			39
	Total[a]	Mean	743	842	764	931	875		1072	956	947	971	950	
		SE	20	6	24	7	4		32	4	2	16	10	
		n	7	78	9	99	205		2	292	2	7	2	703
Juneau	Males	Mean			705		815			958	855	1015		
		SE					13			10				
		n			1		28			43	1	1		74
	Females	Mean		705	672	922	825			920		906		
		SE			13	51	11			6		34		
		n		1	2	3	26			101		7		140
	Total[a]	Mean		742	708	919	815	725	1050	929	792	918		
		SE		25	12	33	6			4	62	24		
		n		3	10	7	110	1	1	267	2	11		412
Juneau Derby	Males	Mean		775			789							
		SE		5			21							
		n		2			5							7
	Females	Mean	690			840	739			800	880			
		SE					13							
		n	1			1	6			1	1			10
	Total[a]	Mean	690	757	715	815	783			826	880	800		
		SE		15	5	25	10			26				
		n	1	5	2	2	42			6	1	1		60

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Appendix B21. (Page 2 of 2).

Sport Fishery			Brood Year 1990 0.2	1989 0.3	1989 1.2	1988 0.4	1988 1.3	1988 2.2	1987 0.5	1987 1.4	1987 2.3	1986 1.5	1986 2.4	Sample Size
Petersburg	Males	Mean					820			930				
		SE					20			21				
		n					2			11				13
	Females	Mean		820		950	875			911				
		SE					5			11				
		n		1		1	2			22				26
	Total[a]	Mean		801		915	824		895	934		952		
		SE		25		25	12			5		15		
		n		7		13	33		1	226		3		283
Wrangell	Males	Mean					845			992		1166		
		SE					75			15				
		n					2			10		1		13
	Females	Mean					840			920				
		SE								13				
		n					1			24				25
	Total[a]	Mean	720	840			842			949		1094		
		SE					22			5		30		
		n	1	1			16			124		4		146
Haines	Males	Mean			719		814			999				
		SE			8		14			25				
		n			5		21			17				43
	Females	Mean					830			972		995		
		SE					26			11		5		
		n					13			38		2		53
	Total[a]	Mean			719		820			980		995		
		SE			8		13			11		5		
		n			5		34			55		2		96

[a] Includes sexed and unsexed chinook salmon.

Appendix B22. Numbers of coho salmon examined for coded wire tags in Southeast Alaska marine boat sport fisheries in 1993.

Fishery	Seasonal Period	Coho Salmon Estimated Harvest	Coho Salmon Number Sampled	Coho Salmon Percent
Ketchikan	4/26-8/01 non-derby	3,977	352	9
	Derby Entered[a]	0	0	0
	Derby Take-Home[a]	9	3	33
	8/02-9/26	14,717	2,398	16
	Total	18,703	2,753	15
Juneau	4/26-8/01	1,942	241	12
	8/02-9/26 non-derby	11,948	3,928	33
	Derby Entered[b]	1,633	1,578	97
	Derby Take-Home[b]	398	104	26
	Total	15,921	5,851	37
Sitka	4/26-8/01 non-derby	4,294	526	12
	Derby Entered[c]	0	0	0
	Derby Take-Home[c]	27	6	22
	8/02-9/26	9,845	938	10
	Total	14,166	1,470	10
Craig	5/10-8/29		2,041	
All areas combined (except Craig)		46,790	10,074	22

[a] Derby held on 29-31 May, 5-6 June, and 12-13 June.
[b] Derby held 13-15 August.
[c] Derby held on 29-31 May and 5-6 June.

Appendix B23. Estimates of hatchery produced coho salmon contributed to the Ketchikan marine boat sport fishery from 26 April to 26 September 1993.

				Non-derby 4/26-8/01			Non-derby 8/02-9/26			Total		
Region	Agency[a]	Hatchery/ Release Site	Tag Code	Rec[b]	Con[c]	Variance[d]	Rec	Con	Variance	Rec	Con	Variance
British Columbia	CDFO	Anderson Creek PIP/GSML	02-11-26				1	5	21	1	5	21
		Kitimat River	18-01-25				1	79	6,137	1	79	6,137
		Sooke River PIP	02-15-54				1	5	21	1	5	21
		B.C. Total					3	89	6,179	3	89	6,179
Alaska	ADFG	Deer Mountain	04-37-14	5	197	8,956				5	197	8,956
			04-37-15	4	129	5,983				4	129	5,983
			04-37-17	1	27	714				1	27	714
			04-37-18	1	42	1,759				1	42	1,759
			04-37-19	2	116	7,183				2	116	7,183
	MIC	Tamgas Creek	47-16-50				3	196	13,620	3	196	13,620
			47-16-52				3	181	11,659	3	181	11,659
	SSRA	Nakat Inlet	04-37-13				2	69	2,357	2	69	2,357
		Neets Bay	04-36-59				3	1,656	986,239	3	1,656	986,239
			04-36-60				1	143	20,322	1	143	20,322
			04-36-61				1	133	17,521	1	133	17,521
			04-36-62				3	121	5,376	3	121	5,376
			04-37-03				2	655	219,959	2	655	219,959
			04-37-09				1	468	219,369	1	468	219,369
		Whitman Lake	04-37-11				1	103	10,480	1	103	10,480
		Alaska Total		13	511	24,595	20	3,725	1,506,902	33	4,236	1,531,497
		All Regions		13	511	24,595	23	3,814	1,513,081	36	4,325	1,537,676

[a] CDFO = Canada Department of Fisheries and Oceans. 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] Variance = Variance of the estimated harvest of the release of the noted tag code.

Appendix B24. Estimates of hatchery produced coho salmon contributed to the Juneau marine boat sport fishery from 26 April to 26 September 1993.

				Non-derby 4/26-9/26			Derby[a]			Total		
Region	Agency[b]	Hatchery/ Release Site	Tag Code	Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance
Alaska	DIPC	Gastineau	04-38-31	2	8	23	3	3	0	5	11	23
			04-38-32	2	95	4,902	1	12	133	3	107	5,035
			04-38-33	6	198	7,613				6	198	7,613
			04-38-34	7	300	13,865				7	300	13,865
			04-38-35	7	554	15,531	1	12	140	8	566	15,671
			04-38-44	10	395	17,461				10	395	17,461
		All Regions		34	1,550	59,395	5	27	273	39	1,577	59,668

[a] Derby held on 13-15 August 1993.
[b] 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] Variance = Variance of the estimated harvest of the release of the noted tag code.

Appendix B25. Estimates of hatchery produced coho salmon contributed to the Sitka marine boat sport fishery from 26 April to 26 September 1993.

				Non-derby 4/26-8/01			Non-derby 8/02-9/26			Total		
Region	Agency[a]	Hatchery/ Release Site	Tag Code	Rec[b]	Con[c]	Variance[d]	Rec	Con	Variance	Rec	Con	Variance
British Columbia	CDFO	Snootli Creek	18-02-08				1	164	26,842	1	164	26,842
		B.C. Total					1	164	26,842	1	164	26,842
Alaska	ADFG	Klawock	04-01-011514	1	15	201				1	15	201
	MIC	Tamgas Creek	47-16-50	1	76	5,706	1	153	23,207	2	229	28,913
	NSRA	Hidden Falls	04-07-04				1	137	18,638	1	137	18,638
		Medvejie	04-36-36	2	132	8,738	2	164	14,534	4	296	23,272
			04-36-37				5	334	14,099	5	334	14,099
			04-36-56				6	81	1,234	6	81	1,234
	SJ	Sheldon Jackson	04-37-22				3	118	5,453	3	118	5,453
			04-37-23				3	143	7,424	3	143	7,424
	SSRA	Whitman Lake	04-37-11	1	133	17,487				1	133	17,487
		Alaska Total		5	356	32,132	21	1,130	84,589	26	1,486	116,721
		All Regions		5	356	32,132	22	1,294	111,431	27	1,650	143,563

[a] CDFO = Canada Department of Fisheries and Oceans. ADFG = Alaska Department of Fish and Game. MIC = Metlakatla Island Community. 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] Variance = Variance of the estimated harvest of the release of the noted tag code.

Appendix B26. Estimates of wild and hatchery produced coho salmon contributed to 2,041 coho salmon sampled from the Craig marine boat sport fishery from 10 May to 18 July 1993.

Region	Agency[a]	Hatchery /Release Site	Tag Code	Rec[b]	Con[c]	Variance[d]	Relative Contribution
British Columbia	CDFO	Toboggan Creek CDP	02-09-12	1	1	0	<0.1%
		Zolzap Creek (wild)[e]	18-09-27	1	1	0	<0.1%
		B.C. Total		2	2	0	<0.1%
Alaska	ADFG	Klawock	04-37-52	6	251	10,239	12.3%
			04-37-53	4	173	7,293	8.5%
	SSRA	Earl West Cove	04-31-45	1	11	106	0.5%
	MIC	Tamgas Creek	47-16-50	1	8	61	0.4%
			47-16-53	1	12	143	0.6%
		Alaska Total		13	455	17,842	22.3%
		All Regions		15	457	17,842	22.3%

[a] CDFO = Canada Department of Fisheries and Oceans. ADFG = Alaska Department of Fish and Game. SSRA = Southern Southeast Regional Aquaculture Association. MIC = Metlakatla Island Community.

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

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

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

[e] Wild recovery not expanded for tagging fraction.

Appendix B27. Estimates of the number of wild coded wire tagged coho salmon contributed to sampled marine boat sport fisheries of Southeast Alaska, 1993.

Juneau

				Non-derby 4/26-9/26			Derby[a]			Total		
Region	Agency[b]	Release Site	Tag Code	Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance
Alaska	ADFG	Auke Creek	04-07-10	1	2	2				1	2	2
		Auke Lake	04-07-05	6	14	40				6	14	40
		BC Tatsamenie Lake	04-29-43	2	7	26	3	3	0	5	10	26
		Berners River	04-37-30	1	2	2	1	1	0	2	3	2
			04-37-31	4	12	43				4	12	43
			04-37-32	1	3	9				1	3	9
			04-38-08	1	4	13				1	4	13
		Taku River	04-28-50	1	3	9				1	3	9
			04-28-51	1	4	13	2	2	0	3	6	13
		Alaska Total		18	51	157	6	6	0	24	57	157
		All Regions		18	51	157	6	6	0	24	57	157

Sitka

				Non-derby 4/26-8/01			Non-derby 8/02-9/26			Total		
Region	Agency[b]	Release Site	Tag Code	Rec[c]	Con[d]	Variance[e]	Rec	Con	Variance	Rec	Con	Variance
Alaska	ADFG	Ford Arm Lake	04-36-38	2	18	156	1	15	201	3	33	357
		Alaska Total		2	18	156	1	15	201	3	33	357
		All Regions		2	18	156	1	15	201	3	33	357

[a] Juneau derby held on 13-15 August.
[b] ADFG = Alaska Department of Fish and Game.
[c] Rec = Number of fish recovered of noted tag code.
[d] Con = Estimated harvest (contribution) of the release of the noted tag code.
[e] Variance = Variance of the estimated harvest of the release of the noted tag code.

APPENDIX C - DATA FILES

Appendix C1. Computer data files and analysis programs developed for the 1993 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_3.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Ketchikan, 1993
C0820M_3.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Petersburg, 1993
C0810M_3.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Wrangell, 1993
E0810M_3.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Juneau, 1993
D0810M_3.DTA	Data file (ASCII) containing interview information recorded on mark-sense interview forms (MARINE INTERVIEW VERSION 1.0) recorded at Sitka, 1993
????93.SAS	SAS programs to create basic interview SAS save files from mark-sense data files. '???' stands for each site respectively: KMC for Ketchikan, PMC for Petersburg, WMC for Wrangell, SMC for Sitka, JMC for Juneau
????93ESS.SAS	SAS programs to create revised interview SAS save files from files created by ?MS93.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 '?'.
????93MSM.SAS	SAS programs to create SAS save files with only the sampling information associated with each sample for each survey from files created by ?MC93ESS.SAS. See above for explanation of '?'
????93EST.SAS	SAS programs to estimate effort, catch, and harvest with associated variances using SAS save files created by ?MC93ESS.SAS and ?MC93MSM.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 '?'

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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.
CWT93CHK.SAS	SAS program to compare SPORTCON.DTA & SPORTBAS.DTA for consistency errors.
SEW93VBN.SAS	SAS program to create creel estimate file for combining with tag data.
SEN93CWT.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.
SEN93CUP.SAS	SAS program to update main CWT estimate databases with bootstrap variances.
SEN93C01.SAS	SAS program to summarize contributions across tag codes for main tables.
SEN93CWP.SAS	SAS program to list tags, contributions, and variances for Appendices.
Age-weight-length (AWL) Files	
A0810AD3.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, 1993
C0810AB3.DTA	Data file (ASCII) containing chinook salmon AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Wrangell, 1993
C0820AB3.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, 1993
E0810AB3.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, 1993
E0810AC3.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, 1993

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A0810AA3.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Ketchikan, 1993
B7600AB3.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Craig, 1993
C0810AA3.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Wrangell, 1993
C0820AA3.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Petersburg, 1993
D0810AC3.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Sitka, 1993
E0810AA3.DTA	Data file (ASCII) containing halibut AWL information recorded on mark-sense interview forms (ALTERNATE AGE WEIGHT LENGTH VERSION 1.0) recorded at Juneau, 1993
REF93CHI.SAS	SAS program to reformat chinook salmon AWL data
LF93CHI.SAS	SAS program to summarize chinook salmon AWL data
REF93HAL.SAS	SAS program to reformat halibut AWL data
LF93HAL.SAS	SAS program to summarize halibut AWL data