MIGRATORY TIMING AND ESCAPEMENT OF TAKU RIVER SALMON STOCKS IN 1987

By

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and

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ABSTRACT

Mark-recapture studies of Taku River salmon (*Oncorhynchus*) stocks were continued by the Alaska Department of Fish and Game and the Canadian Department of Fisheries and Oceans in 1987. The objectives of the study were to provide in-season estimates of the inriver abundance of sockeye salmon (*O. nerka*) and postseason estimates of the inriver abundance of pink (*O. gorbuscha*) and coho salmon (*O. kisutch*), document the migratory timing of five salmon species past Canyon Island, and determine the age, sex, and length compositions of fish wheel catches of chinook (*O. tshawytscha*), sockeye, coho, and chum salmon (*O. keta*). A total of 4,307 sockeye salmon were captured in fish wheels located at Canyon Island, of which 3,690 were tagged and 1,142 were subsequently recovered in fisheries or on the spawning grounds. Marked to unmarked ratios of sockeye salmon in the Canadian inriver commercial gill net harvest were used to generate an estimate of 87,130 sockeye salmon passing Canyon Island and a Canadian fishery exploitation rate of 0.156. The use of different capture methods that varied in size-selectivity for marking and recapture gear was shown to have virtually no effect on the estimate of sockeye salmon run size. An estimated total of 740,727 pink salmon migrated above Canyon Island. Tagging was not conducted over the entire coho salmon run, however we estimated that 43,569 fish had passed Canyon Island by 20 September. The mean dates of migration of chinook, sockeye, and pink salmon runs were similar as in 1984-1986. Inriver migration rates of several headwater sockeye salmon stocks increased through the season. The age compositions of sockeye and chum salmon runs passing Canyon Island changed through time during the season, but the age compositions of chinook and coho salmon runs did not.

KEY WORDS: Mark-recapture, escapement estimation, migratory timing, Taku River, transboundary river, salmon, age, length, sex, fish wheel

INTRODUCTION

The Taku River originates in northern British Columbia and flows through Southeast Alaska, emptying into the Pacific Ocean near Juneau, Alaska (Figure 1). All five species of Pacific salmon (*Oncorhynchus* spp.) return to spawn in the drainage and are primarily exploited by Canadian inriver and Alaskan District 111 commercial fisheries (Figure 1). Sockeye salmon (*O. nerka*) are targeted by the Canadian and early to mid-season Alaskan gillnet fleets, with coho salmon (*O. kisutch*) becoming more important to the Alaskan fleet late in the season. Large catches of pink (*O. gorbuscha*) and chum (*O. keta*) salmon are also taken in District 111. Relatively small numbers of fish, primarily chinook (*O. tshawytscha*) and coho salmon, of Taku River origin are harvested by Canadian sport and subsistence and Alaskan sport fisheries.

Research on Taku River salmon has blossomed in this decade as a result of treaty negotiations between the United States and Canada regarding salmon interceptions. Treaty negotiations revealed the lack of basic knowledge of the population dynamics of transboundary river stocks and of the contributions of these stocks to Alaskan and Canadian fisheries. The Pacific Salmon Treaty was drafted and ratified by the two countries in 1985, and mandated that specific proportions of any surplus return of sockeye salmon not needed to satisfy escapement requirements for the Taku River be allocated to each country's fishermen. Research programs designed to provide data necessary to manage fisheries in accordance with treaty directives were initiated on the Taku River in 1983. Mark-recapture studies on the Taku River, jointly operated by the Alaska Department of Fish and Game (ADF&G) and the Canadian Department of Fisheries and Oceans (CDFO), have been conducted annually since 1984 to produce estimates of the Taku River escapements of sockeye and pink salmon (Clark et al. 1986, McGregor and Clark 1987). Together with results generated from stock identification research (McGregor and Walls 1987, McGregor and Jones in press) these studies have for the first time provided basic statistics useful for understanding the population dynamics and harvest management of Taku River sockeye salmon. This report presents results from Taku River mark-recapture studies continued in 1987.

The specific objectives of the program were to:

1) provide in-season estimates of the inriver abundance of Taku River sockeye salmon,

2) estimate the escapement of Taku River pink and coho salmon past Canyon Island,

3) document the migratory timing and inriver migration rates of specific Taku River sockeye salmon stocks, and

4) collect age, sex, and length data of salmon from fish wheel catches.

METHODS

Study Area Description

The Taku River originates in the Stikine Plateau of northwestern British Columbia, and drains an area of approximately 16,000 square kilometers (Figure 1). The Taku is formed by the merging of two principal tributaries, the Inklin and Nakina rivers, approximately 50 km upstream from the international border. The river flows southwest from this point though the Coast Mountain Range and empties into Taku Inlet about 30 km east of Juneau, Alaska. Approximately 95% of the Taku River watershed lies within Canada.

The Taku River is a turbid river, with much of its discharge originating in glacial fields on the eastern slopes of the Coast Range Mountains. This turbidity precludes accurate enumeration of escapement by aerial or foot surveys. Water volume in the summer generally increases in proportion to the amount of sunshine received in the interior (ADF&G 1955). Winter flows are minimal, ranging from approximately 20 - 40 cubic meters per second (cm/s) at the Canadian government's water survey station located on the lower Taku River near the confluence of the Taku and Tulsequah rivers (P. Milligan, CDFO, Whitehorse, Yukon Territory, personal communication). Discharge increases in April and May, reaching a maximum average flow of 740 cm/s in June. Flow usually remains high in July and begins dropping in late August. The efficiency of the fish wheel operation and the effectiveness of Canadian commercial fishery effort are affected by the magnitude of river discharge. Sudden increases in discharge in the lower river result from the release of the glacially impounded waters of Tulsequah Lake (Kerr 1948). These floods usually occur once or twice a year between May and August. Maximum flows during the floods have measured from 787 - 2,489 cm/s. Water levels fluctuate dramatically during the floods and the river carries a tremendous load of debris.

Fish Wheel Operation

Migrating adult salmon were captured with two fish wheels located at Canyon Island. Each fish wheel consists of a pontoon framework supporting an axle, paddle, and basket assembly. Two fish-catching baskets rotate about the axle due to the force of the water current against two paddles. The paddles are attached to paddle uprights set at right angles to the baskets. Crossbracing connects the baskets and paddle uprights. As the fish wheel baskets rotate and scoop up salmon, V-shaped slides attached to the rib structure of each basket direct fish to liveboxes bolted to the outer sides of the pontoons.

Each fish wheel was constructed of milled lumber and was supported by two 7.6 m long plywood pontoons. Six 200 liter (55 gallon) steel barrels, four of which were filled with polyeurethane foam, were strapped beneath each pontoon for flotation. The baskets measured 3.1 m by 3.7 m, and were covered with

nylon seine mesh (5.1 x 5.1 cm openings). Liveboxes were attached on the outside of both pontoons.

The fish wheels were positioned in the vicinity of Canyon Island on opposite river banks, approximately 200 m apart. Fish wheels were secured in position by anchoring them to large trees with 0.95 cm steel cable and were held out from and parallel to the shoreline by log booms.

The fish wheels rotated at 0 - 4 r.p.m., depending on the water velocity and the number of attached paddles. When water levels subsided we attached more paddles and moved the fish wheels farther out from shore into faster water currents to maintain adequate r.p.m. to catch fish.

The fish wheels were operative from 15 June through 20 September, except during high water caused by the release of Tulsequah Lake on 9 July and 27 August.

Tagging Procedures

All uninjured salmon caught in the fish wheels, with the exception of pink salmon and very small individuals (mid-eye to fork of tail length less than 350 mm) of other species, were tagged. Catches of pink salmon were too large to completely tag, so approximately one out of five were subsampled for tagging throughout the season. Salmon were dipnetted from a livebox into a tagging trough partially filled with river water. Spaghetti tags (Floy Tag and Manufacturing Inc., Seattle, WA) were applied to fish as follows: one person held the fish in the tagging trough while another person inserted a 15 cm applicator needle through the dorsal musculature immediately below the dorsal fin. The ends of the spaghetti tag were then knotted together with a single overhand hitch. Fish were handled with bare hands to reduce scale abrasion. During the application of spaghetti tags biological sampling was also conducted. Sex and mid-eye to fork of tail (MEF) length measurements were recorded and scale samples taken from all chinook, sockeye, coho, and chum salmon caught. Sex and length measurements, but no scale samples, were taken from all pink salmon that were tagged. The tagging and sampling procedures took from 20 to 40 seconds per fish to complete. The fish were then immediately and gently immersed back into the river.

Fish wheel catches were sampled in the morning, afternoon, and evening. More frequent checks were made during the peak migration to minimize holding time and overcrowding of fish in the liveboxes.

The spaghetti tags we used were made of hollow PVC tubing (size 13 - approximately 2.0 mm in diameter) and were consecutively numbered. Flourescent orange tags were used to tag all species. Each tag measured approximately 30 cm in length and was labeled with project description information.

Tag Recovery

Tag recoveries were made by Canadian commercial fishermen. The Canadian fishery occurred in Canadian portions of the Taku River within 20 kilometers of the international border, and operated from one to several days per week from late June through mid-September. A cash reward of $2.00 was offered by DFO for each chinook, sockeye, coho, and chum salmon tag returned with information on the date and location of recapture and $1.00 for each tagged pink salmon with corresponding data. Tags were collected on a regular basis by the Fisheries Patrol Officer (DFO) who also monitored and compiled daily catch statistics.

Fishery catches were sampled for sex, post-orbit to hypural (POH) length measurements, and scale data. Paired MEF and POH length measurements were taken from 200 commercially caught sockeye salmon and were used to develop linear regressions for converting measurements from one type to another.

Tag recoveries were also made by DFO personnel at weirs at Little Trapper and Little Tatsamenie lakes, and Hackett and Nakina rivers. Tags were collected at other spawning sites along the mainstem of the Taku River by National Marine Fisheries Service (Auke Bay Laboratory, NMFS), DFO, and ADF&G personnel. Additional tag recoveries were made in the District 111 fishery and Canadian and subsistence and test fishery catches in the Taku River.

Statistical Methods

An estimation of total population (N) and its variance (Var[N]) were calculated using methods described by Chapman and Junge (1956) and Darroch (1961) and summarized by Seber (1982, p.431- 445). The estimate of population size per recovery stratum j is given by:

$$N_j = D_n S^{-1} t$$

where D is the diagonal matrix of sample size (catch) in the recovery strata, S is the matrix of tag recoveries by tagging and recovery strata, and t is the vector of the number of tags put out per tagging stratum.

The total population is then the sum of these N_j. The variance-covariance matrix of the population estimate in each period strata is given by:

$$\text{Var-Cov } [N] = D_u G^{-1} D_m D_t^{-1} G'^{-1} D_u + D_u (D_p - 1)$$

where:

U = the vector of unmarked population (equal to $D_u S^{-1} t$ where u is the vector of unmarked fish in the catch and D_u is the diagonal matrix of this vector)

G = the matrix of probabilities (G_{ij}) that a fish in tagging stratum i moves to recovery stratum j

p = the vector defined by s^{-1} t and D_p is the corresponding diagonal matrix

D_m = the diagonal matrix of m_i's where $m_i = \sum G_{ij}/p_j$ $^{-1}$ and p_j's are the inverse of the elements of vector p, and

1 = a vector of ones.

Inriver sockeye salmon return estimates were generated on an in-season basis in 1987. Within 24 hours after the weekly closure of the Canadian fishery, mark-recapture data was forwarded to the Douglas ADF&G office. Data was quickly analyzed and inriver return estimates were developed. Due to the estimated three to four day travel time for fish between District 111 and Canyon Island (Clark et al. 1986) and since most tags applied at Canyon Island were not recovered until the following week in the Canadian fishery, our estimates of inriver abundance correspond with the movement of Taku River sockeye salmon through District 111 approximately two weeks earlier.

The migration of each species of salmon can be characterized by its migratory timing distribution. Fish wheel catches and CPUE reflect the timing of the different species migrating past Canyon Island. Migratory timing statistics (mean day of passage and its variance) were calculated following the procedures of Mundy (1982):

$$D = \sum_{i=1}^{d} i\, P(i)$$

where i is an index of the day of migration (i = 1 is the first day of migration), d is the last day of the migration, P(i) is the proportion of the total population passing the reference site on day i as determined from daily fish wheel CPUE, and D is the mean index day of migration which corresponds to a calendar date.

The standard error of the migration is defined as:

$$SD\ [D] = \left(\sum_{i=1}^{d} (D - i)^2\, P(i) \right)^{1/2}$$

Migratory timing of individual sockeye salmon stocks past Canyon Island were derived from recoveries of tagged fish on the spawning grounds and were weighted by fish wheel catch-per-unit- effort (CPUE) to permit the escapement of a particular stock to be apportioned to week of passage past Canyon Island. The formula we used for determining the proportion of the run occuring each week for each stock was:

$$\frac{\left(\frac{C_k T_{ks}}{T_k - T_{kc}} \right)}{\sum_{k=25}^{34} \left(\frac{C_k T_{ks}}{T_k - T_{kc}} \right)}$$

where k is statistical week, T_{ks} is the number of spawning ground recoveries of stock s by statistical week of tagging, T_k is the number of fish tagged

at Canyon Island in statistical week k, T_{kc} is the number of fish tagged at Canyon Island in statistical week k and caught in the Canadian fishery, and C_k is the weekly proportion of fish wheel CPUE.

An assumption implicit in this calculation is that the removal of fish by the Canadian inriver fishery does not significantly alter the migratory timing distribution of individual stocks. This assumption is probably violated because the Canadian fishery exploitation rate of the inriver return varied between fishing periods.

Migration rates were calculated by dividing the distance which tagged salmon traveled by the number of days between the date of tagging and the date of recapture.

RESULTS AND DISCUSSION

Fish Wheel Catches

Catches of chinook, sockeye, pink, coho, and chum salmon and Dolly Varden char (*Salvelinus malma*) are summarized in Tables 1-6. Graphs of the fish wheel CPUE for each species are provided in Figure 2.

Total catches of chinook and sockeye salmon in 1987 were 285 and 4,307 fish, respectively. Catches of both species were considerably less than in 1986 but exceeded fish wheel catches of these species in 1984 and 1985 (Table 7). Chinook salmon catches peaked on 24-25 June, when over 30 fish were captured each day. Only the last portion of the chinook salmon run was present in the lower river when the fish wheels began operation on 15 June. Sockeye salmon catches extended from the first day the fish wheels were installed until 14 September. Peak sockeye salmon catches and CPUE occurred during the dates of 20-21 July and 31 July-3 August, when over 140 fish were caught each day. Pink salmon catches totaled 42,786 fish and far exceeded catches of this species in any other year. The highest daily catch of pink salmon was 3,030 fish, and catches and CPUE peaked on 16 and 25 July. Catches on these two days exceeded 75 pink salmon per fish wheel hour. Catches of coho and chum salmon also exceeded those of any other year, totaling 2,240 and 1,533 fish, respectively.

Tagging and Recovery Data

A total of 12,066 salmon was tagged at Canyon Island in 1987 (Table 8). Approximately 41% (4,896) of the tags were applied to pink salmon, followed by 31% (3,690) to sockeye, 16% (1,976) to coho, 11% (1,297) to chum, and less than 2% (207) to chinook salmon. The numbers of fish tagged each day by species are listed in Tables 1-5.

A total of 2,150 tagged fish was recovered (Table 8). Approximately 54% (1,152) of these tags applied were recovered in the Canadian commercial fishery, while 42% (895) of the tags were recovered on the spawning grounds.

Low numbers of recoveries were made in Canadian lower river subsistence and test fishery catches and several tagged fish were recovered downstream in Taku Inlet in U.S. commercial catches. Sockeye salmon represented 53% (1,142) of all tagged fish that were recovered.

Escapement Estimation

We derived escapement estimates for sockeye, pink, and coho salmon runs. No estimates were developed for the chinook or chum salmon escapements.

Sockeye Salmon

Recoveries of tagged sockeye salmon in the Canadian commercial fishery were used to estimate the magnitude of the inriver return of sockeye salmon. Canadian inriver test fishery data was not included because the test fishery began after the majority of sockeye salmon had already passed upriver. A total of 617 tags with corresponding recovery date information were returned from the 13,554 sockeye salmon taken in the Canadian commercial fishery (Table 9). Because estimation procedures are based on large sample theory, tagging and recovery periods were combined at the beginning and end of the season to increase the frequency of tag recoveries in tag-recapture strata. Strata were grouped as follows: statistical weeks 25 and 26 were grouped as the first tagging strata, statistical weeks 32-39 were grouped as the last tagging strata, and statistical weeks 33-39 were grouped as the last recovery strata. The original stratification was thus reduced to 7 tagging and 7 recovery strata. Analysis of this data matrix yielded an estimate of 87,130 sockeye salmon to have passed Canyon Island in 1987. The approximate 95% confidence interval associated with the 1987 inriver abundance estimate was +/- 12,703 fish.

The peak movement of sockeye salmon occurred during 19-25 July (statistical week 30), when an estimated 26,364 fish migrated by Canyon Island. Peak catches in the Canyon Island fish wheels and the Canadian inriver fishery were taken during this same week, while peak catches of Taku River sockeye salmon in District 111 occurred one week earlier (McGregor and Jones, In Press).

The Taku River sockeye salmon run was exploited by the Canadian fishery at an estimated annual rate of 0.156 (Table 9), compared to 0.140 in 1986, 0.121 in 1985, and 0.204 in 1984. After removal of 13,791 sockeye salmon by the Canadian commercial and test fisheries the escapement totaled 73,339 fish.

The escapement of sockeye salmon to streams located downriver from Canyon Island is unknown and is not included in this estimate. In addition, jack sockeye salmon (fish smaller than approximately 350 mm MEF that have spent only 1 year at sea) were not tagged and therefore the population estimate does not include this size class. Jacks were very common in fish wheel catches in 1987, representing 8% of the total catch. The contribution of jacks to fish wheel catches was higher than we have seen in any other year of this project.

Random sampling in either tagging or recovery efforts is a necessary assumption of the population estimation technique we used. One possible source of non-randomness we investigated was selectivity of tagging and recapture gear by fish size. Analysis of the basic tagging data revealed that small (less than or equal to 520 mm MEF) tagged fish had a lower probability of being recaptured in the Canadian fishery (7%) than did large (greater than 520 mm MEF) tagged fish (20%); chi-square = 51, $P<.001$, df = 1. Visual inspection of the length frequency distributions of tagged sockeye salmon at Canyon Island (Figure 3A) and in the Canadian fishery (Figure 3B) reveals these differences. The smaller tagged fish were not as prevalent in the fishery, probably due to their reduced susceptibility to capture in the gillnets. However the mean length of tagged fish in the Canadian fishery (580 mm) was almost identical to the mean length (581 mm) of a large random sample of untagged fish taken in the fishery (2 sample t-test, $t = 0.2903$, $P>.50$, df = 1,707). Therefore it seems likely that the fish wheels are randomly sampling the entire population with respect to size. If they were selectively catching the smaller fish in the population, the mean length of tagged fish in the fishery would be expected to be less than the mean length of all fish taken in the fishery.

Despite this evidence of randomness in the tagging efforts we examined the effects of stratifying tagging and recovery data by fish size on the total population estimate. Due to the low numbers of small fish both in tagging and recovery strata (a total of 57 tags were recovered from small fish), data for this size group was pooled into 2 tagging and 2 recovery strata for analysis. Large fish totals were high enough to retain the same 7 strata as in the original analysis for all fish (Table 10). Results indicated an escapement of large fish of 67,611 and an escapement of small fish of 22,024, for a total escapement of 89,635 sockeye salmon. This total is very close to our original estimate of 87,130 fish. Another way of examining the effect of size-selective recapture gear on the population estimate is to use only tag and recovery data for large fish to develop a population estimate for this size class, and then expand the estimate by the proportion of small fish taken in the fish wheels. The total population estimate in this case would be:

$$67,611 \; / \; (1 - 0.2182) \; = 86,481 \text{ fish}$$

where 0.2182 is the proportion of small fish in fish wheel catches.

The close agreement of the 3 estimates indicates that differences in the availability of different sized fish to tagging and recapture gear did not bias the sockeye salmon escapement estimate and all tag and recapture data can be used regardless of fish size.

Pink Salmon

Recoveries of tagged pink salmon in the Nakina River, the principal pink salmon spawning tributary in the Taku River drainage, were used to estimate the return of pink salmon past Canyon Island. Recoveries were made at the Nakina River carcass weir operated by the Canadian Department of Fisheries and Oceans and during a foot survey of the lower Nakina River spawning areas

on 10-13 August.

Tagging data was stratified into 2 periods because 22% of early season fish wheel catches (through 9 July) were tagged but only 10% of the catches after this date were tagged. Since pink salmon were tagged at Canyon Island through 10 August, the fish tagged late in the season did not have time to reach the spawning sites to spawn and be available to our carcass recovery effort. To generate a population estimate we truncated tagging totals as of 25 July, the last tagging date from which any spawning ground recoveries were made. The resulting tag and recovery totals are listed in Table 11. A total of 30,332 dead pink salmon were examined for tags at the Nakina weir and 87 tags were found, while 18,357 pink salmon carcasses were examined on the lower Nakina River and 142 tagged fish were found. The population estimate of 585,915 fish represents the escapement past Canyon Island through 25 July. The associated 95% confidence limits are +/- 217,074 fish. Fish wheel CPUE data was used to extrapolate the escapement after 25 July and derive a total inriver return past Canyon Island. The cumulative proportion of fish wheel pink salmon CPUE by 25 July was 0.791. The total population estimate was therefore:

585,915 / 0.791 = 740,727 fish.

Coho Salmon

Recoveries of tagged coho salmon in the Canadian commercial and test fisheries were used to estimate the inriver return of coho salmon. A total of 286 tagged coho salmon were recovered from the fisheries (Table 12).

The analysis of coho salmon mark-recapture data is complicated by several factors: 1) tagging was not performed over the entire coho salmon run and, 2) relatively large numbers of tagged coho (19) were recovered in Yehring Creek, located approximately 3 km downstream from Canyon Island. Tagging was terminated at Canyon Island on 20 September. Canadian inriver gillnet test fishery catches remained high through early October indicating that the latter portion of the run was not tagged. Our estimate of escapement based on tag and recapture data therefore does not cover the entire run. It is not known whether the movement of coho salmon downstream from the Canyon Island tagging site is a natural behavior for this species or if it was a stress-induced behavior caused by tagging. If the behavior is natural and we catch these fish in the fish wheels at the same rate as coho going to headwater systems, the escapement estimate will not be biased by the behavior. If the tagging, however, is causing fish to drop back downstream to spawn, the effect would be to inflate our escapement estimate since untagged fish would not be similarly affected and would continue to migrate upstream through the fishery. For these two reasons it is best to consider the coho salmon escapement estimate we derived as only an index of escapement, but it is important to document because it represents the first efforts made to estimate the relative magnitude of the Taku River coho salmon escapement.

Early and late season coho salmon tag and recovery data were pooled into appropriate strata, as was the case for sockeye salmon. A total of 8 tag and recovery strata were used (Table 12). The last tagged fish recovered in the test fishery was taken on 25 September; therefore only test fishery catches through this date were included in the final catch totals used in the

analysis. The number of coho salmon passing Canyon Island by 20 September, the last day of tagging, was estimated to be 43,569 fish. The 95% confidence limits were +/- 5,584 fish. A total of 6,406 coho salmon were harvested in the Canadian commercial and test fisheries, thereby reducing the escapement to 37,163 fish.

Migratory Timing

Migratory timing statistics, based on daily fish wheel CPUE values, of the five salmon species past Canyon Island in 1987 are listed in Table 13. The run timing of chinook, sockeye, and pink salmon has been remarkably consistent during the years 1984-1987 (Table 13). Chinook salmon are the first species to migrate upriver, and the mean date of migration has varied from 26-28 June during these four years. The chinook salmon migration begins in late April and since the fish wheels have not been installed until mid-June, the estimated mean dates of migration for this species are biased late and the associated standard errors are biased low. The mean date of migration for pink salmon was 19 July, approximately one week earlier than in 1986 but exactly the same as in 1984 and 1985. The mean date of the sockeye salmon migration was 24 July, within one day of the mean dates of the 1984 and 1985 runs but approximately one week later than in 1986. Coho and chum salmon were the latest migrating of the salmon species, with mean dates of migration of 23 August and 9 September, respectively. Both the mean dates and associated standard errors of the migration of these two species are biased since the fish wheels were shut down prior to the end of the migration of each species. Large interannual variation in the estimated mean dates of migrations of these species are due primarily to differences in the annual duration of fish wheel operation.

Sockeye Salmon Stock Timing

We determined the timing of individual stocks of sockeye salmon past Canyon Island in 1987 using recoveries of tagged fish from spawning grounds and weirs (Table 14; Figure 4). The primary recovery locations were weirs at Little Trapper Lake (330 tags), Little Tatsamenie Lake (93 tags), and Hackett River (32 tags). A total of 25 tags were recovered from spawning sites along the mainstem of the Taku River. Tags were also recovered from the Nakina River, Kuthai Lake, and the Nahlin River. Tag recoveries at these locations were small in number, but were notable because of their distinctive early timing. Tags recovered at Kuthai Lake and the Nakina River were applied to sockeye salmon at Canyon Island between statistical weeks 25 and 29, while tags recovered at the Nahlin River were applied in statistical weeks 25 and 26.

The peak of the Little Trapper Lake sockeye salmon migration by Canyon Island was during 19-25 July (statistical week 30). Tag recoveries from this stock covered an eight-week time period, as in 1985 and 1986, from mid-June through early August.

The peak of the Little Tatsamenie Lake return occurred during 26 July-1

August (statistical week 31). Tag returns covered only a five-week period in 1987, compared to eight weeks during the previous two years, probably as a result of the extremely poor run to this system in 1987.

The peak of the Hackett River run also occurred from 26 July-1 August. As in previous years the distribution of recoveries indicates a variable and extended duration of run timing.

Fewer tag recoveries were made in mainstem areas of the Taku River drainage since sockeye salmon weirs were not operated at these locations. Our stock timing information is therefore not as complete or accurate for this stock group as for the systems having larger numbers of tag recoveries. The migration of this composite stock group past Canyon Island peaked from 2-8 August (statistical week 32), and extended through the end of the season.

Inriver Sockeye Salmon Migration Rates

Inriver rates of migration of several headwater stocks, determined from the recovery of tagged fish at weirs, increased through the season (Figure 5). The time it took tagged fish to travel from Canyon Island to Little Trapper Lake decreased consistently during the season; fish tagged in statistical week 26 averaged 50 days in transit, while fish tagged in week 32 averaged 24 days to travel this distance. Travel time of tagged Little Tatsamenie Lake fish declined from 42 days for fish tagged in statistical week 29 to 30 days for fish tagged in week 33. Although fewer tag recoveries were made at the Hackett River weir the same basic trend was apparent. Similar trends in the migration rates of headwater stocks were documented in 1984-1986 (Clark et al. 1986; McGregor and Clark 1987).

Age, Sex, and Length Composition

The age, sex, and length compositions of fish wheel catches of chinook, sockeye, coho, and chum salmon are summarized in Tables 15-22. The age compositions of chinook and coho salmon did not change through the season so we pooled the data and presented a season-long summary for each. Because the age compositions of sockeye and chum salmon varied through the season, samples of these species were grouped by time period.

All chinook salmon sampled had spent one winter in freshwater after emergence (Table 15). The 1.1 age class (jacks) was most common (59%), followed by age-1.2 (21%), age-1.3 (13%), and age-1.4 (7%). Males comprised the majority of the catch (86%). Mean lengths of chinook salmon increased with increasing ocean age (Table 16).

Fish wheel catches of sockeye salmon were comprised primarily of age-1.3 fish (54%), followed by age-1.2 (17%), age-0.3 (13%), age-1.1 (5%), age-2.3 (5%), and other age groups (6%; Table 17). Sockeye salmon that did not spend a winter in freshwater after emergence (zero checks) represented 15% of the samples, while fish that spent two winters following emergence in freshwater comprised 9%. All other fish spent one winter after emergence in freshwater

prior to migrating to sea. Jacks (sockeye salmon that spent only one winter at sea) comprised 8% of the fish wheel catch, far higher than in any other year of this project. The age compositions of fish wheel catches of sockeye salmon changed during the season. Age-1.3 fish dominated the catch throughout the season, but decreased from 82% of the 15-20 June catch to 39% of the 16 August-14 September catch. Age-1.2 fish peaked in the catches during the 5-11 July (38%). The contribution of zero check sockeye salmon increased from approximately 1% of the 15-20 June catch to over 22% of the 2-8 August catch. Males comprised almost 58% of fish wheel catches of sockeye salmon. Mean lengths by sex and age class are summarized in Table 18.

Fish wheel catches of coho salmon were comprised primarily of age-2.1 (65%) and age-1.1 (32%) fish (Table 19). Age-3.1 fish represented 2% of the catch, while age-0. coho salmon comprised 1% of the catch. No change in the age composition of coho salmon catches was noted throughout the season. Approximately 61% of the coho salmon caught were males. Mean length statistics by sex and age class are summarized in Table 20.

Fish wheel catches of chum salmon were comprised mostly of age- 0.4 (49%) and age-0.3 (48%) fish (Table 21). Age-0.4 fish predominated in catches from 5 July - 12 September (57%), while age-0.3 chum salmon were most common (60%) in catches from 13- 20 September. Mean length statistics by sex and age class are summarized in Table 22.

LITERATURE CITED

ADF&G (Alaska Department of Fish and Game). 1955. Annual Report for 1955. Report No. 7. Juneau, AK.

Chapman, D.G. and C.O. Junge. 1956. The estimation of the size of a stratified animal population. Annals of Mathematical Statistics 27:375-389.

Clark, J.E., A.J. McGregor, and F.E. Bergander. 1986. Migratory timing and escapement of Taku River salmon stocks, 1984-1985. Final Report-1985 Salmon Research Conducted in Southeast Alaska by the Alaska Department of Fish and Game in Conjunction with the National Marine Fisheries Service Auke Bay Laboratory for Joint U.S.-Canada Interception Studies. Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.

Darroch, J.N. 1961. The two-sample capture-recapture census when tagging and sampling are stratified. Biometrika 48:241-260.

Kerr, F.A. 1948. Taku River Map Area, British Columbia. Canadian Department of Mines and Resources, Geological Survey Memoir 248. Ottawa, Canada.

McGregor, A.J. and J.E. Clark. 1987. Migratory timing and escapement of Taku River Salmon stocks in 1986. Final Report - 1986 Salmon Research Conducted in Southeast Alaska by the Alaska Department of Fish and Game in Conjunction with the National Marine Fisheries Service Auke Bay Laboratory for Joint U.S.-Canada Interception Studies. Alaska Department of FIsh and Game, Division of Commercial Fisheries, Juneau.

McGregor, A.J. and E.L. Jones. *In Press.* Separation of principal Taku River and Port Snettisham sockeye salmon stocks in Southeast Alaska and Canadian Fisheries of 1987 based on scale patterns analysis. Alaska Department of FIsh and Game, Division of Commercial Fisheries, Technical Fishery Report, Juneau.

McGregor, A.J. and S.L. Walls. 1987. Separation of principal Taku River and Port Snettisham sockeye salmon (*Oncorhynchus nerka*) stocks in Southeastern Alaska and Canadian Fisheries of 1986 based on scale patterns analysis. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report, Report 213. Juneau.

Mundy, P.R. 1982. Computation of migratory timing statistics for adult chinook salmon in the Yukon River, Alaska, and their relevance to fisheries management. North American Journal of Fisheries Management 2:359-370.

Seber, G.A.F. 1982. The estimation of animal abundance and related parameters. Charles Griffin and Co., Ltd. London, England.

Table 1. Catches, numbers tagged, and CPUE (catch per fish wheel hour) of chinook salmon in fish wheels at Canyon Island, 1987.

	Daily Chinook Catch	Cumul. Chinook Catch	Daily Chinook Tagged	Cumul. Chinook Tagged	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
15-Jun	0	0	0	0	0.000	0.000	0.000
16-Jun	7	7	4	4	0.304	0.041	0.041
17-Jun	3	10	2	6	0.128	0.017	0.058
18-Jun	8	18	7	13	0.286	0.038	0.097
19-Jun	11	29	10	23	0.233	0.031	0.128
20-Jun	8	37	8	31	0.172	0.023	0.151
21-Jun	15	52	12	43	0.326	0.044	0.195
22-Jun	8	60	8	51	0.219	0.029	0.224
23-Jun	15	75	11	62	0.462	0.062	0.286
24-Jun	34	109	26	88	1.000	0.134	0.421
25-Jun	39	148	24	112	0.876	0.118	0.539
26-Jun	28	176	21	133	0.615	0.083	0.621
27-Jun	10	186	5	138	0.299	0.040	0.662
28-Jun	20	206	13	151	0.449	0.060	0.722
29-Jun	20	226	13	164	0.471	0.063	0.785
30-Jun	6	232	6	170	0.160	0.022	0.807
01-Jul	3	235	2	172	0.105	0.014	0.821
02-Jul	3	238	3	175	0.081	0.011	0.832
03-Jul	4	242	2	177	0.091	0.012	0.844
04-Jul	6	248	4	181	0.208	0.028	0.872
05-Jul	4	252	2	183	0.101	0.014	0.886
06-Jul	6	258	5	188	0.146	0.020	0.905
07-Jul	2	260	1	189	0.049	0.007	0.912
08-Jul	5	265	4	193	0.135	0.018	0.930
09-Jul	0	265	0	193	0.000	0.000	0.930
10-Jul	2	267	1	194	0.048	0.006	0.936
11-Jul	1	268	1	195	0.023	0.003	0.940
12-Jul	0	268	0	195	0.000	0.000	0.940
13-Jul	0	268	0	195	0.000	0.000	0.940
14-Jul	2	270	2	197	0.045	0.006	0.946
15-Jul	4	274	4	201	0.095	0.013	0.958
16-Jul	0	274	0	201	0.000	0.000	0.958
17-Jul	2	276	1	202	0.047	0.006	0.965
18-Jul	3	279	2	204	0.072	0.010	0.975
19-Jul	0	279	0	204	0.000	0.000	0.975
20-Jul	2	281	2	206	0.048	0.006	0.981
21-Jul	1	282	1	207	0.024	0.003	0.984
22-Jul	1	283	0	207	0.044	0.006	0.990
23-Jul	0	283	0	207	0.000	0.000	0.990
24-Jul	0	283	0	207	0.000	0.000	0.990
25-Jul	0	283	0	207	0.000	0.000	0.990
26-Jul	0	283	0	207	0.000	0.000	0.990
27-Jul	1	284	0	207	0.049	0.007	0.997
28-Jul	0	284	0	207	0.000	0.000	0.997
29-Jul	0	284	0	207	0.000	0.000	0.997
30-Jul	0	284	0	207	0.000	0.000	0.997
31-Jul	0	284	0	207	0.000	0.000	0.997

-continued-

Table 1. continued

	Daily Chinook Catch	Cumul. Chinook Catch	Daily Chinook Tagged	Cumul. Chinook Tagged	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
01-Aug	0	284	0	207	0.000	0.000	0.997
02-Aug	0	284	0	207	0.000	0.000	0.997
03-Aug	1	285	0	207	0.025	0.003	1.000
04-Aug	0	285	0	207	0.000	0.000	1.000
05-Aug	0	285	0	207	0.000	0.000	1.000
06-Aug	0	285	0	207	0.000	0.000	1.000
07-Aug	0	285	0	207	0.000	0.000	1.000
08-Aug	0	285	0	207	0.000	0.000	1.000
09-Aug	0	285	0	207	0.000	0.000	1.000
10-Aug	0	285	0	207	0.000	0.000	1.000
11-Aug	0	285	0	207	0.000	0.000	1.000
12-Aug	0	285	0	207	0.000	0.000	1.000
13-Aug	0	285	0	207	0.000	0.000	1.000
14-Aug	0	285	0	207	0.000	0.000	1.000
15-Aug	0	285	0	207	0.000	0.000	1.000
16-Aug	0	285	0	207	0.000	0.000	1.000
17-Aug	0	285	0	207	0.000	0.000	1.000
18-Aug	0	285	0	207	0.000	0.000	1.000
19-Aug	0	285	0	207	0.000	0.000	1.000
20-Aug	0	285	0	207	0.000	0.000	1.000
21-Aug	0	285	0	207	0.000	0.000	1.000
22-Aug	0	285	0	207	0.000	0.000	1.000
23-Aug	0	285	0	207	0.000	0.000	1.000
24-Aug	0	285	0	207	0.000	0.000	1.000
25-Aug	0	285	0	207	0.000	0.000	1.000
26-Aug	0	285	0	207	0.000	0.000	1.000
27-Aug	0	285	0	207	0.000	0.000	1.000
28-Aug	0	285	0	207	0.000	0.000	1.000
29-Aug	0	285	0	207	0.000	0.000	1.000
30-Aug	0	285	0	207	0.000	0.000	1.000
31-Aug	0	285	0	207	0.000	0.000	1.000
01-Sep	0	285	0	207	0.000	0.000	1.000
02-Sep	0	285	0	207	0.000	0.000	1.000
03-Sep	0	285	0	207	0.000	0.000	1.000
04-Sep	0	285	0	207	0.000	0.000	1.000
05-Sep	0	285	0	207	0.000	0.000	1.000
06-Sep	0	285	0	207	0.000	0.000	1.000
07-Sep	0	285	0	207	0.000	0.000	1.000
08-Sep	0	285	0	207	0.000	0.000	1.000
09-Sep	0	285	0	207	0.000	0.000	1.000
10-Sep	0	285	0	207	0.000	0.000	1.000
11-Sep	0	285	0	207	0.000	0.000	1.000
12-Sep	0	285	0	207	0.000	0.000	1.000
13-Sep	0	285	0	207	0.000	0.000	1.000
14-Sep	0	285	0	207	0.000	0.000	1.000
15-Sep	0	285	0	207	0.000	0.000	1.000
16-Sep	0	285	0	207	0.000	0.000	1.000
17-Sep	0	285	0	207	0.000	0.000	1.000
18-Sep	0	285	0	207	0.000	0.000	1.000
19-Sep	0	285	0	207	0.000	0.000	1.000
20-Sep	0	285	0	207	0.000	0.000	1.000

Table 2. Catches, numbers tagged, and CPUE (catch per fish wheel hour) of sockeye salmon in fish wheels at Canyon Island, 1987.

	Daily Sockeye Catch	Cumul. Sockeye Catch	Daily Sockeye Tagged	Cumul. Sockeye Tagged	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
15-Jun	2	2	0	0	0.250	0.002	0.002
16-Jun	8	10	7	7	0.348	0.003	0.005
17-Jun	6	16	5	12	0.255	0.002	0.007
18-Jun	3	19	2	14	0.107	0.001	0.008
19-Jun	30	49	27	41	0.636	0.006	0.014
20-Jun	33	82	31	72	0.710	0.006	0.020
21-Jun	43	125	41	113	0.935	0.008	0.028
22-Jun	11	136	8	121	0.301	0.003	0.031
23-Jun	23	159	21	142	0.708	0.006	0.037
24-Jun	74	233	73	215	2.176	0.019	0.056
25-Jun	61	294	56	271	1.371	0.012	0.068
26-Jun	26	320	24	295	0.571	0.005	0.073
27-Jun	38	358	33	328	1.134	0.010	0.083
28-Jun	56	414	48	376	1.258	0.011	0.094
29-Jun	105	519	96	472	2.471	0.021	0.115
30-Jun	24	543	19	491	0.640	0.006	0.121
01-Jul	9	552	8	499	0.316	0.003	0.123
02-Jul	8	560	6	505	0.216	0.002	0.125
03-Jul	14	574	14	519	0.317	0.003	0.128
04-Jul	38	612	33	552	1.315	0.011	0.139
05-Jul	87	699	78	630	2.197	0.019	0.159
06-Jul	72	771	67	697	1.748	0.015	0.174
07-Jul	75	846	68	765	1.829	0.016	0.190
08-Jul	26	872	25	790	0.703	0.006	0.196
09-Jul	0	872	0	790	0.000	0.000	0.196
10-Jul	57	929	53	843	1.367	0.012	0.208
11-Jul	24	953	21	864	0.561	0.005	0.213
12-Jul	29	982	24	888	0.673	0.006	0.218
13-Jul	30	1012	29	917	0.682	0.006	0.224
14-Jul	66	1078	65	982	1.500	0.013	0.237
15-Jul	62	1140	56	1038	1.476	0.013	0.250
16-Jul	28	1168	26	1064	0.735	0.006	0.257
17-Jul	41	1209	39	1103	0.969	0.008	0.265
18-Jul	106	1315	100	1203	2.542	0.022	0.287
19-Jul	105	1420	94	1297	2.500	0.022	0.309
20-Jul	164	1584	160	1457	3.905	0.034	0.343
21-Jul	219	1803	198	1655	5.277	0.046	0.389
22-Jul	100	1903	84	1739	4.444	0.039	0.427
23-Jul	138	2041	121	1860	3.407	0.030	0.457
24-Jul	112	2153	96	1956	2.909	0.025	0.482
25-Jul	83	2236	79	2035	2.112	0.018	0.501
26-Jul	117	2353	107	2142	2.882	0.025	0.526
27-Jul	97	2450	90	2232	4.732	0.041	0.567
28-Jul	26	2476	22	2254	2.500	0.022	0.589
29-Jul	62	2538	58	2312	2.818	0.025	0.613
30-Jul	27	2565	25	2337	1.211	0.011	0.624
31-Jul	159	2724	142	2479	5.230	0.045	0.669

-continued-

Table 2. continued

	Daily Sockeye Catch	Cumul. Sockeye Catch	Daily Sockeye Tagged	Cumul. Sockeye Tagged	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
01-Aug	163	2887	136	2615	4.050	0.035	0.704
02-Aug	144	3031	111	2726	3.871	0.034	0.738
03-Aug	150	3181	123	2849	3.699	0.032	0.770
04-Aug	138	3319	114	2963	3.366	0.029	0.799
05-Aug	137	3456	104	3067	3.186	0.028	0.827
06-Aug	97	3553	80	3147	2.240	0.019	0.847
07-Aug	87	3640	66	3213	2.047	0.018	0.864
08-Aug	68	3708	49	3262	1.547	0.013	0.878
09-Aug	66	3774	54	3316	1.500	0.013	0.891
10-Aug	74	3848	62	3378	1.663	0.014	0.905
11-Aug	89	3937	64	3442	1.978	0.017	0.922
12-Aug	49	3986	34	3476	1.089	0.009	0.932
13-Aug	30	4016	17	3493	0.664	0.006	0.938
14-Aug	18	4034	12	3505	0.390	0.003	0.941
15-Aug	35	4069	24	3529	0.783	0.007	0.948
16-Aug	32	4101	24	3553	0.721	0.006	0.954
17-Aug	23	4124	18	3571	0.495	0.004	0.958
18-Aug	19	4143	13	3584	0.406	0.004	0.962
19-Aug	18	4161	11	3595	0.390	0.003	0.965
20-Aug	10	4171	6	3601	0.225	0.002	0.967
21-Aug	5	4176	2	3603	0.106	0.001	0.968
22-Aug	14	4190	11	3614	0.299	0.003	0.971
23-Aug	11	4201	8	3622	0.310	0.003	0.974
24-Aug	7	4208	4	3626	0.221	0.002	0.975
25-Aug	23	4231	18	3644	0.754	0.007	0.982
26-Aug	2	4233	2	3646	0.235	0.002	0.984
27-Aug	0	4233	0	3646	0.000	0.000	0.984
28-Aug	2	4235	1	3647	0.078	0.001	0.985
29-Aug	2	4237	2	3649	0.056	0.000	0.985
30-Aug	6	4243	2	3651	0.140	0.001	0.986
31-Aug	12	4255	5	3656	0.271	0.002	0.989
01-Sep	12	4267	6	3662	0.267	0.002	0.991
02-Sep	5	4272	2	3664	0.114	0.001	0.992
03-Sep	1	4273	1	3665	0.026	0.000	0.992
04-Sep	5	4278	2	3667	0.110	0.001	0.993
05-Sep	2	4280	2	3669	0.058	0.001	0.994
06-Sep	7	4287	5	3674	0.175	0.002	0.995
07-Sep	1	4288	0	3674	0.023	0.000	0.996
08-Sep	6	4294	4	3678	0.185	0.002	0.997
09-Sep	4	4298	4	3682	0.090	0.001	0.998
10-Sep	1	4299	1	3683	0.045	0.000	0.998
11-Sep	0	4299	0	3683	0.000	0.000	0.998
12-Sep	0	4299	0	3683	0.000	0.000	0.998
13-Sep	6	4305	5	3688	0.145	0.001	1.000
14-Sep	2	4307	2	3690	0.049	0.000	1.000
15-Sep	0	4307	0	3690	0.000	0.000	1.000
16-Sep	0	4307	0	3690	0.000	0.000	1.000
17-Sep	0	4307	0	3690	0.000	0.000	1.000
18-Sep	0	4307	0	3690	0.000	0.000	1.000
19-Sep	0	4307	0	3690	0.000	0.000	1.000
20-Sep	0	4307	0	3690	0.000	0.000	1.000

Table 3. Catches, numbers tagged, and CPUE (catch per fish wheel hour) of pink salmon in fish wheels at Canyon Island, 1987.

	Daily Pink Catch	Cumul. Pink Catch	Daily Pink Tagged	Cumul. Pink Tagged	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
15-Jun	0	0	0	0	0.000	0.000	0.000
16-Jun	1	1	1	1	0.043	0.000	0.000
17-Jun	0	1	0	1	0.000	0.000	0.000
18-Jun	0	1	0	1	0.000	0.000	0.000
19-Jun	4	5	4	5	0.085	0.000	0.000
20-Jun	2	7	2	7	0.043	0.000	0.000
21-Jun	0	7	0	7	0.000	0.000	0.000
22-Jun	0	7	0	7	0.000	0.000	0.000
23-Jun	0	7	0	7	0.000	0.000	0.000
24-Jun	7	14	3	10	0.206	0.000	0.000
25-Jun	91	105	12	22	2.045	0.002	0.002
26-Jun	144	249	26	48	3.165	0.003	0.005
27-Jun	227	476	28	76	6.776	0.006	0.012
28-Jun	283	759	40	116	6.360	0.006	0.018
29-Jun	144	903	84	200	3.388	0.003	0.021
30-Jun	14	917	6	206	0.373	0.000	0.021
01-Jul	0	917	0	206	0.000	0.000	0.021
02-Jul	8	925	8	214	0.216	0.000	0.021
03-Jul	68	993	39	253	1.542	0.001	0.023
04-Jul	250	1243	40	293	8.651	0.008	0.031
05-Jul	1381	2624	311	604	34.874	0.033	0.064
06-Jul	692	3316	190	794	16.796	0.016	0.079
07-Jul	2010	5326	314	1108	49.024	0.046	0.125
08-Jul	255	5581	124	1232	6.892	0.006	0.132
09-Jul	2	5583	0	1232	0.444	0.000	0.132
10-Jul	1571	7154	196	1428	37.674	0.035	0.167
11-Jul	1474	8628	161	1589	34.439	0.032	0.200
12-Jul	2760	11388	232	1821	64.037	0.060	0.260
13-Jul	1755	13143	200	2021	39.886	0.037	0.297
14-Jul	1236	14379	125	2146	28.091	0.026	0.323
15-Jul	2549	16928	269	2415	60.690	0.057	0.380
16-Jul	2896	19824	283	2698	76.010	0.071	0.452
17-Jul	2036	21860	246	2944	48.132	0.045	0.497
18-Jul	2148	24008	200	3144	51.511	0.048	0.545
19-Jul	1751	25759	178	3322	41.690	0.039	0.584
20-Jul	727	26486	73	3395	17.310	0.016	0.600
21-Jul	592	27078	49	3444	14.265	0.013	0.614
22-Jul	402	27480	52	3496	17.867	0.017	0.631
23-Jul	1137	28617	118	3614	28.074	0.026	0.657
24-Jul	2526	31143	227	3841	65.610	0.062	0.718
25-Jul	3030	34173	254	4095	77.099	0.072	0.791
26-Jul	1547	35720	157	4252	38.103	0.036	0.826
27-Jul	210	35930	23	4275	10.244	0.010	0.836
28-Jul	6	35936	0	4275	0.577	0.001	0.836
29-Jul	10	35946	0	4275	0.455	0.000	0.837
30-Jul	32	35978	10	4285	1.435	0.001	0.838
31-Jul	270	36248	10	4295	8.882	0.008	0.847

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Table 3. continued

	Daily Pink Catch	Cumul. Pink Catch	Daily Pink Tagged	Cumul. Pink Tagged	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
01-Aug	1453	37701	131	4426	36.099	0.034	0.880
02-Aug	1938	39639	185	4611	52.097	0.049	0.929
03-Aug	1329	40968	119	4730	32.774	0.031	0.960
04-Aug	639	41607	65	4795	15.585	0.015	0.975
05-Aug	333	41940	22	4817	7.744	0.007	0.982
06-Aug	164	42104	17	4834	3.788	0.004	0.985
07-Aug	132	42236	17	4851	3.106	0.003	0.988
08-Aug	130	42366	15	4866	2.958	0.003	0.991
09-Aug	90	42456	15	4881	2.045	0.002	0.993
10-Aug	76	42532	15	4896	1.708	0.002	0.995
11-Aug	92	42624	0	4896	2.044	0.002	0.997
12-Aug	50	42674	0	4896	1.111	0.001	0.998
13-Aug	31	42705	0	4896	0.686	0.001	0.998
14-Aug	19	42724	0	4896	0.411	0.000	0.999
15-Aug	10	42734	0	4896	0.224	0.000	0.999
16-Aug	10	42744	0	4896	0.225	0.000	0.999
17-Aug	7	42751	0	4896	0.151	0.000	0.999
18-Aug	2	42753	0	4896	0.043	0.000	0.999
19-Aug	6	42759	0	4896	0.130	0.000	0.999
20-Aug	2	42761	0	4896	0.045	0.000	0.999
21-Aug	4	42765	0	4896	0.085	0.000	0.999
22-Aug	1	42766	0	4896	0.021	0.000	0.999
23-Aug	2	42768	0	4896	0.056	0.000	1.000
24-Aug	3	42771	0	4896	0.095	0.000	1.000
25-Aug	2	42773	0	4896	0.066	0.000	1.000
26-Aug	0	42773	0	4896	0.000	0.000	1.000
27-Aug	0	42773	0	4896	0.000	0.000	1.000
28-Aug	1	42774	0	4896	0.039	0.000	1.000
29-Aug	0	42774	0	4896	0.000	0.000	1.000
30-Aug	1	42775	0	4896	0.023	0.000	1.000
31-Aug	2	42777	0	4896	0.045	0.000	1.000
01-Sep	2	42779	0	4896	0.044	0.000	1.000
02-Sep	1	42780	0	4896	0.023	0.000	1.000
03-Sep	0	42780	0	4896	0.000	0.000	1.000
04-Sep	0	42780	0	4896	0.000	0.000	1.000
05-Sep	1	42781	0	4896	0.029	0.000	1.000
06-Sep	4	42785	0	4896	0.100	0.000	1.000
07-Sep	0	42785	0	4896	0.000	0.000	1.000
08-Sep	0	42785	0	4896	0.000	0.000	1.000
09-Sep	1	42786	0	4896	0.023	0.000	1.000
10-Sep	0	42786	0	4896	0.000	0.000	1.000
11-Sep	0	42786	0	4896	0.000	0.000	1.000
12-Sep	0	42786	0	4896	0.000	0.000	1.000
13-Sep	0	42786	0	4896	0.000	0.000	1.000
14-Sep	0	42786	0	4896	0.000	0.000	1.000
15-Sep	0	42786	0	4896	0.000	0.000	1.000
16-Sep	0	42786	0	4896	0.000	0.000	1.000
17-Sep	0	42786	0	4896	0.000	0.000	1.000
18-Sep	0	42786	0	4896	0.000	0.000	1.000
19-Sep	0	42786	0	4896	0.000	0.000	1.000
20-Sep	0	42786	0	4896	0.000	0.000	1.000

Table 4. Catches, numbers tagged, and CPUE (catch per fish wheel hour) of coho salmon in fish wheels at Canyon Island, 1987.

	Daily Coho Catch	Cumul. Coho Catch	Daily Coho Tagged	Cumul. Coho Tagged	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
15-Jun	0	0	0	0	0.000	0.000	0.000
16-Jun	0	0	0	0	0.000	0.000	0.000
17-Jun	0	0	0	0	0.000	0.000	0.000
18-Jun	0	0	0	0	0.000	0.000	0.000
19-Jun	0	0	0	0	0.000	0.000	0.000
20-Jun	0	0	0	0	0.000	0.000	0.000
21-Jun	0	0	0	0	0.000	0.000	0.000
22-Jun	0	0	0	0	0.000	0.000	0.000
23-Jun	0	0	0	0	0.000	0.000	0.000
24-Jun	0	0	0	0	0.000	0.000	0.000
25-Jun	0	0	0	0	0.000	0.000	0.000
26-Jun	0	0	0	0	0.000	0.000	0.000
27-Jun	0	0	0	0	0.000	0.000	0.000
28-Jun	0	0	0	0	0.000	0.000	0.000
29-Jun	0	0	0	0	0.000	0.000	0.000
30-Jun	0	0	0	0	0.000	0.000	0.000
01-Jul	0	0	0	0	0.000	0.000	0.000
02-Jul	0	0	0	0	0.000	0.000	0.000
03-Jul	2	2	0	0	0.045	0.001	0.001
04-Jul	0	2	0	0	0.000	0.000	0.001
05-Jul	0	2	0	0	0.000	0.000	0.001
06-Jul	2	4	2	2	0.049	0.001	0.002
07-Jul	4	8	3	5	0.098	0.002	0.003
08-Jul	1	9	1	6	0.027	0.000	0.004
09-Jul	0	9	0	6	0.000	0.000	0.004
10-Jul	2	11	2	8	0.048	0.001	0.004
11-Jul	3	14	3	11	0.070	0.001	0.006
12-Jul	4	18	4	15	0.093	0.002	0.007
13-Jul	5	23	5	20	0.114	0.002	0.009
14-Jul	9	32	8	28	0.205	0.003	0.012
15-Jul	4	36	4	32	0.095	0.002	0.014
16-Jul	5	41	5	37	0.131	0.002	0.016
17-Jul	3	44	3	40	0.071	0.001	0.017
18-Jul	11	55	10	50	0.264	0.004	0.022
19-Jul	17	72	16	66	0.405	0.007	0.028
20-Jul	11	83	11	77	0.262	0.004	0.033
21-Jul	20	103	16	93	0.482	0.008	0.041
22-Jul	13	116	10	103	0.578	0.010	0.050
23-Jul	43	159	39	142	1.062	0.018	0.068
24-Jul	39	198	34	176	1.013	0.017	0.085
25-Jul	23	221	21	197	0.585	0.010	0.095
26-Jul	26	247	20	217	0.640	0.011	0.105
27-Jul	5	252	4	221	0.244	0.004	0.109
28-Jul	3	255	3	224	0.288	0.005	0.114
29-Jul	4	259	2	226	0.182	0.003	0.117
30-Jul	0	259	0	226	0.000	0.000	0.117
31-Jul	33	292	29	255	1.086	0.018	0.135

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Table 4. continued

	Daily Coho Catch	Cumul. Coho Catch	Daily Coho Tagged	Cumul. Coho Tagged	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
01-Aug	52	344	49	304	1.292	0.021	0.157
02-Aug	44	388	15	319	1.183	0.020	0.176
03-Aug	47	435	42	361	1.159	0.019	0.195
04-Aug	47	482	42	403	1.146	0.019	0.215
05-Aug	49	531	43	446	1.140	0.019	0.233
06-Aug	30	561	26	472	0.693	0.012	0.245
07-Aug	37	598	32	504	0.871	0.014	0.259
08-Aug	51	649	44	548	1.160	0.019	0.279
09-Aug	34	683	29	577	0.773	0.013	0.292
10-Aug	32	715	30	607	0.719	0.012	0.303
11-Aug	36	751	34	641	0.800	0.013	0.317
12-Aug	41	792	39	680	0.911	0.015	0.332
13-Aug	26	818	25	705	0.575	0.010	0.341
14-Aug	26	844	22	727	0.563	0.009	0.351
15-Aug	29	873	26	753	0.649	0.011	0.362
16-Aug	21	894	18	771	0.473	0.008	0.369
17-Aug	23	917	18	789	0.495	0.008	0.378
18-Aug	14	931	13	802	0.299	0.005	0.383
19-Aug	14	945	13	815	0.303	0.005	0.388
20-Aug	5	950	4	819	0.112	0.002	0.390
21-Aug	10	960	9	828	0.212	0.004	0.393
22-Aug	14	974	14	842	0.299	0.005	0.398
23-Aug	19	993	17	859	0.535	0.009	0.407
24-Aug	15	1008	12	871	0.473	0.008	0.415
25-Aug	75	1083	67	938	2.459	0.041	0.456
26-Aug	18	1101	17	955	2.118	0.035	0.491
27-Aug	0	1101	0	955	0.000	0.000	0.491
28-Aug	36	1137	28	983	1.412	0.023	0.514
29-Aug	28	1165	28	1011	0.789	0.013	0.527
30-Aug	34	1199	29	1040	0.791	0.013	0.540
31-Aug	55	1254	49	1089	1.242	0.021	0.561
01-Sep	70	1324	64	1153	1.556	0.026	0.587
02-Sep	78	1402	67	1220	1.781	0.030	0.617
03-Sep	40	1442	34	1254	1.053	0.017	0.634
04-Sep	70	1512	52	1306	1.535	0.025	0.660
05-Sep	64	1576	61	1367	1.855	0.031	0.690
06-Sep	88	1664	78	1445	2.200	0.037	0.727
07-Sep	78	1742	70	1515	1.814	0.030	0.757
08-Sep	37	1779	36	1551	1.138	0.019	0.776
09-Sep	71	1850	65	1616	1.599	0.027	0.802
10-Sep	30	1880	28	1644	1.364	0.023	0.825
11-Sep	0	1880	0	1644	0.000	0.000	0.825
12-Sep	67	1947	59	1703	2.161	0.036	0.861
13-Sep	149	2096	138	1841	3.599	0.060	0.921
14-Sep	45	2141	43	1884	1.098	0.018	0.939
15-Sep	34	2175	30	1914	0.758	0.013	0.952
16-Sep	23	2198	22	1936	0.605	0.010	0.962
17-Sep	8	2206	8	1944	0.349	0.006	0.967
18-Sep	15	2221	15	1959	0.659	0.011	0.978
19-Sep	12	2233	11	1970	0.519	0.009	0.987
20-Sep	7	2240	6	1976	0.778	0.013	1.000

Table 5. Catches, numbers tagged, and CPUE (catch per fish wheel hour) of chum salmon in fish wheels at Canyon Island, 1987.

	Daily Chum Catch	Cumul. Chum Catch	Daily Chum Tagged	Cumul. Chum Tagged	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
15-Jun	0	0	0	0	0.000	0.000	0.000
16-Jun	0	0	0	0	0.000	0.000	0.000
17-Jun	0	0	0	0	0.000	0.000	0.000
18-Jun	0	0	0	0	0.000	0.000	0.000
19-Jun	0	0	0	0	0.000	0.000	0.000
20-Jun	0	0	0	0	0.000	0.000	0.000
21-Jun	0	0	0	0	0.000	0.000	0.000
22-Jun	0	0	0	0	0.000	0.000	0.000
23-Jun	0	0	0	0	0.000	0.000	0.000
24-Jun	0	0	0	0	0.000	0.000	0.000
25-Jun	0	0	0	0	0.000	0.000	0.000
26-Jun	0	0	0	0	0.000	0.000	0.000
27-Jun	0	0	0	0	0.000	0.000	0.000
28-Jun	0	0	0	0	0.000	0.000	0.000
29-Jun	0	0	0	0	0.000	0.000	0.000
30-Jun	0	0	0	0	0.000	0.000	0.000
01-Jul	0	0	0	0	0.000	0.000	0.000
02-Jul	0	0	0	0	0.000	0.000	0.000
03-Jul	0	0	0	0	0.000	0.000	0.000
04-Jul	0	0	0	0	0.000	0.000	0.000
05-Jul	1	1	1	1	0.025	0.001	0.001
06-Jul	0	1	0	1	0.000	0.000	0.001
07-Jul	0	1	0	1	0.000	0.000	0.001
08-Jul	0	1	0	1	0.000	0.000	0.001
09-Jul	0	1	0	1	0.000	0.000	0.001
10-Jul	0	1	0	1	0.000	0.000	0.001
11-Jul	0	1	0	1	0.000	0.000	0.001
12-Jul	0	1	0	1	0.000	0.000	0.001
13-Jul	0	1	0	1	0.000	0.000	0.001
14-Jul	2	3	2	3	0.045	0.001	0.002
15-Jul	0	3	0	3	0.000	0.000	0.002
16-Jul	0	3	0	3	0.000	0.000	0.002
17-Jul	0	3	0	3	0.000	0.000	0.002
18-Jul	0	3	0	3	0.000	0.000	0.002
19-Jul	0	3	0	3	0.000	0.000	0.002
20-Jul	1	4	1	4	0.024	0.001	0.002
21-Jul	2	6	1	5	0.048	0.001	0.003
22-Jul	0	6	0	5	0.000	0.000	0.003
23-Jul	1	7	1	6	0.025	0.001	0.004
24-Jul	0	7	0	6	0.000	0.000	0.004
25-Jul	3	10	3	9	0.076	0.002	0.006
26-Jul	2	12	2	11	0.049	0.001	0.007
27-Jul	2	14	1	12	0.098	0.002	0.009
28-Jul	0	14	0	12	0.000	0.000	0.009
29-Jul	0	14	0	12	0.000	0.000	0.009
30-Jul	0	14	0	12	0.000	0.000	0.009
31-Jul	2	16	2	14	0.066	0.002	0.011

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Table 5. continued

	Daily Chum Catch	Cumul. Chum Catch	Daily Chum Tagged	Cumul. Chum Tagged	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
01-Aug	6	22	6	20	0.149	0.003	0.014
02-Aug	7	29	3	23	0.188	0.004	0.018
03-Aug	7	36	7	30	0.173	0.004	0.022
04-Aug	3	39	3	33	0.073	0.002	0.024
05-Aug	4	43	4	37	0.093	0.002	0.026
06-Aug	6	49	6	43	0.139	0.003	0.030
07-Aug	3	52	4	47	0.071	0.002	0.031
08-Aug	7	59	7	54	0.159	0.004	0.035
09-Aug	3	62	3	57	0.068	0.002	0.037
10-Aug	1	63	1	58	0.022	0.001	0.037
11-Aug	4	67	4	62	0.089	0.002	0.039
12-Aug	9	76	9	71	0.200	0.005	0.044
13-Aug	7	83	7	78	0.155	0.004	0.047
14-Aug	2	85	2	80	0.043	0.001	0.048
15-Aug	4	89	4	84	0.089	0.002	0.050
16-Aug	5	94	5	89	0.113	0.003	0.053
17-Aug	0	94	0	89	0.000	0.000	0.053
18-Aug	5	99	4	93	0.107	0.002	0.056
19-Aug	1	100	1	94	0.022	0.001	0.056
20-Aug	1	101	1	95	0.022	0.001	0.057
21-Aug	0	101	0	95	0.000	0.000	0.057
22-Aug	6	107	5	100	0.128	0.003	0.060
23-Aug	7	114	7	107	0.197	0.005	0.064
24-Aug	3	117	3	110	0.095	0.002	0.066
25-Aug	17	134	15	125	0.557	0.013	0.079
26-Aug	5	139	5	130	0.588	0.014	0.093
27-Aug	0	139	0	130	0.000	0.000	0.093
28-Aug	2	141	2	132	0.078	0.002	0.095
29-Aug	4	145	4	136	0.113	0.003	0.097
30-Aug	14	159	13	149	0.326	0.008	0.105
31-Aug	31	190	29	178	0.700	0.016	0.121
01-Sep	39	229	38	216	0.867	0.020	0.142
02-Sep	77	306	72	288	1.758	0.041	0.182
03-Sep	23	329	23	311	0.605	0.014	0.197
04-Sep	26	355	25	336	0.570	0.013	0.210
05-Sep	44	399	41	377	1.275	0.030	0.239
06-Sep	73	472	69	446	1.825	0.042	0.282
07-Sep	93	565	77	523	2.163	0.050	0.332
08-Sep	44	609	46	569	1.354	0.032	0.364
09-Sep	102	711	92	661	2.297	0.053	0.417
10-Sep	50	761	46	707	2.273	0.053	0.470
11-Sep	6	767	4	711	0.375	0.009	0.479
12-Sep	61	828	52	763	1.968	0.046	0.525
13-Sep	209	1037	194	957	5.048	0.118	0.642
14-Sep	209	1246	100	1057	5.098	0.119	0.761
15-Sep	127	1373	91	1148	2.832	0.066	0.827
16-Sep	44	1417	42	1190	1.158	0.027	0.854
17-Sep	27	1444	25	1215	1.179	0.027	0.881
18-Sep	46	1490	45	1260	2.022	0.047	0.928
19-Sep	25	1515	22	1282	1.082	0.025	0.953
20-Sep	18	1533	15	1297	2.000	0.047	1.000

Table 6. Catches, and CPUE (catch/fish wheel hour) of Dolly Varden char in fish wheels at Canyon Island, 1987.

	Daily Dolly Catch	Cumul. Dolly Catch	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
15-Jun	0	0	0.000	0.000	0.000
16-Jun	1	1	0.043	0.002	0.002
17-Jun	2	3	0.085	0.004	0.005
18-Jun	1	4	0.036	0.001	0.007
19-Jun	2	6	0.042	0.002	0.009
20-Jun	2	8	0.043	0.002	0.010
21-Jun	2	10	0.043	0.002	0.012
22-Jun	3	13	0.082	0.003	0.016
23-Jun	7	20	0.215	0.009	0.025
24-Jun	17	37	0.500	0.021	0.045
25-Jun	22	59	0.494	0.021	0.066
26-Jun	22	81	0.484	0.020	0.086
27-Jun	20	101	0.597	0.025	0.111
28-Jun	9	110	0.202	0.008	0.119
29-Jun	62	172	1.459	0.061	0.180
30-Jun	28	200	0.747	0.031	0.211
01-Jul	25	225	0.877	0.036	0.247
02-Jul	26	251	0.703	0.029	0.277
03-Jul	37	288	0.839	0.035	0.311
04-Jul	27	315	0.934	0.039	0.350
05-Jul	11	326	0.278	0.012	0.362
06-Jul	8	334	0.194	0.008	0.370
07-Jul	24	358	0.585	0.024	0.394
08-Jul	15	373	0.405	0.017	0.411
09-Jul	0	373	0.000	0.000	0.411
10-Jul	30	403	0.719	0.030	0.441
11-Jul	18	421	0.421	0.017	0.458
12-Jul	8	429	0.186	0.008	0.466
13-Jul	18	447	0.409	0.017	0.483
14-Jul	15	462	0.341	0.014	0.497
15-Jul	36	498	0.857	0.036	0.533
16-Jul	46	544	1.207	0.050	0.583
17-Jul	51	595	1.206	0.050	0.633
18-Jul	51	646	1.223	0.051	0.684
19-Jul	31	677	0.738	0.031	0.715
20-Jul	9	686	0.214	0.009	0.724
21-Jul	16	702	0.386	0.016	0.740
22-Jul	5	707	0.222	0.009	0.749
23-Jul	11	718	0.272	0.011	0.760
24-Jul	10	728	0.260	0.011	0.771
25-Jul	10	738	0.254	0.011	0.782
26-Jul	14	752	0.345	0.014	0.796
27-Jul	13	765	0.634	0.026	0.822
28-Jul	0	765	0.000	0.000	0.822
29-Jul	0	765	0.000	0.000	0.822
30-Jul	2	767	0.090	0.004	0.826
31-Jul	9	776	0.296	0.012	0.838

Table 6. continued

	Daily Dolly Catch	Cumul. Dolly Catch	Daily CPUE	Daily Proport. CPUE	Cumul. Proport. CPUE
01-Aug	12	788	0.298	0.012	0.851
02-Aug	15	803	0.403	0.017	0.868
03-Aug	18	821	0.444	0.018	0.886
04-Aug	15	836	0.366	0.015	0.901
05-Aug	6	842	0.140	0.006	0.907
06-Aug	7	849	0.162	0.007	0.914
07-Aug	4	853	0.094	0.004	0.918
08-Aug	2	855	0.046	0.002	0.920
09-Aug	4	859	0.091	0.004	0.923
10-Aug	3	862	0.067	0.003	0.926
11-Aug	4	866	0.089	0.004	0.930
12-Aug	5	871	0.111	0.005	0.934
13-Aug	4	875	0.088	0.004	0.938
14-Aug	5	880	0.108	0.004	0.943
15-Aug	4	884	0.089	0.004	0.946
16-Aug	1	885	0.023	0.001	0.947
17-Aug	1	886	0.022	0.001	0.948
18-Aug	3	889	0.064	0.003	0.951
19-Aug	1	890	0.022	0.001	0.952
20-Aug	0	890	0.000	0.000	0.952
21-Aug	2	892	0.042	0.002	0.953
22-Aug	2	894	0.043	0.002	0.955
23-Aug	2	896	0.056	0.002	0.958
24-Aug	0	896	0.000	0.000	0.958
25-Aug	1	897	0.033	0.001	0.959
26-Aug	0	897	0.000	0.000	0.959
27-Aug	0	897	0.000	0.000	0.959
28-Aug	1	898	0.039	0.002	0.961
29-Aug	3	901	0.085	0.004	0.964
30-Aug	5	906	0.116	0.005	0.969
31-Aug	5	911	0.113	0.005	0.974
01-Sep	2	913	0.044	0.002	0.975
02-Sep	8	921	0.183	0.008	0.983
03-Sep	0	921	0.000	0.000	0.983
04-Sep	2	923	0.044	0.002	0.985
05-Sep	0	923	0.000	0.000	0.985
06-Sep	3	926	0.075	0.003	0.988
07-Sep	0	926	0.000	0.000	0.988
08-Sep	1	927	0.031	0.001	0.989
09-Sep	3	930	0.068	0.003	0.992
10-Sep	2	932	0.091	0.004	0.996
11-Sep	0	932	0.000	0.000	0.996
12-Sep	1	933	0.032	0.001	0.997
13-Sep	0	933	0.000	0.000	0.997
14-Sep	1	934	0.024	0.001	0.998
15-Sep	0	934	0.000	0.000	0.998
16-Sep	0	934	0.000	0.000	0.998
17-Sep	0	934	0.000	0.000	0.998
18-Sep	0	934	0.000	0.000	0.998
19-Sep	1	935	0.043	0.002	1.000
20-Sep	0	935	0.000	0.000	1.000

Table 7. Total fish wheel catches of salmon, by species, 1984 - 1987.

	Year			
Species	1984	1985	1986	1987
Chinook	138	184	571	285
Sockeye	2,334	3,601	5,808	4,307
Pink	20,845	27,670	7,256	42,786
Coho	889	1,207	758	2,240
Chum	316	1,376	80	1,533

Table 8. Summary by species of the tags applied at Canyon Island and tag recoveries, 1987.

Species	Number of Fish Tagged	Recovery Location					
		Canadian Commercial Catch	Canadian Testfish Catch	Canadian Subsistence Catch	District 111 Catch	Escapement	Total
Chinook	207	16	0	0	1	29	46
Sockeye	3,690	617	15	6	2	502	1,142
Coho	1,976	255	31	4	8	61	359
Pink	4,896	137	2	0	2	302	443
Chum	1,297	127	30	1	1	1	160
Total	12,066	1,152	78	11	14	895	2,150

Table 9. Tagging and recovery data used to calculate the inriver abundance of sockeye salmon past Canyon Island, the Canadian fishery exploitation rate, and the escapement past the fishery in each recovery strata in 1987.[a]

Statistical Week of Tagging	Dates	Statistical Week of Recovery							Total Recoveries	Total Tagged
		27	28	29	30	31	32	33-39		
25-26	(6/15-6/27)	8	7						15	328
27	(6/28-7/4)		12	3					15	224
28	(7/5-11)			24	1				25	312
29	(7/12-18)			8	38	1	1		48	339
30	(7/19-25)				16	35	43	2	96	832
31	(7/26-8/1)					4	119	20	143	580
32-39	(8/2-9/14)						122	153	275	1,075
Total		8	19	35	55	40	285	175	617	3,690
Inriver Abundance		4,888	7,862	9,980	26,364	12,371	14,929	10,736		Total 87,130
Standard Error		1,987	2,328	1,922	6,614	2,269	1,998	1,440		6,481
Commercial Catch		178	508	782	4,621	751	4,118	2,596		13,554
Exploitation Rate		0.036	0.065	0.078	0.175	0.061	0.276	0.242		0.156
Testfish Catch		0	0	0	0	59	51	127		237
Escapement		4,710	7,354	9,198	21,743	11,561	10,760	8,013		73,339

[a] Only commercial fishery tag recovery data was used to generate abundance estimates.

Table 10. Tagging and recovery data used to calculate the inriver abundance of "large" (>520 mm MEF) and "small" (<=520 mm MEF) sockeye salmon past Canyon Island in 1987.

LARGE FISH (>520 mm MEF)

Statistical Week of Tagging	Dates	Week of Recovery 27	28	29	30	31	32	33-39	Total Recoveries	Total Tagged
25-26	(6/15-6/27)	5	5						10	277
27	(6/28-7/4)		12	2					14	177
28	(7/5-7/11)			20	1				21	173
29	(7/12-7/18)			7	37	1	1		46	235
30	(7/19-7/25)				15	34	39	2	90	672
31	(7/26-8/1)					4	112	17	133	492
32-39	(8/2-9/14)						111	135	246	859
Total		5	17	29	53	39	263	154	560	2,885

								Total
Inriver Abundance	6,392	5,778	5,795	18,604	9,228	12,959	8,855	67,611
Commercial Catch (Large Fish)	152	433	687	4,335	668	3,866	2,455	12,596

SMALL FISH (<=520 mm MEF)

Statistical Week of Tagging	Dates	Week of Recovery 27-31	32-39	Total Recoveries	Total Tagged
25-30	(6/15-7/25)	14	4	18	501
31-39	(7/26-9/14)	0	39	39	304
Total		14	43	57	805

			Total
Inriver Abundance	18,961	3,063	22,024
Commercial Catch (Small Fish)	565	393	958

Total Inriver Abundance (Large + Small Fish) = 89,688 sockeye salmon.

Table 11. Tagging and recovery data used to calculate the escapement of pink salmon past Canyon Island in 1987.

Tagging Strata	Tag Recoveries by Location: Nakina River Weir	Tag Recoveries by Location: Lower Nakina River	Total Tagged	Population Estimate Through 7/25/87	Standard Error	Total Population Estimate[a]
6/16-7/09	51	40	1,232	89,851	162,957	
7/10-7/25	36	102	2,863	496,064	72,546	
Total	87	142	4,095	585,915	110,752	740,727
Carcasses Examined	30,332	18,357	48,689			

[a] Fish wheel CPUE data was used to expand the population estimate to cover the return.

Table 12. Tagging and recovery data used to calculate the inriver abundance of coho salmon past Canyon Island, the Canadian fishery exploitation rate, and the escapement past the fishery in each recovery strata in 1987.[a]

Statistical Week of Tagging	Dates	Statistical Week of Recovery								Total Recoveries	Total Tagged
		28-31	32	33	34	35	36	37	38-40		
28-30	(7/6-7/25)	12	4	1						17	197
31	(7/26-8/1)		28	3						31	107
32	(8/2-8/8)		9	32	5	1				47	244
33	(8/9-8/15)			4	22	1	1	1	1	30	205
34	(8/16-8/22)				2	5	3	2	1	13	89
35	(8/23-8/29)					2	25	1	5	33	169
36	(8/30-9/5)						12	42	4	58	356
37-39	(9/6-9/20)							9	48	57	609
Total		12	41	40	29	9	41	46	11	286	1,976

	28-31	32	33	34	35	36	37	38-40	Total
Inriver Abundance	3,841	2,529	3,623	4,721	3,503	4,061	3,843	17,449	43,570
Standard Error	962	378	465	801	936	673	451	2,256	2,849
Commercial Catch	254	768	625	596	385	1,017	587	1,367	5,599
Exploitation Rate	0.066	0.304	0.173	0.126	0.110	0.250	0.153	0.078	0.129
Testfish Catch	4	11	50	78	52	122	17	473[b]	807
Escapement	3,583	1,750	2,948	4,047	3,066	2,922	3,239	15,609	37,163

[a] Commercial and test fishery tag recovery data was used to generate abundance estimates.
[b] The test fishery catch in the final strata was reduced to 151 for use in calculating population size (see text). The total catch in this test fishery strata was 473 fish.

Table 13. Migratory timing statistics of the various salmon species past the Canyon Island fish wheels, 1984-1987.

Species	Statistic	Year			
		1984[a]	1985[b]	1986	1987
Chinook	Mean Date	28 June	26 June	28 June	27 June
	Standard Error[c]	8	8.6	9.2	7.
Sockeye	Mean Date	23 July	24 July	16 July	24 July
	Standard Error	17.6	18.1	14.2	15.
Pink	Mean Date	19 July	19 July	27 July	19 July
	Standard Error	9.3	8.5	5.5	9.
Coho	Mean Date	11 Aug.	18 Aug.	3 Aug.	23 Aug.
	Standard Error	12.3	16.3	10.3	18.
Chum	Mean Date	14 Aug.	8 Sept.	7 Aug.	9 Sept.
	Standard Error	12.8	11.8	11.3	10.

[a] Based on daily fish wheel catches.
[b] Based on daily fish wheel catch-per-unit-effort.
[c] Units are days.

Table 14. Weekly and cumulative proportions of individual sockeye salmon stocks passing Canyon Island in 1987, based on spawning ground recoveries of tagged fish weighted by abundance indices (fish wheel CPUE).

		Little Trapper		Little Tatsamenie		Hackett		Mainstem	
Stat Week	Dates	Weekly Prop.	Cumul. Prop.	Weekly Prop.	Cumul. Prop.	Weekly Prop.	Cumul. Prop.	Weekly Prop.	Cumul. Prop.
25	6/14-6/20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26	6/21-6/27	0.005	0.005	0.000	0.000	0.022	0.022	0.000	0.000
27	6/28-7/4	0.013	0.018	0.000	0.000	0.022	0.044	0.000	0.000
28	7/5-7/11	0.088	0.106	0.000	0.000	0.021	0.065	0.000	0.000
29	7/12-7/18	0.172	0.278	0.044	0.044	0.000	0.065	0.000	0.000
30	7/19-7/25	0.368	0.646	0.191	0.235	0.217	0.282	0.062	0.062
31	7/26-8/1	0.275	0.921	0.412	0.647	0.541	0.823	0.149	0.211
32	8/2-8/8	0.076	0.997	0.273	0.920	0.099	0.922	0.468	0.679
33	8/9-8/15	0.003	1.000	0.080	1.000	0.078	1.000	0.167	0.845
34	8/16-8/22	0.000	1.000	0.000	1.000	0.000	1.000	0.069	0.914
35-38	8/23-9/20	0.000	1.000	0.000	1.000	0.000	1.000	0.086	1.000

Table 15. Age and sex composition of the Canyon Island fish wheel catch of chinook salmon in 1987.

	Brood Year and Age Class				
	1984	1983	1982	1981	
	1.1	1.2	1.3	1.4	Total
Sample Dates:	(16 June - 3 August)				
Male					
Sample Number	121	33	11	10	175
Percent	59.3	16.2	5.4	4.9	85.8
Std. Error	3.4	2.6	1.6	1.5	2.4
Female					
Sample Number		10	14	5	29
Percent		4.9	6.9	2.5	14.2
Std. Error		1.5	1.8	1.1	2.4
All Fish [a]					
Sample Number	122	44	26	15	207
Percent	58.9	21.3	12.6	7.2	100.0
Std. Error	3.4	2.8	2.3	1.8	

[a] Includes unsexed fish totals.

Table 16. Length composition by age and sex of the Canyon Island fish wheel catch of chinook salmon in 1987.

		Brood Year and Age Class			
		1984	1983	1982	1981
		1.1	1.2	1.3	1.4
Male	Avg. Length	368	543	733	861
	Std. Error	3.5	11.9	23.0	27.9
	Sample Size	121	32	11	10
Female	Avg. Length		576	770	865
	Std. Error		20.9	10.8	19.1
	Sample Size		10	14	5
All Fish	Avg. Length	368	549	748	862
	Std. Error	3.5	10.3	13.1	19.2
	Sample Size	121	43	26	15

Table 17. Age and sex composition of the Canyon Island fish wheel catch of sockeye salmon in 1987.

	Brood Year and Age Class											
	1985	1984		1983			1982			1981		1980	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4	Total
Sample Dates:	(June 15 - 20)												
Male													41
Sample Size				1	8			30	2				45.1
Percent				1.1	8.8			33.0	2.2				5.2
Std. Error				1.1	3.0			4.9	1.5				
Female													50
Sample Size					1			45	1		3		54.9
Percent					1.1			49.5	1.1		3.3		5.2
Std. Error					1.1			5.3	1.1		1.9		
All Fish													91
Sample Size				1	9			75	3		3		100.0
Percent				1.1	9.9			82.4	3.3		3.3		
Std. Error				1.1	3.1			4.0	1.9		1.9		
Sample Dates:	(June 21 - 27)												
Male													95
Sample Size		1		1	22			68	2		1		60.9
Percent		0.6		0.6	14.1			43.6	1.3		0.6		3.9
Std. Error		0.6		0.6	2.8			4.0	0.9		0.6		
Female													61
Sample Size		1			9			48	2		1		39.1
Percent		0.6			5.8			30.8	1.3		0.6		3.9
Std. Error		0.6			1.9			3.7	0.9		0.6		
All Fish													156
Sample Size		2		1	31			116	4		2		100.0
Percent		1.3		0.6	19.9			74.4	2.6		1.3		
Std. Error		0.9		0.6	3.2			3.5	1.3		0.9		
Sample Dates:	(June 28 - July 4)												
Male													104
Sample Size				2	19			70	7	1	5		63.8
Percent				1.2	11.7			42.9	4.3	0.6	3.1		3.8
Std. Error				0.9	2.5			3.9	1.6	0.6	1.3		
Female													59
Sample Size				1	9			39	6		4		36.2
Percent				0.6	5.5			23.9	3.7		2.5		3.8
Std. Error				0.6	1.8			3.3	1.5		1.2		
All Fish [a]													165
Sample Size				3	28			111	13	1	9		100.0
Percent				1.8	17.0			67.3	7.9	0.6	5.5		
Std. Error				1.0	2.9			3.6	2.1	0.6	1.8		

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	Brood Year and Age Class												
	1985	1984		1983			1982			1981		1980	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4	Total
Sample Dates:	(July 5 - 11)												
Male													
Sample Size		1		5	68			60	5		12		151
Percent		0.4		2.2	29.8			26.3	2.2		5.3		66.2
Std. Error		0.4		1.0	3.0			2.9	1.0		1.5		3.1
Female													
Sample Size				4	19			33	11		10		77
Percent				1.8	8.3			14.5	4.8		4.4		33.8
Std. Error				0.9	1.8			2.3	1.4		1.4		3.1
All Fish [a]													
Sample Size		1		10	87			93	16		22		229
Percent		0.4		4.4	38.0			40.6	7.0		9.6		100.0
Std. Error		0.4		1.3	3.2			3.2	1.7		1.9		
Sample Dates:	(July 12 - 18)												
Male													
Sample Size		2		6	65			82	4		8		167
Percent		0.8		2.4	25.9			32.7	1.6		3.2		66.5
Std. Error		0.6		1.0	2.8			2.9	0.8		1.1		3.0
Female													
Sample Size				2	8			66	4		4		84
Percent				0.8	3.2			26.3	1.6		1.6		33.5
Std. Error				0.6	1.1			2.8	0.8		0.8		3.0
All Fish													
Sample Size		2		8	73			148	8		12		251
Percent		0.8		3.2	29.1			59.0	3.2		4.8		100.0
Std. Error		0.6		1.1	2.9			3.1	1.1		1.3		
Sample Dates:	(July 19 - 25)												
Male													
Sample Size	1	9	11	38	82	4		184	3	2	14		348
Percent	0.2	1.4	1.7	5.8	12.4	0.6		27.9	0.5	0.3	2.1		52.8
Std. Error	0.1	0.4	0.5	0.9	1.3	0.3		1.7	0.3	0.2	0.6		1.9
Female													
Sample Size				46	26		1	211	1		26		311
Percent				7.0	3.9		0.2	32.0	0.2		3.9		47.2
Std. Error				1.0	0.7		0.1	1.8	0.1		0.7		1.9
All Fish [a]													
Sample Size	1	9	11	85	110	4	1	397	4	2	40		664
Percent	0.2	1.4	1.7	12.8	16.6	0.6	0.2	59.8	0.6	0.3	6.0		100.0
Std. Error	0.1	0.4	0.5	1.3	1.4	0.3	0.1	1.9	0.3	0.2	0.9		

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	Brood Year and Age Class												
	1985	1984		1983			1982			1981		1980	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4	Total
Sample Dates:	(July 26 - August 1)												
Male													
Sample Size	1	8	17	33	34	7	1	138	1		9	1	250
Percent	0.2	1.7	3.6	7.1	7.3	1.5	0.2	29.6	0.2		1.9	0.2	53.5
Std. Error	0.2	0.6	0.9	1.2	1.2	0.6	0.2	2.1	0.2		0.6	0.2	2.3
Female													
Sample Size				53	9			138	2	2	13		217
Percent				11.3	1.9			29.6	0.4	0.4	2.8		46.5
Std. Error				1.5	0.6			2.1	0.3	0.3	0.8		2.3
All Fish [a]													
Sample Size	1	8	17	87	43	7	1	278	3	2	22	1	470
Percent	0.2	1.7	3.6	18.5	9.1	1.5	0.2	59.1	0.6	0.4	4.7	0.2	100.0
Std. Error	0.2	0.6	0.9	1.8	1.3	0.6	0.2	2.2	0.4	0.3	1.0	0.2	
Sample Dates:	(August 2 - 8)												
Male													
Sample Size	5	4	43	50	62	28	1	104	4		8		309
Percent	0.9	0.7	8.0	9.3	11.5	5.2	0.2	19.3	0.7		1.5		57.4
Std. Error	0.4	0.4	1.2	1.2	1.4	0.9	0.2	1.7	0.4		0.5		2.1
Female													
Sample Size				62	17			133	6		11		229
Percent				11.5	3.2			24.7	1.1		2.0		42.6
Std. Error				1.4	0.7			1.8	0.4		0.6		2.1
All Fish													
Sample Size	5	4	43	112	79	28	1	237	10		19		538
Percent	0.9	0.7	8.0	20.8	14.7	5.2	0.2	44.1	1.9		3.5		100.0
Std. Error	0.4	0.4	1.2	1.7	1.5	0.9	0.2	2.1	0.6		0.8		
Sample Dates:	(August 9 - 15)												
Male													
Sample Size	9	1	38	20	22	18	1	37	2		2		150
Percent	3.5	0.4	14.8	7.8	8.6	7.0	0.4	14.4	0.8		0.8		58.4
Std. Error	1.1	0.4	2.2	1.7	1.7	1.6	0.4	2.2	0.5		0.5		3.1
Female													
Sample Size		1		26	16			61	1		2		107
Percent		0.4		10.1	6.2			23.7	0.4		0.8		41.6
Std. Error		0.4		1.9	1.5			2.6	0.4		0.5		3.1
All Fish													
Sample Size	9	2	38	46	38	18	1	98	3		4		257
Percent	3.5	0.8	14.8	17.9	14.8	7.0	0.4	38.1	1.2		1.6		100.0
Std. Error	1.1	0.5	2.2	2.4	2.2	1.6	0.4	3.0	0.7		0.8		

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	Brood Year and Age Class												
	1985	1984		1983			1982			1981		1980	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4	Total
Sample Dates:	(August 16 - Sept. 14)												
Male													
Sample Size	7	1	40	13	15	1		19	1		1		98
Percent	4.2	0.6	24.1	7.8	9.0	0.6		11.4	0.6		0.6		59.0
Std. Error	1.6	0.6	3.3	2.1	2.2	0.6		2.5	0.6		0.6		3.8
Female													
Sample Size				13	4		1	45	2		3		68
Percent				7.8	2.4		0.6	27.1	1.2		1.8		41.0
Std. Error				2.1	1.2		0.6	3.4	0.8		1.0		3.8
All Fish													
Sample Size	7	1	40	26	19	1	1	64	3		4		166
Percent	4.2	0.6	24.1	15.7	11.4	0.6	0.6	38.6	1.8		2.4		100.0
Std. Error	1.6	0.6	3.3	2.8	2.5	0.6	0.6	3.8	1.0		1.2		
Total													
Male													
Sample Size	23	27	149	169	397	58	3	792	31	3	60	1	1713
Percent	0.8	0.9	5.0	5.7	13.3	1.9	0.1	26.6	1.0	0.1	2.0	<0.1	57.6
Std. Error	0.1	0.2	0.4	0.4	0.6	0.2	0.1	0.7	0.2	0.1	0.2	<0.1	0.8
Female													
Sample Size		2		207	118		2	819	36	2	77		1263
Percent		0.1		7.0	4.0		0.1	27.5	1.2	0.1	2.6		42.4
Std. Error		<0.1		0.4	0.3		<0.1	0.8	0.2	<0.1	0.3		0.8
All Fish [a]													
Sample Size	23	29	149	379	517	58	5	1617	67	5	137	1	2987
Percent	0.8	1.0	5.0	12.7	17.3	1.9	0.2	54.1	2.2	0.2	4.6	<0.1	100.0
Std. Error	0.1	0.2	0.4	0.6	0.6	0.2	0.1	0.8	0.2	0.1	0.4	<0.1	

[a] Includes unsexed fish totals.

Table 18. Length composition by age and sex of the Canyon Island fish wheel catch of sockeye salmon in 1987.

		Brood Year and Age Class											
		1985	1984		1983			1982			1981		1980
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4
Sample Dates:		(June 15 - September 14)											
Male	Avg. Length	316	458	319	597	456	335	608	600	481	567	612	650
	Std. Error	3.8	5.3	1.4	2.6	1.8	5.5	18.6	1.2	9.1	41.8	4.2	
	Sample Size	23	27	149	166	390	58	3	771	30	3	58	1
Female	Avg. Length		490		578	484		613	583	505	563	579	
	Std. Error		50.0		1.7	3.5		2.5	1.0	5.8	7.5	2.9	
	Sample Size		2		206	117		2	809	34	2	75	
All Fish	Avg. Length	316	460	319	586	463	335	610	591	494	565	593	650
	Std. Error	3.8	5.7	1.4	1.5	1.7	5.5	10.2	0.8	5.4	23.0	2.8	
	Sample Size	23	29	149	372	507	58	5	1582	64	5	133	1

Table 19. Age and sex composition of the Canyon Island fish wheel catch of coho salmon in 1987.

	Brood Year and Age Class							
	1985	1984		1983	1982		1981	
	1.0	1.1	2.0	2.1	3.1	4.0	5.0	Total
Sample Dates:	(3 July - 20 September)							
Male								
Sample Size		343	4	648	24	1	1	1021
Percent		20.6	0.2	38.9	1.4	0.1	0.1	61.3
Std. Error		0.9	0.1	1.1	0.3	0.1	0.1	1.1
Female								
Sample Size	1	200		430	14			645
Percent	0.1	12.0		25.8	0.8			38.7
Std. Error	0.1	0.8		1.0	0.2			1.1
All Fish[a]								
Sample Size	1	549	4	1105	39	1	1	1700
Percent	0.1	32.3	0.2	65.0	2.3	0.1	0.1	100.0
Std. Error	0.1	1.1	0.1	1.1	0.3	0.1	0.1	

[a] Includes unsexed fish totals.

Table 20. Length composition by age and sex of the Canyon Island fish wheel catch of coho salmon in 1987.

		Brood Year and Age Class						
		1985	1984		1983	1982		1981
		1.0	1.1	2.0	2.1	3.1	4.0	5.0
Male	Avg. Length		559	303	582	571	365	310
	Std. Error		4.8	31.0	3.4	16.8		
	Sample Size		331	4	627	22	1	1
Female	Avg. Length	330	595		613	599		
	Std. Error		5.1		2.9	15.5		
	Sample Size	1	191		419	14		
All Fish	Avg. Length	330	572	303	595	582	365	310
	Std. Error		3.7	31.0	2.4	12.0		
	Sample Size	1	522	4	1048	36	1	1

Table 21. Age and sex composition of the Canyon Island fish wheel catch of chum salmon in 1987.

	Brood Year and Age Class				
	1984	1983	1982	1981	
	0.2	0.3	0.4	0.5	Total
Sample Dates:	(5 July - 12 September)				
Male					
Sample Size	3	131	190	10	334
Percent	0.5	21.9	31.8	1.7	55.9
Std. Error	0.3	1.7	1.9	0.5	2.0
Female					
Sample Size	2	104	151	6	263
Percent	0.3	17.4	25.3	1.0	44.1
Std. Error	0.2	1.5	1.8	0.4	2.0
All Fish [a]					
Sample Size	5	235	343	17	600
Percent	0.8	39.2	57.2	2.8	100.0
Std. Error	0.4	2.0	2.0	0.7	
Sample Dates:	(13 September - 20 September)				
Male					
Sample Size	3	164	86	1	254
Percent	0.6	34.7	18.2	0.2	53.7
Std. Error	0.4	2.2	1.8	0.2	2.3
Female					
Sample Size	2	120	95	2	219
Percent	0.4	25.4	20.1	0.4	46.3
Std. Error	0.3	2.0	1.8	0.3	2.3
All Fish					
Sample Size	5	284	181	3	473
Percent	1.1	60.0	38.3	0.6	100.0
Std. Error	0.5	2.2	2.2	0.4	
Total					
Male					
Sample Size	6	295	276	11	588
Percent	0.6	27.6	25.8	1.0	55.0
Std. Error	0.2	1.3	1.3	0.3	1.5
Female					
Sample Size	4	224	246	8	482
Percent	0.4	20.9	23.0	0.7	45.0
Std. Error	0.2	1.2	1.3	0.3	1.5
All Fish [a]					
Sample Size	10	519	524	20	1073
Percent	0.9	48.4	48.8	1.9	100.0
Std. Error	0.3	1.5	1.5	0.4	

[a] Includes unsexed fish totals.

Table 22. Length composition by age and sex of the Canyon Island fish wheel catch of chum salmon in 1987.

		Brood Year and Age Class			
		1984	1983	1982	1981
		0.2	0.3	0.4	0.5
Male	Avg. Length	603	653	681	664
	Std. Error	9.0	2.1	2.6	12.7
	Sample Size	6	292	274	11
Female	Avg. Length	543	629	655	674
	Std. Error	35.1	2.0	2.2	14.0
	Sample Size	4	221	243	8
All Fish	Avg. Length	579	642	669	668
	Std. Error	17.0	1.5	1.8	9.2
	Sample Size	10	513	517	19

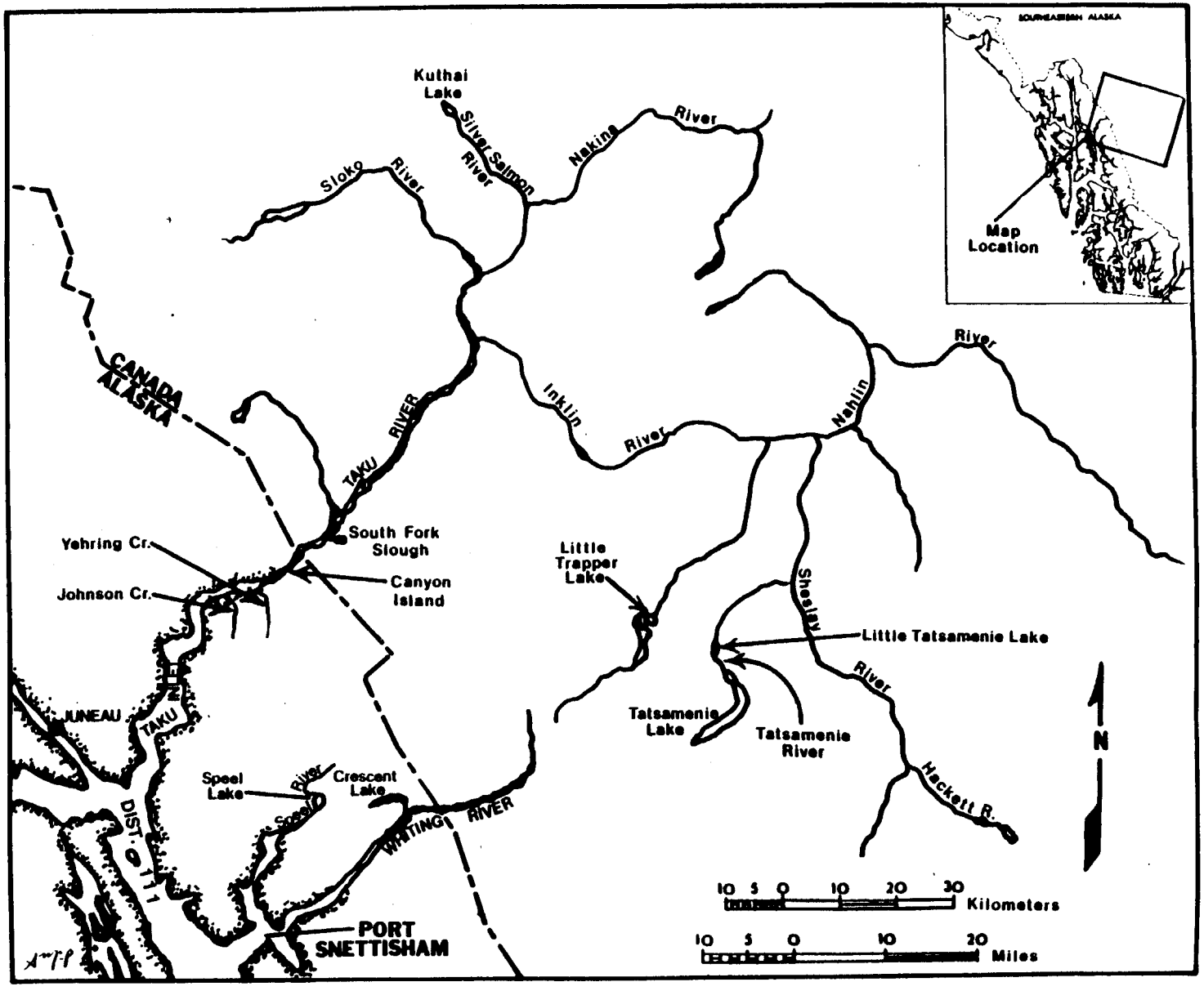

Figure 1. Taku River and Port Snettisham drainages.

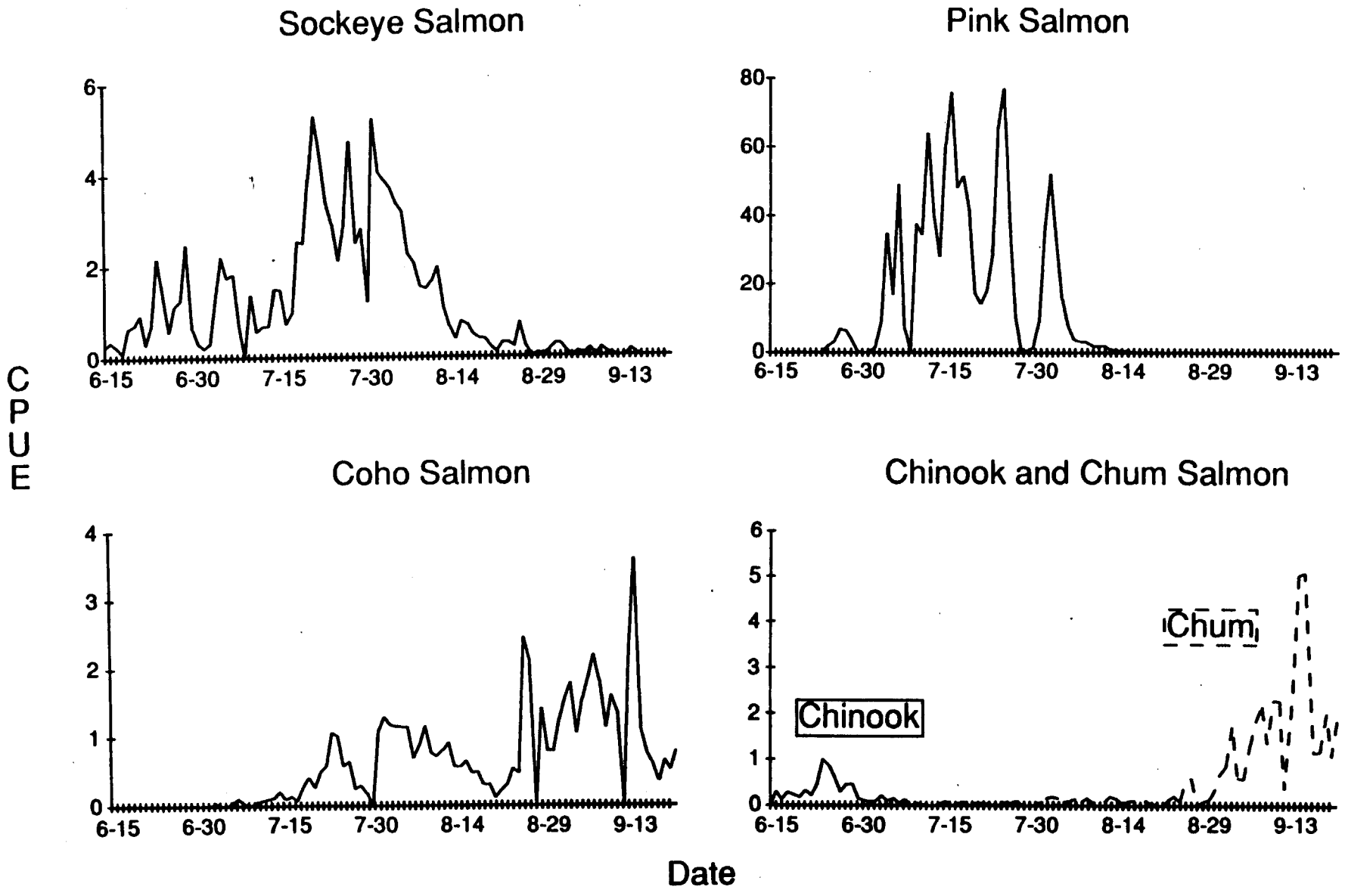

Figure 2. Fish wheel CPUE (catch-per-wheel-hour) for the various species captured in 1987.

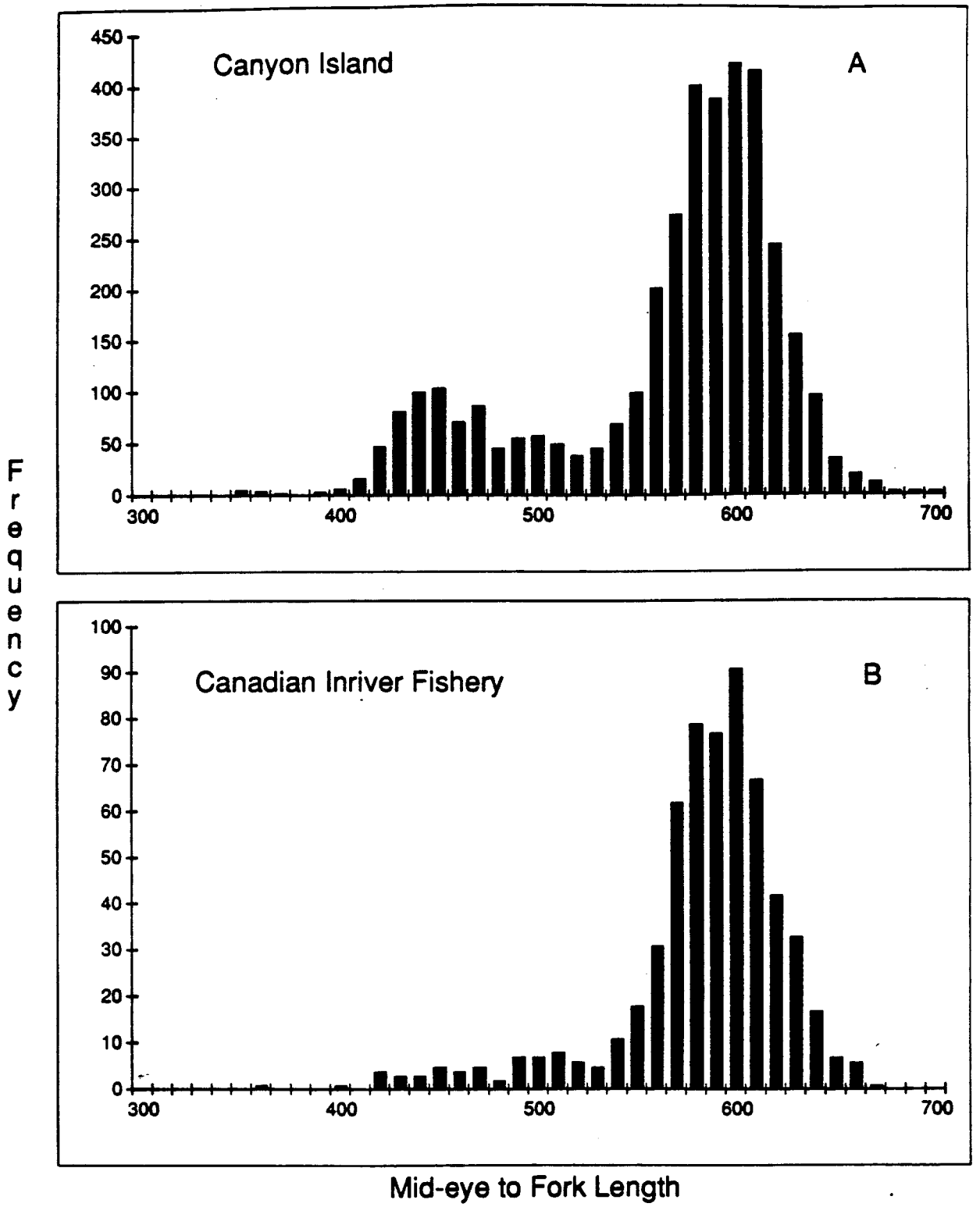

Figure 3. Length frequency distributions of sockeye salmon tagged at Canyon Island and of tagged sockeye salmon recovered in the Canadian commercial gillnet fishery in 1987.

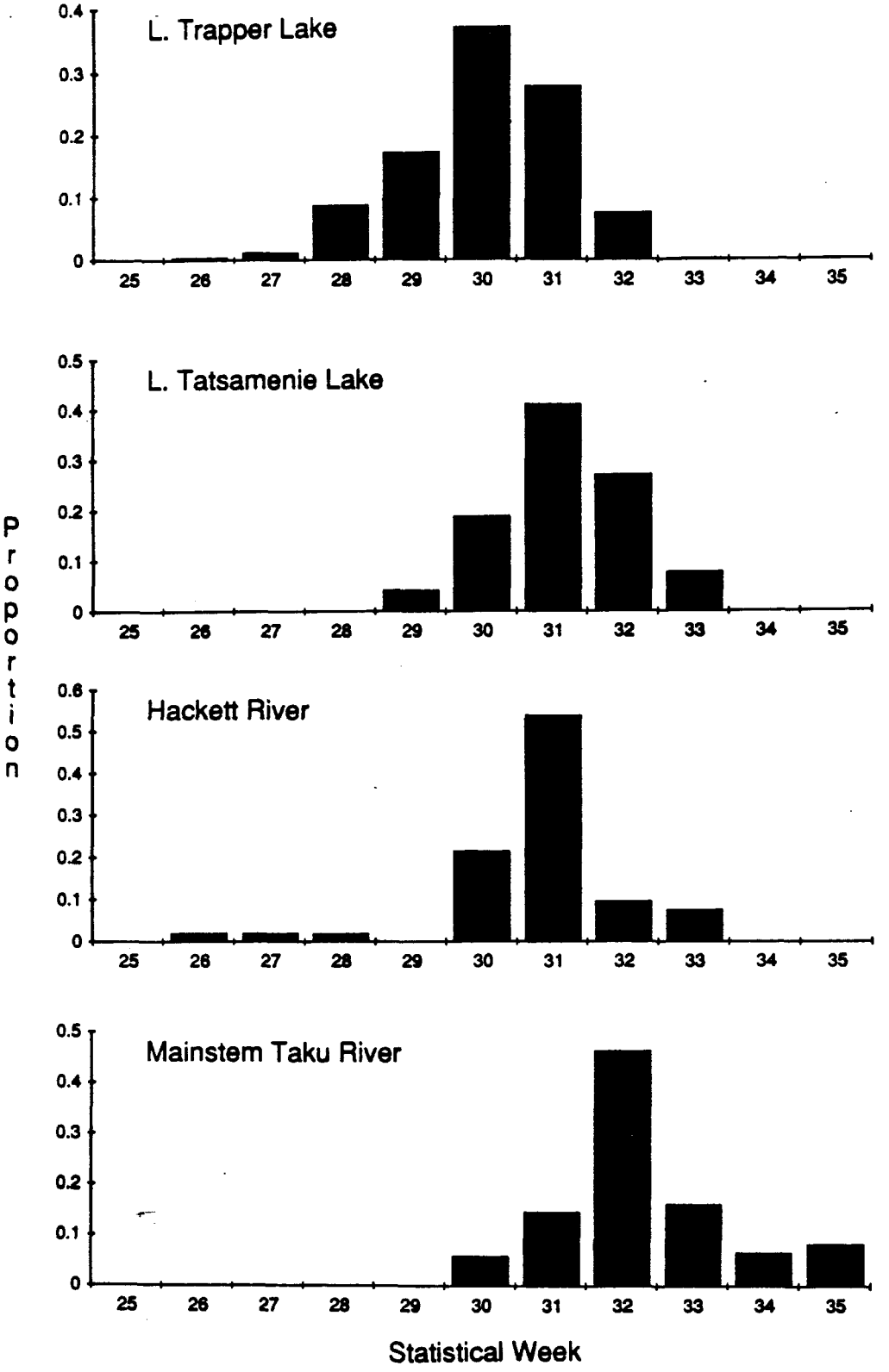

Figure 4. Weekly proportions of individual sockeye salmon stocks passing Canyon Island in 1987, based on spawning ground recoveries of tagged fish weighted by abundance indices (fish wheel CPUE).

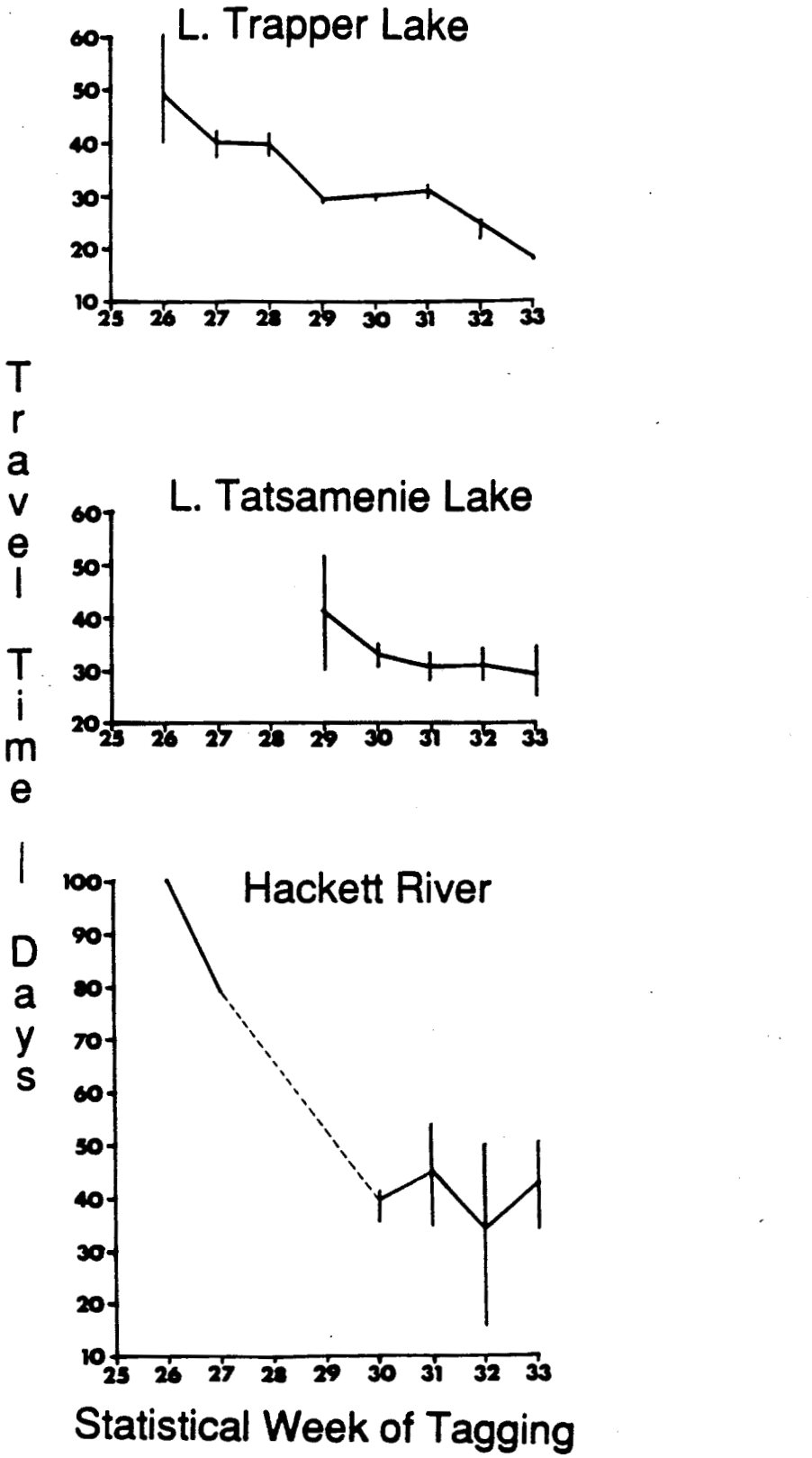

Figure 5. Mean travel times (and 95% confidence intervals) of tagged sockeye salmon between Canyon Island and three Taku River headwater weirs.