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FORECASTS FOR THE 1992 STIKINE RIVER SOCKEYE SALMON RUN

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By

Kathleen A. Jensen

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ABSTRACT

Preseason forecasts of the Tahltan, non-Tahltan and the entire Stikine River sockeye salmon runs for 1992 were made based on spawner-recruit and sibling analyses, and additional forecasts based on smolt analysis were made for the Tahltan stock. Spawner-recruit forecasts were 26,436 Tahltan fish (95% Prediction Interval (PI)=3,815 to 624,719 fish), 46,069 non-Tahltan fish (95% PI=20,251 to 128,058), and 73,630 Stikine fish (95% PI=22,134 to 385,135). The correlation coefficients for the spawner-recruit analysis of the Tahltan and entire run were less than .5 but was .63 for the non-Tahltan stock group. With only five years of data there was a large uncertainty around the average survival smolt forecast of 27,933 and the smolt-recruit regression forecast of 29,752 (PI=0 to 165,697) Tahltan fish. Sibling analysis appeared to work moderately well for all stock groups. Linear regressions of the run of all fish in year *t* and the number of age-1.2 fish in year *t-1* were made based on eight brood years of age-specific catch and escapement data. The 1992 run predictions were 80,962 Tahltan fish (R^2=.735; PI $\pm$ 59,143), 96,782 non-Tahltan fish (R^2=.458; PI $\pm$ 69,117), and 187,547 Stikine fish (R^2=.684; PI $\pm$ 111,588). Due to the limited data, these sibling forecasts are considered experimental and should not be viewed as a proven technique for forecasting the run sizes of these stocks. For the Tahltan stock, the sibling forecast of 80,962 fish was chosen as the best predictor of the 1992 sockeye run. The final non-Tahltan run prediction was made by averaging the spawner-recruit and sibling forecasts for a run prediction of 71,426 fish. The entire Stikine run forecast is 152,388 sockeye salmon. The test fishery in District 108 can be used inseason to verify the accuracy of the preseason forecast due to the linear correlation between the Tahltan, non-Tahltan, and total Stikine sockeye run and the cumulative catch. For week 26 the correlation coefficient was .789 for Tahltan, .683 for non-Tahltan, and .841 for all Stikine fish.

INTRODUCTION

A preseason forecast of the Stikine River sockeye salmon (*Oncorhynchus nerka*) run is needed each year to determine early season fisheries management procedures for U.S. gillnet fisheries near the Stikine River (Southeast Alaska Districts 106 and 108) and for the Canadian inriver gillnet fisheries, as stipulated by the U.S./Canada Pacific Salmon Treaty. This paper presents the forecast method developed by the Alaska Department of Fish and Game (ADF&G) for 1992. The forecast, used jointly by the two countries since 1988, has consisted of various combinations of ADF&G time series, spawner-recruit, smolt, and sibling forecasts, and Canadian Department of Fisheries and Oceans (DFO) smolt and spawner-recruit forecasts.

Sockeye salmon of transboundary Stikine River origin are harvested in U.S. marine fisheries in Southeast Alaska's Districts 106 and 108 and in Canadian fisheries in the Stikine River (Figure 1). Management of transboundary river salmon to achieve conservation and allocation objectives, as stipulated by the Pacific Salmon Treaty, requires a cooperative approach by Canada and the United States. In order to facilitate cooperative management of Stikine River sockeye salmon, the Transboundary Technical Committee (TTC) developed a management model based on preseason and inseason forecasting, catch per unit effort (CPUE) data, desired escapement goals, and total allowable catch (TAC). This model was used in 1988 through 1991 and will be used in 1992 (TTC 1988; TTC 1990a; TTC 1990b; TTC 1991; TTC *in press*). The TAC output from the model is based on the preseason forecast for the first two weeks of the season and on inseason CPUE in various fisheries for the remainder of the season. There is limited data available on which to base preseason forecasts. Various methods have been used the past few years and different methods have been applied to the different stocks. Improved accuracy of the preseason forecast would be valuable to fishery managers, particularly during the early portion of the run when little other data is available to assess run strength. Two major stock groups are recognized for the Stikine River sockeye run: 1) the Tahltan group which spawns in Tahltan Lake; and 2) the non-Tahltan group which spawns in small lakes, sloughs, and side channels of the mainstem river and its tributaries. Most Stikine River sockeye salmon mature as age-1.3 fish. Other important age groups include ages -1.2, -2.2, -2.3, -0.2, and -0.3, with the latter two age classes found only in the non-Tahltan stock group.

Preseason salmon forecasts have been an integral part of fisheries management on the west coast of North America for decades. Several methods have met with varying degrees of success. Spawner-recruit analysis, although primarily a method of estimating optimum escapement levels, has been used to forecast sockeye salmon runs. In Alaska it is used to forecast the Copper River sockeye run (Geiger and Savikko 1990). The forecast for the Bristol Bay sockeye run is based on the mean or weighted (by variance) mean of linear regressions of spawner-recruit, sibling, smolt, and Japanese research vessel catches (Fried and Yuen 1987). Sibling forecasting, using the return of age n fish in year t to predict the return of age $n+1$ fish in year $t+1$, has been used as a sole technique and in conjunction with other forecasting methods. A simple linear regression has been used for the major age groups for Coghill Lake sockeye salmon, while multiple

regressions incorporating numbers of spawners, numbers of smolt, and/or length data have been used for sockeye returns to Kodiak Island and Chignik (Geiger and Savikko 1990). Sibling forecasting has worked very well for coho salmon runs in Oregon where a simple linear regression of the number of jacks in year *t* has been used to predict the run in year *t*+1 (Gunsolus 1978; GAO 1983). Bilton (1973) found that although there were positive correlations between the catch or run of 3-year-old chum salmon in year *t* and the catch or run of 4-year-old chum salmon in year *t*+1, sibling forecasting was not feasible due to the high variation. Sibling forecasting of sockeye salmon runs in Alaska has worked for some runs and not for others (Geiger and Savikko 1990).

Inseason run strength indices can be used to assess the accuracy of a preseason forecast. Catch or catch per unit effort (CPUE) has often been used as an index of total fish abundance. If the catch or CPUE can be apportioned to stock or if the fishery occurs in an area or time when a single stock or stock group dominates the catch, then the index can be used as a measure of stock-specific abundance. Because Stikine River stocks typically dominate the sockeye catch in District 108, the catch or CPUE in the District 108 test fishery may serve as an index of abundance for Stikine River sockeye salmon and as a method to verify the accuracy of the preseason run size estimate.

The purpose of this study was to determine if sibling, spawner/recruit, or smolt data could be used to predict the Tahltan, non-Tahltan, or entire Stikine River sockeye run. This study also reviews the reliability of the District 108 test fishery as an inseason abundance index and run strength predictor for Stikine River sockeye salmon.

METHODS

Database

Catch and escapement data for the Tahltan and non-Tahltan stock groups and for the entire Stikine (Tahltan + non-Tahltan) sockeye run from 1983 through 1991 were compiled (Appendix A). Inriver run size estimates for Tahltan and non-Tahltan fish are available since 1979; however, stock compositions of marine catches were not estimated prior to 1982 and in that year the Tahltan and non-Tahltan groups were not separated. Therefore, the reliable data base for age- and stock-specific catch and escapement includes 1983 and later.

Age compositions were compiled from yearly catch and escapement reports produced by the Alaska Department of Fish and Game and included the years: 1983 (McGregor et al. 1984), 1984 (McGregor and McPherson 1986), 1985 (McPherson and McGregor 1986), 1986 (McPherson et al. 1988), 1987 (McPherson et al. 1988), 1988 (McPherson et al. 1990), 1989 (Rowse and McPherson *in press*), 1990 (Rowse and McPherson *in prep.*, and 1991 *ADF&G in prep.*). Stock compositions for catches

were compiled from various published and unpublished ADF&G reports and memoranda. Stock compositions for District 106 catches were compiled for the years: 1983 (Oliver et al. 1984), 1984 (Oliver and Walls 1985), 1985 (Oliver and Jensen 1986), 1986 (Jensen et al. 1989), 1987 (Jensen and Frank 1988), 1988 (Jensen and Frank 1989), 1989 (Jensen and Frank 1992), and 1990 and 1991 (Jensen and Frank *in prep*). Stock compositions for District 108 catches were compiled for the years: 1985 (Jensen 1986) and 1986 through 1991 (references as listed for District 106). Stock compositions for the inriver Stikine catches were compiled for the years: 1983 (Walls 1984a), 1984 (Walls 1984b), 1985 (ADF&G data file), 1986 (Jensen et al. 1989), 1987 (TTC 1988), 1988 (TTC 1990a), and 1989 (TTC 1990b), 1990 (TTC 1991), and 1991 (TTC *in prep.*). Catches for each fishery and the Tahltan and non-Tahltan escapement estimates for 1983 through 1991 were taken from the most current source and, in most cases, have been updated since those listed in the original reports.

Age-specific stock compositions for the Canadian test fishery and commercial sockeye catches and for the entire inriver run in the Stikine River were calculated for 1991. Stock compositions were estimated only for females (based on egg diameter) by DFO personnel. Since the age composition of the catches of females and males were different and changed through time, weekly sex specific age compositions were estimated. The ratio of Tahltan to non-Tahltan females in each weekly sample of a specific age class was applied to the sample of male fish of that age class. The samples were then expanded to the catches or inriver run size estimates (Appendix B). Observed stock ratios from the test fishery catches were fit to a logistic model for proportion (Cox and Snell, 1989). The predicted values from this model were used in order to minimize the effects of small sample sizes for some ages in some time strata.

Scales used for age and stock composition estimates for District 106 and 108 catches were collected by ADF&G personnel; the scales from inriver catches and from non-Tahltan escapements were collected by ADF&G and DFO personnel; and scale collections from Tahltan Weir escapements used to estimate the age compositions in the above reports were provided by the DFO.

Not all catches were analyzed in all years and some assumptions about stock and age compositions were made. It was assumed that 90% of the Canadian commercial and Indian food fishery catches in the upper Stikine River were comprised of Tahltan fish and 10% were comprised of non-Tahltan fish (based on an unpublished analysis of a limited database of scale circuli counts). The age composition of the Tahltan stock in the upper river catches was assumed to be the same as that of the escapement through Tahltan Weir in all years. The age composition of the non-Tahltan stock in the upper river catches was assumed to be the same as that of the lower river test fishery catch when that data was available (1985-1990), of the lower river commercial catch in 1983, and of the Tahltan escapement in 1984 (no other data available). Because they were released alive, fish captured in the Kakwan Point test fisheries and the sonar test fisheries below the U.S./Canada border were accounted for elsewhere and, therefore, were not included in the total catch calculations. The average age and stock compositions of District 108 commercial and test fishery catches from 1985 through 1989 were used

for 1983 and 1984. The age and stock compositions for the District 108 test fishery catch in 1985 were used for the commercial catch in 1985. The age and stock compositions for the District 108 commercial catches in 1987, 1989, and 1990 were used for the test fishery catches in those years. The District 106 commercial catch stock and age compositions in 1984, 1985, 1987, 1989, and 1990 were used to represent the stock and age compositions of the District 106 test fishery catches for those years.

Spawner-Recruit Analysis

The potential for spawner-recruit analysis was investigated for each of the stock groups, Tahltan and non-Tahltan, and for the entire Stikine River sockeye run. Forecasts were based on a pooled age form of the Ricker (1954) curve and a form modified for age-specific returns (Brannian et al. 1982). The pooled age spawner-recruit analysis is a single regression of total number of recruits (all ages combined) on the number of spawners in the parent brood year. The predicted runs for the three major ages (4, 5, and 6-year old fish) are then apportioned by weighting the forecasts by the average age of the runs. The age-specific analysis results from the sum of predicted recruits for three separate regressions of recruits of a given age (4, 5, and 6-year old fish) on the number of spawners in the parent brood year. Analyses were performed for both forms using the log transformation to linearity.

pooled age: $$R/S = a + e^{-(bS)}$$

or $$\ln(R/S) = \ln(a) - bS$$

and age-specific: $$R_{it}/S_{td} = a + e^{-bS_t}$$

or $$\ln(R_{it}/S_t) = \ln(a) - bS_t$$

where:

R_{it} = number of recruits age *i* from spawning during brood year *t*,
S_t = number of spawners in year *t*.

The database was sufficient to analyze only seven brood years for the pooled age model, beginning with the 1980 parent year and ending with the 1986 parent year. The most recent eight years were used for the age-specific spawner recruit regressions; years used varied among age classes. The accuracies of the regressions were tested by a jackknife or "leaving-one-out" method. The absolute error and error as a percent of actual run were estimated for each regression and group by calculating the absolute difference between the actual and predicted run size for every year. Errors were compared among regressions for each stock group and between stock groups. 95% prediction intervals were calculated for brood regressions (Kleinbaum and Kupper 1978) where:

$$P_I = Y \pm t_{n-2,1-\alpha/2} S_{Y|X} \sqrt{1 + \frac{1}{n} + \frac{(X_0 - \bar{X})^2}{(n-1) S_X^2}}$$

Prediction intervals were computed for the log-transformed model, then each end of the interval was untransformed to get an interval for actual return. These prediction intervals are minimum estimates since the errors associated with apportioning the returns by average age compositions are not included. Prediction intervals were calculated by simulation for the age-specific spawner-recruit forecasts. For each age, the predicted log of return was assumed to have a student t-distribution with mean equal to the predicted log of return, variance equal to the variance of the prediction and n-2 degrees of freedom. A set of three random deviates were generated, one from each distribution. The antilogs of the deviates were then summed to obtain total return. This process was repeated 100,000 times. The 2.5th and 97.5th percentiles of the resulting distribution were then used to form a 95% prediction interval.

Smolt-Recruit Analysis

A smolt-recruit regression was used to predict the 1992 Tahltan sockeye run based on data from smolt outmigrations in 1985 through 1989. In addition, an average percent survival forecast was made by multiplying the number of smolt by the average survival rate and assuming an average marine age composition for the returns. The accuracies of the regressions and average survival estimates were tested by a jackknife approach. The absolute error and error as a percent of actual run were estimated for each regression by calculating the absolute difference between the actual and predicted run size for every year. A 95% prediction interval was calculated for the smolt-recruit regression. There is no information on smolt outmigrations for the non-Tahltan stock group.

Sibling Analysis

Although the term sibling forecast or sibling relationship is used to describe the analyses in this section, not all of the regressions tested were standard sibling relationships where the return of age *n* fish in year *t* is used to predict the return of age *n*+1 fish in year *t*+1. Linear regressions were tried for five relationships: age-1.3 versus -1.2; all age groups versus age-1.2; all ages other than age-0. versus age-1.2; all age-0. versus age-0.2; and all returning fish versus age-1.2 + age-0.2. The last three regressions were not used for the Tahltan group as age-0. fish are not present in that stock. Forecasts for the 1992 run were made for each group using data from all years (1983-1991). The accuracies of the regressions were tested by a jackknife approach. The absolute error and error as a percent of actual run were estimated for each regression and

group by calculating the absolute difference between the actual and predicted run size for every year (1983-1991). Errors were compared among regressions for each stock group and between stock groups. 95% prediction intervals were calculated for the age-1.3 vs age-1.2 regressions and for the all age groups versus age-1.2 regressions.

Inseason Run Strength Index

Simple linear regressions of total run strength on cumulative weekly District 108 test fishery catch were run for Tahltan, non-Tahltan, and all Stikine sockeye stocks. Data was available from 1984 through 1991. During four of eight years the test fishery was not operating during, Statistical Week 24, therefore, Week 24 was not included in the analysis. Cumulative catch for Weeks 25 - 30 was input into linear regressions and was also analyzed graphically.

RESULTS

Spawner-Recruit Analysis

Brood tables (Appendix A.4) from each of the stock groups indicate that there is not a strong linear correlation between spawning escapement and adult return (Figures 2-4). The smallest escapements of the Tahltan stock, 10,211 and 11,018 fish, produced 28,664 and 122,870 fish, respectively. A non-Tahltan escapement of 30,806 produced a return of 96,508 fish, while an escapement of 29,307 fish produced a return of 35,393 fish. Stikine River escapements of 41,824 and 48,221 fish produced returns of 219,378 and 44,371 fish, respectively. The regressions for all ages combined predicted returns of 17,717 Tahltan fish (R^2=.396), 42,860 non-Tahltan fish (R^2=.631), and 59,747 Stikine River fish (R^2=.476), assuming an average age-structure of returns. The average error estimated with a jackknife procedure was 131.9% for the Tahltan group, 33.4% for the non-Tahltan group, and 54.2% for the Stikine River returns (Table 2, Appendices C.1-C.3). The age-specific regressions generally had low correlation coefficients which ranged from .271 to .646 (Table 1). The predicted 1992 runs were 21,375 Tahltan, 42,482 non-Tahltan, and 73,630 Stikine River fish. Medians of runs predicted through simulations were 26,436 Tahltan, 46,069 non-Tahltan, and 73,630 Stikine River fish. Prediction intervals were broad for the age-specific predictions. The average error estimated with a jackknife procedure varied among ages and stocks (Table 3, Appendices C.1-C.3).

Smolt-Recruit Analysis

There appears to be a linear correlation between the number of smolts and the number of recruits produced for Tahltan sockeye salmon (Figure 5, Table 4). Linear regression of the number of adults vs the number of smolt had an R^2 of .614 and resulted in a prediction of 29,752 fish with a prediction interval of 0 to 165,697 fish. However, the average error estimated with a jackknife procedure was 123.4% (Table 5, Appendix C.4). The prediction from the average percent survival estimate was 27,993 fish, and the average error from the jackknife estimator was 93.5%. The 1984 and 1986 outmigrations of 219,702 and 244,330 smolt had survival rates of 6.4% and produced returns of 14,073 and 15,516 adults, respectively, while the 1985 smolt outmigration of 613,531 fish had a survival rate of 1.2% and produced a return of 7,031 adults. There does not appear to be any correlation between the number of smolt and their survival (Figure 6). There does not appear to be a linear correlation between the number of spawning adults and the number of smolt outmigrating two years later (Figure 7). The number of smolt per spawner is negatively correlated with the number of spawners (Appendices A.5 and A.6).

Sibling Analysis

Of the five age class combinations used for the sibling analysis, the all age groups vs age-1.2 fish was the method chosen for the sibling forecast. The sibling forecasts for the 1992 sockeye runs are 80,962 Tahltan fish (R^2=.735; prediction interval = $\pm$ 59,843), 96,782 non-Tahltan fish (R^2=.458; prediction interval = $\pm$ 69,117), and 187,574 Stikine River fish (R^2.684; prediction interval = $\pm$ 111,588) (Table 6). Graphical analysis indicated that the regression for the Tahltan stock was strongly driven by two data points, the age-1.2 return in 1984 and 1990 (Figure 8). Exclusion of these data points resulted in regressions with R^2 of .611 and .913, respectively (Appendix C.5). The data for the non-Tahltan and entire Stikine appeared less clustered than for the Tahltan stock (Figures 9 and 10) and removal of single data points did not greatly affect the correlation coefficient (Appendices C.6 and C.7)

The correlation between age-1.2 fish in year *t* and age-1.3 fish in year *t*+1 was strong for all groups. However, unmeasured error would be introduced in estimating the run strength of fish other the age-1.3; therefore, this method was not used for forecasting.

The average percent forecast error for total run, estimated with a jackknife procedure, was lowest for regression of all ages vs the age-1.2 fish. The average error rate for the Tahltan group was 70.9% (Table 7), for the non-Tahltan group 41.0%, and for the Stikine group 30.3%. Error rates for the regression of age-0.2+age-1.2 fish vs the entire run were similar to those for the age-1.2 vs the entire run for the non-Tahltan and the Stikine groups.

Inseason Run Strength Index

There is a linear correlation between the cumulative catch in the District 108 test fishery and the run of Tahltan, non-Tahltan, and all Stikine sockeye salmon (Appendix D.1). The best fits for the regressions of run size on cumulative catch occurred for week 26 with R^2=.789 for Tahltan, R^2=.683 for non-Tahltan, and R^2=.841 for all Stikine fish (Appendix D.2). The linear trend is also apparent graphically (Appendices D.3-D.5).

DISCUSSION

The limited data available for forecasts make it difficult to evaluate which method is the most appropriate. This is especially problematic when the forecasts differ greatly from each other. For the Tahltan stock, the prediction intervals and average error rate for the sibling forecast were much smaller than those for the spawner-recruit or smolt-recruit methods. Therefore, the sibling procedure was chosen as the forecast for the 1992 Tahltan run. For the non-Tahltan stocks the prediction intervals and average error rates were similar for the spawner-recruit and sibling forecasts. Therefore, the average of these two methods was used as the prediction for the 1992 non-Tahltan sockeye run. The total Stikine run forecast is the sum of the Tahltan and non-Tahltan forecasts. This forecast is very high compared to 8 of the last 9 years. The forecast of 80,962 Tahltan fish would require a smolt to adult survival of 13% to 14%, nearly double the previous record of 7.3% for the 1988 smolt outmigration. However, the two ocean fish which returned from the 1989 smolt outmigration indicated that 2.2% of the fish have already successfully recruited to adults. This was also twice the previous rate of return for two ocean fish. This could reflect either a change in age structure from three ocean to two ocean fish or a high smolt to adult survival rate.

The lack of correlation between the number of Tahltan spawners and recruits is likely due to the limited area available for spawning.

There are potential sources of error in the age-specific catch and escapement data. The catches of Tahltan and non-Tahltan fish were estimated with proven techniques and variances can be determined. However, assumptions were made for some catches when samples were unavailable, for example, the test fish catches are assumed to have the same age and stock compositions as the commercial catches. The Tahltan escapement was known since it was counted at the weir, however, there was an unknown and potentially large uncertainty associated with the non-Tahltan escapement estimates. The estimate was based on the ratio of non-Tahltan to Tahltan fish in the inriver run, migratory timing (estimated from standardized test fishery CPUE data), and the Tahltan run strength. Potential errors in the non-Tahltan escapement would affect all forecasts for this stock and for the entire Stikine River sockeye run.

Further study is needed; however, it appears that the spawning escapement goal for this system may be larger than that which will maximize smolt production. It appears that 20,000 adults, or fewer, may consistently produce more smolt than the current escapement goal of 30,000 fish. There does appear to be a correlation between number of smolts and number of returning adults.

All aspects of this analysis were affected by the paucity of data. Due to the small number of data pairs, each had a very high weight and, thus, an abnormal year may have exerted an unduly high influence on any correlation present. Also, with only a few years of data, it was not possible to positively ascertain which, if any, of the years, were abnormal. A cursory sibling forecast of the Tahltan stock of Stikine River sockeye salmon in 1988 was made based on only four years of data. The return of age-1.2 Tahltan sockeye in 1987 was used to forecast the return of age-1.3 sockeye salmon in 1988, and the number of age-1.3 fish was expanded to the total run by the average (1983-1987) proportion of the run comprised of that age group. The method correctly predicted a small run and the technique was used again in 1989, based on five years of data. This forecast was incorporated into the Stikine management model and, although not as accurate as the forecast of the previous year, it correctly predicted a small run. The sibling forecast was again incorporated into the Stikine management model for 1990. The sibling forecast for the 1990 Tahltan run (27,523 fish) was very near the total estimated run of 26,289 fish. The smolt forecast overestimated the run and the spawner-recruit forecast underestimated it. The spawner-recruit forecast for the non-Tahltan stock was 53,751, very close to the total estimated run of 53,174, while the sibling forecast was less than half the realized run. Both the sibling and spawner-recruit forecasts underestimated the entire 1990 Stikine run by more than 20,000 fish. The sibling and smolt forecasts for 1991 underestimated the Tahltan run by approximately 50%. The non-Tahltan forecasts underestimated the run by 20% for the spawner-recruit and 50% for the sibling methods. All forecasts made in 1991 underestimated all segments of the Stikine River sockeye runs.

The cumulative catch in the District 108 test fishery should provide a good indication of the accuracy of the preseason forecasts. The high correlation coefficients for week 26 should allow time to target the Stikine stocks should the high preseason forecasts prove accurate. Conversely, should the catch in the test fishery be low, managers may decide to place less emphasis on the preseason prediction of Stikine run strength.

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Table 1. Predictions for the 1992 Stikine sockeye runs based on spawner-recruit regressions for brood returns and age-specific run forecasts. The brood forecast was estimated by weighting the brood returns by average age of return.

	Brood Forecast All Ages	Age-Specific run Forecasts				
		Age-4	Age-5	Age-6	Total	Simulation
Tahltan						
Constant	1.17602	-0.73233	1.26094	-1.63601		
Std Err of Y Est	1.10225	1.55429	1.15227	0.46515		
R Squared	0.39603	0.35635	0.39607	0.64601		
No. of Observations	7	8	8	8		
Degrees of Freedom	5	6	6	6		
X Coefficient(s)	-0.00004	-0.00005	-0.00004	-0.00003		
Std Err of Coef.	0.00002	0.00003	0.00002	0.00001		
Predicted 6-year-olds	3,166					
Predicted 5-year-olds	13,907					
Predicted 4-year-olds	644					
Predictions for 1992	17,717	1,067	18,138	2,169	21,375	26,436
Prediction Interval						
Lower Bound		10	598	598		3,815
Upper Bound		117,062	550,410	7,869		624,719
Non-Tahltan						
Constant	1.05611	-0.65787	0.79162	-1.68261		
Std Err of Y Est	0.38688	0.51695	0.43925	0.72086		
R Squared	0.63117	0.27135	0.59157	0.40413		
No. of Observations	7	8	8	8		
Degrees of Freedom	5	6	6	6		
X Coefficient(s)	-0.00002	-0.00001	-0.00002	-0.00002		
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001		
Predicted 6-year-olds	2,614					
Predicted 5-year-olds	29,473					
Predicted 4-year-olds	10,773					
Predictions for 1992	42,860	8,973	30,578	2,932	42,482	46,069
Prediction Interval						
Lower Bound		2,093	8,841	406		20,251
Upper Bound		38,473	105,754	21,166		128,058
Stikine River						
Constant	1.08310	-0.65621	0.99915	-1.66235		
Std Err of Y Est	0.64359	0.67333	0.69117	0.56375		
R Squared	0.47613	0.36008	0.47620	0.52092		
No. of Observations	7	8	8	8		
Degrees of Freedom	5	6	6	6		
X Coefficient(s)	-0.00001	-0.00001	-0.00001	-0.00001		
Std Err of Coef.	0.00001	0.00001	0.00001	0.00000		
Predicted 6-year-olds	5,243					
Predicted 5-year-olds	43,933					
Predicted 4-year-olds	10,571					
Predictions for 1992	59,747	10,028	51,441	5,165	66,634	73,630
Prediction Interval						
Lower Bound		1,419	7,003	1,094		22,134
Upper Bound		70,848	377,842	24,395		385,135

Table 2. Actual vs predicted returns of Stikine River sockeye salmon estimated with a jackknife procedure applied to spawner-recruit regressions for the 1979 to 1985 escapements.

Year		Run Size		Absolute Error	
Brood	Return	Actual	Predicted	Number	Percent
Tahltan					
1979	1985	28,664	19,810	8,854	30.9
1980	1986	122,870	11,265	111,605	90.8
1981	1987	35,579	19,319	16,260	45.7
1982	1988	12,987	35,474	22,487	173.2
1983	1989	7,876	40,873	32,997	419.0
1984	1990	16,729	32,796	16,067	96.0
1985	1991	24,437	7,938	16,499	67.5
Average				32,110	131.9
Non-Tahltan					
1979	1985	38,032	34,804	3,228	8.5
1980	1986	96,508	45,516	50,992	52.8
1981	1987	52,592	62,891	10,299	19.6
1982	1988	28,146	45,631	17,485	62.1
1983	1989	34,039	54,832	20,793	61.1
1984	1990	70,035	54,145	15,890	22.7
1985	1991	52,324	55,941	3,617	6.9
Average				17,472	33.4
Stikine River					
1979	1985	66,696	53,699	12,997	19.5
1980	1986	219,378	55,489	163,889	74.7
1981	1987	88,171	84,998	3,173	3.6
1982	1988	41,133	92,997	51,864	126.1
1983	1989	41,915	94,023	52,109	124.3
1984	1990	86,764	89,626	2,862	3.3
1985	1991	76,761	55,526	21,235	27.7
Average				44,018	54.2

Table 3. Actual vs predicted runs of Stikine River sockeye salmon estimated with a jackknife procedure applied to age-specific spawner-recruit regressions for the 1984 through 1991 runs.

	Tahltan				Non-Tahltan				Stikine			
	Age-4	Age-5	Age-6	Total	Age-4	Age-5	Age-6	Total	Age-4	Age-5	Age-6	Total
1984												
Predicted	1,796	22,393	2,325	26,514	10,304	27,179	2,487	39,970	11,652	50,435	4,918	67,006
Actual	13,690	25,138	1,940	40,768	15,966	24,078	3,039	43,083	29,656	49,216	4,979	83,851
Abs. Difference	11,894	2,745	385	14,254	5,662	3,101	552	3,113	18,004	1,219	61	16,845
Percent	86.9	10.9	19.8	35.0	35.5	12.9	18.2	7.2	60.7	2.5	1.2	20.1
1985												
Predicted	1,422	14,316	1,287	17,025	14,615	32,516	1,502	48,633	16,771	49,779	2,673	69,223
Actual	2,634	106,496	2,081	111,211	16,957	78,452	6,941	102,350	19,591	184,948	9,022	213,561
Abs. Difference	1,212	92,180	794	94,186	2,342	45,936	5,439	53,717	2,820	135,169	6,349	144,338
Percent	46.0	86.6	38.1	84.7	13.8	58.6	78.4	52.5	14.4	73.1	70.4	67.6
1986												
Predicted	4,323	16,527	1,270	22,120	8,385	42,767	3,242	54,394	16,990	63,792	4,852	85,634
Actual	286	30,822	2,685	33,793	7,277	32,476	1,561	41,314	7,563	63,298	4,246	75,107
Abs. Difference	4,037	14,295	1,415	11,673	1,108	10,291	1,681	13,080	9,427	494	606	10,527
Percent	1411.4	46.4	52.7	34.5	15.2	31.7	107.7	31.7	124.6	0.8	14.3	14.0
1987												
Predicted	4,729	33,294	2,238	40,260	11,355	33,498	3,254	48,107	17,165	77,542	5,690	100,397
Actual	468	11,645	2,123	14,236	7,485	19,090	2,313	28,888	7,953	30,735	4,436	43,124
Abs. Difference	4,261	21,649	115	26,024	3,870	14,408	941	19,219	9,212	46,807	1,254	57,273
Percent	910.4	185.9	5.4	182.8	51.7	75.5	40.7	66.5	115.8	152.3	28.3	132.8
1988												
Predicted	2,818	40,312	2,689	45,820	12,647	39,217	3,151	55,016	17,726	79,354	6,065	103,145
Actual	2,742	5,613	1,056	9,411	11,125	22,906	834	34,865	13,867	28,519	1,890	44,276
Abs. Difference	76	34,699	1,633	36,409	1,522	16,311	2,317	20,151	3,859	50,835	4,175	58,869
Percent	2.8	618.2	154.6	386.9	13.7	71.2	277.8	57.8	27.8	178.2	220.9	133.0
1989												
Predicted	255	31,518	2,296	34,069	13,068	37,700	2,818	53,585	8,827	72,435	5,156	86,418
Actual	2,151	11,688	1,795	15,634	16,670	54,611	3,265	74,546	18,821	66,299	5,060	90,180
Abs. Difference	1,896	19,830	501	18,435	3,602	16,911	447	20,961	9,994	6,136	96	3,762
Percent	88.1	169.7	27.9	117.9	21.6	31.0	13.7	28.1	53.1	9.3	1.9	4.2
1990												
Predicted	3,202	6,128	2,442	11,773	12,620	37,440	2,972	53,032	16,776	39,174	5,510	61,461
Actual	4,307	19,682	2,299	26,288	4,983	31,704	4,063	40,750	9,290	51,386	6,362	67,038
Abs. Difference	1,105	13,554	143	14,515	7,637	5,736	1,091	12,282	7,486	12,212	852	5,577
Percent	25.7	68.9	6.2	55.2	153.3	18.1	26.8	30.1	80.6	23.8	13.4	8.3
1991												
Predicted	1,306	24,485	969	26,760	6,737	35,951	1,331	44,019	7,730	61,249	2,363	71,341
Actual	8,565	79,695	2,603	90,863	18,355	41,743	2,763	62,861	26,920	121,438	5,366	153,724
Abs. Difference	7,259	55,210	1,634	64,103	11,618	5,522	1,432	18,842	19,190	60,189	3,003	82,383
Percent	84.8	69.3	62.8	70.5	63.3	13.3	51.8	30.0	71.3	49.6	56.0	53.6
Average												
Abs. Difference	3,967	31,770	827	34,950	4,670	14,777	1,738	20,171	9,999	39,133	2,050	47,447
Percent	332.0	157.0	46.0	120.9	46.0	39.0	76.9	38.0	68.5	61.2	50.8	54.2

Table 4. Predictions for the 1992 Tahltan sockeye run based on smolt-adult average survival and linear regression.

Average smolt-adult survival forecast				
Smolt	Outmigration	Average Survival	Average Marine Age	Predicted Run
1989	580,574	0.048	0.886	24,677
1990	607,645	0.048	0.114	3,315
Total				27,993

Regression forecast	
Constant	0
Std Err of Y Est	19,551
R Squared	0.614
No. of Observations	5
Degrees of Freedom	4
X Coefficient(s)	0.051
Std Err of Coef.	0.012
Estimated recruits	29,752
Prediction Interval	
Lower Bound	0
Upper Bound	165,697

Table 5. Actual vs predicted run size of Tahltan sockeye salmon based on a jackknife prodecure used for smolt-recruit regressions and for average percent survival estimates for the 1987 through 1991 sockeye runs. Y intercept fixed at zero.

	Run Size		Error	
Year	Actual	Pred.	Number	Percent
Regressions				
1987	14,073	11,204	2,870	20.4
1988	7,031	35,746	28,715	408.4
1989	15,516	12,448	3,068	19.8
1990	23,374	47,964	24,590	105.2
1991	84,184	30,905	53,279	63.3
Average			22,504	123.4
Average Survival				
1985	14,073	10,537	3,536	25.1
1988	7,031	29,426	22,395	318.5
1989	15,516	11,718	3,798	24.5
1990	23,374	38,869	15,495	66.3
1991	84,184	56,121	28,063	33.3
Average			14,657	93.5

Table 6. Predictions for the 1992 Stikine sockeye runs based on sibling forecasts where regressions are run for various age groups to predict components of, or the entire run.

X in Year t Y in Year t+1	1.2 1.3	1.2 All	1.2 All no 0.	0.2 All 0.	0.2+1.2 All
Tahltan					
Constant	9,069	16,824			
Std Err of Y Est	16,766	21,014			
R Squared	0.816	0.735			
No. of Observations	8	8			
Degrees of Freedom	6	6			
X Coefficient(s)	7.544	7.489			
Std Err of Coef.	1.463	1.833			
Predicted 1992	73,677	80,962			
Prediction Interval	47,189	59,143			
Lower Bound	26,488	21,819			
Upper Bound	120,866	140,105			
Non-Tahltan					
Constant	9,804	20,962	19,711	3,071	21,733
Std Err of Y Est	14,900	19,886	17,570	4,020	20,149
R Squared	0.504	0.458	0.443	0.208	0.444
No. of Observations	8	8	8	8	8
Degrees of Freedom	6	6	6	6	6
X Coefficient(s)	4.558	5.548	4.760	5.838	5.003
Std Err of Coef.	1.846	2.464	2.177	4.654	2.287
Predicted 1992	72,089	96,782	84,757	6,544	93,081
Prediction Interval	51,788	69,117			
Lower Bound	20,301	27,665			
Upper Bound	123,877	165,899			
Stikine					
Constant	9,520	29,794	27,121	3,071	29,411
Std Err of Y Est	28,060	35,926	35,697	4,020	37,102
R Squared	0.756	0.684	0.665	0.208	0.663
No. of Observations	8	8	8	8	8
Degrees of Freedom	6	6	6	6	6
X Coefficient(s)	6.630	7.096	6.745	5.838	6.777
Std Err of Coef.	1.538	1.969	1.956	4.654	1.972
Predicted 1992	156,910	187,547	177,062	6,544	184,104
Prediction Interval	87,156	111,588			
Lower Bound	69,754	75,959			
Upper Bound	244,065	299,135			

Table 7. Actual vs predicted run size of Stikine River sockeye salmon based on a jackknife prodecure used for sibling forecast regressions for 1984 through 1991.

	Tahltan Fish				Non-Tahltan Fish				Stikine River Fish			
	Run Size		Absolute Error		Run Size		Absolute Error		Run Size		Absolute Error	
Year	Actual	Predicted	#	%	Actual	Predicted	#	%	Actual	Predicted	#	%
Regression 1: X=age-1.2 Y=age-1.3												
1984	24,695	19,095	5,600	22.7	23,044	39,512	16,468	71.5	47,739	61,159	13,420	28.1
1985	106,164	184,106	77,942	73.4	76,500	39,663	36,837	48.2	182,664	153,685	28,979	15.9
1986	30,501	28,708	1,793	5.9	31,449	43,364	11,915	37.9	61,950	75,030	13,081	21.1
1987	11,343	11,196	148	1.3	18,715	40,412	21,697	115.9	30,058	55,981	25,923	86.2
1988	5,206	14,369	9,163	176.0	21,784	26,444	4,660	21.4	26,990	37,596	10,606	39.3
1989	10,572	32,598	22,026	208.3	53,685	42,838	10,846	20.2	64,256	80,404	16,148	25.1
1990	17,808	26,498	8,690	48.8	31,452	22,081	9,371	29.8	49,260	44,123	5,137	10.4
1991	75,399	36,488	38,911	51.6	40,324	14,886	25,438	63.1	115,723	46,673	69,050	59.7
Average			20,534	73.5			17,154	51.0			20,793	35.7
Regression 2: X=age-1.2 Y=all ages												
1984	40,768	25,217	15,552	38.1	43,932	56,147	12,215	27.8	84,700	82,842	1,858	2.2
1985	111,211	213,854	102,643	92.3	103,290	54,866	48,424	46.9	214,501	190,955	23,546	11.0
1986	33,793	36,965	3,172	9.4	41,684	62,724	21,040	50.5	75,477	101,402	25,925	34.3
1987	14,235	20,161	5,925	41.6	29,164	58,600	29,436	100.9	43,400	81,045	37,646	86.7
1988	9,412	22,943	13,531	143.8	35,745	41,159	5,414	15.1	45,156	60,785	15,628	34.6
1989	15,634	40,578	24,944	159.6	74,755	61,101	13,654	18.3	90,389	105,369	14,980	16.6
1990	26,289	34,000	7,711	29.3	41,042	37,982	3,061	7.5	67,331	67,903	572	0.8
1991	90,862	42,815	48,047	52.9	63,958	24,767	39,191	61.3	154,319	67,614	86,705	56.2
Average			27,691	70.9			21,554	41.0			25,857	30.3
Regression 3: X=age-1.2 Y=non age-0.												
1984					39,184	49,929	10,745	27.4	79,952	77,440	2,512	3.1
1985					92,393	44,386	48,007	52.0	203,604	169,965	33,639	16.5
1986					40,157	55,108	14,951	37.2	73,949	94,695	20,746	28.1
1987					24,819	52,276	27,458	110.6	39,054	76,016	36,962	94.6
1988					31,379	37,342	5,963	19.0	40,790	56,840	16,049	39.3
1989					61,081	55,085	5,996	9.8	76,715	100,120	23,406	30.5
1990					38,581	33,768	4,812	12.5	64,869	62,898	1,971	3.0
1991					57,578	22,341	35,237	61.2	148,441	62,590	85,851	57.8
Average							19,146	41.2			27,642	34.1
Regression 4: X=age-0.2 Y=age-0.												
1984					4,748	5,475	727	15.3	4,748	5,475	727	15.3
1985					10,897	6,879	4,018	36.9	10,897	6,879	4,018	36.9
1986					1,528	11,862	10,334	676.5	1,528	11,862	10,334	676.5
1987					4,346	5,392	1,047	24.1	4,346	5,392	1,047	24.1
1988					4,366	4,473	107	2.4	4,366	4,473	107	2.4
1989					13,674	5,738	7,936	58.0	13,674	5,738	7,936	58.0
1990					2,462	4,875	2,414	98.1	2,462	4,875	2,414	98.1
1991					5,881	2,443	3,438	58.5	5,881	2,443	3,438	58.5
Average							3,753	121.2			3,753	121.2
Regression 5: X=age-0.2 + -1.2 Y=all ages												
1984					43,932	55,789	11,857	27.0	84,700	82,573	2,127	2.5
1985					103,290	55,173	48,117	46.6	214,501	165,049	49,452	23.1
1986					41,684	64,703	23,019	55.2	75,477	104,480	29,003	38.4
1987					29,164	57,788	28,623	98.1	43,400	81,178	37,779	87.0
1988					35,745	41,291	5,546	15.5	45,156	60,818	15,662	34.7
1989					74,755	62,078	12,678	17.0	90,389	107,913	17,524	19.4
1990					41,042	38,064	2,979	7.3	67,331	67,082	249	0.4
1991					63,458	23,857	39,601	62.4	154,319	64,823	89,496	58.0
Average							21,552	41.1			30,161	32.9
Predicted from R3+R4												
1984					43,932	55,404	11,472	26.1	84,700	82,915	1,785	2.1
1985					103,290	51,265	52,025	50.4	214,501	176,844	37,657	17.6
1986					41,684	66,970	25,285	60.7	75,477	106,558	31,081	41.2
1987					29,164	57,669	28,504	97.7	43,400	81,408	38,009	87.6
1988					35,745	41,815	6,070	17.0	45,156	61,312	16,156	35.8
1989					74,755	60,823	13,932	18.6	90,389	105,859	15,470	17.1
1990					41,042	38,644	2,399	5.8	67,331	67,773	442	0.7
1991					63,458	24,784	38,674	60.9	154,319	65,033	89,286	57.9
Average							22,295	42.2			28,736	32.5

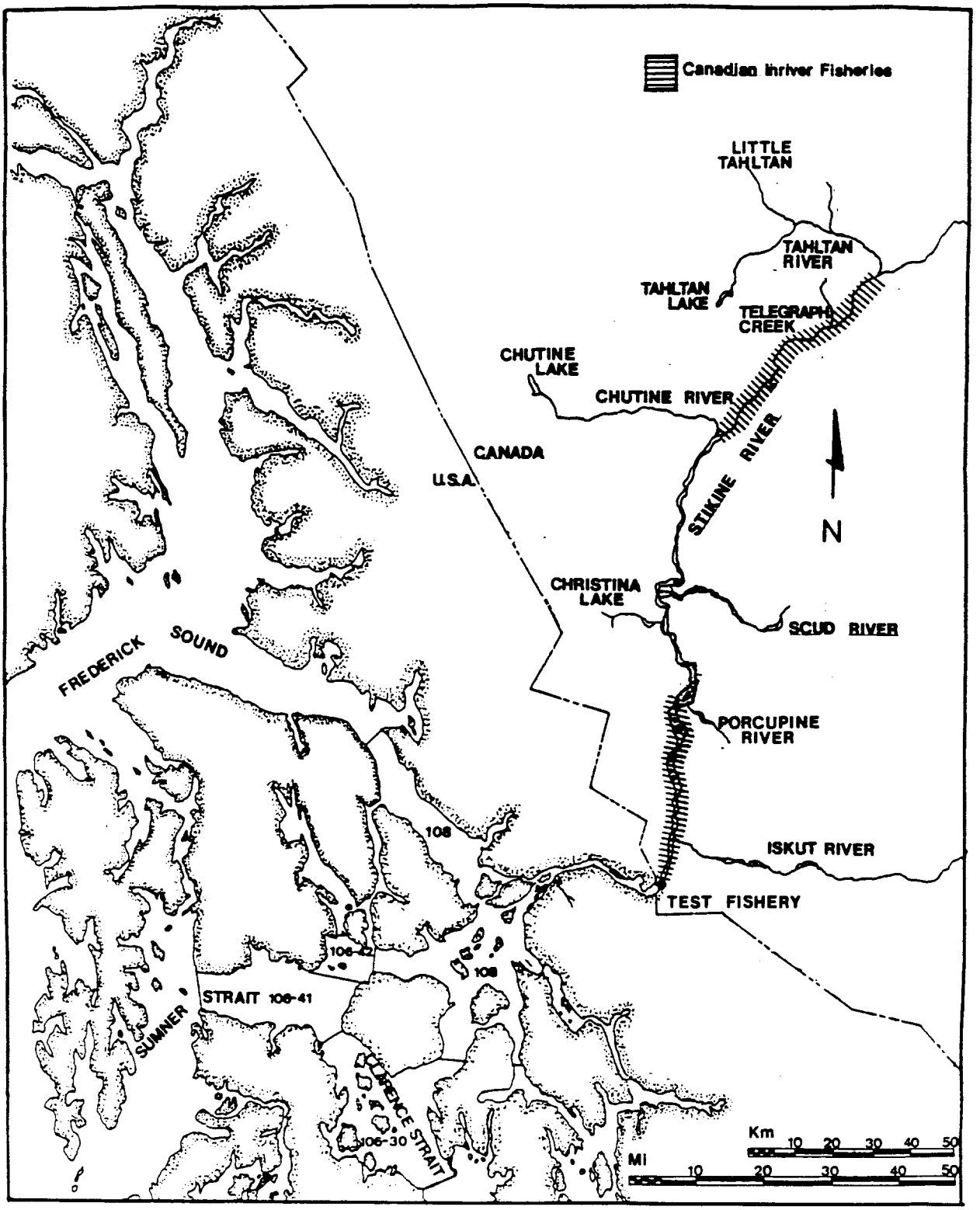


Figure 1. The transboundary Stikine River and major U.S. and Canadian fishing areas.

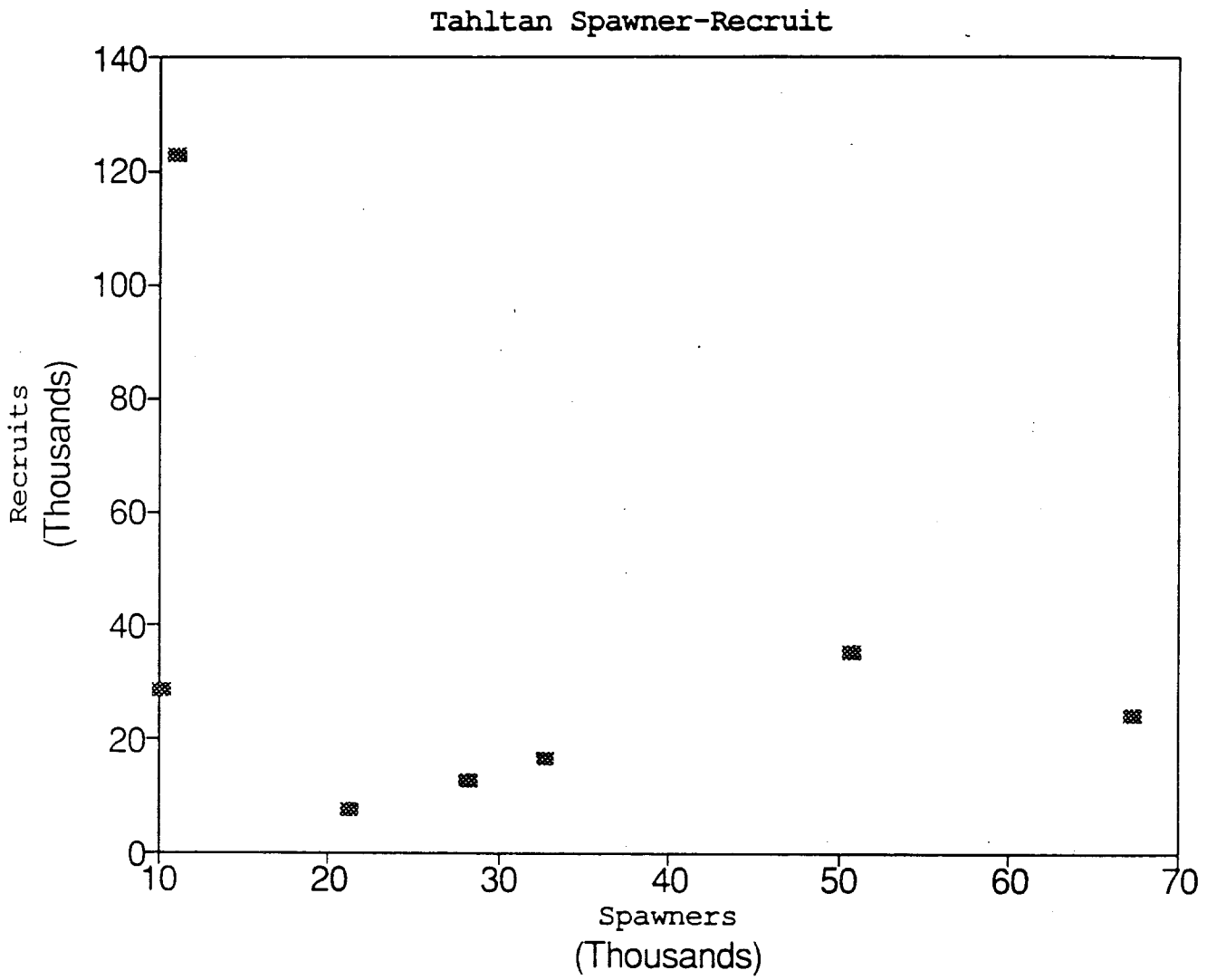


Figure 2. - Spawner-recruit relationship for Tahitan sockeye salmon.

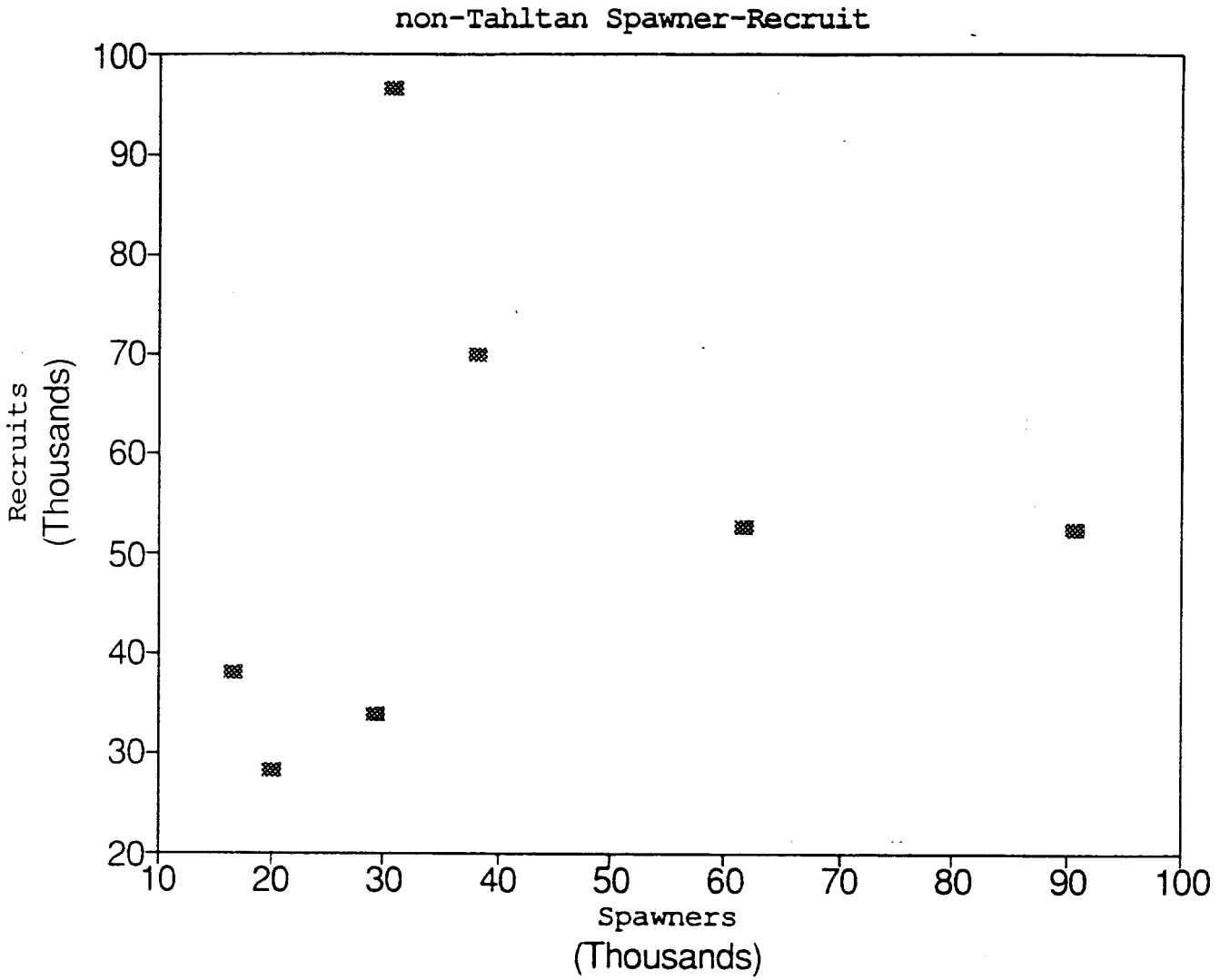


Figure 3. Spawner-recruit relationship for non-Tahltan sockeye salmon.

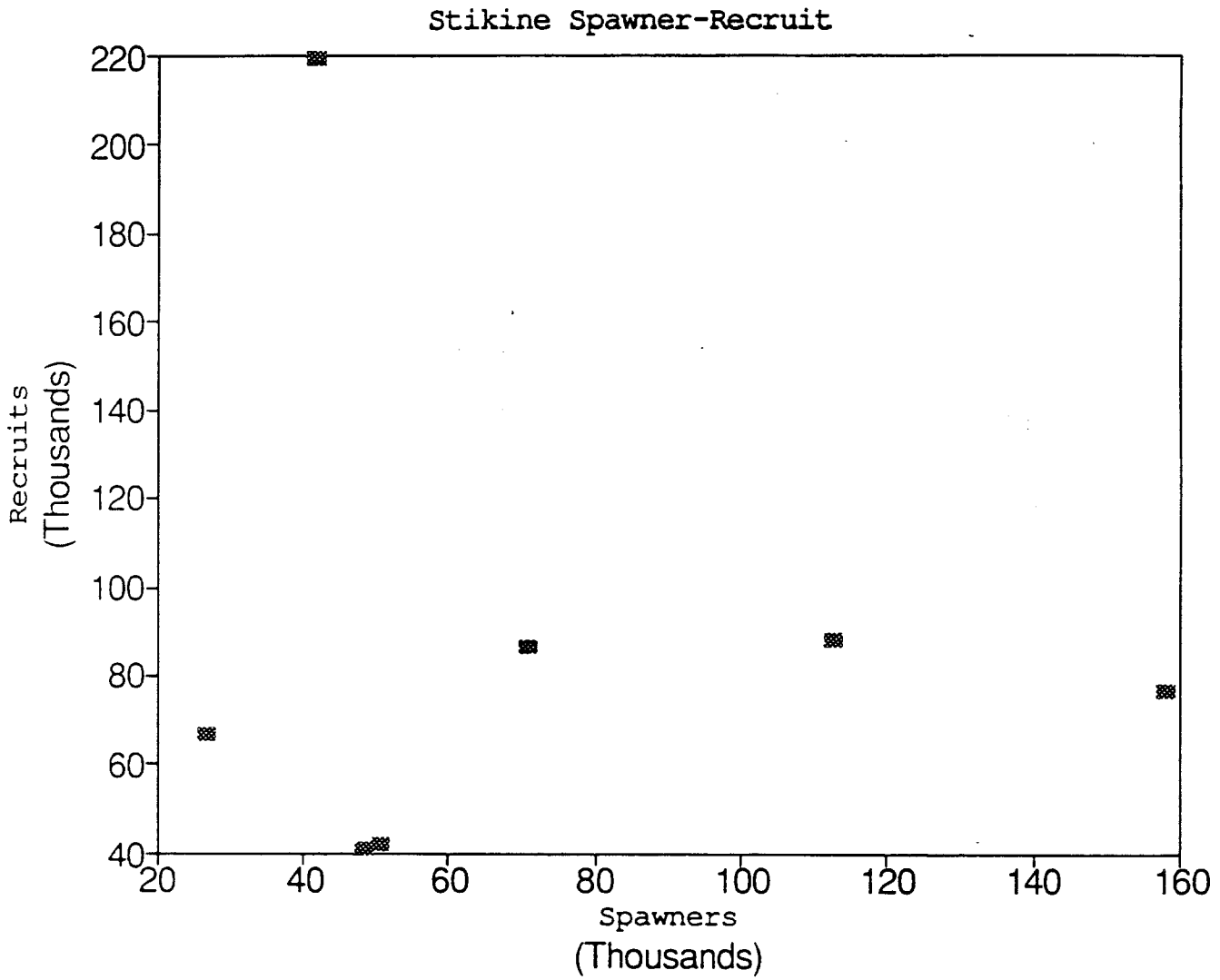


Figure 4. - Spawner-recruit relationship for Stikine sockeye salmon.

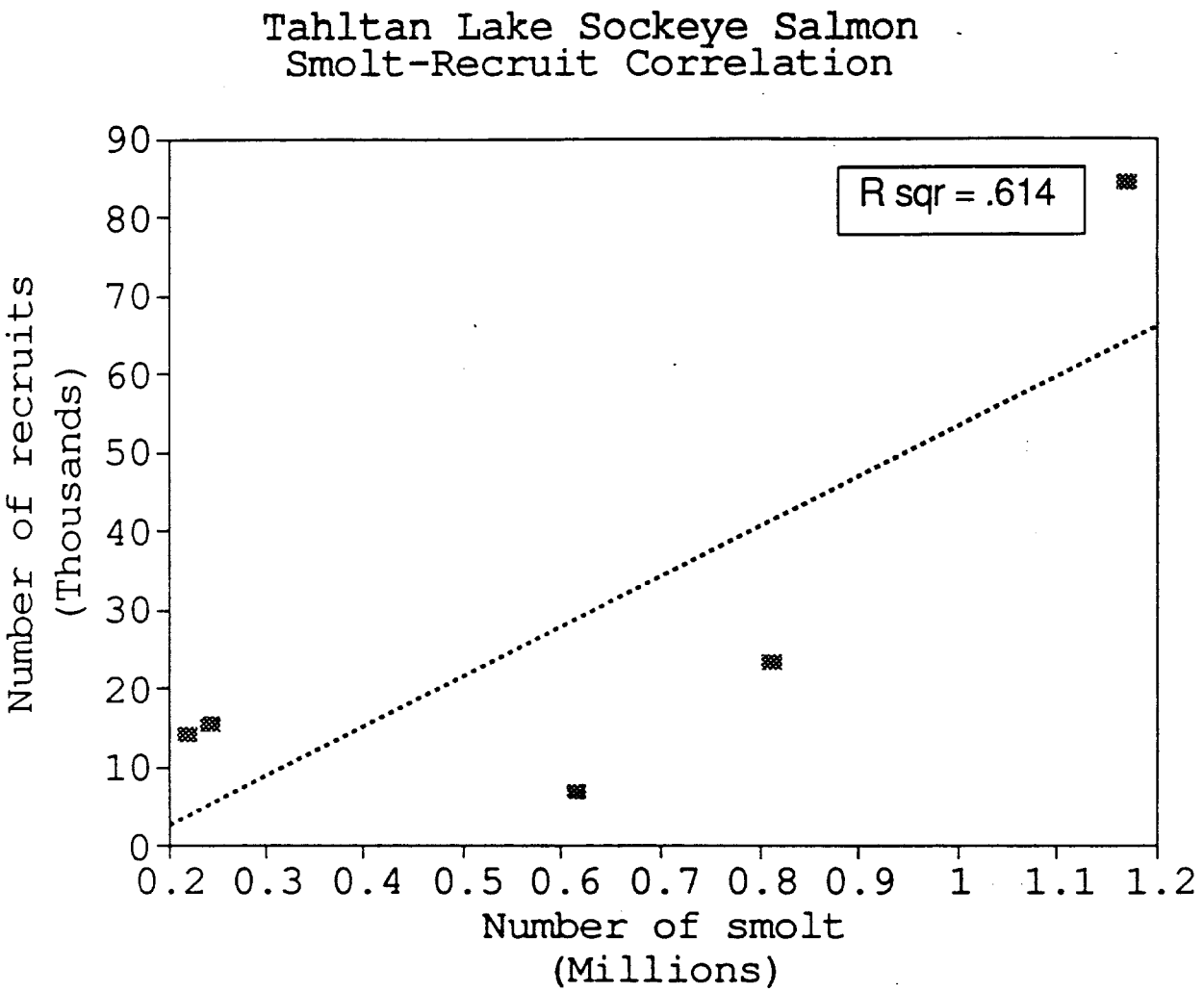


Figure 5. Smolt-recruit relationship for Tahltan sockeye salmon.

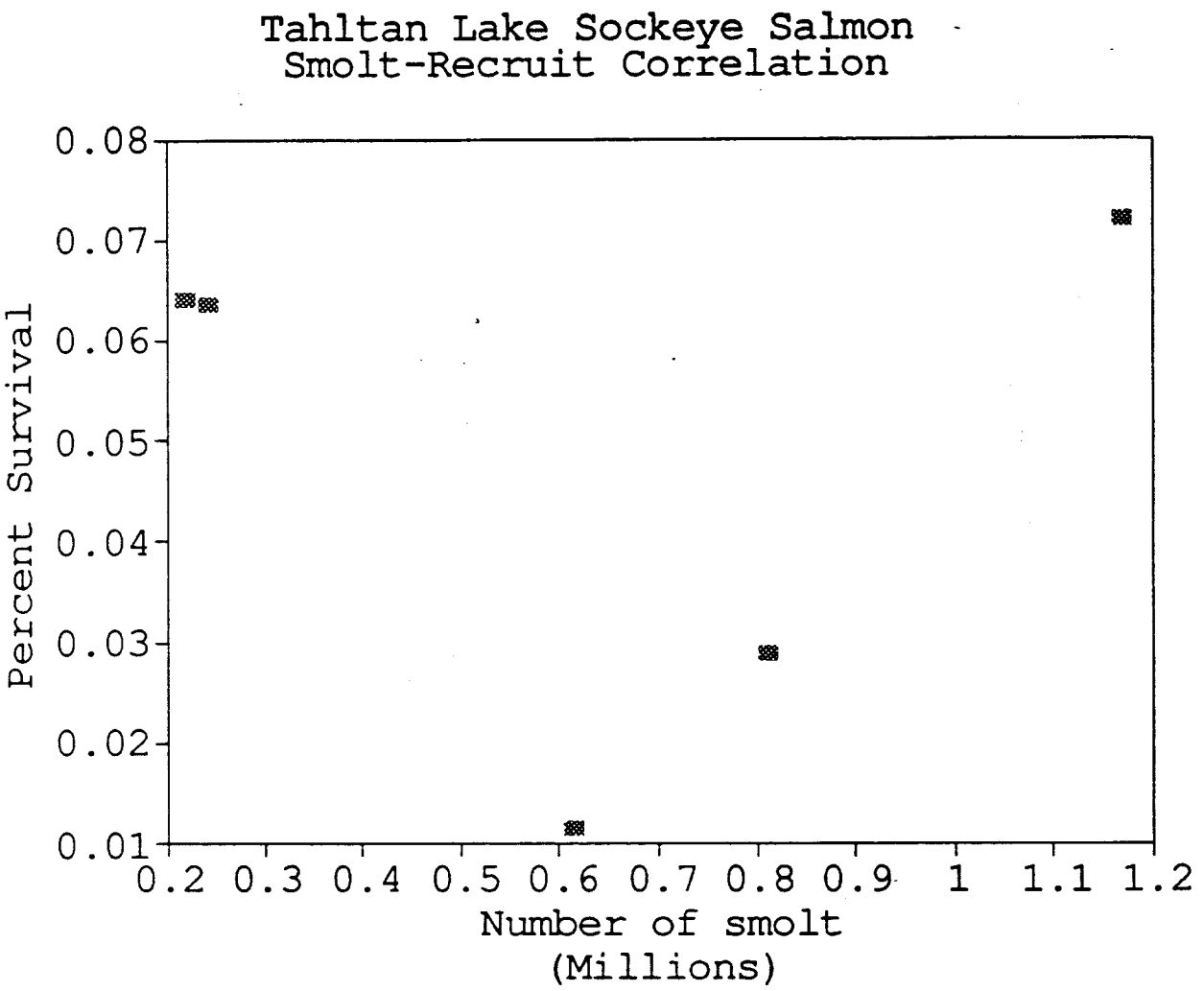


Figure 6. - Smolt to adult survival vs number of Tahltan sockeye smolt.

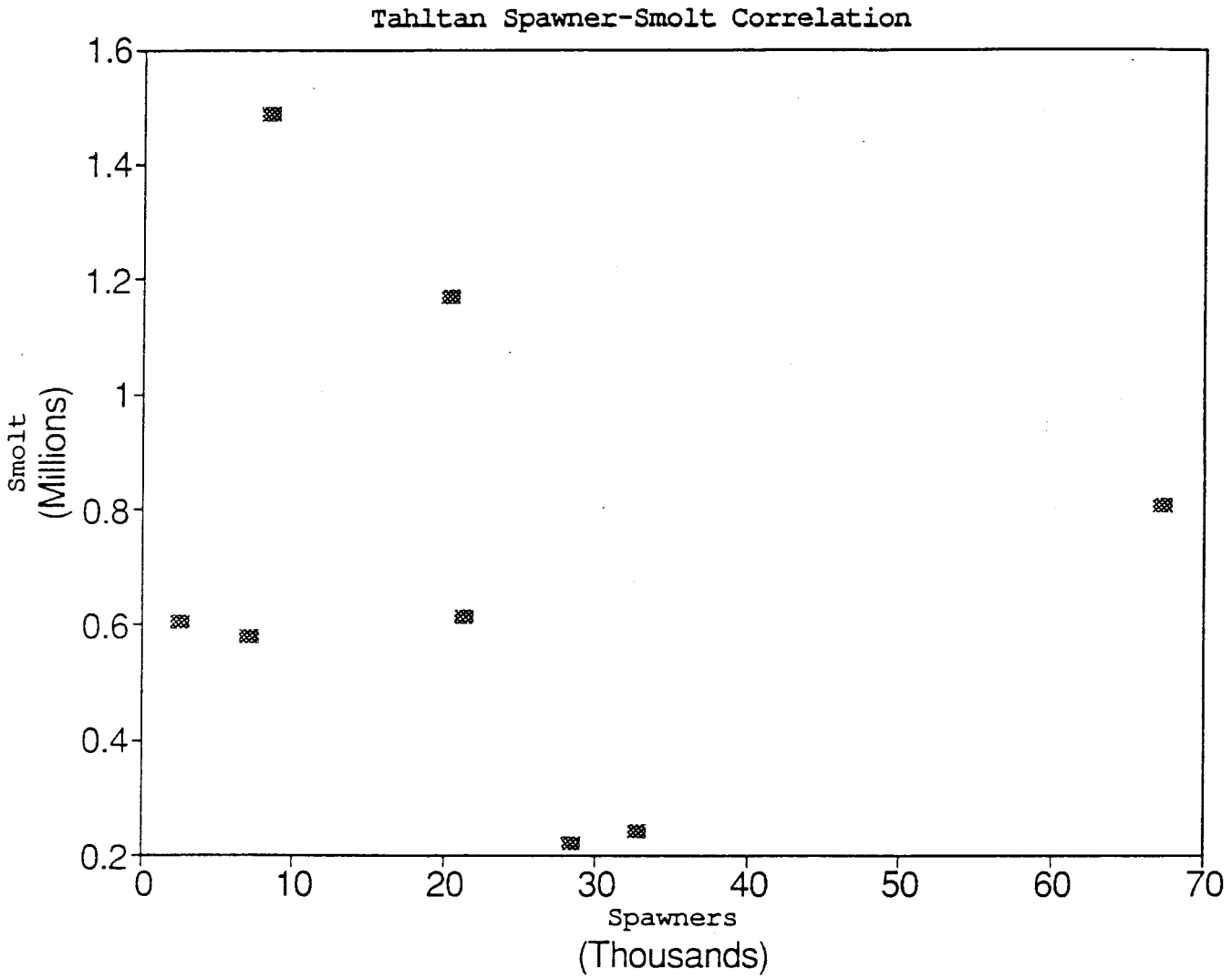


Figure 7. Spawner-smolt relationship for Tahltan sockeye salmon.

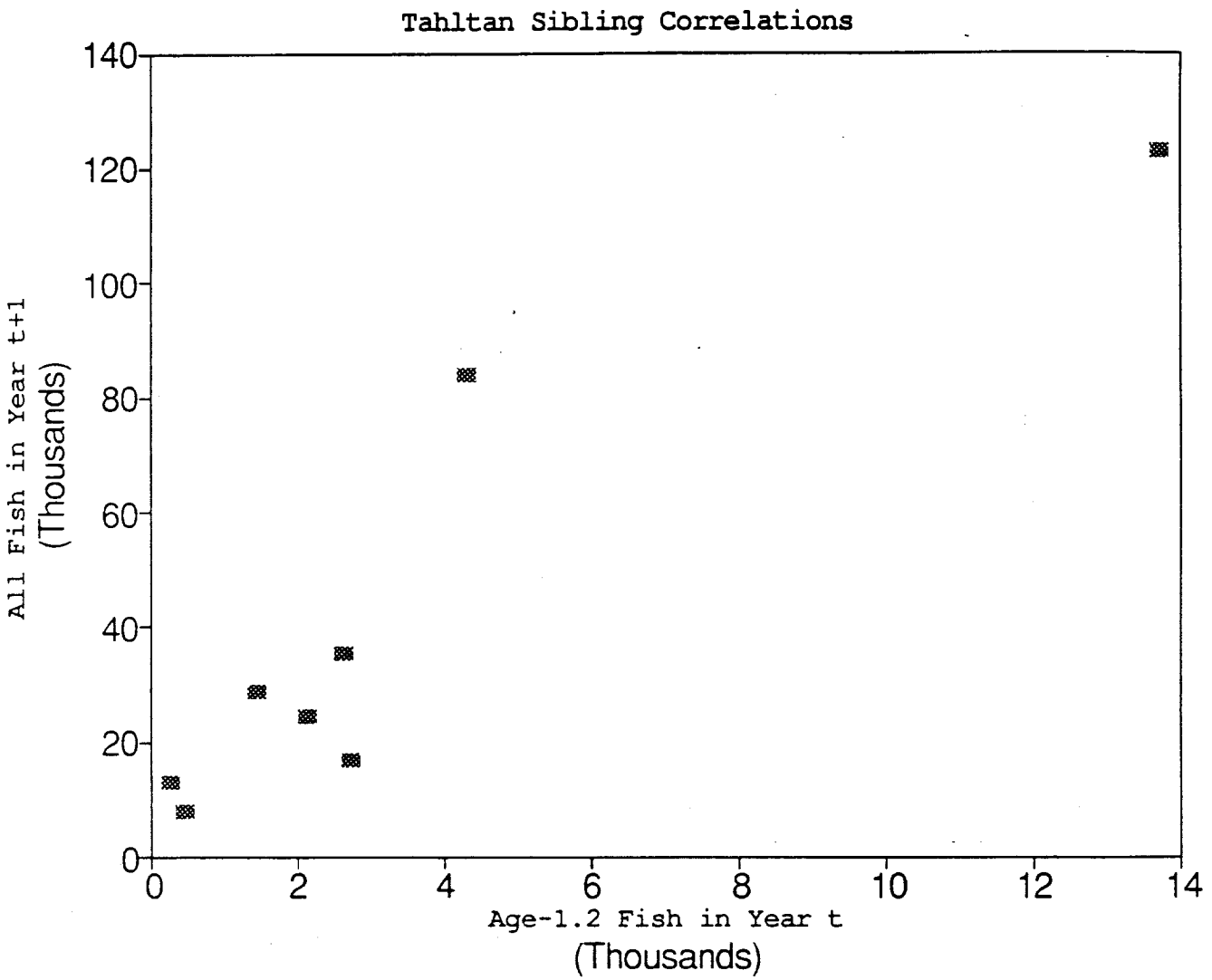


Figure 8. Relationship of age-1.2 Tahltan sockeye salmon in year *t* and the entire Tahltan run in year *t*+1.

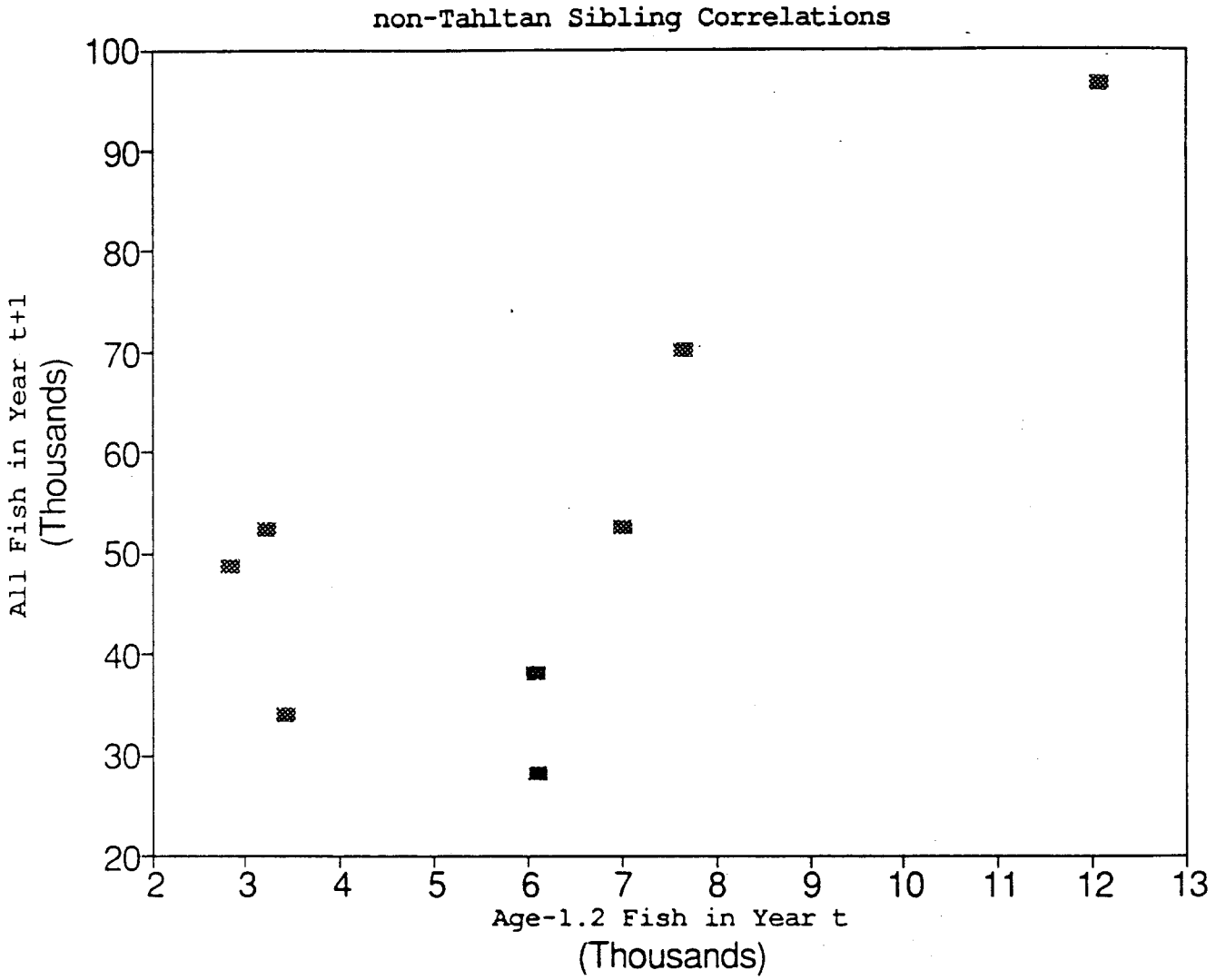


Figure 9. Relationship of age-1.2 non-Tahltan sockeye salmon in year *t* and the entire non-Tahltan run in year *t*+1.

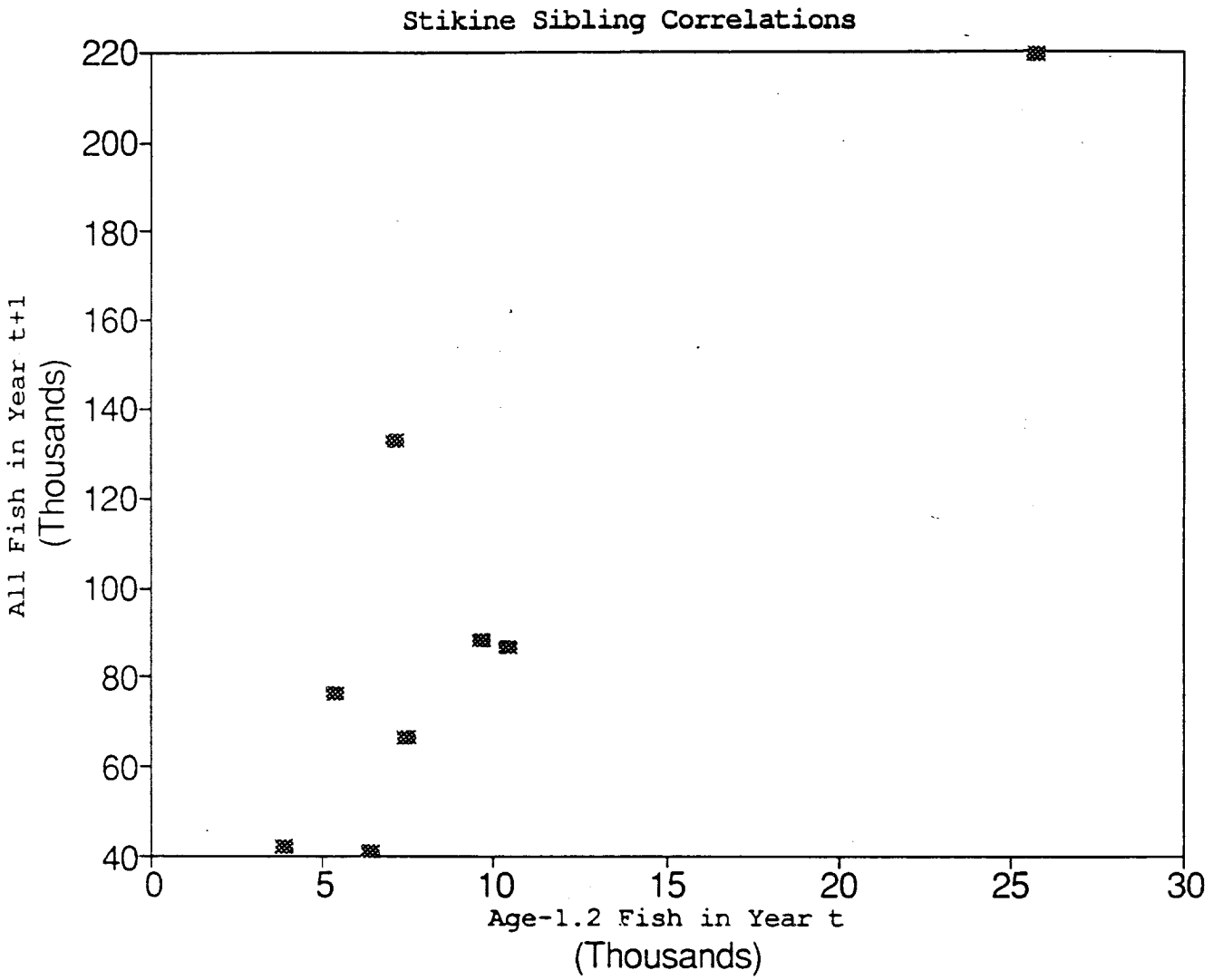


Figure 10. Relationship of age-1.2 Stikine sockeye salmon in year *t* and the entire Stikine run in year *t*+1.

Appendix A.1. Age-specific catch and escapement of Tahltan sockeye salmon, 1983-1991.

Year and Area	Age-Specific Catch and Escapement 1.2	1.3	2.2	2.3	Total
1983					
106	147	4,594	0	289	5,030
108	5	35	1	4	45
L.R. Commercial	720	5,364	35	573	6,692
U.R. Commercial	12	504	1	35	553
Indian Food Fish	92	3,818	6	269	4,184
Tahltan Escape.	468	19,394	29	1,365	21,256
Catch	977	14,315	42	1,169	16,504
Escapement	468	19,394	29	1,365	21,256
Totals	1,445	33,710	71	2,534	37,760
1984					
106	1,084	1,518	0	70	2,673
108	39	254	4	26	323
106-41T	16	23	0	1	40
108T	24	114	3	21	161
L.R. Commercial	0	0	0	0	0
U.R. Commercial	0	0	0	0	0
Indian Food Fish	1,598	2,908	56	233	4,794
Tahltan Escape.	10,928	19,878	381	1,590	32,777
Catch	2,762	4,817	62	350	7,991
Escapement	10,928	19,878	381	1,590	32,777
Totals	13,690	24,695	443	1,940	40,768
1985					
106-41&42	345	18,226	0	230	18,801
106-30	12	5,171	0	61	5,244
108	7	291	2	10	310
106-41T	9	460	0	6	475
108T	8	345	2	12	367
Stikine Test	23	463	5	14	505
L.R. Commercial	481	9,769	108	291	10,649
U.R. Commercial	23	931	3	19	976
Indian Food Fish	153	6,258	19	128	6,558
Tahltan Escape.	1,574	64,248	193	1,311	67,326
Catch	1,060	41,916	139	770	43,885
Escapement	1,574	64,248	193	1,311	67,326
Totals	2,634	106,164	332	2,081	111,211

Appendix A.1. (Page 2 of 3)

Year and Area	Age-Specific Catch and Escapement 1.2	1.3	2.2	2.3	Total
1986					
106-41&42	0	1,740	0	330	2,070
106-30	0	0	0	11	11
108	0	393	0	0	393
106-41T	0	6	0	2	8
106-30T	0	0	0	0	0
108T	12	230	7	25	274
Stikine Test	3	151	3	10	167
L.R. Commercial	75	5,513	69	412	6,069
U.R. Commercial	6	665	7	56	734
Indian Food Fish	30	3,431	37	289	3,787
Tahltan Escape.	160	18,373	198	1,549	20,280
Catch	126	12,128	123	1,136	13,513
Escapement	160	18,373	198	1,549	20,280
Totals	286	30,501	321	2,685	33,793
1987					
106-41&42	0	494	0	661	1,155
106-30	0	209	0	12	221
108	107	497	36	71	710
106-41T	0	17	0	22	39
106-30T	0	3	0	0	3
108T	19	89	6	13	127
Stikine Test	15	439	14	45	513
L.R. Commercial	181	989	59	150	1,380
U.R. Commercial	8	372	10	59	448
Indian Food Fish	47	2,225	57	352	2,681
Tahltan Escape.	90	6,011	119	737	6,958
Catch	377	5,332	182	1,386	7,277
Escapement	90	6,011	119	737	6,958
Totals	468	11,343	302	2,123	14,235
1988					
106-41&42	48	881	0	144	1,073
106-30	0	694	0	51	745
108	33	139	0	50	222
106-41T	2	28	0	5	35
108T	15	22	0	22	59
Stikine Test	125	200	27	55	407
L.R. Commercial	996	608	245	212	2,062
U.R. Commercial	99	172	9	34	313
Indian Food Fish	621	1,073	55	210	1,959
Tahltan Escape.	803	1,389	71	272	2,536
Catch	1,939	3,817	336	784	6,876
Escapement	803	1,389	71	272	2,536
Totals	2,742	5,206	407	1,056	9,412

Appendix A.1. (Page 3 of 3)

Year and Area	Age-Specific Catch and Escapement 1.2	1.3	2.2	2.3	Total
1989					
106-41&42	0	611	0	346	957
106-30	0	94	0	60	154
108	97	229	0	15	341
106-41T	0	0	0	0	0
108T	30	70	0	5	104
Stikine Test	60	255	30	37	381
L.R. Commercial	550	1,587	433	243	2,813
U.R. Commercial	58	315	27	44	444
Indian Food Fish	276	1,508	127	212	2,124
Tahltan Escape.	1,081	5,904	499	832	8,316
Catch	1,070	4,667	617	963	7,318
Escapement	1,081	5,904	499	832	8,316
Totals	2,151	10,572	1,116	1,795	15,634
1990					
106-41&42	121	274	216	190	801
106-30	70	0	0	44	114
108	165	859	99	157	1280
106-41T	1	16	6	8	31
106-30T	0	0	0	0	0
108T	12	52	6	11	81
Stikine Test	126	612	44	99	881
L.R. Commercial	1,058	3,118	439	414	5,029
U.R. Commercial	65	303	25	32	425
Indian Food Fish	415	1,938	160	207	2,720
Tahltan Escape.	2,276	10,636	879	1,136	14,927
Catch	2,031	7,172	995	1,163	11,362
Escapement	2,276	10,636	879	1,136	14,927
Totals	4,307	17,808	1,874	2,299	26,289
1991					
106-41&42	204	11,219	0	0	11423
106-30	83	2,696	17	0	2797
108	948	7,640	220	0	8807
108T	42	392	7	0	441
Stikine Test	305	942	131	64	1,442
L.R. Commercial	2,199	7,787	966	184	11,136
U.R. Commercial	60	559	37	29	685
Indian Food Fish	349	3,260	215	172	3,995
Tahltan Escape.	4,374	40,904	2,702	2,154	50,135
Catch	4,190	34,495	1,593	449	40,726
Escapement	4,374	40,904	2,702	2,154	50,135
Totals	8,565	75,399	4,296	2,603	90,861

a/ The district test fishery stock and age compositions are estimated to be the same as the commercial catch when no other data are available.
b/ The in river test fishery stock and age compositions are estimated to be the same as commercial catch when no other data are data available.
c/ The upper river commercial and Indian food fishery catches are assumed to be 90% Tahltan origin with the Tahltan fish having the same age composition as the Tahltan escapement.
d/ Assumes all fish captured at Kakwan Point were released alive and accounted for elsewhere (numbers small).
e/ In 1983 the age composition of Tahltan sockeye salmon in the District 108 catch is assumed to be the same as in District 106
f/ In 1983 the fraction of the District 108 sockeye catch comprised of Tahltan fish is the average of 1985-1989.

Appendix A.2. Age-specific catch and escapement of non-Tahltan Stikine sockeye salmon, 1983-1991.

Year and Area	Age-Specific Catch and Escapement							Total
	0.2	0.3	0.4	1.2	1.3	2.2	2.3	
1983								
106	0	0	0	0	308	0	324	632
108	1	26	0	8	72	1	3	111
L.R. Commercial	116	216	0	1,424	6,830	196	383	9,165
U.R. Commercial	1	1	0	10	46	1	3	61
Indian Food Fish	6	11	0	72	346	10	19	465
Mainstem Escape.	370	691	0	4,553	21,841	628	1,223	29,307
Catch	123	254	0	1,514	7,603	208	732	10,434
Escapement	370	691	0	4,553	21,841	628	1,223	29,307
Totals	493	945	0	6,067	29,444	837	1,955	39,741
1984								
106	0	0	0	2,438	983	0	656	4,078
108	4	186	2	60	527	5	24	808
106-41T	0	0	0	36	15	0	10	61
108T	2	73	0	12	239	2	16	345
L.R. Commercial	0	0	0	0	0	0	0	0
U.R. Commercial	0	0	0	0	0	0	0	0
Indian Food Fish	12	50	0	131	293	14	32	533
Mainstem Escape.	828	3,590	0	9,389	20,986	1,013	2,301	38,107
Catch	18	309	2	2,679	2,057	21	738	5,825
Escapement	828	3,590	0	9,389	20,986	1,013	2,301	38,107
Totals	846	3,899	2	12,067	23,044	1,034	3,039	43,932
1985								
106-41&42	0	0	0	0	800	0	962	1,762
106-30	0	0	0	0	744	0	507	1,251
108	2	65	2	14	576	4	20	683
106-41T	0	0	0	0	20	0	24	44
108T	0	60	5	15	703	5	22	810
Stikine Test	0	0	0	10	764	10	57	842
L.R. Commercial	59	647	2	458	4,798	127	352	6,444
U.R. Commercial	1	11	0	8	81	2	6	108
Indian Food Fish	7	73	0	52	543	14	40	729
Mainstem Escape.	835	9,100	27	6,443	67,471	1,790	4,951	90,617
Catch	69	857	9	557	9,030	162	1,990	12,673
Escapement	835	9,100	27	6,443	67,471	1,790	4,951	90,617
Totals	904	9,957	36	7,000	76,500	1,952	6,941	103,290
1986								
106-41&42	0	0	0	82	0	0	419	501
106-30	0	0	0	70	0	0	35	105
108	17	264	0	147	2,357	0	73	2,858
106-41T	0	0	0	2	2	0	5	9
106-30T	0	0	0	0	0	0	0	0
108T	1	11	0	8	149	5	16	190
Stikine Test	2	5	0	38	209	6	6	267
L.R. Commercial	103	256	0	1,303	4,148	271	262	6,342
U.R. Commercial	1	2	0	12	64	2	2	82
Indian Food Fish	3	8	0	60	329	10	10	421
Mainstem Escape.	244	611	0	4,398	24,190	733	733	30,910
Catch	127	546	0	1,722	7,258	294	827	10,774
Escapement	244	611	0	4,398	24,190	733	733	30,910
Totals	371	1,157	0	6,120	31,449	1,027	1,561	41,684

Appendix A.2. (Page 2 of 3)

Age-Specific Catch and Escapement

Year and Area	0.2	0.3	0.4	1.2	1.3	2.2	2.3	Total
1987								
106-41&42	0	0	0	0	258	0	0	258
106-30	0	0	0	0	710	0	0	710
108	0	360	0	49	229	16	53	708
106-41T	0	0	0	0	9	0	0	9
106-30T	0	0	0	0	11	0	0	11
108T	0	56	0	7	52	0	12	127
Stikine Test	8	168	2	132	784	14	105	1,213
L.R. Commercial	96	533	0	899	2,843	99	288	4,758
U.R. Commercial	0	7	0	5	32	1	4	50
Indian Food Fish	2	41	1	32	193	3	26	298
Mainstem Escape.	130	2,905	37	2,290	13,593	242	1,825	21,023
Catch	106	1,165	3	1,125	5,122	133	488	8,141
Escapement	130	2,905	37	2,290	13,593	242	1,825	21,023
Totals	236	4,070	40	3,415	18,715	375	2,313	29,164
1988								
106-41&42	0	0	0	0	64	0	0	64
106-30	0	0	0	0	0	0	0	0
108	9	120	6	147	428	0	0	711
106-41T	0	0	0	0	0	0	0	0
108T	8	56	0	11	203	0	0	277
Stikine Test	18	92	0	177	561	27	20	895
L.R. Commercial	364	849	6	2,728	6,061	406	290	10,704
U.R. Commercial	1	4	0	7	22	1	1	35
Indian Food Fish	4	22	0	43	136	6	5	218
Mainstem Escape.	463	2,344	0	4,525	14,310	681	518	22,841
Catch	404	1,142	12	3,114	7,475	440	316	12,904
Escapement	463	2,344	0	4,525	14,310	681	518	22,841
Totals	867	3,486	12	7,639	21,784	1,122	834	35,745
1989								
106-41&42	0	0	0	366	2,949	0	515	3830
106-30	0	0	0	932	54	0	244	1231
108	27	2,292	0	193	5,341	0	164	8017
106-41T	0	0	0	2	13	0	2	17
108T	2	196	0	16	456	0	14	684
Stikine Test	0	236	0	29	887	16	57	1,226
L.R. Commercial	0	2,654	0	305	10,742	246	419	14,366
U.R. Commercial	0	10	0	1	36	1	2	49
Indian Food Fish	0	46	0	6	171	3	11	236
Mainstem Escape.	180	8,032	0	1,355	33,035	661	1,836	45,099
Catch	29	5,433	0	1,850	20,649	266	1,429	29,656
Escapement	180	8,032	0	1,355	33,035	661	1,836	45,099
Totals	209	13,465	0	3,205	53,685	926	3,265	74,755
1990								
106-41&42	0	0	0	798	474	0	639	1911
106-30	0	0	0	559	314	0	202	1075
108	25	369	51	73	3,169	0	553	4239
106-41T	0	0	0	13	25	0	11	49
106-30T	0	0	0	1	1	0	0	2
108T	2	25	3	4	203	0	37	275
Stikine Test	4	29	2	39	889	5	92	1,060
L.R. Commercial	60	315	24	723	7,742	128	509	9,501
U.R. Commercial	0	1	0	2	40	0	4	47
Indian Food Fish	1	8	1	11	253	1	26	302
Mainstem Escape.	12	1,423	106	590	18,342	118	1,990	22,581
Catch	92	748	81	2,223	13,110	134	2,073	18,461
Escapement	12	1,423	106	590	18,342	118	1,990	22,581
Totals	104	2,170	187	2,813	31,452	252	4,063	41,042

Appendix A.2. (Page 3 of 3)

Age-Specific Catch and Escapement

Year and Area	0.2	0.3	0.4	1.2	1.3	2.2	2.3	Total
1991								
106-41&42	0	0	0	836	2,203	0	0	3039
106-30	0	0	0	245	205	0	0	450
108	68	1,529	23	1,090	4,277	0	0	6987
108T	2	45	1	46	131	0	0	224
Stikine Test	10	70	0	184	598	25	47	934
L.R. Commercial	136	528	0	874	4,242	127	521	6,427
U.R. Commercial	2	6	0	10	50	2	6	76
Indian Food Fish	9	36	0	60	293	9	36	444
Mainstem Escape.	346	3,069	0	9,727	28,325	1,257	2,154	44,877
Catch	227	2,214	24	3,346	11,999	162	609	18,581
Escapement	346	3,069	0	9,727	28,325	1,257	2,154	44,877
Totals	574	5,283	24	13,072	40,324	1,419	2,763	63,458

a/ The district test fishery stock and age compositions are estimated to be the same as the commercial catch when no other data are available.
b/ The in river test fishery stock and age compositions are estimated to be the same as the commercial catch when no other data are available.
c/ The upper river commercial and Indian food fishery catches are assumed to be 10% non-Tahltan origin with the non-Tahltan fish having the same age composition as non-Tahltan portion of the test fishery catches.
d/ Assumes all fish captured at Kakwan Point were released alive and accounted for elsewhere (numbers small).
e/ The 1983 age-composition of non-Tahltan sockeye salmon in the District 108 catch is assumed to be the same as in District 106.
f/ In 1983 the fraction of the District 108 sockeye catch comprised of Tahltan fish is the average of 1985-1989.

Appendix A.3. Age-specific catch and escapement of Stikine River sockeye salmon, 1983-1991.

	Age-Specific Catch and Escapement							
Year and Area	0.2	0.3	0.4	1.2	1.3	2.2	2.3	Total
1983								
106	0	0	0	147	4,902	0	613	5,662
108	1	26	0	14	108	1	7	156
L.R. Commercial	116	216	0	2,144	12,195	231	955	15,857
U.R. Commercial	1	1	0	22	550	2	38	614
Indian Food Fish	6	11	0	164	4,164	16	288	4,649
Escapement	370	691	0	5,020	41,236	657	2,588	50,563
Catch	123	254	0	2,491	21,918	250	1,901	26,938
Escapement	370	691	0	5,020	41,236	657	2,588	50,563
Totals	493	945	0	7,511	63,154	907	4,490	77,501
1984								
106	0	0	0	3,523	2,502	0	727	6,751
108	4	186	2	99	781	8	50	1,131
106-41T	0	0	0	53	37	0	11	101
108T	2	73	0	36	353	5	36	506
L.R. Commercial	0	0	0	0	0	0	0	0
U.R. Commercial	0	0	0	0	0	0	0	0
Indian Food Fish	12	50	0	1,730	3,201	70	265	5,327
Escapement	828	3,590	0	20,316	40,865	1,394	3,891	70,884
Catch	18	309	2	5,441	6,874	83	1,089	13,816
Escapement	828	3,590	0	20,316	40,865	1,394	3,891	70,884
Totals	846	3,899	2	25,757	47,739	1,477	4,979	84,700
1985								
106-41&42	0	0	0	345	19,026	0	1,192	20,563
106-30	0	0	0	12	5,915	0	568	6,495
108	2	65	2	21	868	6	29	993
106-41T	0	0	0	9	480	0	30	519
108T	0	60	5	23	1,048	7	34	1,177
Stikine Test	0	0	0	33	1,228	15	71	1,347
L.R. Commercial	59	647	2	939	14,567	235	643	17,093
U.R. Commercial	1	11	0	31	1,012	5	25	1,084
Indian Food Fish	7	73	0	205	6,801	33	168	7,287
Escapement	835	9,100	27	8,017	131,719	1,983	6,262	157,943
Catch	69	857	9	1,617	50,946	300	2,760	56,558
Escapement	835	9,100	27	8,017	131,719	1,983	6,262	157,943
Totals	904	9,957	36	9,634	182,664	2,283	9,022	214,501
1986								
106-41&42	0	0	0	82	1,740	0	749	2,571
106-30	0	0	0	70	0	0	46	116
108	17	264	0	147	2,750	0	73	3,251
106-41T	0	0	0	2	8	0	7	17
106-30T	0	0	0	0	0	0	0	0
108T	1	11	0	20	379	12	41	464
Stikine Test	2	5	0	41	360	9	16	434
L.R. Commercial	103	256	0	1,378	9,661	340	674	12,411
U.R. Commercial	1	2	0	17	728	9	58	815
Indian Food Fish	3	8	0	90	3,760	47	299	4,208
Escapement	244	611	0	4,558	42,563	931	2,282	51,190
Catch	127	546	0	1,848	19,386	417	1,963	24,287
Escapement	244	611	0	4,558	42,563	931	2,282	51,190
Totals	371	1,157	0	6,406	61,950	1,348	4,245	75,477

Appendix A.3. (Page 2 of 3)

Age-Specific Catch and Escapement

Year and Area	0.2	0.3	0.4	1.2	1.3	2.2	2.3	Total
1987								
106-41&42	0	0	0	0	752	0	661	1,413
106-30	0	0	0	0	919	0	12	931
108	0	360	0	156	726	52	124	1,418
106-41T	0	0	0	0	26	0	22	48
106-30T	0	0	0	0	14	0	0	14
108T	0	56	0	26	141	6	25	254
Stikine Test	8	168	2	147	1,223	28	151	1,726
L.R. Commercial	96	533	0	1,080	3,832	158	438	6,138
U.R. Commercial	0	7	0	13	404	10	63	498
Indian Food Fish	2	41	1	80	2,417	61	377	2,979
Escapement	130	2,905	37	2,381	19,604	362	2,562	27,981
Catch	106	1,165	3	1,502	10,454	315	1,874	15,419
Escapement	130	2,905	37	2,381	19,604	362	2,562	27,981
Totals	236	4,070	40	3,883	30,058	677	4,436	43,400
1988								
106-41&42	0	0	0	48	945	0	144	1,137
106-30	0	0	0	0	694	0	51	745
108	9	120	6	180	567	0	50	933
106-41T	0	0	0	2	28	0	5	35
108T	8	56	0	26	225	0	22	336
Stikine Test	18	92	0	302	761	54	75	1,302
L.R. Commercial	364	849	6	3,725	6,669	651	502	12,766
U.R. Commercial	1	4	0	106	193	10	34	348
Indian Food Fish	4	22	0	664	1,210	62	215	2,177
Escapement	463	2,344	0	5,328	15,699	753	790	25,377
Catch	404	1,142	12	5,053	11,292	777	1,099	19,779
Escapement	463	2,344	0	5,328	15,699	753	790	25,377
Totals	867	3,486	12	10,381	26,990	1,529	1,889	45,156
1989								
106-41&42	0	0	0	366	3,559	0	862	4,787
106-30	0	0	0	932	148	0	305	1,385
108	27	2,292	0	290	5,570	0	179	8,358
106-41T	0	0	0	2	13	0	2	17
108T	2	196	0	46	526	0	19	788
Stikine Test	0	236	0	89	1,142	46	94	1,607
L.R. Commercial	0	2,654	0	855	12,329	679	662	17,179
U.R. Commercial	0	10	0	59	351	27	47	493
Indian Food Fish	0	46	0	282	1,679	131	223	2,360
Escapement	180	8,032	0	2,436	38,940	1,160	2,668	53,415
Catch	29	5,433	0	2,920	25,317	883	2,392	36,974
Escapement	180	8,032	0	2,436	38,940	1,160	2,668	53,415
Totals	209	13,465	0	5,356	64,256	2,042	5,060	90,389
1990								
106-41&42	0	0	0	918	749	216	829	2,712
106-30	0	0	0	629	314	0	246	1,189
108	25	369	51	238	4,028	99	710	5,519
106-41T	0	0	0	14	41	6	19	80
106-41T	0	0	0	1	1	0	0	2
108T	2	25	3	16	255	6	48	356
Stikine Test	4	29	2	165	1,501	49	191	1,941
L.R. Commercial	60	315	24	1,781	10,860	567	923	14,530
U.R. Commercial	0	1	0	67	342	25	36	472
Indian Food Fish	1	8	1	426	2,191	162	233	3,022
Escapement	12	1,423	106	2,866	28,978	997	3,126	37,508
Catch	92	748	81	4,255	20,282	1,130	3,236	29,823
Escapement	12	1,423	106	2,866	28,978	997	3,126	37,508
Totals	104	2,170	187	7,121	49,260	2,127	6,362	67,331

Appendix A.3. (Page 3 of 3)

Age-Specific Catch and Escapement

Year and Area	0.2	0.3	0.4	1.2	1.3	2.2	2.3	Total
1991								
106-41&42	0	0	0	1,040	13,422	0	0	14,462
106-30	0	0	0	328	2,902	17	0	3,247
108	68	1,529	23	2,038	11,917	220	0	15,794
108T	2	45	1	88	522	7	0	665
Stikine Test	10	70	0	489	1,540	156	111	2,376
L.R. Commercial	136	528	0	3,073	12,029	1,093	705	17,563
U.R. Commercial	2	6	0	70	609	38	36	761
Indian Food Fish	9	36	0	409	3,553	224	208	4,439
Escapement	346	3,069	0	14,101	69,230	3,959	4,307	95,012
Catch	227	2,214	24	7,536	46,494	1,756	1,058	59,307
Escapement	346	3,069	0	14,101	69,230	3,959	4,307	95,012
Totals	574	5,283	24	21,637	115,723	5,715	5,366	154,319

a/ The district test fishery stock and age compositions are estimated to be the same as commercial catch when no other data are available.
b/ The in river test fishery stock and age compositions are estimated to be the same as the commercial catch when no other data are available.
c/ The age compositions of the upper river commercial and Indian food fishery catches are assumed to be the same as the Tahltan escapement for Tahltan fish and as the lower river test or commercial catches for the non-Tahltan fish.
d/ Assumes all fish captured at Kakwan Point were released alive and accounted for elsewhere (numbers small).
e/ In 1983 the age composition of Stikine sockeye salmon in the District 108 catch is assumed to be the same as in District 106.
f/ In 1983 the fraction of the District 108 sockeye catch comprised of Stikine fish is the average of 1985-1989.

Appendix A.4. Brood tables for Stikine sockeye salmon.

Spawners		Recruits							
Year	Number	0.2	0.3	0.4	1.2	1.3	2.2	2.3	Total
Tahltan									
1978	22,788					33,710	71	1,940	35,720
1979	10,211				1,445	24,695	443	2,081	28,664
1980	11,018				13,690	106,164	332	2,685	122,870
1981	50,790				2,634	30,501	321	2,123	35,579
1982	28,257				286	11,343	302	1,056	12,987
1983	21,256				468	5,206	407	1,795	7,876
1984	32,777				2,742	10,572	1,116	2,299	16,729
1985	67,326				2,151	17,808	1,874	2,603	24,437
1986	20,280				4,307	75,399	4,296		84,002
1987	6,958				8,565				8,565
1988	2,536								
1989	8,316								
Non-Tahltan									
1978	22,788 a/			0		29,444	837	3,039	33,320
1979	16,608		945	2	6,067	23,044	1,034	6,941	38,032
1980	30,806	493	3,899	36	12,067	76,500	1,952	1,561	96,508
1981	61,615	846	9,957	0	7,000	31,449	1,027	2,313	52,592
1982	19,964	904	1,157	40	6,120	18,715	375	834	28,146
1983	29,307	371	4,070	12	3,415	21,784	1,122	3,265	34,039
1984	38,107	236	3,486	0	7,639	53,685	926	4,063	70,035
1985	90,617	867	13,465	187	3,205	31,452	252	2,895	52,324
1986	30,910	209	2,170	24	2,813	42,054	1,496		48,766
1987	21,023	104	5,470		13,666				19,241
1988	22,841	595							595
1989	45,099								
Stikine									
1978	45,576			0		63,154	907	4,979	69,041
1979	26,819		945	2	7,511	47,739	1,477	9,022	66,696
1980	41,824	493	3,899	36	25,757	182,664	2,283	4,245	219,378
1981	112,405	846	9,957	0	9,634	61,950	1,348	4,436	88,171
1982	48,221	904	1,157	40	6,406	30,058	677	1,889	41,132
1983	50,563	371	4,070	12	3,883	26,990	1,529	5,060	41,915
1984	70,884	236	3,486	0	10,381	64,256	2,042	6,362	86,764
1985	157,943	867	13,465	187	5,356	49,260	2,127	5,497	76,760
1986	51,190	209	2,170	24	7,121	117,453	5,792		132,768
1987	27,981	104	5,470		22,231				27,805
1988	25,377	595							595
1989	53,415								

a/ 1978 brood stock estimated by doubling Tahltan escapement

Appendix A.5. Smolt-recruit relationship for Tahltan sockeye salmon.

Smolt		Recruits					Percent
Year	Number	1.2	1.3	2.2	2.3	Total	Survival
1984	219702	286	11,343	321	2,123	14,073	0.0641
1985	613531	468	5,206	302	1,056	7,031	0.0115
1986	244330	2,742	10,572	407	1,795	15,516	0.0635
1987	810432	2,151	17,808	1,116	2,299	23,374	0.0288
1988	1170136	4,307	75,399	1,874	2,603	84,184	0.0719
1989	580574	8,565		4,296		12,860	0.0222
1990	607645						
1991							

Appendix A.6. Spawner-smolt relationship for Tahltan sockeye salmon, 1982-1989. Calculations are based on the assumption of age-1. smolt.

Brood Year	Spawners	Smolt	Smolt per Spawner
1982	28,257	219702	8
1983	21,256	613531	29
1984	32,777	244330	7
1985	67,326	810432	12
1986	20,280	1170136	58
1987	6,958	580574	83
1988	2,536	607645	240
1989	8,316	1487265	179
Average			77
	14,327	155,000	
	[illegible]		
	19,000		

Appendix B.1. Age and stock compositions of female sockeye salmon caught in the Stikine River test fishery, 1991. Sex specific age compositions were calculated and the smoothed stock composition of the sampled females was expanded to the catch by age.

	Age Composition								
Week	0.2	0.3	0.4	1.2	1.3	1.4	2.2	2.3	Total
Proportion of age class composed of Tahltan fish									
25				1.000	0.750		1.000	0.600	
26				0.935	0.969		0.998	0.950	
27				0.884	0.912		0.991	0.878	
28				0.803	0.776		0.970	0.733	
29				0.684	0.538		0.901	0.512	
30				0.535	0.281		0.718	0.286	
31				0.380	0.116		0.418	0.133	
32				0.246	0.042		0.168	0.055	
33				0.148	0.015		0.054	0.022	
34				0.084	0.005		0.016	0.008	
35				0.047	0.002		0.005	0.003	
Catch of Tahltan fish									
25				0	13		0	3	16
26				3	28		0	1	32
27				45	227		22	15	309
28				34	146		16	6	202
29				21	89		23	5	138
30				19	28		16	4	67
31				3	2		2	0	7
32				2	2		0	0	4
33				1	1		0	0	2
34				0	0		0	0	0
35				0	0		0	0	0
Total				128	536		79	34	777
Prop.				0.165	0.690		0.102	0.044	1.000
Proportion of age class composed of non-Tahltan fish									
25	1.000	1.000	1.000	0.000	0.250	1.000	0.000	0.400	
26	1.000	1.000	1.000	0.065	0.031	1.000	0.002	0.050	
27	1.000	1.000	1.000	0.116	0.088	1.000	0.009	0.122	
28	1.000	1.000	1.000	0.197	0.224	1.000	0.030	0.267	
29	1.000	1.000	1.000	0.316	0.462	1.000	0.099	0.488	
30	1.000	1.000	1.000	0.465	0.719	1.000	0.282	0.714	
31	1.000	1.000	1.000	0.620	0.884	1.000	0.582	0.867	
32	1.000	1.000	1.000	0.754	0.958	1.000	0.832	0.945	
33	1.000	1.000	1.000	0.852	0.985	1.000	0.946	0.978	
34	1.000	1.000	1.000	0.916	0.995	1.000	0.984	0.992	
35	1.000	1.000	1.000	0.953	0.998	1.000	0.996	0.997	
Catch of non-Tahltan fish									
25	0	0	0	0	4	0	0	2	6
26	0	0	0	0	1	0	0	0	1
27	0	8	0	6	22	0	0	2	38
28	0	5	0	8	42	0	1	2	58
29	0	7	0	10	76	1	2	5	101
30	0	9	0	16	73	1	6	11	116
31	0	4	0	4	16	0	2	0	26
32	0	2	0	8	43	1	0	5	59
33	0	4	0	9	61	0	1	0	75
34	1	0	0	5	28	1	0	0	35
35	0	2	0	3	2	0	2	0	9
Total	1	41	0	69	368	4	14	27	524
Prop.	0.002	0.078	0.000	0.132	0.702	0.008	0.027	0.052	1.000

Appendix B.2. Age and stock compositions of male sockeye salmon caught in the Stikine River test fishery, 1991. Sex specific age compositions were calculated and the smoothed stock composition of the sampled females was expanded to the catch by age.

							Tahltan		
Week	0.2	0.3	0.4	1.2	1.3	1.4	2.2	2.3	Total
Proportion of age class composed of Tahltan fish									
25				1.000	0.750		1.000	0.600	
26				0.935	0.969		0.998	0.950	
27				0.884	0.912		0.991	0.878	
28				0.803	0.776		0.970	0.733	
29				0.684	0.538		0.901	0.512	
30				0.535	0.281		0.718	0.286	
31				0.380	0.116		0.418	0.133	
32				0.246	0.042		0.168	0.055	
33				0.148	0.015		0.054	0.022	
34				0.084	0.005		0.016	0.008	
35				0.047	0.002		0.005	0.003	
Catch of Tahltan fish									
25				3	10		0	0	13
26				1	34		0	1	36
27				51	176		13	11	251
28				33	95		8	9	145
29				44	68		19	6	137
30				32	20		11	3	66
31				7	2		1	0	10
32				2	1		0	0	3
33				3	0		0	0	3
34				1	0		0	0	1
35				0	0		0	0	0
Total				177	406		52	30	665
Prop.				0.266	0.611		0.078	0.045	1.000
Proportion of age class composed of non-Tahltan fish									
25	1.000	1.000	1.000	0.000	0.250	1.000	0.000	0.400	
26	1.000	1.000	1.000	0.065	0.031	1.000	0.002	0.050	
27	1.000	1.000	1.000	0.116	0.088	1.000	0.009	0.122	
28	1.000	1.000	1.000	0.197	0.224	1.000	0.030	0.267	
29	1.000	1.000	1.000	0.316	0.462	1.000	0.099	0.488	
30	1.000	1.000	1.000	0.465	0.719	1.000	0.282	0.714	
31	1.000	1.000	1.000	0.620	0.884	1.000	0.582	0.867	
32	1.000	1.000	1.000	0.754	0.958	1.000	0.832	0.945	
33	1.000	1.000	1.000	0.852	0.985	1.000	0.946	0.978	
34	1.000	1.000	1.000	0.916	0.995	1.000	0.984	0.992	
35	1.000	1.000	1.000	0.953	0.998	1.000	0.996	0.997	
Catch of non-Tahltan fish									
25	0	0	0	0	3	0	0	0	3
26	0	0	0	0	1	1	0	0	2
27	3	3	0	7	17	3	0	2	35
28	0	4	0	8	28	0	0	3	43
29	0	7	0	21	59	1	2	5	95
30	4	3	0	27	52	0	4	7	97
31	0	1	0	12	13	1	1	1	29
32	1	4	0	8	16	1	0	0	30
33	1	6	0	18	18	0	3	1	47
34	0	0	0	12	15	0	1	0	28
35	0	0	0	0	1	0	0	0	1
Total	9	28	0	113	223	7	11	19	410
Prop.	0.022	0.068	0.000	0.276	0.544	0.017	0.027	0.046	1.000

Appendix B.3. Age and stock compositions of sockeye salmon in the Stikine River test fishery catches and inriver run, 1991. Sex specific age compositions were calculated and the smoothed stockcomposition of the sampled females was expanded to the catch and run by age.

	Age Composition								
Week	0.2	0.3	0.4	1.2	1.3	1.4	2.2	2.3	Total
Catch of Tahltan fish									
25				3	23		0	3	29
26				4	62		0	2	68
27				96	403		35	26	560
28				67	241		24	15	347
29				65	157		42	11	275
30				51	48		27	7	133
31				10	4		3	0	17
32				4	3		0	0	7
33				4	1		0	0	5
34				1	0		0	0	1
35				0	0		0	0	0
Sum				305	942		131	64	1,442
Prop				0.212	0.653		0.091	0.044	1.000
Proportion of age run of Tahltan fish									
25				0.000	0.003		0.000	0.000	0.004
26				0.004	0.067		0.000	0.002	0.073
27				0.068	0.284		0.025	0.018	0.394
28				0.047	0.170		0.017	0.011	0.245
29				0.033	0.080		0.021	0.006	0.139
30				0.033	0.031		0.018	0.005	0.087
31				0.027	0.011		0.008	0.000	0.045
32				0.004	0.003		0.000	0.000	0.006
33				0.002	0.001		0.000	0.000	0.004
34				0.001	0.000		0.000	0.000	0.001
35				0.000	0.000		0.000	0.000	0.000
Pro.				0.220	0.650		0.089	0.042	1.000
Sum				14808	43812		5965	2808	67393
Catch of non-Tahltan fish									
25	0	0	0	0	7	0	0	2	9
26	0	0	0	0	2	1	0	0	3
27	3	11	0	13	39	3	0	4	73
28	0	9	0	16	70	0	1	5	101
29	0	14	0	31	135	2	4	10	196
30	4	12	0	43	125	1	10	18	213
31	0	5	0	16	29	1	3	1	55
32	1	6	0	16	59	2	0	5	89
33	1	10	0	27	79	0	4	1	122
34	1	0	0	17	43	1	1	0	63
35	0	2	0	3	3	0	2	0	10
Sum	10	69	0	182	591	11	25	46	934
Prop	0.011	0.074	0.000	0.195	0.633	0.012	0.027	0.049	1.000
Proportion of run composed of non-Tahltan fish									
25	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.002
26	0.000	0.000	0.000	0.000	0.003	0.001	0.000	0.000	0.004
27	0.003	0.010	0.000	0.012	0.035	0.003	0.000	0.004	0.066
28	0.000	0.008	0.000	0.014	0.063	0.000	0.001	0.005	0.091
29	0.000	0.009	0.000	0.020	0.087	0.001	0.003	0.006	0.127
30	0.003	0.010	0.000	0.036	0.104	0.001	0.008	0.015	0.178
31	0.000	0.017	0.000	0.054	0.098	0.003	0.010	0.003	0.186
32	0.001	0.007	0.000	0.019	0.069	0.002	0.000	0.006	0.104
33	0.001	0.004	0.000	0.020	0.062	0.002	0.001	0.003	0.093
34	0.001	0.000	0.000	0.025	0.063	0.001	0.001	0.000	0.093
35	0.000	0.011	0.000	0.017	0.017	0.000	0.011	0.000	0.057
Pro.	0.010	0.076	0.000	0.217	0.604	0.015	0.035	0.042	1.000
Sum	522	4014	0	11460	31858	803	1871	2230	52758

Appendix B.4. Migratory timing of the sockeye run in the Stikine River, 1991. Sex specific age compositions were calculated and the smoothed stock composition of the sampled females was expanded to the run by age.

	Prop. of Catch		Catch and Effort			Migratory Timing	
Week	Tahltan	non-Tahltan	Drifts	Catch	Std. CPUE	Tahltan	non-Tahltan
25	0.763	0.237	55	2	0.036	0.002	0.001
26	0.958	0.042	50	25	0.500	0.041	0.002
27	0.885	0.115	50	146	2.920	0.221	0.029
28	0.775	0.225	40	83	2.075	0.138	0.040
29	0.584	0.416	39	61	1.564	0.078	0.056
30	0.384	0.616	50	74	1.480	0.049	0.078
31	0.236	0.764	20	25	1.250	0.025	0.082
32	0.073	0.927	40	23	0.575	0.004	0.046
33	0.050	0.950	50	25	0.500	0.002	0.041
34	0.016	0.984	60	29	0.483	0.001	0.041
35	0.000	1.000	55	10	0.292	0.000	0.025
					11.675	0.561	0.439

Final Estimates for 1991
Tahltan 67,393 non-Tahltan 52,758 Stikine 120,151

Appendix B.5. Age and stock compositions of female sockeye salmon caught in the Stikine River commercial fishery, 1991. Sex specific age compositions were calculated and the stock composition of the sampled females was expanded to the catch by age.

	Tahltan					Non-Tahltan								
Week	1.2	1.3	2.2	2.3	Total	0.2	0.3	0.4	1.2	1.3	1.4	2.2	2.3	Total
Age and Stock Compositions of Samples														
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	2	17	0	0	19	0	0	0	0	7	0	0	0	7
27	7	70	2	1	80	0	1	0	0	11	0	0	1	13
28	10	46	1	0	57	0	3	0	0	7	0	0	1	11
29	13	28	10	3	54	1	4	0	2	13	0	0	2	21
30	7	14	5	0	26	1	6	0	2	24	1	1	4	38
31	4	2	1	0	7	2	14	0	10	33	1	2	3	63
32	0	4	1	0	5	0	7	0	11	43	1	0	3	65
33	0	0	0	0	0	0	4	0	3	22	0	3	0	32
34	0	0	0	0	0	0	2	0	2	10	1	0	0	15
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	43	181	20	4	248	4	41	0	30	170	4	6	14	265
Age and Stock Compositions of Samples														
25	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000
26	1.000	0.708	0.000	0.000	0.731	1.000	1.000	1.000	0.000	0.292	0.000	0.000	0.000	0.269
27	1.000	0.864	1.000	0.500	0.860	1.000	1.000	1.000	0.000	0.136	0.000	0.000	0.500	0.140
28	1.000	0.868	1.000	0.000	0.838	1.000	1.000	1.000	0.000	0.132	0.000	0.000	1.000	0.162
29	0.867	0.683	1.000	0.600	0.720	1.000	1.000	1.000	0.133	0.317	0.000	0.000	0.400	0.280
30	0.778	0.368	0.833	0.000	0.406	1.000	1.000	1.000	0.222	0.632	0.167	0.167	1.000	0.594
31	0.286	0.057	0.333	0.000	0.100	1.000	1.000	1.000	0.714	0.943	0.500	0.667	0.000	0.900
32	0.000	0.085	0.000	0.000	0.071	1.000	1.000	1.000	1.000	0.915	0.000	0.000	1.000	0.929
33	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	1.000	1.000	0.000	1.000	0.000	1.000
34	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.000	1.000
35	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Prop.	0.173	0.730	0.081	0.016	1.000	0.015	0.155	0.000	0.113	0.642	0.015	0.023	0.053	1.000
Total	0.084	0.353	0.039	0.008	0.483	0.008	0.080	0.000	0.058	0.331	0.008	0.012	0.027	0.517
Age and Stock Compositions of Catch														
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	6	51	0	0	57	0	0	0	0	21	0	0	0	21
27	85	1096	24	12	1217	0	12	0	0	172	0	0	12	196
28	534	2230	138	0	2902	0	59	0	0	339	0	0	119	517
29	601	1160	402	98	2261	18	73	0	93	539	0	0	66	789
30	94	190	57	0	341	8	45	0	27	325	8	11	61	485
31	79	61	33	0	173	18	125	0	198	1013	9	65	81	1509
32	0	17	8	0	25	0	19	0	35	180	3	0	11	248
33	0	0	0	0	0	0	8	0	6	50	0	6	0	70
34	0	0	0	0	0	0	7	0	4	37	4	4	0	56
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1399	4805	662	110	6976	44	348	0	363	2676	24	86	350	3891
Prop.	0.201	0.689	0.095	0.016	1.000	0.011	0.089	0.000	0.093	0.688	0.006	0.022	0.090	1.000

Appendix B.6. Age and stock compositions of male sockeye salmon caught in the Stikine River commercial fishery, 1991. Sex specific age compositions were calculated and the stock composition of the sampled females was expanded to the catch by age.

	Tahltan					Non-Tahltan								
Week	1.2	1.3	2.2	2.3	Total	0.2	0.3	0.4	1.2	1.3	1.4	2.2	2.3	Total
Age and Stock Compositions of Samples														
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	1	18	0	0	19	0	1	0	0	8	0	0	0	9
27	9	90	1	2	101	2	1	0	0	14	1	0	2	20
28	10	51	4	0	65	0	2	0	0	8	0	0	3	13
29	11	37	7	3	58	0	2	0	2	17	0	0	2	23
30	23	14	7	0	43	1	6	0	6	23	0	1	5	43
31	13	3	2	0	18	5	4	0	31	58	1	3	0	102
32	0	4	0	0	4	5	1	0	35	43	0	0	1	85
33	0	0	0	0	0	0	0	0	8	19	0	0	0	27
34	0	0	0	0	0	0	0	0	8	7	0	0	0	15
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	66	217	20	5	309	13	17	0	91	197	2	5	13	336
Age and Stock Compositions of Samples														
25	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	1.000	0.000	0.000	0.000
26	1.000	0.708	0.000	0.000	0.693	1.000	1.000	1.000	0.000	0.292	1.000	0.000	0.000	0.307
27	1.000	0.864	1.000	0.500	0.838	1.000	1.000	1.000	0.000	0.136	1.000	0.000	0.500	0.162
28	1.000	0.868	1.000	0.000	0.836	1.000	1.000	1.000	0.000	0.132	1.000	0.000	1.000	0.164
29	0.867	0.683	1.000	0.600	0.718	1.000	1.000	1.000	0.133	0.317	1.000	0.000	0.400	0.282
30	0.778	0.368	0.833	0.000	0.498	1.000	1.000	1.000	0.222	0.632	1.000	0.167	1.000	0.502
31	0.286	0.057	0.333	0.000	0.148	1.000	1.000	1.000	0.714	0.943	1.000	0.667	0.000	0.852
32	0.000	0.085	0.000	0.000	0.045	1.000	1.000	1.000	1.000	0.915	1.000	0.000	0.000	0.955
33	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000
34	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000
35	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	1.000	0.000	0.000	0.000
Sum	0.215	0.705	0.066	0.015	1.000	0.039	0.051	0.000	0.269	0.584	0.006	0.014	0.037	1.000
Total	0.103	0.337	0.032	0.007	0.479	0.020	0.026	0.000	0.140	0.305	0.003	0.007	0.019	0.521
Age and Stock Compositions of the Catch														
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	3	56	0	0	59	0	3	0	0	23	0	0	0	26
27	110	1095	12	19	1236	24	12	0	0	172	12	0	18	238
28	198	1012	79	0	1289	0	40	0	0	154	0	0	59	253
29	206	673	128	55	1062	0	37	0	32	313	0	0	36	418
30	170	104	51	0	325	8	45	0	49	177	0	10	38	327
31	113	31	15	0	159	45	36	0	281	514	9	30	9	924
32	0	11	19	0	30	14	3	0	96	118	0	0	3	234
33	0	0	0	0	0	0	0	0	17	39	0	0	4	60
34	0	0	0	0	0	0	0	0	30	26	0	0	0	56
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	800	2982	304	74	4160	91	176	0	505	1536	21	40	167	2536
Prop.	0.192	0.717	0.073	0.018	1.000	0.036	0.069	0.000	0.199	0.606	0.008	0.016	0.066	1.000

Appendix B.7. Age and stock compositions of sockeye salmon caught in the Stikine River commercial fishery, 1991. Sex specific age compositions were calculated and the stock composition of the sampled females was expanded to the catch by age.

	Age Class								
Week	0.2	0.3	0.4	1.2	1.3	1.4	2.2	2.3	Total
Tahltan Sockeye Stocks									
25				0	0		0	0	0
26				9	107		0	0	116
27				195	2,191		36	31	2,453
28				732	3,242		217	0	4,191
29				807	1,833		530	153	3,323
30				264	294		108	0	666
31				192	92		48	0	332
32				0	28		27	0	55
33				0	0		0	0	0
34				0	0		0	0	0
35				0	0		0	0	0
Total catch by stock and age				2,199	7,787		966	184	11136
Proportion of age by stock				0.197	0.699		0.087	0.017	1.000
Proportion of age and stock by catch				0.125	0.443		0.055	0.010	0.634
Non-Tahltan Sockeye Stocks									
25	0	0	0	0	0	0	0	0	0
26	0	3	0	0	44	0	0	0	47
27	24	24	0	0	344	12	0	30	434
28	0	99	0	0	493	0	0	178	770
29	18	110	0	125	852	0	0	102	1,207
30	16	90	0	76	502	8	21	99	812
31	63	161	0	479	1,527	18	95	90	2,433
32	14	22	0	131	298	3	0	14	482
33	0	8	0	23	89	0	6	4	130
34	0	7	0	34	63	4	4	0	112
35	0	0	0	0	0	0	0	0	0
Total catch by stock and age	135	524	0	868	4,212	45	126	517	6,427
Proportion of age by stock	0.021	0.082	0.000	0.135	0.655	0.007	0.020	0.080	1.000
Proportion of age and stock by catch	0.008	0.030	0.000	0.049	0.240	0.003	0.007	0.029	0.366

Appendix B.8. Sex specific age composition of Tahltan Lake sockeye escapement, 1991.

Date and Statistical Week		Brood Year and Age Class 1987 1.2	1986 1.3	1986 2.2	1985 2.3	1985 3.2	Total	Sample Size
Age Composition of Samples								
7/14-7/20	Males	0.058	0.870	0.043	0.029	0.000	1.000	69
Week 29	Females	0.026	0.923	0.009	0.043	0.000	1.000	117
7/21-7/27	Males	0.073	0.855	0.042	0.030	0.000	1.000	165
Week 30	Females	0.091	0.831	0.050	0.027	0.000	1.000	219
7/28-8/03	Males	0.040	0.720	0.100	0.140	0.000	1.000	50
Week 31	Females	0.141	0.772	0.065	0.022	0.000	1.000	92
8/04-8/10	Males	0.034	0.862	0.034	0.069	0.000	1.000	29
Week 32	Females	0.143	0.714	0.114	0.029	0.000	1.000	35
8/11-8/17	Males	0.000	0.750	0.000	0.250	0.000	1.000	8
Week 33	Females	0.391	0.304	0.261	0.043	0.000	1.000	23
8/18-8/24	Males	0.231	0.538	0.077	0.154	0.000	1.000	13
Week 34	Females	0.095	0.810	0.048	0.048	0.000	1.000	21
8/25-9/07	Males	0.333	0.333	0.000	0.167	0.167	1.000	6
Wks 35&36	Females	0.286	0.571	0.143	0.000	0.000	1.000	7
Totals	Males	0.071	0.815	0.050	0.062	0.003	1.000	340
	Females	0.105	0.805	0.058	0.031	0.000	1.000	514
Age Composition of Escapement								
7/14-7/20	Males	266	3,990	199	133	0	4,588	
Week 29	Females	199	7,182	67	332	0	7,780	
	All Fish	465	11,172	266	465	0	12,368	
7/21-7/27	Males	632	7,429	369	263	0	8,693	
Week 30	Females	1,054	9,589	580	316	0	11,539	
	All Fish	1,686	17,018	949	579	0	20,232	
7/28-8/03	Males	137	2,466	343	480	0	3,426	
Week 31	Females	891	4,865	411	137	0	6,304	
	All Fish	1,028	7,331	754	617	0	9,730	
8/04-8/10	Males	76	1,895	76	152	0	2,199	
Week 32	Females	379	1,897	303	76	0	2,655	
	All Fish	455	3,792	379	228	0	4,854	
8/11-8/17	Males	0	233	0	78	0	311	
Week 33	Females	350	273	234	39	0	896	
	All Fish	350	506	234	117	0	1,207	
8/18-8/24	Males	84	194	28	55	0	361	
Week 34	Females	55	472	27	28	0	582	
	All Fish	139	666	55	83	0	943	
8/25-9/07	Males	123	122	0	62	62	369	
Wks 35&36	Females	123	246	62	0	0	431	
	All Fish	246	368	62	62	62	800	
Totals	Males	1,318	16,329	1,015	1,223	62	19,948	
	Females	3,051	24,524	1,684	928	0	30,186	
	All Fish	4,369	40,853	2,699	2,151	62	50,134	
Percents	Males	0.066	0.819	0.051	0.061	0.003		
	Females	0.101	0.812	0.056	0.031	0.000		
	All Fish	0.087	0.815	0.054	0.043	0.001		

Appendix C.1. Spawner recruit regression analysis of Tahltan sockeye returns and runs estimated with a jackknife procedure. The brood forecasts (n=6) were made for the entire return from a spawning escapement. The age-specific run forecasts (n=7) were made by regressing the number of spawners on the return of each age and combining the predictions for the run in a given year.

	Brood Forecast All Ages	Age-Specific Run Forecasts			
		Age-4	Age-5	Age-6	Total
Year	1979	1980	1979	1978	
Constant	1.02838	-1.37964	1.22110	-1.59759	
Std Err of Y Est	1.22286	1.50921	1.26148	0.50404	
R Squared	0.31129	0.25401	0.34494	0.65301	
X Coefficient(s)	-0.00004	-0.00004	-0.00004	-0.00003	
Std Err of Coef.	0.00003	0.00003	0.00003	0.00001	
Predicted Recruits	19,810	1,796	22,393	2,325	26,514
Actual Recruits	28,664	13,690	25,138	1,940	40,768
Year	1980	1981	1980	1979	
Constant	0.24423	-0.67643	0.58727	-1.80605	
Std Err of Y Est	0.72470	1.68643	0.99821	0.47571	
R Squared	0.29351	0.35441	0.29033	0.57142	
X Coefficient(s)	-0.00002	-0.00006	-0.00003	-0.00003	
Std Err of Coef.	0.00002	0.00003	0.00002	0.00001	
Predicted Recruits	11,265	1,422	14,316	1,287	17,025
Actual Recruits	122,870	2,634	106,496	2,081	111,211
Year	1981	1980	1981	1980	
Constant	1.22859	-0.34883	1.32343	-1.89417	
Std Err of Y Est	1.20486	1.26873	1.23984	0.42113	
R Squared	0.41646	0.51286	0.40718	0.59987	
X Coefficient(s)	-0.00004	-0.00005	-0.00005	-0.00002	
Std Err of Coef.	0.00003	0.00002	0.00003	0.00001	
Predicted Recruits	19,319	4,323	16,527	1,270	22,120
Actual Recruits	35,579	286	30,822	2,685	33,793
Year	1982	1983	1982	1981	
Constant	1.36053	-0.23902	1.41507	-1.64145	
Std Err of Y Est	1.14167	1.41066	1.18342	0.50915	
R Squared	0.44801	0.50004	0.43533	0.59555	
X Coefficient(s)	-0.00004	-0.00006	-0.00004	-0.00003	
Std Err of Coef.	0.00002	0.00003	0.00002	0.00001	
Predicted Recruits	35,474	4,729	33,294	2,238	40,260
Actual Recruits	12,987	468	11,645	2,123	14,236
Year	1983	1984	1983	1982	
Constant	1.61636	-0.72973	1.70153	-1.49503	
Std Err of Y Est	0.98255	1.70260	0.96736	0.32727	
R Squared	0.57221	0.35534	0.58699	0.82312	
X Coefficient(s)	-0.00005	-0.00005	-0.00005	-0.00003	
Std Err of Coef.	0.00002	0.00003	0.00002	0.00001	
Predicted Recruits	40,873	2,818	40,312	2,689	45,820
Actual Recruits	7,876	2,742	5,613	1,056	9,411
Year	1984	1985	1984	1983	
Constant	1.26320	-0.17592	1.35734	-1.57946	
Std Err of Y Est	1.19233	1.59511	1.19228	0.49942	
R Squared	0.40825	0.39509	0.41269	0.65947	
X Coefficient(s)	-0.00004	-0.00008	-0.00004	-0.00003	
Std Err of Coef.	0.00002	0.00004	0.00002	0.00001	
Predicted Recruits	32,796	255	31,518	2,296	34,069
Actual Recruits	16,729	2,151	11,688	1,795	15,634
Year	1985	1986	1985	1984	
Constant	1.49538	-0.79855	1.58943	-1.62996	
Std Err of Y Est	1.18311	1.69828	1.22098	0.50892	
R Squared	0.37658	0.34069	0.35817	0.64533	
X Coefficient(s)	-0.00005	-0.00005	-0.00006	-0.00003	
Std Err of Coef.	0.00003	0.00003	0.00004	0.00001	
Predicted Recruits	7,938	3,202	6,128	2,442	11,773
Actual Recruits	24,437	4,307	19,682	2,299	26,288
Year		1987	1986	1985	
Constant		-1.41036	0.98457	-1.35053	
Std Err of Y Est		1.55163	1.16600	0.43137	
R Squared		0.21424	0.37490	0.69835	
X Coefficient(s)		-0.00004	-0.00004	-0.00004	
Std Err of Coef.		0.00003	0.00002	0.00001	
Predicted Recruits		1,306	24,485	969	26,760
Actual Recruits		8,565	79,695	2,603	90,863

Appendix C.2. Spawner recruit regression analysis of non-Tahltan sockeye returns and runs estimated with a jackknife proceedure. The brood forecasts (n=6) were made for the entire return from a spawning escapement. The age-specific run forecasts (n=7) were made by regressing the number of spawners on the return of each age and combining the predictions for the run in a given year.

	Brood Forecast All Ages	Age-Specific Run Forecasts			
		Age-4	Age-5	Age-6	Total
Year	1979	1980	1979	1978	
Constant	1.02218	-0.75370	0.83289	-1.73535	
Std Err of Y Est	0.43092	0.53662	0.47889	0.78550	
R Squared	0.57511	0.25318	0.57208	0.37477	
X Coefficient(s)	-0.00002	-0.00001	-0.00002	-0.00002	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001	
Predicted Recruits	34,804	10,304	27,179	2,487	39,970
Actual Recruits	38,032	15,966	24,078	3,039	43,083
Year	1980	1981	1980	1979	
Constant	0.87345	-0.64512	0.60814	-2.16771	
Std Err of Y Est	0.26378	0.56330	0.31414	0.51466	
R Squared	0.78167	0.27110	0.73227	0.37218	
X Coefficient(s)	-0.00002	-0.00001	-0.00002	-0.00001	
Std Err of Coef.	0.00000	0.00001	0.00000	0.00001	
Predicted Recruits	45,516	14,615	32,516	1,502	48,633
Actual Recruits	96,508	16,957	78,452	6,941	102,350
Year	1981	1980	1981	1980	
Constant	1.04544	-0.61165	0.76989	-1.54102	
Std Err of Y Est	0.42551	0.56354	0.46901	0.72910	
R Squared	0.58423	0.27138	0.53411	0.46776	
X Coefficient(s)	-0.00002	-0.00001	-0.00002	-0.00002	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001	
Predicted Recruits	62,891	8,385	42,767	3,242	54,394
Actual Recruits	52,592	7,277	32,476	1,561	41,314
Year	1982	1983	1982	1981	
Constant	1.22502	-0.56051	0.96560	-1.70773	
Std Err of Y Est	0.37850	0.53974	0.42662	0.77840	
R Squared	0.71759	0.32111	0.67864	0.33821	
X Coefficient(s)	-0.00002	-0.00001	-0.00002	-0.00002	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001	
Predicted Recruits	45,631	11,355	33,498	3,254	48,107
Actual Recruits	28,146	7,485	19,090	2,313	28,888
Year	1983	1984	1983	1982	
Constant	1.17901	-0.63907	0.91115	-1.30005	
Std Err of Y Est	0.37450	0.56374	0.42709	0.58498	
R Squared	0.71778	0.27513	0.66992	0.63976	
X Coefficient(s)	-0.00002	-0.00001	-0.00002	-0.00003	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001	
Predicted Recruits	54,832	12,647	39,217	3,151	55,016
Actual Recruits	34,039	11,125	22,906	834	34,865
Year	1984	1985	1984	1983	
Constant	1.01203	-0.56717	0.73964	-1.71305	
Std Err of Y Est	0.41586	0.56363	0.45554	0.78732	
R Squared	0.64407	0.14514	0.61417	0.39315	
X Coefficient(s)	-0.00002	-0.00002	-0.00002	-0.00002	
Std Err of Coef.	0.00001	0.00002	0.00001	0.00001	
Predicted Recruits	54,145	13,068	37,700	2,818	53,585
Actual Recruits	70,035	16,670	54,611	3,265	74,546
Year	1985	1986	1985	1984	
Constant	1.03307	-0.45550	0.73352	-1.72337	
Std Err of Y Est	0.43220	0.41629	0.47964	0.77876	
R Squared	0.32758	0.48206	0.26540	0.40985	
X Coefficient(s)	-0.00002	-0.00001	-0.00002	-0.00002	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001	
Predicted Recruits	55,941	12,620	37,440	2,972	53,032
Actual Recruits	52,324	4,983	31,704	4,063	40,750
Year		1987	1986	1985	
Constant		-0.98727	0.75186	-1.42980	
Std Err of Y Est		0.38708	0.47459	0.76859	
R Squared		0.20026	0.58333	0.30812	
X Coefficient(s)		-0.00001	-0.00002	-0.00003	
Std Err of Coef.		0.00001	0.00001	0.00002	
Predicted Recruits		6,737	35,951	1,331	44,019
Actual Recruits		18,355	41,743	2,763	62,861

Appendix C.3. Spawner recruit regression analysis of Stikine sockeye returns and runs estimated with a jackknife proceedure. The brood forecasts (n=6) were made for the entire return from a spawning escapement. The age-specific run forecasts (n=7) made by regressing the number of spawners on the return of each age and combining the predictions for the run in a given year.

	Brood Forecast All Ages	Age-Specific Run Forecasts			
		Age-4	Age-5	Age-6	Total
Year	1979	1980	1979	1978	
Constant	0.99656	-0.91240	1.00772	-1.66535	
Std Err of Y Est	0.71385	0.63391	0.75708	0.61753	
R Squared	0.39649	0.32010	0.43612	0.50803	
X Coefficient(s)	-0.00001	-0.00001	-0.00001	-0.00001	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001	
Predicted Recruits	53,699	11,652	50,435	4,918	67,006
Actual Recruits	66,696	29,656	49,216	4,979	83,851
Year	1980	1981	1980	1979	
Constant	0.64964	-0.64099	0.64205	-2.07685	
Std Err of Y Est	0.38396	0.73516	0.54055	0.40190	
R Squared	0.60801	0.34408	0.51695	0.51126	
X Coefficient(s)	-0.00001	-0.00001	-0.00001	-0.00001	
Std Err of Coef.	0.00000	0.00001	0.00000	0.00000	
Predicted Recruits	55,489	16,771	49,779	2,673	69,223
Actual Recruits	219,378	19,591	184,948	9,022	213,561
Year	1981	1980	1981	1980	
Constant	1.08601	-0.46155	0.99840	-1.62705	
Std Err of Y Est	0.71938	0.65889	0.75714	0.61518	
R Squared	0.44289	0.46078	0.43402	0.51731	
X Coefficient(s)	-0.00001	-0.00001	-0.00001	-0.00001	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001	
Predicted Recruits	84,998	16,990	63,792	4,852	85,634
Actual Recruits	88,171	7,563	63,298	4,246	75,107
Year	1982	1983	1982	1981	
Constant	1.31115	-0.48069	1.22001	-1.68578	
Std Err of Y Est	0.61871	0.66624	0.65532	0.61009	
R Squared	0.59660	0.44907	0.58832	0.45180	
X Coefficient(s)	-0.00001	-0.00001	-0.00002	-0.00001	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001	
Predicted Recruits	92,997	17,165	77,542	5,690	100,397
Actual Recruits	41,133	7,953	30,735	4,436	43,124
Year	1983	1984	1983	1982	
Constant	1.29837	-0.62650	1.23086	-1.39187	
Std Err of Y Est	0.61970	0.73040	0.62920	0.39029	
R Squared	0.59258	0.36399	0.60930	0.77490	
X Coefficient(s)	-0.00001	-0.00001	-0.00002	-0.00001	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00000	
Predicted Recruits	94,023	17,726	79,354	6,065	103,145
Actual Recruits	41,915	13,867	28,519	1,890	44,276
Year	1984	1985	1984	1983	
Constant	1.08806	-0.40021	1.00979	-1.65820	
Std Err of Y Est	0.71939	0.71429	0.75624	0.61750	
R Squared	0.47635	0.30310	0.47656	0.51457	
X Coefficient(s)	-0.00001	-0.00002	-0.00001	-0.00001	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001	
Predicted Recruits	89,626	8,827	72,435	5,156	86,418
Actual Recruits	86,764	18,821	66,299	5,060	90,180
Year	1985	1986	1985	1984	
Constant	1.19127	-0.52332	1.08990	-1.67914	
Std Err of Y Est	0.71411	0.69627	0.75424	0.61462	
R Squared	0.30716	0.41581	0.28372	0.52393	
X Coefficient(s)	-0.00001	-0.00001	-0.00002	-0.00001	
Std Err of Coef.	0.00001	0.00001	0.00001	0.00001	
Predicted Recruits	55,526	16,776	39,174	5,510	61,461
Actual Recruits	76,761	9,290	51,386	6,362	67,038
Year		1987	1986	1985	
Constant		-1.09943	0.84311	-1.38747	
Std Err of Y Est		0.54997	0.70020	0.58206	
R Squared		0.24971	0.47120	0.46589	
X Coefficient(s)		-0.00001	-0.00001	-0.00002	
Std Err of Coef.		0.00001	0.00001	0.00001	
Predicted Recruits		7,730	61,249	2,363	71,341
Actual Recruits		26,920	121,438	5,366	153,724

Appendix C.4. Smolt recruit regression analysis of Tahltan sockeye runs estimted with a jackknife procedure. n=4 and y fixed

Without 1984	
Constant	0
Std Err of Y Est	22515.87
R Squared	0.588011
No. of Observations	4
Degrees of Freedom	3
X Coefficient(s)	0.050994
Std Err of Coef.	0.014349
Predicted Recruits	11,203
Actual Recruits	14,073
Without 1985	
Constant	0
Std Err of Y Est	16613.76
R Squared	0.754267
No. of Observations	4
Degrees of Freedom	3
X Coefficient(s)	0.058263
Std Err of Coef.	0.011373
Predicted Recruits	35,746
Actual Recruits	7,031
Without 1986	
Constant	0
Std Err of Y Est	22507.66
R Squared	0.593885
No. of Observations	4
Degrees of Freedom	3
X Coefficient(s)	0.050947
Std Err of Coef.	0.014378
Predicted Recruits	12,448
Actual Recruits	15,516
Without 1987	
Constant	0
Std Err of Y Est	18995.66
R Squared	0.724324
No. of Observations	4
Degrees of Freedom	3
X Coefficient(s)	0.059184
Std Err of Coef.	0.013952
Predicted Recruits	47,964
Actual Recruits	23,374
Without 1988	
Constant	0
Std Err of Y Est	8917.491
R Squared	-0.77032
No. of Observations	4
Degrees of Freedom	3
X Coefficient(s)	0.026411
Std Err of Coef.	0.008348
Predicted Recruits	30,905
Actual Recruits	84,184

Appendix C.5. Sibing regression analysis of Tahltan sockeye runs estimated with a jackknife procedure. n=7

X in Year t Y in Year t+1	1.2 1.3	1.2 All
All years except 1983(X)-1984(Y)		
Constant	8,071	14,051
Std Err of Y Est	18,222	22,115
R Squared	0.816	0.756
X Coefficient(s)	7.630	7.728
Std Err of Coef.	1.619	1.965
Predicted 1984	19,095	25,217
Actual 1984	24,695	40,768
All years except 1984(X)-1985(Y)		
Constant	(2,210)	1,969
Std Err of Y Est	15,527	19,051
R Squared	0.646	0.611
X Coefficient(s)	13.610	15.477
Std Err of Coef.	4.502	5.524
Predicted 1985	184,106	213,854
Actual 1985	106,164	111,211
All years except 1985(X)-1986(Y)		
Constant	8,806	17,290
Std Err of Y Est	18,351	22,981
R Squared	0.816	0.734
X Coefficient(s)	7.555	7.469
Std Err of Coef.	1.606	2.011
Predicted 1986	28,708	36,965
Actual 1986	30,501	33,793
All years except 1986(X)-1987(Y)		
Constant	9,038	18,061
Std Err of Y Est	18,367	22,897
R Squared	0.802	0.711
X Coefficient(s)	7.547	7.345
Std Err of Coef.	1.678	2.092
Predicted 1987	11,196	20,161
Actual 1987	11,343	14,235
All years except 1987(X)-1988(Y)		
Constant	10,939	19,585
Std Err of Y Est	17,994	22,369
R Squared	0.801	0.714
X Coefficient(s)	7.334	7.180
Std Err of Coef.	1.635	2.033
Predicted 1988	14,369	22,943
Actual 1988	5,206	9,412
All years except 1988(X)-1989(Y)		
Constant	12,243	20,417
Std Err of Y Est	15,900	20,530
R Squared	0.851	0.770
X Coefficient(s)	7.422	7.351
Std Err of Coef.	1.390	1.795
Predicted 1989	32,598	40,578
Actual 1989	10,572	15,634
All years except 1989(X)-1990(Y)		
Constant	10,457	18,055
Std Err of Y Est	18,009	22,796
R Squared	0.816	0.732
X Coefficient(s)	7.457	7.412
Std Err of Coef.	1.583	2.004
Predicted 1990	26,498	34,000
Actual 1990	17,808	26,289
All years except 1990(X)-1991(Y)		
Constant	5,070	11,885
Std Err of Y Est	8,603	11,331
R Squared	0.949	0.913
X Coefficient(s)	7.294	7.181
Std Err of Coef.	0.753	0.992
Predicted 1991	36,488	42,815
Actual 1991	75,399	90,862

Appendix C.6. Sibling regression analysis of non-Tahltan sockeye runs estimated with a jackknife procedure. n=7

X in Year t Y in Year t+1	1.2 1.3	1.2 All	1.2 All non 0	0.2 All 0	0.2+1.2 All
All years except 1983(X)-1984(Y)					
Constant	11,823	22,460	21,028	1,631	22,503
Std Err of Y Est	14,798	21,176	18,715	4,199	22,592
R Squared	0.554	0.473	0.458	0.280	0.400
X Coefficient(s)	4.564	5.553	4.764	7.792	5.074
Std Err of Coef.	1.833	2.624	2.319	5.594	2.781
Predicted 1984	39,512	56,147	49,929	5,475	55,789
Actual 1984	23,044	43,932	39,184	4,748	43,932
All years except 1984(X)-1985(Y)					
Constant	25,782	41,966	40,534	3,499	41,566
Std Err of Y Est	13,425	18,045	14,970	4,132	18,003
R Squared	0.034	0.016	0.002	0.103	0.021
X Coefficient(s)	1.150	1.069	0.319	3.994	1.054
Std Err of Coef.	2.761	3.711	3.078	5.282	3.221
Predicted 1985	39,663	54,866	44,386	6,879	55,173
Actual 1985	76,500	103,290	92,393	10,897	103,290
All years except 1985(X)-1986(Y)					
Constant	10,234	21,721	20,250	1,569	21,971
Std Err of Y Est	15,556	19,958	18,220	2,299	19,925
R Squared	0.543	0.525	0.489	0.734	0.526
X Coefficient(s)	4.733	5.858	4.980	11.383	5.406
Std Err of Coef.	1.943	2.493	2.276	3.065	2.293
Predicted 1986	43,364	62,724	55,108	11,862	64,703
Actual 1986	31,449	41,684	40,157	1,528	41,684
All years except 1986(X)-1987(Y)					
Constant	12,356	24,424	22,940	3,296	25,440
Std Err of Y Est	13,567	17,970	15,445	4,382	18,542
R Squared	0.598	0.557	0.557	0.194	0.528
X Coefficient(s)	4.584	5.584	4.793	5.652	4.983
Std Err of Coef.	1.681	2.226	1.914	5.144	2.105
Predicted 1987	40,412	58,600	52,276	5,392	57,788
Actual 1987	18,715	29,164	24,819	4,346	29,164
All years except 1987(X)-1988(Y)					
Constant	11,520	22,957	21,908	3,104	23,780
Std Err of Y Est	16,220	21,681	19,105	4,403	21,965
R Squared	0.454	0.409	0.391	0.187	0.393
X Coefficient(s)	4.370	5.330	4.519	5.800	4.796
Std Err of Coef.	2.143	2.865	2.524	5.404	2.663
Predicted 1988	26,444	41,159	37,342	4,473	41,291
Actual 1988	21,784	35,745	31,379	4,366	35,745
All years except 1988(X)-1989(Y)					
Constant	10,055	21,279	19,849	4,028	22,245
Std Err of Y Est	15,709	21,057	19,091	3,256	21,463
R Squared	0.482	0.433	0.421	0.042	0.411
X Coefficient(s)	4.292	5.213	4.613	1.971	4.683
Std Err of Coef.	1.991	2.669	2.420	4.221	2.509
Predicted 1989	42,838	61,101	55,085	5,738	62,078
Actual 1989	53,685	74,755	61,081	13,674	74,755
All years except 1989(X)-1990(Y)					
Constant	6,168	19,775	17,844	3,854	20,574
Std Err of Y Est	15,913	21,752	19,157	4,302	22,042
R Squared	0.521	0.433	0.430	0.143	0.418
X Coefficient(s)	4.966	5.681	4.969	4.884	5.123
Std Err of Coef.	2.127	2.908	2.561	5.349	2.705
Predicted 1990	22,081	37,982	33,768	4,875	38,064
Actual 1990	31,452	41,042	38,581	2,462	41,042
All years except 1990(X)-1991(Y)					
Constant	(1,722)	3,385	3,688	1,631	3,486
Std Err of Y Est	12,683	15,134	12,901	4,199	15,305
R Squared	0.698	0.729	0.738	0.280	0.723
X Coefficient(s)	5.903	7.600	6.631	7.792	6.982
Std Err of Coef.	1.738	2.074	1.768	5.594	1.935
Predicted 1991	14,886	24,767	22,341	2,443	23,857
Actual 1991	40,324	63,458	57,578	5,881	63,458

Appendix C.7. Sibling regression analysis of Stikine River sockeye runs estimated with a jackknife procedure. n=7

X in Year t Y in Year t+1	1.2 1.3	1.2 All	1.2 All non 0	0.2 All 0	0.2+1.2 All
All years except 1983(X)-1984(Y)					
Constant	11,962	29,456	26,664	1,631	26,407
Std Err of Y Est	30,228	39,347	39,091	4,199	40,763
R Squared	0.755	0.682	0.663	0.280	0.659
X Coefficient(s)	6.550	7.107	6.760	7.792	7.017
Std Err of Coef.	1.668	2.171	2.157	5.594	2.260
Predicted 1984	61,159	82,842	77,440	5,475	82,573
Actual 1984	47,739	84,700	79,952	4,748	84,700
All years except 1984(X)-1985(Y)					
Constant	19,342	37,774	38,522	3,499	46,442
Std Err of Y Est	30,513	39,239	38,867	4,132	40,056
R Squared	0.154	0.125	0.097	0.103	0.088
X Coefficient(s)	5.216	5.947	5.103	3.994	4.458
Std Err of Coef.	5.464	7.027	6.960	5.282	6.400
Predicted 1985	153,685	190,955	169,965	6,879	165,049
Actual 1985	182,664	214,501	203,604	10,897	214,501
All years except 1985(X)-1986(Y)					
Constant	11,108	32,940	29,639	1,569	32,603
Std Err of Y Est	30,247	37,831	38,129	2,299	38,792
R Squared	0.762	0.701	0.676	0.734	0.686
X Coefficient(s)	6.635	7.106	6.753	11.383	6.821
Std Err of Coef.	1.658	2.073	2.090	3.065	2.063
Predicted 1986	75,030	101,402	94,695	11,862	104,480
Actual 1986	61,950	75,477	73,949	1,528	75,477
All years except 1986(X)-1987(Y)					
Constant	15,055	37,832	35,012	3,296	37,588
Std Err of Y Est	28,829	36,179	36,027	4,382	37,558
R Squared	0.760	0.691	0.670	0.194	0.667
X Coefficient(s)	6.389	6.746	6.401	5.652	6.432
Std Err of Coef.	1.607	2.016	2.008	5.144	2.031
Predicted 1987	55,981	81,045	76,016	5,392	81,178
Actual 1987	30,058	43,400	39,054	4,346	43,400
All years except 1987(X)-1988(Y)					
Constant	12,549	34,257	31,704	3,104	33,979
Std Err of Y Est	30,451	38,867	38,587	4,403	40,172
R Squared	0.727	0.647	0.626	0.187	0.623
X Coefficient(s)	6.451	6.832	6.474	5.800	6.516
Std Err of Coef.	1.767	2.256	2.240	5.404	2.266
Predicted 1988	37,596	60,785	56,840	4,473	60,818
Actual 1988	26,990	45,156	40,790	4,366	45,156
All years except 1988(X)-1989(Y)					
Constant	11,135	31,293	29,462	4,028	30,987
Std Err of Y Est	29,988	38,854	37,862	3,256	39,980
R Squared	0.767	0.691	0.682	0.042	0.673
X Coefficient(s)	6.672	7.136	6.806	1.971	6.839
Std Err of Coef.	1.646	2.132	2.078	4.221	2.131
Predicted 1989	80,404	105,369	100,120	5,738	107,913
Actual 1989	64,256	90,389	76,715	13,674	90,389
All years except 1989(X)-1990(Y)					
Constant	8,270	29,933	26,641	3,854	29,348
Std Err of Y Est	30,667	39,354	39,096	4,302	40,644
R Squared	0.749	0.670	0.653	0.143	0.648
X Coefficient(s)	6.694	7.089	6.769	4.884	6.780
Std Err of Coef.	1.733	2.223	2.209	5.349	2.233
Predicted 1990	44,123	67,903	62,898	4,875	67,082
Actual 1990	49,260	67,331	64,869	2,462	67,331
All years except 1990(X)-1991(Y)					
Constant	(4,147)	12,522	10,054	1,631	10,613
Std Err of Y Est	9,232	13,266	13,742	4,199	14,153
R Squared	0.975	0.957	0.950	0.280	0.951
X Coefficient(s)	7.137	7.737	7.378	7.792	7.503
Std Err of Coef.	0.511	0.734	0.761	5.594	0.762
Predicted 1991	46,673	67,614	62,590	2,443	64,823
Actual 1991	115,723	154,319	148,441	5,881	154,319

Appendix D.1. District 108-50/60 test fishery catches of sockeye salmon and Stikine River run strength estimates, 1984-1991. Two boats fished in 1988 through 1990 and catches used were weekly averages.

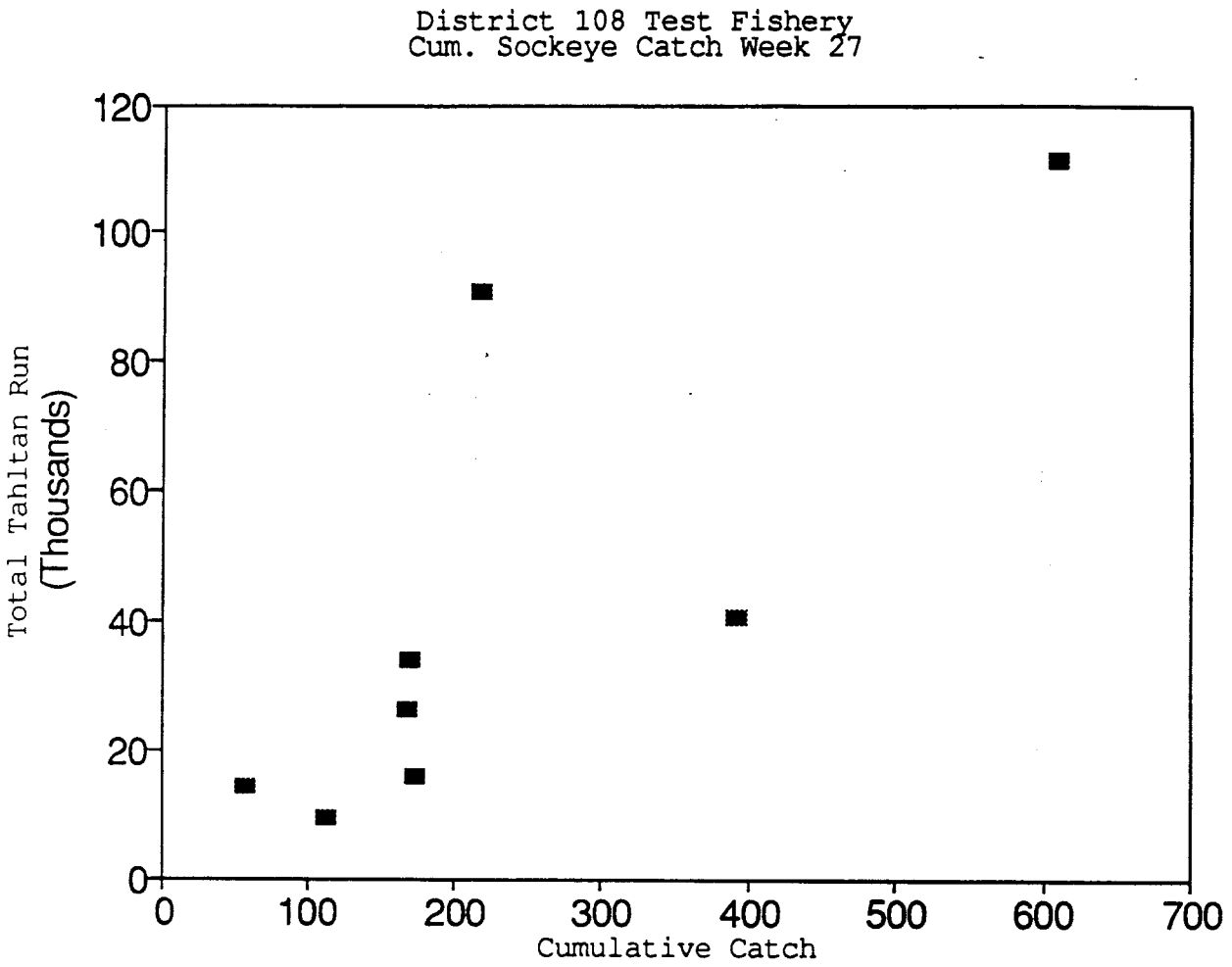
	Statistical Week								
Year	24	25	26	27	28	29	30	31	Total
Catch									
1984	13	53	122	217	75	84	77		641
1985	6	97	171	342	309	311	22		1258
1986	2	5	77	87	121	209	63		564
1987		8	18	32	79	79	40	31	287
1988	6	14	30	69	40	56	12		227
1989		23	81	69	213	71	33	22	512
1990		27	62	78	75	77	72	28	419
1991		46	119	53	105	51	37	35	446
Cumulative Catch - does not include week 24									
1984		53	175	392	467	551	628	628	
1985		97	268	610	919	1230	1252	1252	
1986		5	82	169	290	499	562	562	
1987		8	26	58	137	216	256	287	
1988		14	44	113	153	209	221	221	
1989		23	104	173	386	457	490	512	
1990		27	89	167	242	319	391	419	
1991		46	165	218	323	374	411	446	

Run Size

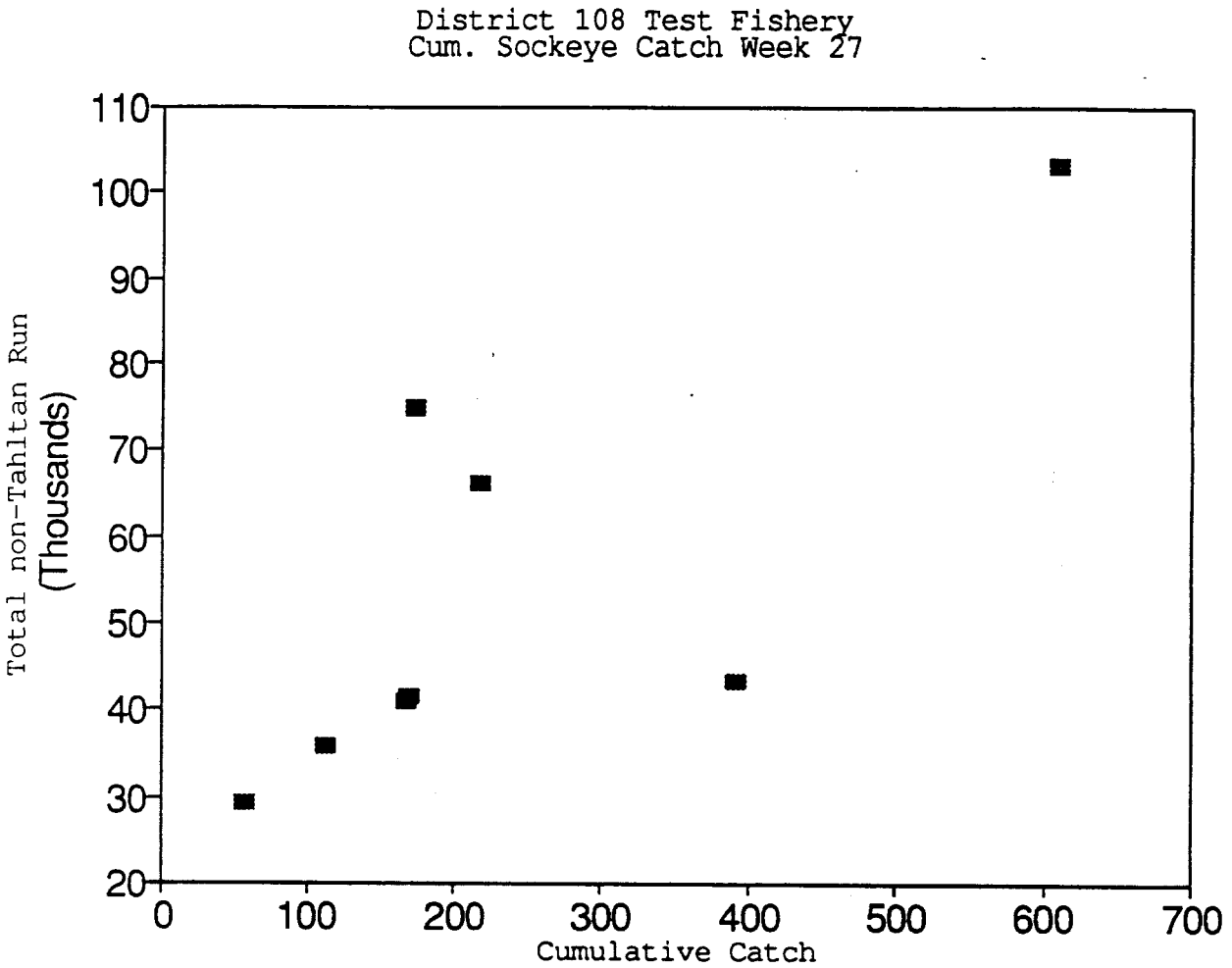
	Tahltan	Non-Tahltan	Total Stikine
1984	40822	43317	84139
1985	111205	103289	214494
1986	33771	41685	75456
1987	14178	29164	43342
1988	9351	35745	45096
1989	15666	74723	90389
1990	26230	41012	67242
1991	90861	66198	157059

Appendix D.2. Regressions from the cumulative sockeye catch in the District 108 fishery vs the Tahltan, non-Tahltan, and total Stikine sockeye run, 1984 to 1991.

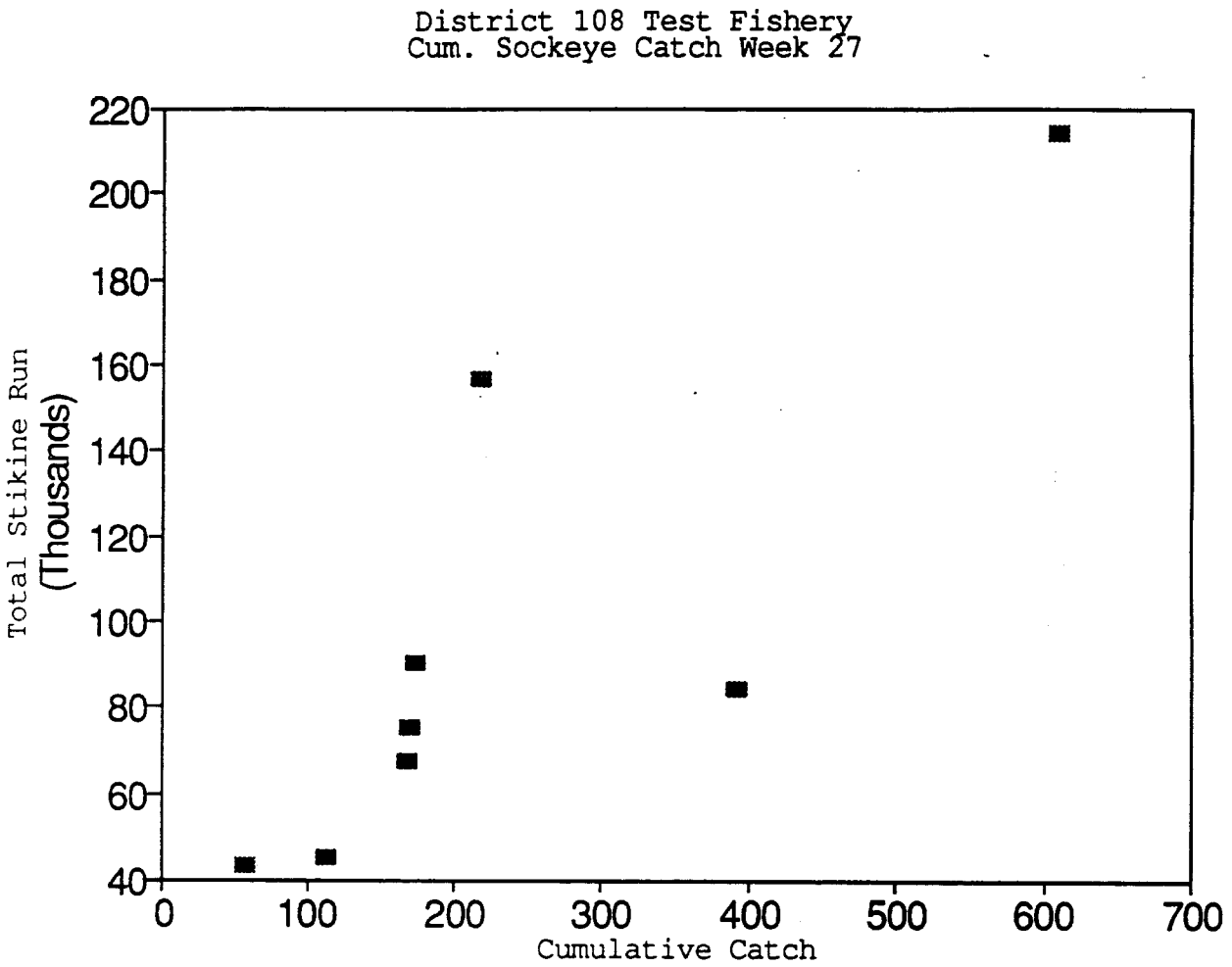
Regression Output	Week 25	Week 26	Week 27	Week 28	Week 29	Week 30
Tahltan						
Regression Output:						
Constant	6673.1	-7617.8	3545.3	-138.6	403.6	-3458.3
Std Err of Y Est	21159.1	18773.4	25499.6	25727.9	26578.9	26888.0
R Squared	0.73200	0.78903	0.61077	0.60377	0.57713	0.56723
No. of Observations	8	8	8	8	8	8
Degrees of Freedom	6	6	6	6	6	6
X Coefficient(s)	1057.5	422.9	165.1	117.7	87.9	87.8
Std Err of Coef.	261.2	89.3	53.8	38.9	30.7	31.3
Non-Tahltan						
Regression Output:						
Constant	32134.5	23358.7	29404.0	22538.0	23630.8	21466.5
Std Err of Y Est	16329.9	15220.4	17820.1	13255.8	14944.4	15841.1
R Squared	0.63561	0.68345	0.56608	0.75989	0.69482	0.65710
No. of Observations	8	8	8	8	8	8
Degrees of Freedom	6	6	6	6	6	6
X Coefficient(s)	652.2	260.5	105.2	87.4	63.8	62.6
Std Err of Coef.	201.6	72.4	37.6	20.0	17.3	18.4
Stikine						
Regression Output:						
Constant	38807.7	15740.9	32949.3	22399.4	24034.3	18008.3
Std Err of Y Est	29903.2	25463.8	36820.0	32062.2	34894.8	36222.2
R Squared	0.78140	0.84149	0.66858	0.74870	0.70233	0.67926
No. of Observations	8	8	8	8	8	8
Degrees of Freedom	6	6	6	6	6	6
X Coefficient(s)	1709.7	683.4	270.3	205.0	151.7	150.4
Std Err of Coef.	369.2	121.1	77.7	48.5	40.3	42.2



Appendix D.3. Total Tahltan sockeye run vs cumulative sockeye catch through week 27 in the District 108 test fishery.



Appendix D.4. Total non-Tahltan sockeye run vs cumulative sockeye catch through week 27 in the District 108 test fishery.



Appendix D.5. Total Stikine sockeye run vs cumulative sockeye catch through week 27 in the District 108 test fishery.

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