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Stock Compositions of Sockeye Salmon Catches in Southeast Alaska's Districts 106 and 108 and the Stikine River, 1986, Estimated with Scale Pattern Analysis

by
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and
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State of Alaska Steve Cowper, Governor

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ABSTRACT

Linear discriminant function analysis of scale patterns was used to estimate the sockeye (*Oncorhynchus nerka*) stock compositions in Alaska's commercial gill net fisheries in Districts 106 and 108, in the Stikine River test fishery, and in Canada's lower river commercial fishery, 1986. Contributions of the Alaska I, Alaska II, Nass-Skeena, Tahltan, and non-Tahltan Stikine stock groups to Alaska's fisheries Stikine stock groups to Alaska's fisheries were estimated to be 65,315, 35,882, 42,754, 2,473, and 3,468 fish, respectively. The migratory timing, estimated from CPUE, of the Alaska I stock group peaked in District 106 during mid-July, the Alaska II group during late July, and the Nass/Skeena group during late July to mid-August. Tahltan stocks contributed greater than 70% of the Canadian commercial catch through July 19 while the non-Tahltan Stikine stocks contributed greater than 70% after July 26. Stock compositions in Subdistricts 106-41 and 106-30 and in the Stikine River were estimated in-season to provide guidelines for managers in making fishery extension or closure decisions. Although the estimates were within management error range, log-likelihood analysis with ã = 0.05 indicated that the in-season estimates were significantly different from the postseason estimate for both districts in most openings. The in-season stock composition estimates for the Canadian commercial harvest in the Stikine River were not significantly different from the postseason estimates through July 19. The 1986 Stikine River run was estimated to be 79,321 fish, with 5,941 fish caught in Alaska's commercial fisheries and 73,380 fish entering the river. The Canadian commercial and food fishery catches were estimated to be 10,613 Tahltan fish and 6,821 non-Tahltan fish, while estimated escapements were 20,280 Tahltan fish and 35,666 non-Tahltan fish.

KEY WORDS: sockeye salmon, linear discriminant function, scale patterns analysis, stock composition, transboundary, migratory timing, in-season analysis

INTRODUCTION

Sockeye salmon (*Oncorhynchus nerka*) are harvested in marine net fisheries throughout Southeast Alaska and northern British Columbia. Commercial drift gill net fisheries in Alaska's Districts 106 and 108 harvest sockeye salmon of Alaskan origin, but also intercept some sockeye salmon of transboundary Stikine River origin and some fish destined to spawn in the Nass and Skeena Rivers of Canada. Interception of salmon bound for one country's rivers as they migrate through the territorial waters of the other country has become a research and management concern in recent years with the implementation of the U.S./Canada Pacific Salmon Treaty. The Stikine River arises in British Columbia and passes through Alaska and is therefore a transboundary river. Cooperative international management of transboundary river sockeye salmon is mandated by this treaty under Annex IV. Chapter 1. Knowledge of stock-specific harvest is, therefore, needed to fulfill requirements of and assess compliance with the harvest sharing guidelines outlined in the treaty.

Objectives

The purpose of this study is to determine the contributions of major sockeye stock groups to gill net fisheries in Alaska's Subdistricts 106-41 and 106-30 and District 108 and in Canada's commercial fisheries in the Stikine River. The estimation of the interception rates and relative abundance of Stikine River sockeye salmon is requisite to help implement treaty guidelines. Scale patterns from fish in both the U.S. and Canadian commercial catches are analyzed both on an in-season and a postseason basis to estimate stock contributions on a weekly basis.

Study Area

Sockeye salmon harvested in Districts 106 and 108 commercial fisheries originate from lake systems and their tributaries throughout Southeast Alaska, from the sloughs and lakes of the transboundary Stikine River, and from the Canadian Nass and Skeena Rivers (Figure 1). Tagging studies have shown that few stocks outside this area pass through District 106. Adult sockeye salmon were tagged in 1982 and 1983 in several Alaskan and Canadian fishing districts to determine migratory pathways and interception rates of various stocks. The majority of terminal area recoveries from fish tagged in District 106 occured along the northeast coast of Prince of Wales Island and upper Behm Canal (Steve Hoffman, Alaska Department of Fish and Game, personal communication). Tags applied in this district were also recovered in Alaskan systems as far south as the U.S. Canada border, and in the Stikine, Nass, and Skeena Rivers. There were few or no recoveries of tags applied in more southern districts in either the northern Prince of Wales Island lake systems or the Stikine River.

Numerous sockeye salmon producing lakes are scattered throughout the achipelago and mainland of Southeast Alaska. They range in size from small

lakes of a few hectares to large systems greater than 500 hectares (e.g., McDonald and Klawock Lakes) and include multi-lake systems like the Sarkar and Galea-Sweetwater complexes. Sockeye salmon production is limited by the quantity and quality of spawning areas, the available rearing area, or other environmental conditions as well as the number of spawners. Sockeye productivity varies greatly, even between systems of roughly equivalent size (McGregor 1983; McGregor et al. 1984; McGregor and McPherson 1985; McPherson and McGregor 1986; and McPherson et al. 1988). Typical small systems such as Alecks and Kutlaku Lakes on Kuiu Island produce estimated runs of a few thousand fish. While total run size in not known, escapements in two intermediate systems, which had enumeration weirs, Karta Lake on eastern Prince of Wales Island and Salmon Bay Lake on northeast Prince of Wales Island averaged 25,000 and 18,000 fish, respectively (1982 to 1986 excluding 1984 when weirs were not installed). The single largest producer of sockeye salmon in recent years in southern Southeast Alaska is McDonald Lake, located in upper Behm Canal. Escapements to this system have ranged from 56,000 in 1983 to 174,000 in 1985 and have averaged 115,000 (1981 to 1986, excluding 1982 when the weir washed out).

The Stikine River is a transboundary river that originates in British Columbia, Canada, crosses the Alaskan panhandle, and flows into Frederick Sound north of Wrangell, Alaska. Approximately 90% of the river system is inaccessible to anadromous fish due to natural barriers and velocity blocks. The majority of the accessible spawning habitat is located above the U.S./Canada border. The largest single contributor to the Stikine River sockeye run is the Tahltan Lake group, hereafter referred to as Tahltan. This system has a weir and escapement counts have ranged from 1,800 fish in 1963 to 67,300 fish in 1985 with an average of 20,900 (1959 to 1986, excluding 1962 when the weir installation date was unspecified and 1965 when a large slide hindered access into the lake) (TTC 1987). The remainder of the Stikine River sockeye stocks, hereafter referred to as non-Tahltan Stikine, spawn in small lakes, sloughs, and side channels of the mainstem river and its tributaries, most of which are glacially occluded. Non-Tahltan Stikine escapement estimates have ranged from 13,400 in 1979 to 60,900 in 1981 with an average of 30,500 (1979 to 1986). A Canadian subsistence fishery operating near Telegraph Creek has harvested a yearly average of 3,800 fish since 1972 (DFO 1986). Canadian commercial fisheries on the upper and lower portions of the river have harvested an average of 600 and 15,900 fish, respectively (1979 to 1986, excluding 1984 when both were closed).

The Nass and Skeena Rivers also contribute substantial numbers of sockeye salmon to the District 106 and 108 harvests in some years. The Nass River originates in British Columbia and drains into Portland Canal, just south of the U.S./Canada border. Estimated escapements to this system have averaged 233,600 from 1980 to 1986 (PSC 1988). The Skeena River also originates in British Columbia and drains into the ocean about 50 km south of the Nass River. Estimated escapements have averaged 1,134,700 from 1980 to 1986 (PSC 1988).

Stock Separation Studies

The United States and Canada inititated research programs to assess the feasibility of various stock separation techniques applicable to jointly harvested sockeye salmon stocks in 1982. Several methods of stock separation have been used, including the incidence of the parasite *Myxobolus neurobius*, differences in genotypes, adult tagging studies, and scale pattern analysis. Of these, scale pattern analysis has been used most extensively to determine stock composition of the harvests in Alaskan mixed stock commercial fisheries (Oliver et al. 1984; Oliver and Walls 1985; Oliver and Jensen 1986).

Scale pattern analysis has proven highly accurate in determining the contribution rates of sockeye stocks to Southeast Alaska's commercial fisheries because of significant and persistent differences in the freshwater and early marine growth of stocks originating in various Alaskan and Canadian systems. The original stock groupings used by the Alaska Department of Fish and Game (ADF&G) were Alaska (comprised of samples taken from 22 to 28 Alaska escapements), Nass/Skeena (comprised of samples taken from inriver test fisheries on the Nass and Skeena Rivers), and Stikine River (comprised of scale samples collected from the Canadian inriver commercial fishery). The stock groupings were expanded in 1983 by creating separate standards for the Tahltan Lake escapement and for the non-Tahltan Stikine escapement (samples from mainstem river and side slough spawners and Chutine, Skud, and Iskut River spawners). Standards were further refined in 1986 to separate two distinct Alaska patterns (Alaska I, typified by Salmon Bay and Hugh Smith Lake patterns and Alaska II, typified by the McDonald Lake pattern).

MATERIALS AND METHODS

Collection and Preparation of Scale Samples

Scales were taken from random samples of 700 sockeye salmon each from the commercial catches in Alaska's Subdistricts 106-41 and 106-30 and District 108 each week the fisheries were open (McPherson et al. 1988). Samples were also collected from test fisheries in Districts 106 and 108 when available. The scale samples from the Stikine River test fishery and the Canadian lower river commercial catch were collected by ADF&G and Department of Fisheries and Oceans, Canada (DFO) personnel. Stock group standards used in postseason analysis were developed from scales sampled from escapements. Approximately 500 scales were collected from each of 23 lake systems throughout Southeast Alaska (Figure 2), 1000 scales at the Tahltan weir, (Figure 3), 500 from the non-Tahltan Stikine escapements, and approximately 1000 to 1500 from each test fishery operating in the lower reaches of the Nass and Skeena Rivers (Figure 1). The standards used in the in-season analysis were developed from scales collected in the same areas in 1985.

Scales were taken from the left side of the fish approximately two rows above the lateral line along a diagonal downward from the posterior

insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Scales on salmon fry first develop in this area, and thus, for purposes of aging and digitizing, it is the prefered area. Scales were mounted on gum cards and impressions made in cellulose acetate (Clutter and Whitesel 1956).

Age Determination and Measurement of the Scales

A goal of 700 scale samples per district per week was established for the age composition estimation. Individual fish ages were determined from scale images magnified to 70 power on a microfiche reader and were recorded in European notation. The sample size used for the scale pattern analysis varied on a weekly basis and was dependent on age composition. Generally 100 age-1.3 fish and as many scales as possible (up to 100) from each of the age-1.2, -2.2, and -2.3 age groups were analyzed for each district and week (Appendix A). Scale images magnified at 100X were projected onto a digitizing tablet using equipment similar to that described by Ryan and Christie (1976). Measurements were made and recorded with a microcomputer-controlled digitizing system with fortran programs.

Previous studies have established that an axis approximately perpendicular to the anterior edge of the unsculptured posterior field is best for consistently measuring sockeye scales (Clutter and Whitesel 1956; Narver 1963). This axis is approximately 20° dorsal or ventral from the anterior-posterior axis, and all circuli counts and scale measurements in the lacustrine and first year marine zone were made along it. Marshall et al. (1984) established the separability of major stock groups by measurements in three (or four) zones: 1) the scale center to the last circulus of the first freshwater annulus, 2) when present, the first circuli of the second year of freshwater growth to the end of the second freshwater annulus, 3) the plus growth or scale growth after the last freshwater annulus and before the first marine circulus (Mosher 1968), and 4) the first year marine growth (i.e., the first marine circulus to the end of the first marine annulus) (Figure 4). A total of 74 variables, including circuli counts, incremental distances, and ratios and/or combinations of the measured variables are calculated for samples with a single freshwater annular zone and 106 variables for samples with two freshwater annular zones (Appendix A.4).

Analytical Procedures

The ability to differentiate salmon stocks based on scale patterns depends upon the degree of difference in the scale characters between stocks (Marshall et al. 1987). Linear discriminant function (LDF) analysis of scale patterns has been used to estimate stock contribution to southern Southeast Alaska mixed stock sockeye salmon fisheries since 1982 (Oliver et al. 1984; Oliver and Walls 1985; Oliver and Jensen 1986).

LDF is a multivariate technique that develops classification rules used to assign a sockeye salmon sampled in a mixed stock fishery to a stock of

origin. The variables calculated from the circuli counts and incremental distances on scales from fish of known origin provide a set of measurements used to define these rules. A sample of p selected scale variables from a number of salmon stocks or stock groups defines a single region in p-space characteristic of that group of fish. Based on probability theory, the established regions in p-space are uniquely defined or separated by decision surfaces. A sockeye salmon harvested in a mixed stock fishery may be classified according to which region its p-tuple occupies. The accuracy of classification depends upon the precision with which the regions defining each stock or group are described and the inherent separation between them. The LDF is the linear combination of p observed variables which maximizes the between-group variance relative to the within-group variance (Fisher 1936).

The major assumptions underlying LDF analysis are: 1) the groups being investigated are discrete and identifiable; 2) the parent distributions of the measured variables are multivariate normal; and 3) the variance-covariance matrices for all groups are equal. Gilbert (1969) found LDF satisfactory if the variance-covariance matrices were not too different. In addition, large sample sizes appear to make the LDF robust to the assumption of common variance-covariance matrices (Issacson 1954; Anas and Murai 1969). The method also appears to be robust to violations of the normality assumption for discrete distributions, however, it is not robust for continuous non-Gaussian parent distributions (Lachenbruch et al. 1973; Krzanowski 1977). Some preliminary results of a study comparing the accuracy of LDF, quadratic discriminant function, direct density estimation (Cook 1982), and nearest neighbor analysis in classifying our data indicate that the LDF has a slightly higher classification accuracy than do the other estimators for the stock groups present in the mixed stock fisheries of Southeast Alaska. This again indicates that the above assumptions are met or that LDF is robust to violations of them.

Scale variables to be used in the LDF are selected with a stepwise regression. In this process variables are added until the partial F-statistic of all variables available for entry into the model is less than 4.00 (Enslein et al. 1977). An almost unbiased estimate of classification accuracy for each LDF was determined using a leaving-one-out procedure (Lachenbruch 1967). One sample is "left-out", the discriminant rule is estimated, and the "left-out" sample is classified using the discriminant rule and checked to see if it was classified correctly. This procedure is repeated for all samples. Thus, when an LDF is run using the leaving-one-out procedure a classification matrix is developed which gives the proportion of correctly identified fish and the proportion of missclasification of each stock to each of the other stocks.

When more than two stock groups are being analyzed the stepwise regression procedure does not always result in maximum classification accuracies or the most balanced classification matrix. Frequently, well-separated groups are separated even further, while poorly separated groups remain poorly separated (Habbema and Hermans 1977). Scale variables that provided the best discrimination between the groups that most often misclassified as each other were occasionally added to or substituted for other variables used in the LDF to provide either a better balance to the classification matrix or to increase the mean classification accuracy.

The proportional estimates of stock composition in the mixed stock harvests, referred to as initial estimates, were adjusted with a classification matrix correction procedure (Cook and Lord 1978). The fish in the mixed stock composition sample are classified with the LDF. The vector of proportional estimates for each stock or stock group is multiplied by the classification matrix to give new estimates, referred to as adjusted estimates, for the true proportions of stocks and stock groups in the mixed stock fishery. In cases where adjusted estimated proportions for a stock group were less than zero, the entire catch sample was reclassified with a model excluding that stock group. This process was repeated until all adjusted estimated proportions were positive.

The variance and 90% confidence intervals of the adjusted estimates of stock proportions were computed according to Pella and Robertson (1979). The variance-covariance matrices for the misclassification matrix and for the mixed stock proportion vector are determined from the multinomial probability distribution. These two variance-covariance matrices are combined to give variances and covariances for the adjusted estimates of stock proportions. The variances for the proportions of each stock are the diagonal elements of this combined matrix, i.e., they are an additive combination of: 1) the sampling variation in estimation of the probability of assignment of the known stock group, and 2) the sampling variation in estimation of the assignment composition of the mixed stock group.

Classification of Catches

In-season estimates provide fisheries managers with data to assist them in determining fisheries openings. Commercial catches were analyzed in-season with standards developed from the previous year's escapements. Stock contributions for the District 106-41, 106-30, and 108 commercial harvests were estimated and summaries provided to managers within 48 hours of the fishery closures from mid-June through early August. All four of the major age groups were digitized when possible (in some weeks the age 2.2 fish were not analyzed due to lack of time). Stock compositions for the Canadian commercial catches on the Stikine River were also estimated in-season, however, there was a 3- to 5-day lag between fishery closures and catch analyses due to logistical difficulties in receiving the data. Only the age-1.3 fish were digitized in-season, and the stock composition was expanded to all fish, except the age-0.2 and -0.3 fish. Since no age-0. fish have been sampled at Tahltan weir, it was assumed that all age-0. fish are of the non-Tahltan Stikine group.

The commercial catches were reclassified postseasonally with standards built from the 1986 escapements. The four major age groups (1.2, 1.3, 2.2, and 2.3) have generally contributed more than 98% of the catch in Districts 106 and 108. Standards were developed for each age class for the Alaska I and Nass/Skeena groups. Standards for age-1.2, -1.3, and -2.3 fish were developed for the Alaska II and non-Tahltan Stikine groups. Tahltan standards were developed for age-1.3 and -2.3 fish only. Standards were not developed for age classes which contributed only a minor fraction of the escapement for a given stock or stock group since insufficient scales were available to build them. Age-specific models were used in the analysis to:

1) account for differences in age composition between stocks, 2) remove potential bias due to differences in migratory timing of different age fish, and 3) eliminate the effect of different environmental conditions on the scale patterns of different age fish. Stock contributions were estimated for each week to track temporal patterns; however, in some weeks catches were small and samples of the less common age groups were insufficient to classify unless pooled with the adjacent week's sample. The proportions of each stock from the catch sample were expanded to the week's catch by:

$$C_{ijt} = C_t * P_{it} * S_{ijt} \tag{1}$$

where: C_{ijt} = estimated catch of fish of age i and group j in time period t

C_t = total catch in time period t,

P_{it} = estimated proportion of fish of age i in the catch in time period t, and

S_{ijt} = proportion of fish of age i and group j in the catch in time period t estimated with LDF.

The stock apportionment of the minor age groups not classified with LDF assumes that the proportion of the minor ages belonging to any given stock is equal to the combined proportion of all LDF classified age classes:

$$C_{mjt} = C_t * P_{mt} * S_{\cdot jt} \tag{2}$$

where: C_{mjt} = estimated catch of fish of minor age classes of group j in time period t, and

P_{mt} = estimated proportion of fish of minor age groups in the catch in time period t.

The variances (V) of the weekly ($C_{\cdot jt}$) and seasonal ($C_{\cdot j\cdot}$) stock composition estimates were approximated with the delta method (Seber 1982). The variance estimates are functions of: 1) the accuracy of the age-specific models used to classify the unknowns, 2) the sample size of each standard used to develop the age-specific models, 3) the proportions of each stock in the initial and in the adjusted stock composition estimates, the 4) age-specific stock composition sample sizes, 5) age composition sample sizes, and 6) the catch size. However, it is a minimum estimate of variance since it does not include any variance associated with the age classes not classified with LDF nor, any variance for stocks contributing no fish during a given week.

Variances of the proportions of stock contributions were calculated by:

$$V(P_j) = P_j^2 * \left(\frac{V(C_j)}{C_j^2} + \frac{V(C.)}{C.^2} \right) \quad (3)$$

where: P_j = proportion of stock j or C_j/C.

An evident change in the growth pattern of some stock(s) from the previous year's growth pattern resulted in an in-season classification problem of a minor stock, the non-Tahltan Stikine fish. This incongruity in the estimated contribution of non-Tahltan Stikine fish was apparent during the first weeks of the commercial fisheries in Subdistricts 106-41 and 106-30. The estimated contributions ranged from 24% to 32% in 106-30 and from 13% to 34% in 106-41. From 1983-85 the weekly non-Tahltan Stikine contribution was not estimated to be >12.6%. Data from 1983 and 1984 were analyzed for District 106 as a whole. In 1983 the proportion of non-Tahltan Stikine fish peaked at 5.6% in mid-July (week 29) and in 1984 it peaked at 5.0% in late June (week 26) and 12.6% in mid-July (week 29). Subdistricts were split (30 and 41) in the 1985 analysis. The proportion of non-Tahltan Stikine fish peaked at 3.1% in early July (week 28) in 106-30 and at 2.9% in late July (week 30) and at 4.0% and 4.8% during late August and September in 106-41. The estimated inriver Stikine stock compositions for 1983, 1984, and 1985 were non-Tahltan Stikine 56%, 40%, and 57%, respectively. Generally, even when non-Tahltan Stikine stocks were more abundant in the inriver catch than were Tahltan stocks, they were less abundant in the 106 commercial fisheries in weeks when both stocks were present. The ratio of Tahltan sockeye salmon over all Stikine River sockeye salmon in the 1985 commercial catches in 106-30 and 106-41 was mirrored in the Canadian inriver catch 1 week later (Table 1), with generally less than 0.10 difference through mid-July (week 29). We assume that the migratory patterns in 1985 and 1986 were similar, thus, the ratio of Tahltan fish over all Stikine River fish in the Canadian inriver catch was used to adjust the proportion of non-Tahltan Stikine fish in the previous week's District 106 catches by:

$$\hat{N}_{dt} = \frac{N_{r(t+1)}}{T_{r(t+1)}} * T_{dt} \quad (4)$$

where: N_d = adjusted estimated proportion of Stikine (non-Tahltan) fish in Alaska's district d catch in week t,

$N_{r(t+1)}$ = proportion of Stikine (non-Tahltan) fish in the Canadian commercial catch in week t+1,

$T_{r(t+1)}$ = proportion of Tahltan fish in the Canadian commercial catch in week t+1, and

T_{dt} = proportion of Tahltan fish in Alaska's district d catch in week t.

This resulted in a consistent drop in the estimated contribution of the non-Tahltan Stikine sockeye salmon to the District 106 commercial fisheries. Reclassification of the catches with a three-way model (Alaska vs Nass/Skeena vs Tahltan, with non-Tahltan Stikine excluded) resulted in a substantial increase in the Alaska contribution. Since 80% or more of the fish formerly classified to non-Tahltan Stikine were reclassified as Alaska, the differences in the original and revised non-Tahltan Stikine contributions were assigned to the Alaska group. No variances were calculated for the revised estimate.

The postseason classifications of the Stikine River commercial and test fishery catches were run with 2-way Tahltan versus non-Tahltan Stikine models for age-1.3 and age-2.3 fish. No standards for Tahltan age-1.2 or age-2.2 fish were available due to insufficient numbers of fish (only 7 fish were aged-1.2 and 10 were aged-2.2 from an ageable escapement sample of 719 fish from Tahltan weir). Therefore, the ratio of the unclassified age group to the age 1.3 fish in the escapements was used to estimate the stock composition of the unclassified age group in the fishery catch by:

$$\hat{H}_{ij} = \frac{H_{1.3j} * (E_{ij}/E_{1.3j})}{\sum_{j=1}^{2} H_{1.3j}*(E_{ij}/E_{1.3j})} \qquad (5)$$

where: $\hat{H}_{ij}$ = estimated proportion of stock j in harvest of age i fish,

$H_{1.3j}$ = estimated proportion of stock j in harvest of age 1.3 fish,

E_{ij} = estimated proportion of age i fish in stock j's escapement,

$E_{1.3j}$ = estimated proportion of age 1.3 fish in stock j's escapement

i = a single age group of interest, and

j = stock group 1 or 2.

Basic assumptions in this method are; 1) the ratio of catchabilities between stock 1 and stock 2 is the same for age i as for age 1.3 fish and 2) there is little error in the age composition estimates for both the Tahltan and the non-Tahltan Stikine escapements. E_{ij} was estimated from the age composition of fish sampled at the Tahltan weir or from the non Tahltan Stikine spawning grounds. No variance estimates were available for the stock compositions estimated with formula (5).

Adjusted in-season and postseason weekly stock composition estimates for Subdistricts 106-41 and 106-30 and for the Stikine River were compared to

test if the in-season estimates differed significantly from the postseason estimates for each fishery. This comparison is a measure of interannual variation in scale patterns. Data was set up in a standard contingency table format and tested with the G statistic (log-likelihood ratio test) (Zar 1984).

Estimation of the Stikine River Sockeye Run

The weir counts at Tahltan weir (DFO 1986), added to the number of Tahltan fish in the inriver sockeye salmon catches, provided an estimate of the total inriver run of Tahltan fish. The magnitude of the inriver run of the non-Tahltan Stikine stock group was estimated with:

$$R_{1\cdot} = \frac{R_{2\cdot} * P'_{1\cdot}}{P'_{2\cdot}} \tag{6}$$

where: $R_{1\cdot}$ = run size of non-Tahltan Stikine fish past the Canadian inriver test fishery,

$R_{2\cdot}$ = run size of Tahltan fish past the Canadian inriver test fishery,

$P'_{1\cdot}$ = adjusted proportion of non-Tahltan Stikine fish in the season's test fishery catch, and

$P'_{2\cdot}$ = adjusted proportion of Tahltan fish in the season's test fishery catch.

and:

$$P'_{jt} = P_{jt} * \frac{C_t}{\sum_{t=1}^{N} C_t} \tag{7}$$

where: P'_{jt} = adjusted proportion of total sockeye run belonging to stock j and occurring in week t,

P_{jt} = proportion of stock j in week t from test fishery catch analysis,

C_t = CPUE from test fishery week t, and

N = number of weeks in fishing season.

RESULTS

The stock compositions of the sockeye salmon caught in Districts 106-41, 106-30, and 108 and in the Stikine River were estimated from mid-June through late September (statistical weeks 25 to 39). Of the 149,892 sockeye salmon harvested in Districts 106 and 108, 44% were of Alaska I origin, 24% of Alaska II, 29% of Nass/Skeena, 2% of Tahltan, and 2% of non-Tahltan Stikine origin (Table 2). Of the Canadian lower Stikine River commercial catch of 12,411 fish (DFO 1986), 49% were of Tahltan and 51% were of non-Tahltan Stikine origin (Table 3). Model accuracies, determined from classification matrices (Appendix B), ranged from a low of 64 to 66% for the five-standard model to a high of > 90% for some of the two standard models (Table 4). The Alaska I and Alaska II groups tended to misclassify as each other, as did the Alaska II and Stikine groups and the Tahltan and Nass/Skeena groups. In most models the Nass/Skeena groups had the lowest and the non-Tahltan Stikine standard had the highest misclassification rates.

Stock Composition of the Subdistrict 106-41 Catch

Of the estimated 85,243 sockeye salmon harvested in Subdistrict 106-41 in 1986, 66% were of Alaska I and Alaska II origin, 31% of Nass/Skeena origin, and 3% of transboundary Stikine River origin (Table 2). Classifications were determined for each age class (Appendix C.1). The harvest of the Alaska I group peaked in late June and early July with a second peak in late July when the harvest of Alaska II fish also peaked (Figure 5). Stikine River stocks contributed only a small portion of the catch with the Tahltan contribution estimated at 2.4% and the non-Tahltan Stikine at 0.6%. An estimated 1,175 Tahltan fish were harvested in late June (week 27) and 712 in late July (week 31). Catches of Tahltan and non-Tahltan Stikine fish were <500 fish in other weeks. The Alaska I group dominated the catch during June when they comprised an estimated 66-85% of the weekly catch and remained an important contributor through the remainder of the season (Figure 6). Approximately 15-32% of the catch was comprised of Nass/Skeena fish prior to early August, however, this group was the most abundant group later with estimated contributions of 49-59% of the rapidly declining weekly harvest after early August.

The estimated peak catch per boat day (CPUE) occured in late June and early July, and late July (weeks 27 and 30) for all groups except Nass/Skeena which peaked in mid-August (week 33). Peak CPUE's of 44, 37, and 32 fish for Alaska I, Alaska II, and Nass/Skeena, respectively, were much greater than those of Tahltan and non-Tahltan Stikine at 4 and 2 fish, respectively (Appendix C.2). The weekly proportion of CPUE, an indicator of migratory timing, peaked for all groups combined during late July (week 31), but, that of the individual groups all peaked in other weeks (Figure 7).

Stock Composition of the Subdistrict 106-30 Catch

Stock composition by age class was estimated for the Subdistrict 106-30 sockeye harvest (Appendix C.3). Of the estimated 60,462 sockeye salmon harvested in drift gill net fishery in 1986, 73% were of Alaska I and Alaska II origin, 27% of Nass/Skeena origin, and 0.2% of transboundary Stikine River origin (Table 2). The peak harvests of Alaska I fish occured in late June-early July; Alaska II fish peaked in late July and Nass/Skeena fish in August. The Tahltan and non-Tahltan Stikine groups were only minor components and contributed <1% of the catch, with an estimated 11 and 105 fish, respectively (Figure 8). The Alaska I group was harvested throughout the season and contributed 80% of the catch during mid-June through mid-July (weeks 25 to 29) (Figure 9). The majority of the Alaska II and Nass/Skeena fish were caught in late July and August.

The CPUE of the Alaska I group was greater than 65 fish in mid July (weeks 29 and 30). The peak CPUE of 43 Alaska II and 22 Nass/Skeena fish per boat day both occured during late July (week 31) (Appendix C.4). The weekly proportion of CPUE by group indicated that the migratory timing of the Alaska II and the Nass/Skeena groups were similar to each other and later than the Alaska I group in Subdistrict 106-30 (Figure 10). Little can be learned of the migratory timing of the Tahltan and non-Tahltan Stikine groups through the District 106-30 fishery due to the extremely small catches of these stocks. A rough estimate of the migratory timing of the Stikine River sockeye stocks may be gleaned from previous years' stock composition estimates (Appendix C.5 to C.8).

Stock Composition of the District 108 Catch

Stock composition by age class was estimated for the District 108 sockeye harvest (Appendix C.9). Of the estimated harvest of 4,187 sockeye salmon taken in 1986, 68% were of non-Tahltan Stikine origin, 9% of Tahltan origin, 22% of Alaska I and Alaska II origin, and 2% of Nass/Skeena origin (Table 2). The non-Tahltan Stikine group contributed the most fish to the catches in each period (Figures 11 and 12).

The CPUE was calculated for the entire season and for the sampled period, mid-July through early August (weeks 30, 31, and 32) (Appendix C.10). The catch per boat day of the non-Tahltan Stikine group was <40 fish while CPUE's of other groups were <16 fish. The Alaska I, Nass/Skeena, and Tahtan groups peaked in late July (week 30) and the Alaska II group peaked during early August (week 32) (Figure 13). The proportion of the CPUE of non-Tahltan Stikine fish was spread equally among the three weeks.

Stock Composition of the Canadian Stikine River Catch

Stock contributions were estimated by age class for the Canadian commercial sockeye harvest in the lower Stikine River. The contributions of the Tahltan and non-Tahltan Stikine stock groups to the 12,411 (DFO 1987) drift

and set gillnet fishery harvest were estimated at 49% and 51% of the catch, respectively (Table 3). Tahltan fish dominated the catch through mid-July (week 29) and non-Tahltan fish contributed the majority of the harvest after late July (week 31).

A peak catch per fishing day of 85 sockeye salmon occurred during mid-July (week 30) (Appendix C.12). The peak catch per fishing day for Tahltan fish occured during early July (week 28) and that for non-Tahltan in late July (week 31) (Figure 14). The migratory timing of sockeye salmon through the commercial fishery as indicated by proportion of CPUE was similar to that of the test fishery (Appendix C.12-15 and Figure 15).

Test Fishery versus Commercial Catch Analysis

Stock compositions and run timing were estimated for the test fishery catches in Subdistricts 106-41, 106-30, 108-30/40, and 108-50/60 (Appendix D.1-8). Stock composition estimates for both commercial and test fishery catches were compared for weeks when both were available (Table 5 and Appendix D.9). There were major differences in the stock compositions of the test and commercial catches during the weeks when both were operating. The Alaska I group was relatively more abundant and the Alaska II less abundant in the commercial catch than in the test fishery catch. The relative abundances of the other groups also differed between the commercial catch and the test fishery catch, but no trend was apparent. The number of comparisons was insufficient to run a sign test.

Comparison of In-season and Postseason Analysis

The in-season stock composition estimates were compared with the postseason estimates (Appendix E.). The postseason contribution estimates for the Alaska I and Alaska II groups were combined as Alaska to facilitate comparisons. Weekly differences between in- and postseason stock composition estimates were greater in Subdistrict 106-30 than in Subdistrict 106-41. The adjusted estimates were close for all groups in all weeks in Subdistrict 106-41, with relatively small differences between the in- and postseason estimates of the most abundant stock groups (Appendix E.2). Differences between adjusted in- and postseason estimates of some stocks were relatively large in weeks 26, 27, and 29 in Subdistrict 106-30, however estimates were close for most stocks in most weeks (Appendix E.8). Log-likelihood ratio analysis of the stock composition estimates from both subdistricts indicated that the in-season estimates were significantly different from the postseason estimates $\alpha = 0.05$ (Table 6) in most weeks. Generally, a greater proportion of Alaska fish and a smaller proportion of Tahltan and non-Tahltan Stikine fish were estimated with the postseason than with the in-season analysis.

The in- and postseason estimates of stock contributions in the Canadian Stikine River commercial fishery were close to each other for all weeks for age-1.3 fish (Appendix E.14). The in- and postseason estimates through week

30 were not significantly different from each other at $\alpha = 0.05$ with log-likelihood ratio analysis (Table 6).

Stikine River Run Strength Estimation

The Tahltan stocks dominated the Canadian Stikine River test fishery catch through mid-July, and the non-Tahltan Stikine stocks dominated the catch thereafter (Figures 1 and 15 and Appendix C.13). This pattern was similar to that observed in the lower river commercial catch. The migratory timing as indicated by proportion of CPUE was used to weight the scale pattern analysis estimates of stock composition of the Canadian test fishery catches to determine adjusted weekly proportions of each stock (Appendix C.14). Summed over all weeks, this resulted in a total proportion 0.421 Tahltan and 0.579 non-Tahltan sockeye salmon (Appendix C.15). The total Canadian inriver catch of Tahltan fish was 10,613 and the weir count for Tahltan spawning escapement was 20,280 giving a Tahltan inriver run estimate of 30,893 (Table 7). These numbers, input into formula (6) provide an estimate of 42,487 for the non-Tahltan Stikine inriver run. The total sockeye salmon inriver run was therefore, 73,380 fish, which, combined with the U.S. catch of Stikine River sockeye salmon, produced an estimated total run of 79,321 (Table 7).

DISCUSSION

Although the total sockeye catch in District 106 was close to the recent years average (1982-1985) of 149,705 fish the stock composition was substantially different from that of previous years (Appendix C.5-8). The contribution rate of the Alaska groups was the highest and that of the Stikine River groups was the lowest since scale patterns analysis was initiated in 1982. A strong run of McDonald Lake fish (Alaska II) was a major factor in the high contribution of the Alaska stocks. This stock has been exceedingly productive in recent years (1981-1986).

The low harvest of the Stikine River stocks was due to relatively low abundance of these stocks and to district and subdistrict closures to specifically conserve these stocks. The low return of the Tahltan stock group, 33,366 fish (89.2% age 1.3), was unexpected in light of the relatively large, 50,790 spawning escapement in 1981. However, the lake appears to be spawning area limited and, thus, the spawner-recruit curve may decline when escapements are large and spawning area competition occurs (Sandy Johnson and Chris Wood, Department of Fisheries and Oceans, Canada, personal communication). The average return of the Stikine (non-Tahltan) stock group, was also less than expected. However, the variances around the escapement estimates for this group are very large and a spawner-recruit curve is difficult to develop. The egg to juvenile survival of the sockeye salmon that hatch and rear in the mainstem and side channels of the Stikine River would be more heavily influenced by environmental factors, particularly water level, than would lake residents. Thus, the number of recruits may not be closely correlated to the number of spawners. The Canadian commercial fishery, initiated in 1979, may also have had a

negative impact on the run. However, since 1986 was the first run when all contributing parent years had been subjected to major harvests in the fishery, no real conclusion can be drawn.

The District 108 catch had a much higher proportion of both the Tahltan and the non-Tahltan Stikine groups than did District 106. Although the total number fish which migrate through each district cannot be estimated, it appears that Stikine River sockeye have a more northern migratory route than do the Alaskan and Canadian stocks. This pattern was also indicated in the stock composition of the Frederick Sound test fishery catch in 1985, where the contribution of Tahltan fish ranged from 70% in mid-June (week 25) to 12% in mid-July (week 29) and the non-Tahltan Stikine contribution increased from 9% in mid-June (week 25) to 80% in mid-July (week 29). The only other stock group present, Alaska I and II combined, contributed an estimated 7% of the catch.

Knowledge of the migratory timing of the stock groups in mixed stock fisheries is necessary if managers wish to allow differential harvest rates on the various stock groups. The migratory timing of a stock group through a commercial fishery district can be estimated from the weekly proportion of the total CPUE attributed that stock group. Although the CPUE may be affected by several variables including gear competition and efficiency, weather conditions, rate of passage, fishing expertise, or availability of other species, in some situations it is the best or only method available for estimating migratory timing. The Subdistrict 106-41 gill net fishery closure during early and mid-July (weeks 28 and 29) minimized the harvest of the weak Stikine River sockeye run. Since the majority of the Stikine River sockeye pass through the Subdistrict during July, regular openings during the remainder of the season allowed adequate harvest of other stock groups with minimal impact on Stikine River stocks.

Analysis of scale patterns enable us to estimate the contributions of major stock groups to fisheries in Districts 106-41, 106-30, and 108 and in the Stikine River. The in-season stock identification program provided managers with timely estimates of relative stock strengths which were used in making fishery extension or closure decisions. In-season exchange of stock composition estimates, catches and CPUE's, and escapement data, between the Canadian Department of Fisheries and Oceans and the Alaska Department of Fish and Game allowed personnel to cooperate in managing the Stikine River sockeye salmon as mandated in the U.S./Canada Pacific Salmon Treaty. Research on stock separation techniques is an ongoing process. Cooperative research programs between the U.S. and Canada, should enable us to further refine stock composition estimates in the future.

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TABLES AND FIGURES

Table 1. The ratio of Tahltan to all Stikine River sockeye salmon in Canada's Stikine River commercial fishery and in Alaska's District 106 gill net fisheries, 1985.

106-41 Commercial Catch				Inriver Commercial Catch			
Week	Tahltan	Stikine	Proportion Tahltan	Week	Tahltan	Stikine	Proportion Tahltan
25	0.277	0.050	0.847	26	0.960	0.040	0.960
26				27			
27	0.340	0.050	0.872	28	0.940	0.060	0.940
28	0.290	0.060	0.829	29	0.830	0.170	0.830
29	0.140	0.000	1.000	30	0.450	0.550	0.450
30	0.050	0.030	0.625	31	0.320	0.680	0.320

106-41 Test Fish Catch				Inriver Commercial Catch			
Week	Tahltan	Stikine	Proportion Tahltan	Week	Tahltan	Stikine	Proportion Tahltan
24	0.190	0.080	0.704				
25	0.380	0.060	0.864	26	0.960	0.040	0.960
26	0.317	0.050	0.864	27			
27	0.340	0.070	0.829	28	0.940	0.060	0.940
28	0.210	0.020	0.913	29	0.830	0.170	0.830
29	0.090	0.030	0.750	30	0.450	0.550	0.450
30	0.070	0.050	0.583	31	0.320	0.680	0.320

106-30 Commercial Catch				Inriver Commercial Catch			
Week	Tahltan	Stikine	Proportion Tahltan	Week	Tahltan	Stikine	Proportion Tahltan
25	0.232	0.040	0.853	26	0.960	0.040	0.960
26	0.240	0.090	0.727	27			
27	0.340	0.050	0.872	28	0.940	0.060	0.940
28	0.290	0.060	0.829	29	0.830	0.170	0.830
29	0.140	0.000	1.000	30	0.450	0.550	0.450
30	0.071	0.020	0.780	31	0.320	0.680	0.320

Table 2. Estimated contributions of sockeye salmon stock groups to Alaska's District 106 and 108 commercial drift gill net fisheries, 1986.

Dates	Group	Catch by District 106-30	106-41	108	Total	Percent
6/15-6/21	Ak. I	553	1,659	2	2,214	84.50
Week 25	Ak. II	27	0	4	31	1.18
	Nas/Ske	64	287	1	352	13.44
	Tahltan	0	0	5	5	0.19
	Stikine	0	0	18	18	0.69
	Total	644	1,946	30	2,620	
6/22-6/28	Ak. I	537	2,527	1	3,065	82.77
Week 26	Ak. II	46	14	2	62	1.67
	Nas/Ske	59	444	0	503	13.58
	Tahltan	0	62	3	65	1.76
	Stikine	0	0	8	8	0.22
	Total	642	3,047	14	3,703	
6/29-7/05	Ak. I	3,539	8,585		12,124	69.73
Week 27	Ak. II	74	536		610	3.51
	Nas/Ske	673	2,377		3,050	17.54
	Tahltan	9	1,175		1,184	6.81
	Stikine	0	420		420	2.42
	Total	4,295	13,093		17,388	
7/06-7/12 Week 28	--No commercial fishery openings					
7/13-7/19	Ak. I	6,086			6,086	79.80
Week 29	Ak. II	1,115			1,115	14.62
	Nas/Ske	424			424	5.56
	Tahltan	2			2	0.03
	Stikine	0			0	0.00
	Total	7,627			7,627	
7/20-7/26	Ak. I	5,400	5,308	130	10,838	46.19
Week 30	Ak. II	2,092	4,553	298	6,943	29.59
	Nas/Ske	1,295	2,744	47	4,086	17.41
	Tahltan	0	0	346	346	1.47
	Stikine	0	64	1,188	1,252	5.34
	Total	8,787	12,669	2,009	23,465	
7/27-8/02	Ak. I	5,590	7,369	20	12,979	37.87
Week 31	Ak. II	5,756	6,589	65	12,410	36.21
	Nas/Ske	2,993	4,560	5	7,558	22.06
	Tahltan	0	712	38	750	2.19
	Stikine	0	16	555	571	1.67
	Total	14,339	19,246	683	34,268	
8/03-8/09	Ak. I	3,659	5,637	13	9,309	36.35
Week 32	Ak. II	3,350	4,456	173	7,979	31.16
	Nas/Ske	2,931	4,681	9	7,621	29.76
	Tahltan	0	0	0	0	0.00
	Stikine	105	0	593	698	2.73
	Total	10,045	14,774	788	25,607	
8/10-8/16	Ak. I	2,042	3,355	7	5,404	26.60
Week 33	Ak. II	1,058	3,104	99	4,261	20.98
	Nas/Ske	2,696	7,486	5	10,187	50.15
	Tahltan	0	121	0	121	0.60
	Stikine	0	0	340	340	1.67
	Total	5,796	14,066	451	20,313	
8/17-9/27	Ak. I	1,732	1,561	3	3,296	22.12
Wk 34-39	Ak. II	1,219	1,206	46	2,471	16.58
	Nas/Ske	5,336	3,634	3	8,973	60.22
	Tahltan	0	0	0	0	0.00
	Stikine	0	1	160	161	1.08
	Total	8,287	6,402	212	14,901	
	Ak. I	29,138	36,001	176	65,315	43.58
	Ak. II	14,737	20,458	687	35,882	23.94
Fishery	Nas/Ske	16,471	26,213	70	42,754	28.52
Totals	Tahltan	11	2,070	392	2,473	1.65
	Stikine	105	501	2,862	3,468	2.31
	Total	60,462	85,243	4,187	149,892	

Table 3. Estimated contributions of sockeye salmon stock groups to Stikine River test fishery catches and to Canada's lower river commercial catches, 1986.

		Commercial Catch		Test Fishery	
Dates	Group	Total	Percent	Total	Percent
6/22-7/05	Tahltan	550	72.7	8	80.0
Wks 26-27	non-Tahltan	206	27.2	2	20.0
	Total	757		10	
7/06-7/12	Tahltan	2,639	82.6	36	64.3
Week 28	non-Tahltan	554	17.3	20	35.7
	Total	3,194		56	
7/13-7/19	Tahltan	1,298	74.5	51	81.0
Week 29	non-Tahltan	443	25.4	12	19.0
	Total	1,742		63	
7/20-7/26	Tahltan	876	51.7	32	49.2
Week 30	non-Tahltan	818	48.3	33	50.8
	Total	1,694		65	
7/27-8/02	Tahltan	647	20.8	26	27.4
Week 31	non-Tahltan	2,464	79.2	69	72.6
	Total	3,111		95	
8/03-8/09	Tahltan	86	9.1	9	13.8
Week 32	non-Tahltan	859	90.9	56	86.2
	Total	945		65	
8/10-8/30	Tahltan	0	0.0	0	0.0
Wk. 33-35	non-Tahltan	971	100.0	42	100.0
	Total	971		42	
Fishery	Tahltan	6,096	49.1	162	40.9
Totals	non-Tahltan	6,315	50.9	234	59.1
	Total	12,414		396	

Table 4. Mean classification accuracies from linear discriminant function models used to classify sockeye salmon harvested in Alaska's District 106 and 108 and Canada's Stikine River gill net fisheries, 1986.

	Mean Classification Accuracy by Age			
Stock Groups	1.2	1.3	2.2	2.3
Alaska I vs Alaska II vs Nass/Skeena vs Tahltan vs Stikine		0.656		0.639
Alaska I vs Alaska II vs Nass/Skeena vs Tahltan		0.754		0.774
Alaska I vs Alaska II vs Nass/Skeena vs Stikine	0.700			0.695
Alaska I vs Alaska II vs Nass/Skeena	0.770	0.803		0.800
Alaska I vs Nass/Skeena vs Tahltan		0.806		
Alaska I vs Nass/Skeena vs Stikine	0.748			0.752
Alaska II vs Nass/Skeena vs Stikine	0.820			0.820
Alaska II vs Tahltan vs Stikine		0.752		
Alaska I vs Nass/Skeena	0.897	0.926	0.887	0.881
Alaska I vs Stikine	0.788	0.833		
Tahltan vs Stikine		0.920		0.708

Table 5. A comparison of estimated stock composition percents for sockeye salmon caught in the District 106 commercial and test drift gill net fisheries, 1986.

Date and Statistical Week		106-41			106-30		
		Catch	Test	Difference	Catch	Test	Difference
6/15-6/21	Ak. I	85.3	72.9	12.4	85.9	82.4	3.5
Week 25	Ak. II	0.0	11.4	-11.4	4.2	14.7	-10.5
	Nas/Ske	14.7	15.7	-1.0	9.9	2.9	7.0
	Tahltan	0.0	0.0	0.0	0.0	0.0	0.0
	Stikine	0.0	0.0	0.0	0.0	0.0	0.0
6/22-6/28	Ak. I	82.9	68.4	14.5	83.4		
Week 26	Ak. II	0.5	15.8	-15.3	7.1		
	Nas/Ske	14.6	12.6	1.9	9.2		
	Tahltan	2.0	3.2	-1.1	0.0		
	Stikine	0.0	0.0	0.0	0.0		
6/29-7/05	Ak. I	65.6	69.9	-4.3	82.4	75.0	7.4
Week 27	Ak. II	4.1	5.9	-1.8	1.7	16.3	-14.5
	Nas/Ske	18.2	16.9	1.2	15.7	8.8	6.9
	Tahltan	9.0	2.2	6.8	0.2	0.0	0.2
	Stikine	3.2	5.1	-1.9	0.0	0.0	0.0
	Ak. I	70.6	70.1	0.5	82.9	76.3	6.7
Fishery	Ak. II	3.0	10.3	-7.3	2.6	16.0	-13.3
Total	Nas/Ske	17.2	15.3	1.9	14.3	7.7	6.5
	Tahltan	6.8	2.0	4.8	0.2	0.0	0.2
	Stikine	2.3	2.3	0.0	0.0	0.0	0.0

Table 6. Log-likelihood (G) values for the comparison of weekly in-season and postseason stock composition estimates for sockeye salmon harvested in Alaska's District 106 and Canada's Stikine River commercial gill net fisheries, 1986.

Stat. Week	Dates	G	P	Reject Ho [a]
106-41	Critical value = 7.815			
25	6/15-6/21	30.740	P < 0.001	yes
26	6/22-6/28	43.872	P < 0.001	yes
27	6/29-7/05	25.219	P < 0.001	yes
28	7/06-7/12			
29	7/13-7/19			
30	7/20-7/26	2.797	0.250 < P < 0.500	no
31	7/27-8/02	16.222	0.001 < P < 0.005	yes
32	8/03-8/09	14.777	0.001 < P < 0.005	yes
Season total		73.643	P < 0.001	yes
106-30	Critical value = 7.815			
25	6/15-6/21	4.099	0.250 < P < 0.500	no
26	6/22-6/28	51.215	0.001 < P < 0.005	yes
27	6/29-7/05	66.190	0.001 < P < 0.005	yes
28	7/06-7/12			
29	7/13-7/19	52.125	0.001 < P < 0.005	yes
30	7/20-7/26	43.993	0.001 < P < 0.005	yes
31	7/27-8/02	9.918	0.010 < P < 0.025	yes
32	8/03-8/09	5.531	0.100 < P < 0.250	no
Season total		142.263	0.001 < P < 0.005	yes
Stikine	Critical value = 3.841			
26-27	6/22-7/05	0.238	0.500 < P < 0.750	no
28	7/06-7/12	0.001	0.975 < P < 0.990	no
29	7/13-7/19	3.829	0.050 < P < 0.100	no
30	7/20-7/26	3.396	0.050 < P < 0.100	no
31	7/27-8/02	4.284	0.025 < P < 0.050	yes
Season total		7.664	0.025 < P < 0.050	yes

[a] Ho: The stock composition estimates for a specific time period are independent of the type of analysis (ie. in-season or postseason).

Table 7. Catch and escapement of Stikine River sockeye salmon, 1986.

Area	Tahltan	non-Tahltan	Total
Alaskan Catch			
District 106 and 108	2,473	3,468	5,941
Canadian Catch [a]			
Telegraph Creek Food Fishery	3,787	421	4,208
Upper River Commercial	734	81	815
Lower River Commercial	6,092	6,319	12,411
Total Canadian Catch	10,613	6,821	17,434
Total Catch	13,086	10,289	23,375
Spawning Escapement	20,280	35,666	55,946
Total Inriver Run	30,893	42,487	73,380
Total Run	33,366	45,955	79,321
Test Fishery Catches [b]			
Canadian Inriver Test Fishery	167	253	420
Alaskan Inriver Test Fishery	234	354	588
Alaskan District Test Fisheries [c]	318	218	536

[a] Total harvest numbers from DFO, Whitehorse, Yukon.
[b] Test fishery catches not included in total run size estimation by agreement of Transboundary Technical Committee.
[c] Minimum estimate since test fishery catches in some weeks were not sampled and only the age 1.3 fish in the District 108 test fisheries were analyzed.

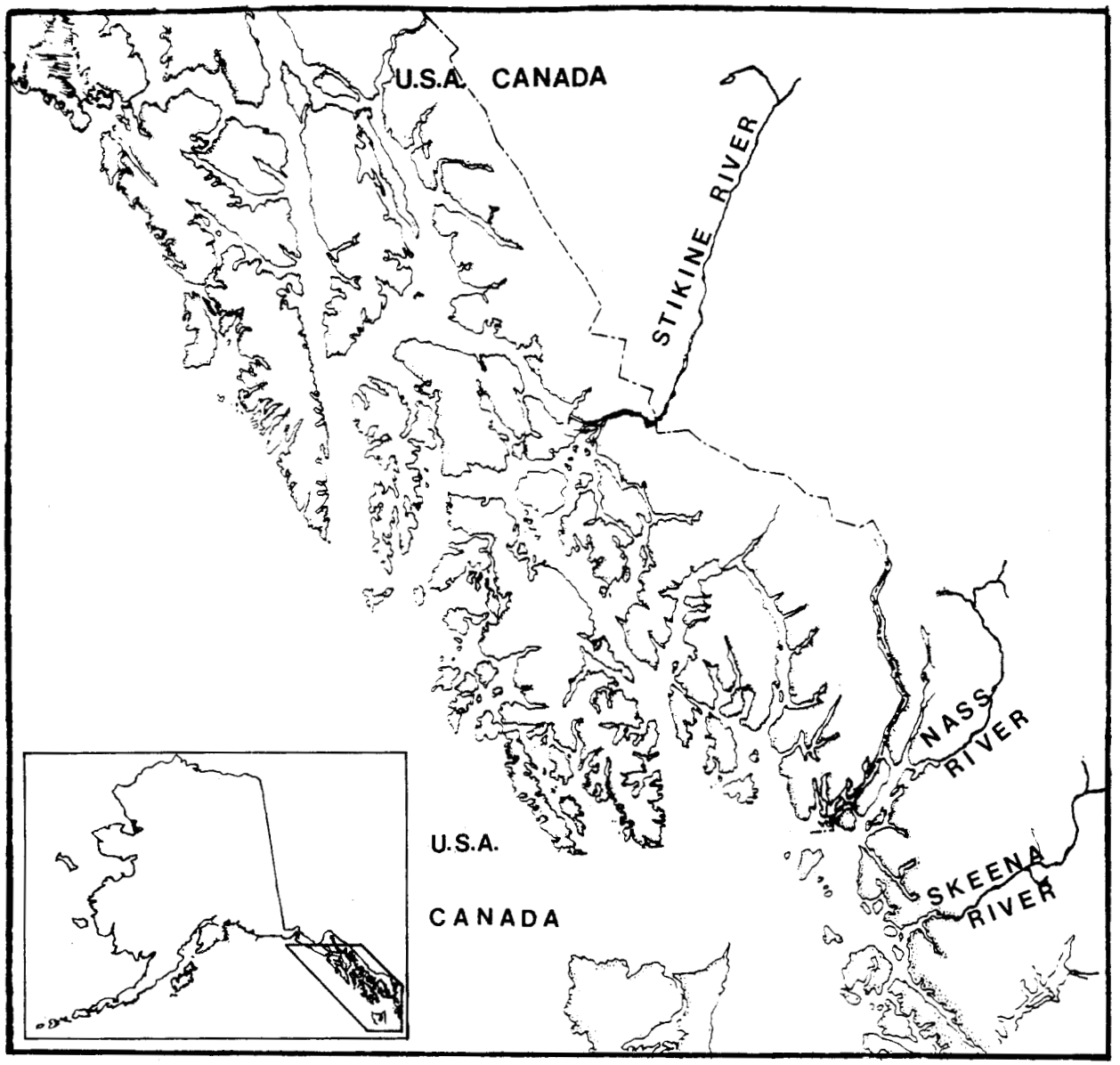

Figure 1. Southeast Alaska, northern British Columbia, and the Transboundary Stikine River.

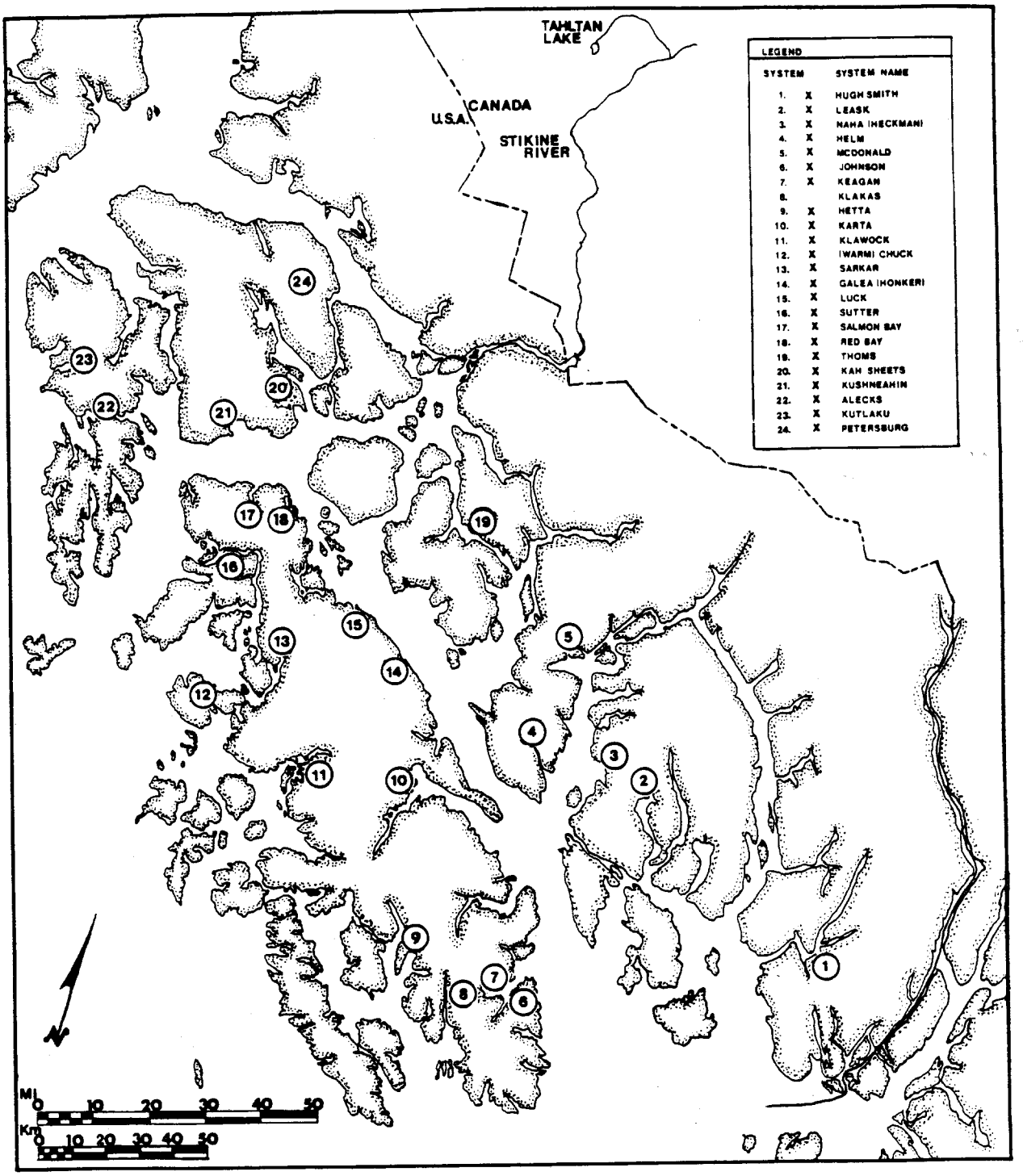

Figure 2. Major sockeye salmon systems of Southeast Alaska. Numbers identify lakes where scale samples were collected for scale pattern analysis.

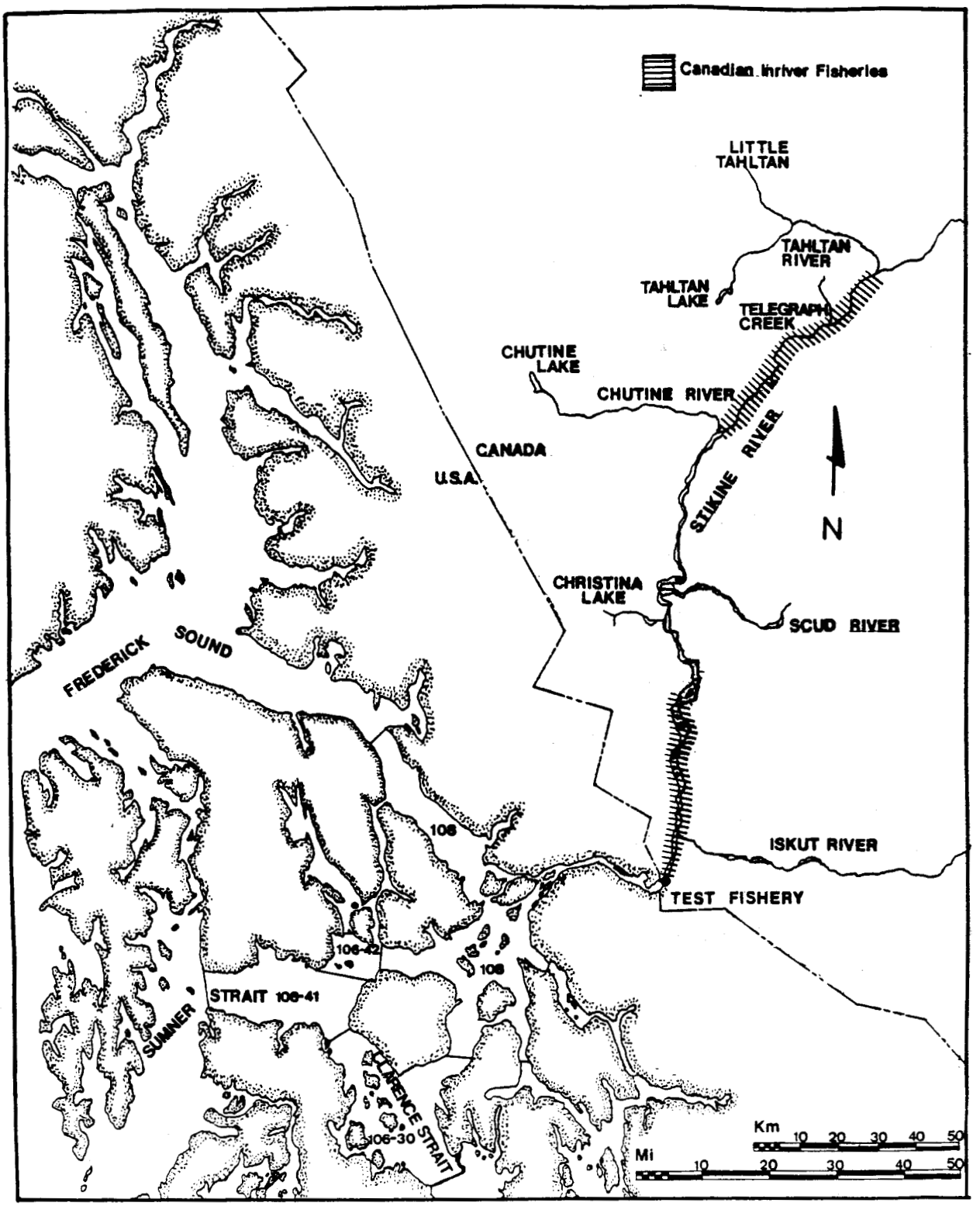

Figure 3. The transboundary Stikine River, major tributaries, and fishery areas.

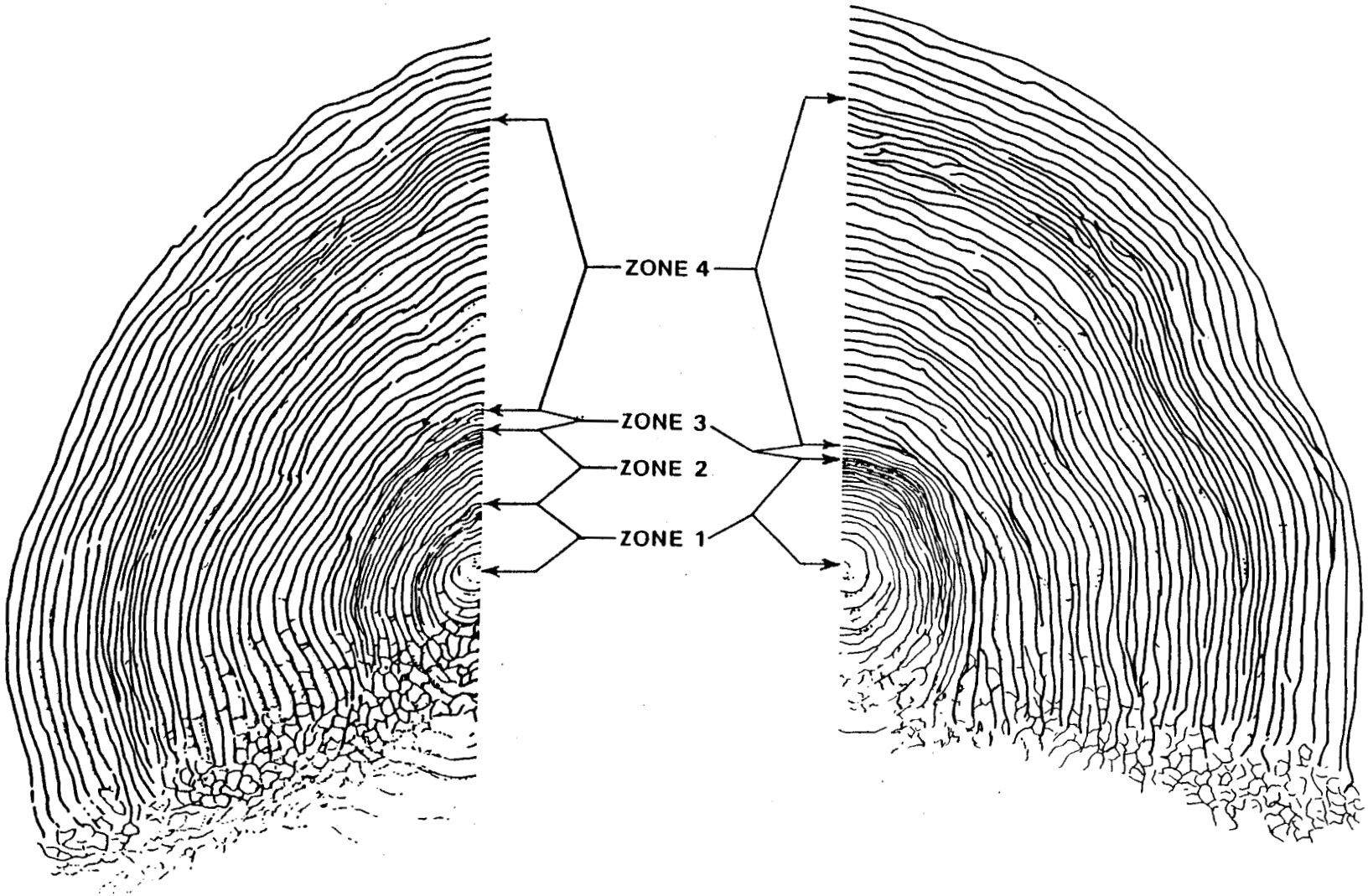

Figure 4. Typical scale for age-2. and-1. sockeye salmon with zones used for scale pattern analysis delineated.

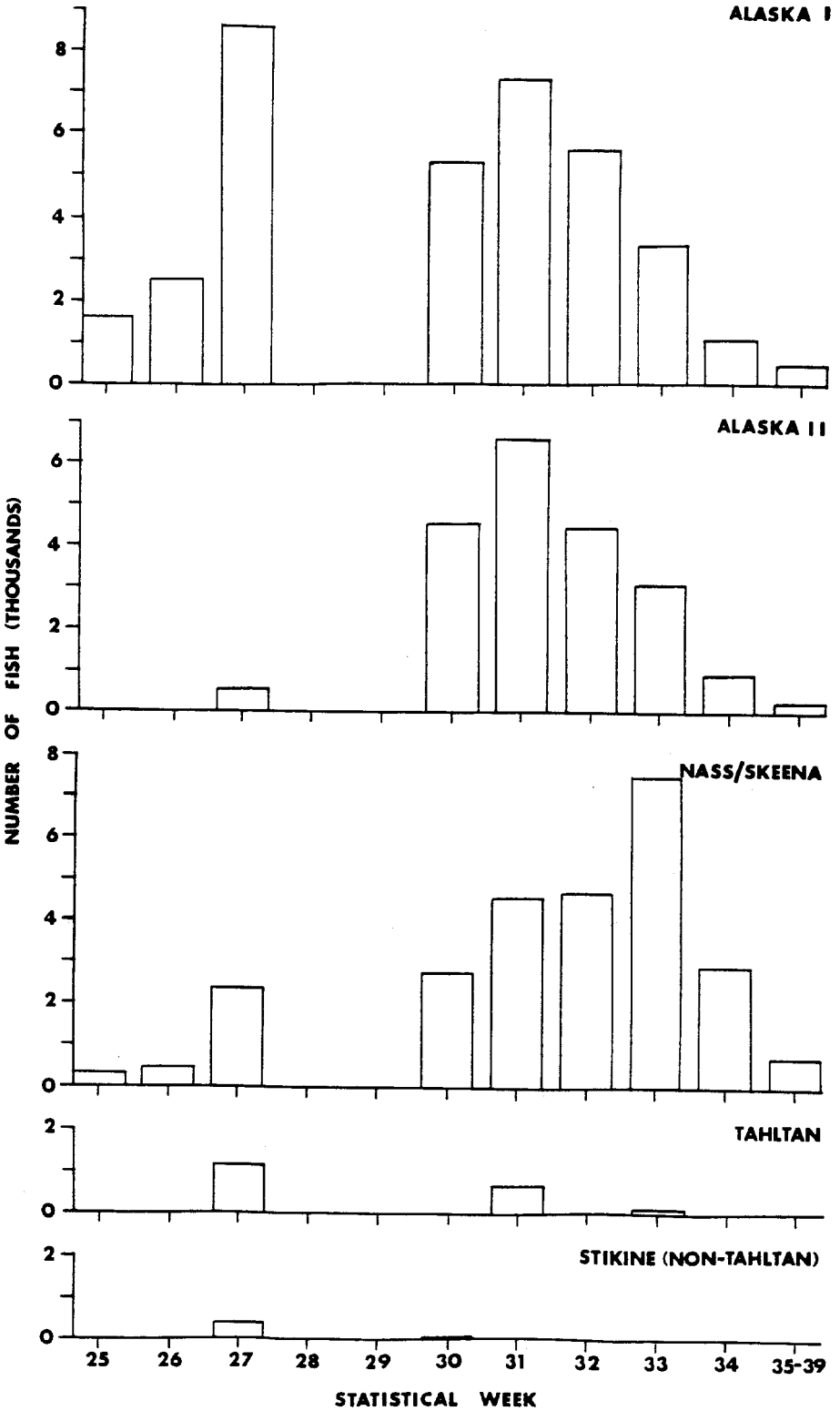

Figure 5. Weekly harvest of major sockeye salmon stock groups in Alaska's Subdistrict 106-41 commercial drift gill net fishery, 1986.

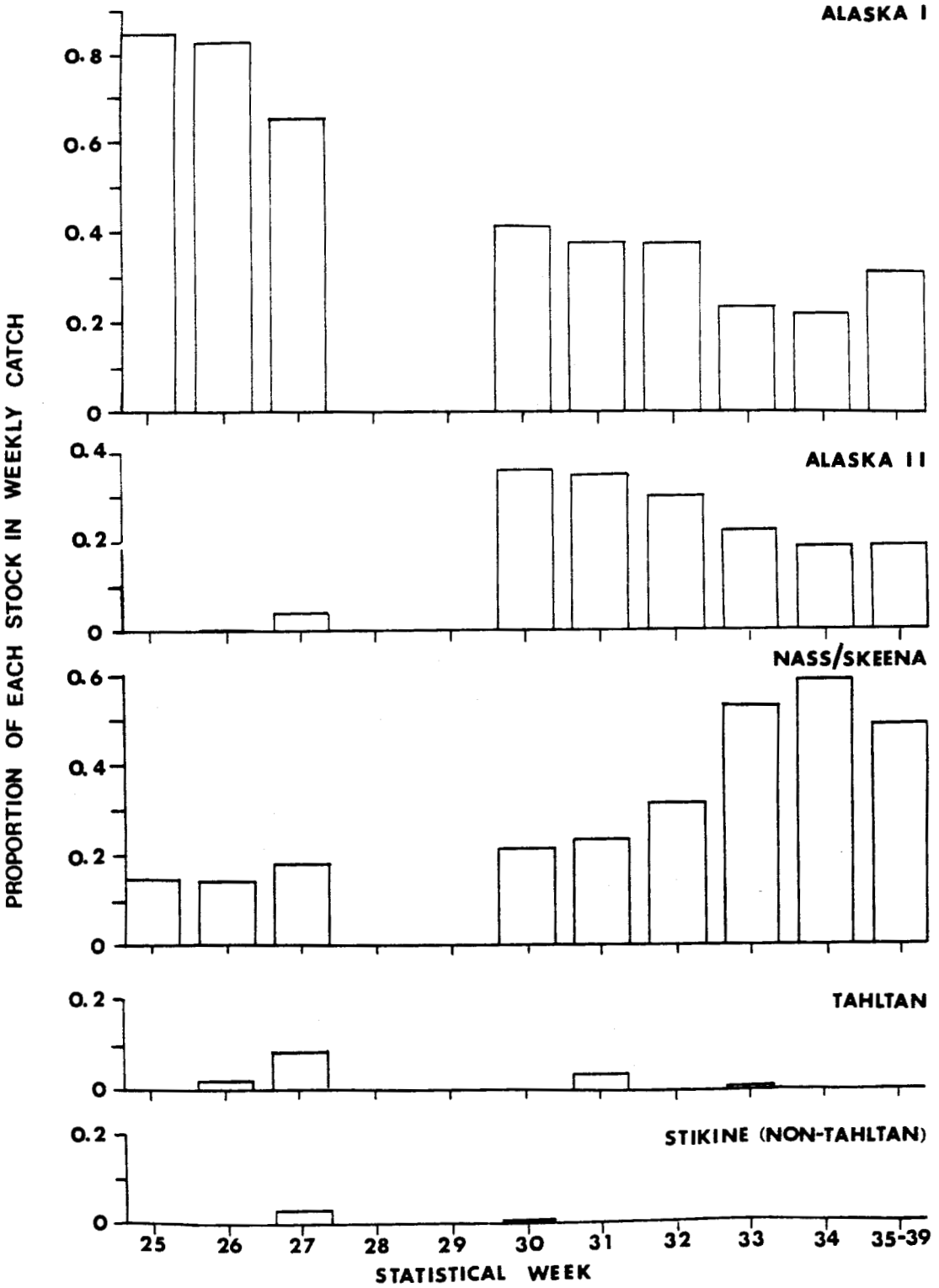

Figure 6. Proportions of each major sockeye salmon stock group in the weekly catch in Alaska's Subdistrict 106-41 commercial drift gill net fishery, 1986.

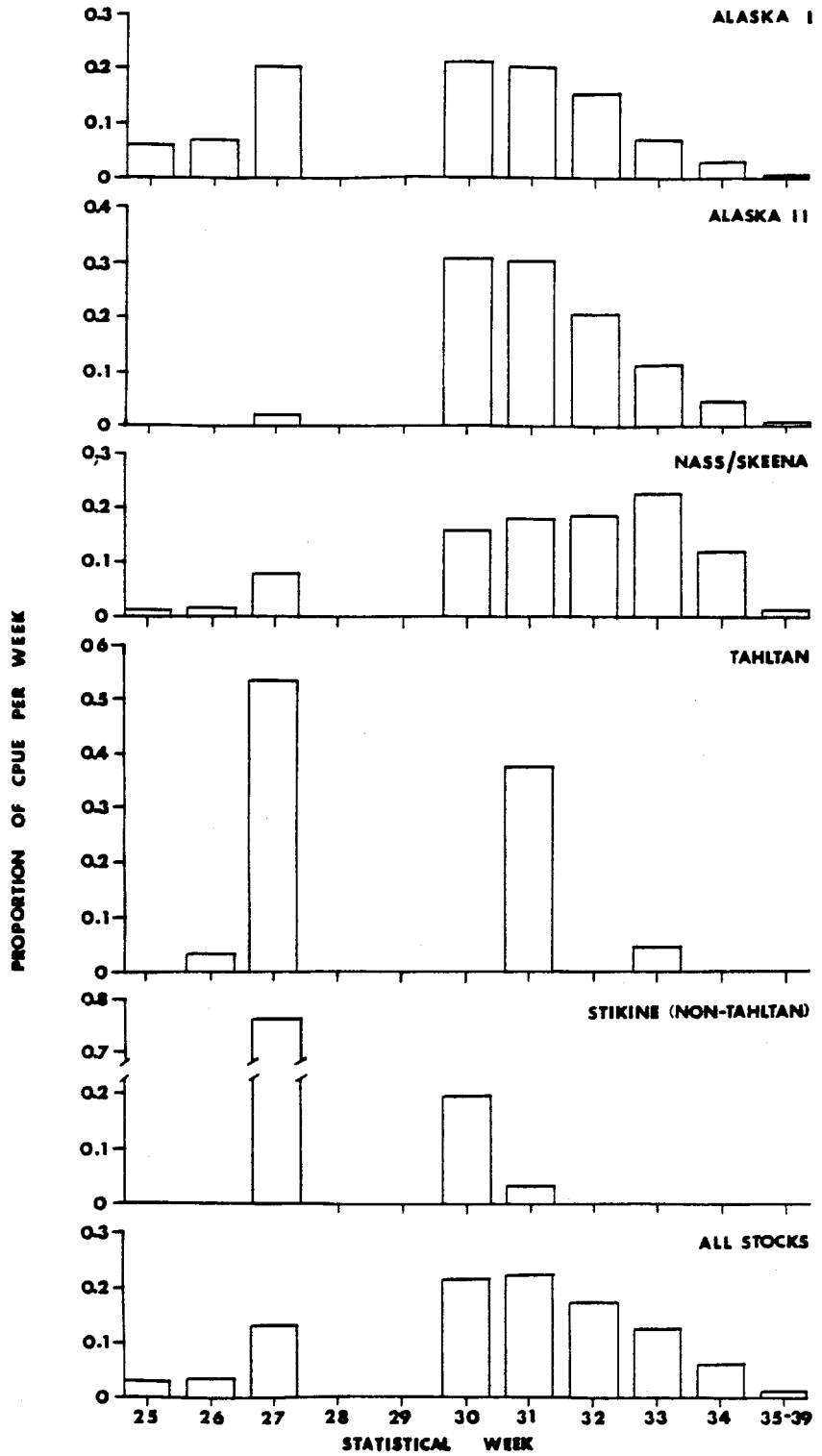

Figure 7. Migratory timing of major sockeye salmon stock groups as indicated by the weekly proportion of a total stock group CPUE occurring each week in Alaska's Subdistrict 106-41 commercial drift gill net fishery, 1986.

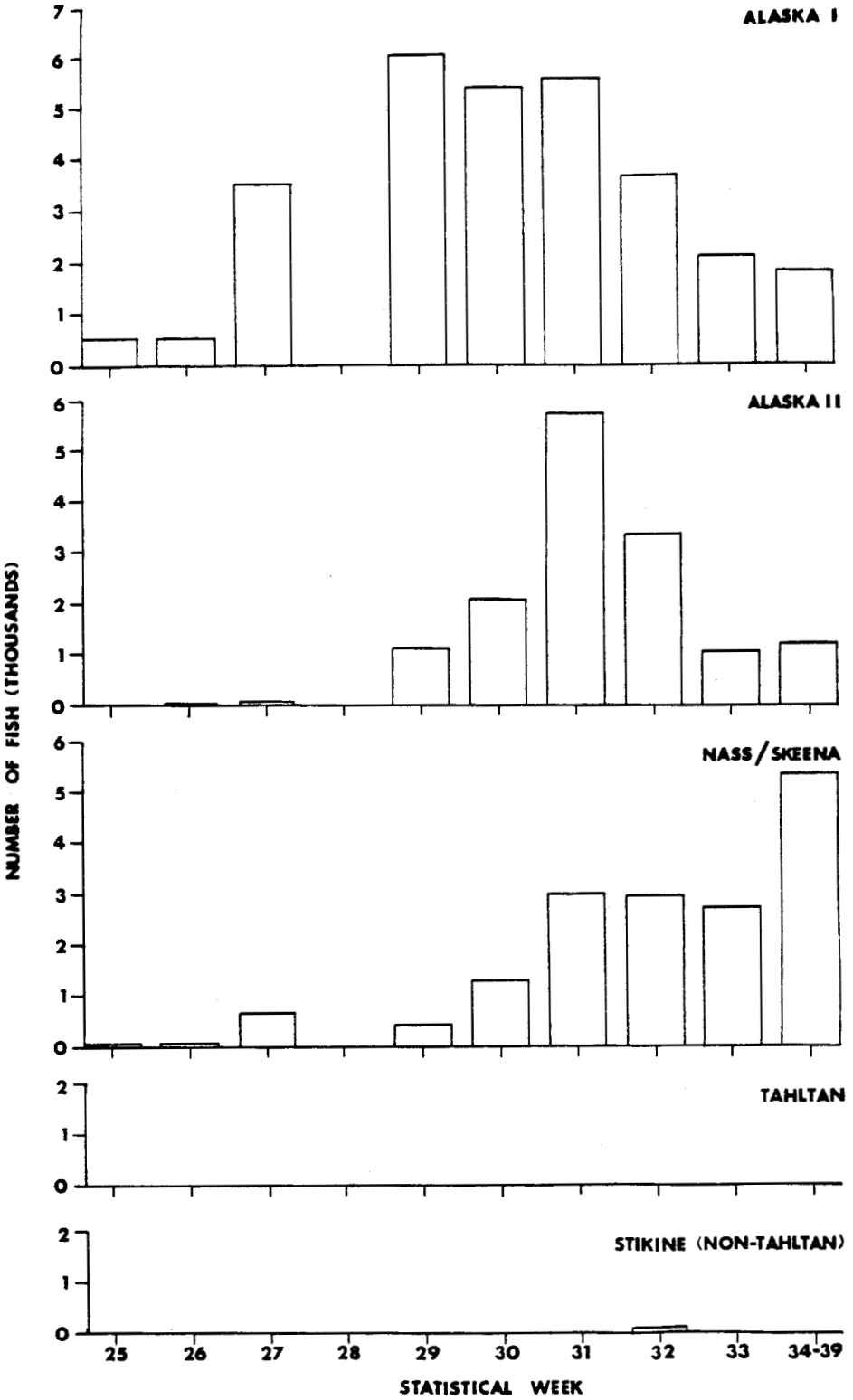

Figure 8. Weekly harvest of major sockeye salmon stock groups in Alaska's Subdistrict 106-30 commercial drift gill net fishery, 1986.

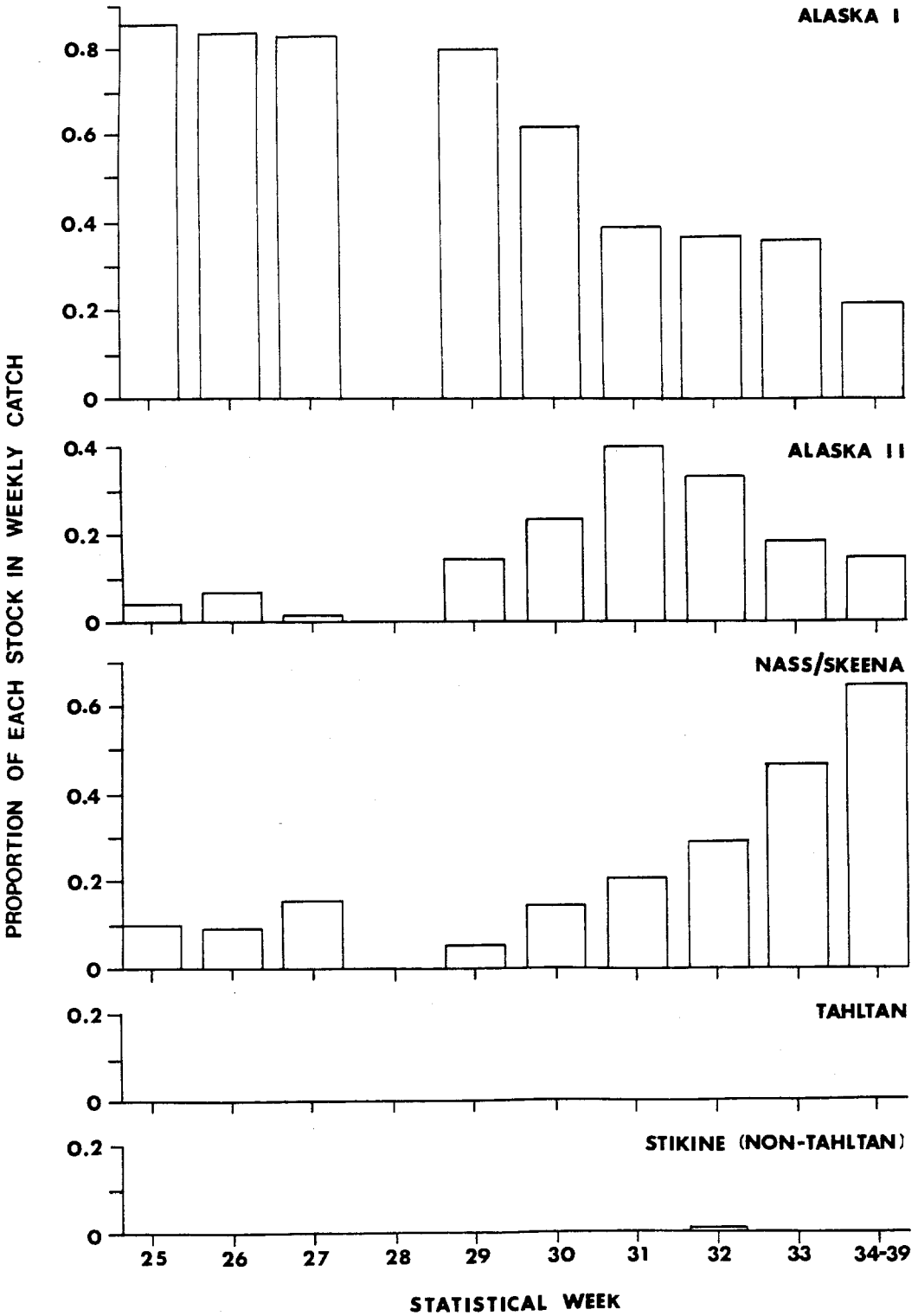

Figure 9. Proportions of each major sockeye salmon stock group in the weekly catch in Alaska's Subdistrict 106-30 commercial drift gill net fishery, 1986.

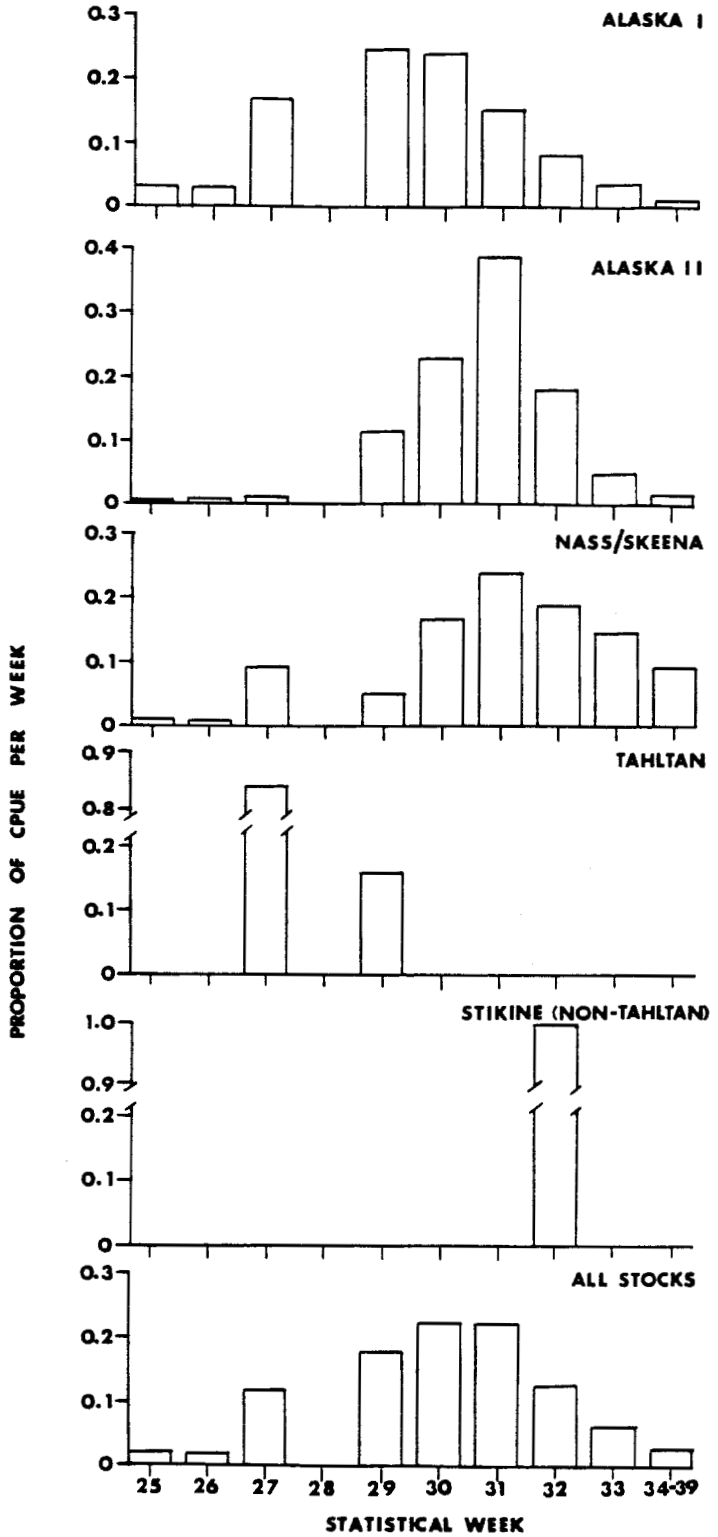

Figure 10. Migratory timing of major sockeye salmon stock groups as indicated by the weekly proportion of a total stock group CPUE occurring each week in Alaska's Subdistrict 106-30 commercial drift gill net fishery, 1986.

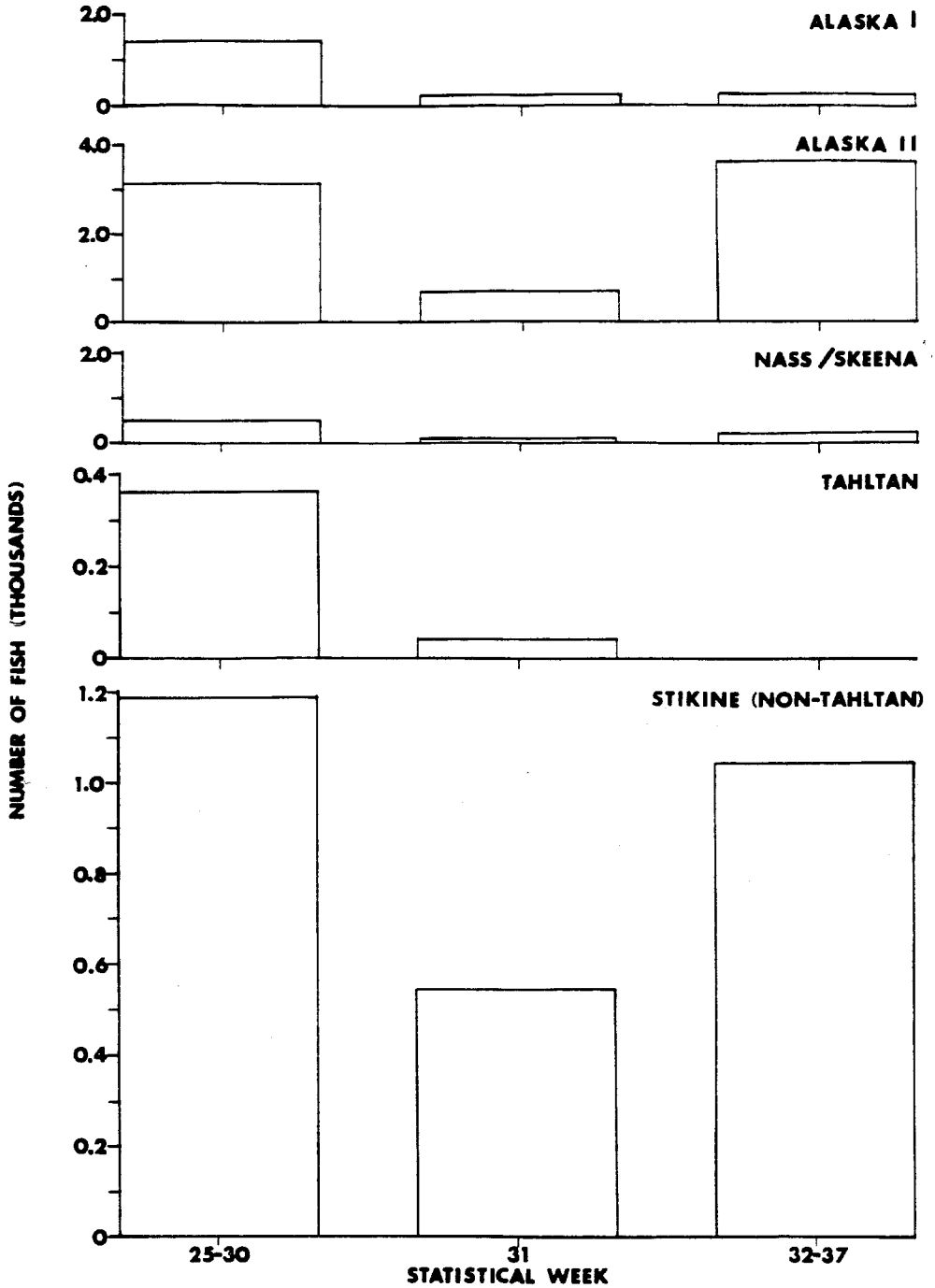

Figure 11. Weekly harvest of major sockeye salmon stock groups in Alaska's District 108 commercial drift gill net fishery, 1986.

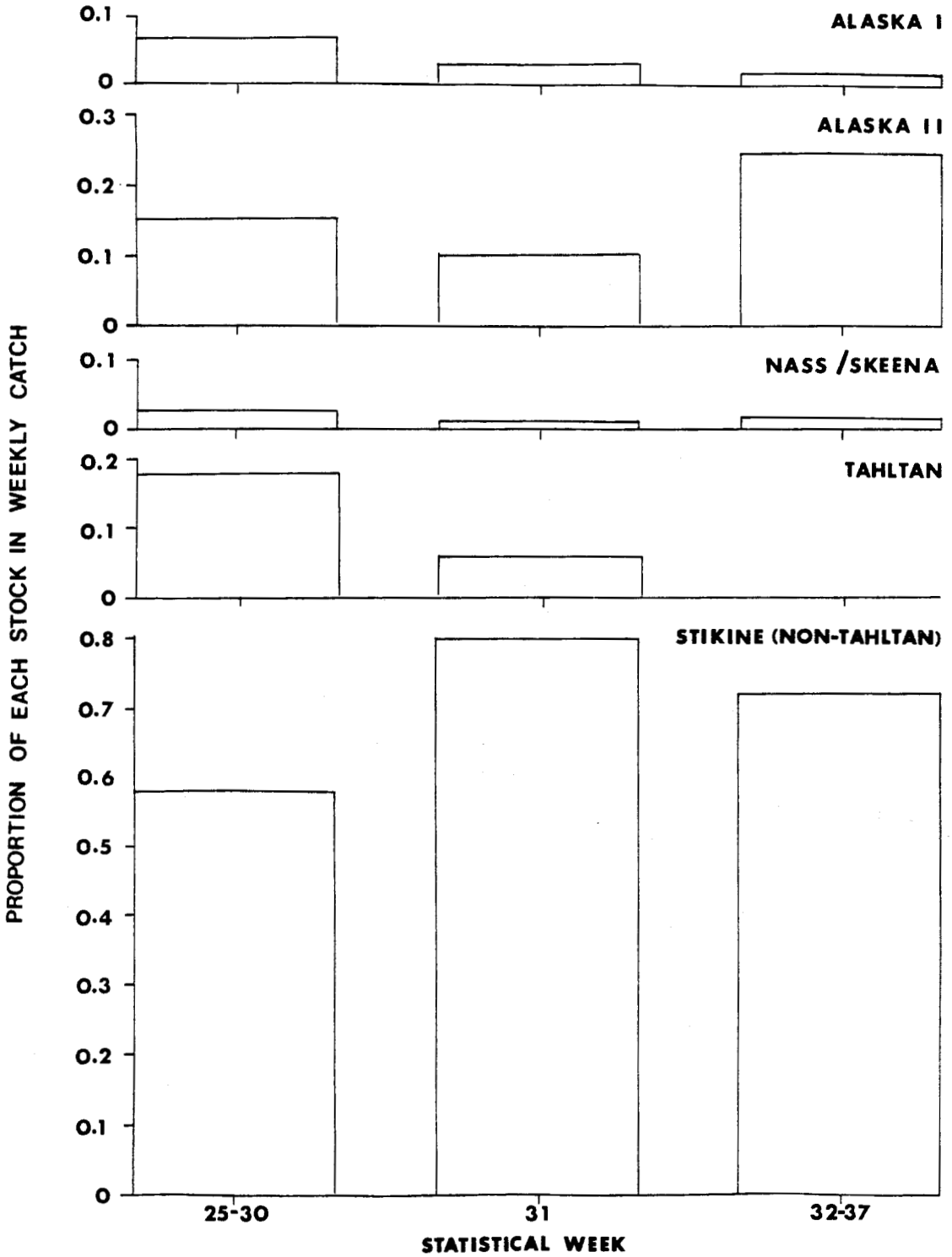

Figure 12. Proportions of each major sockeye salmon stock group in the weekly catch in Alaska's District 108 commercial drift gill net fishery, 1986.

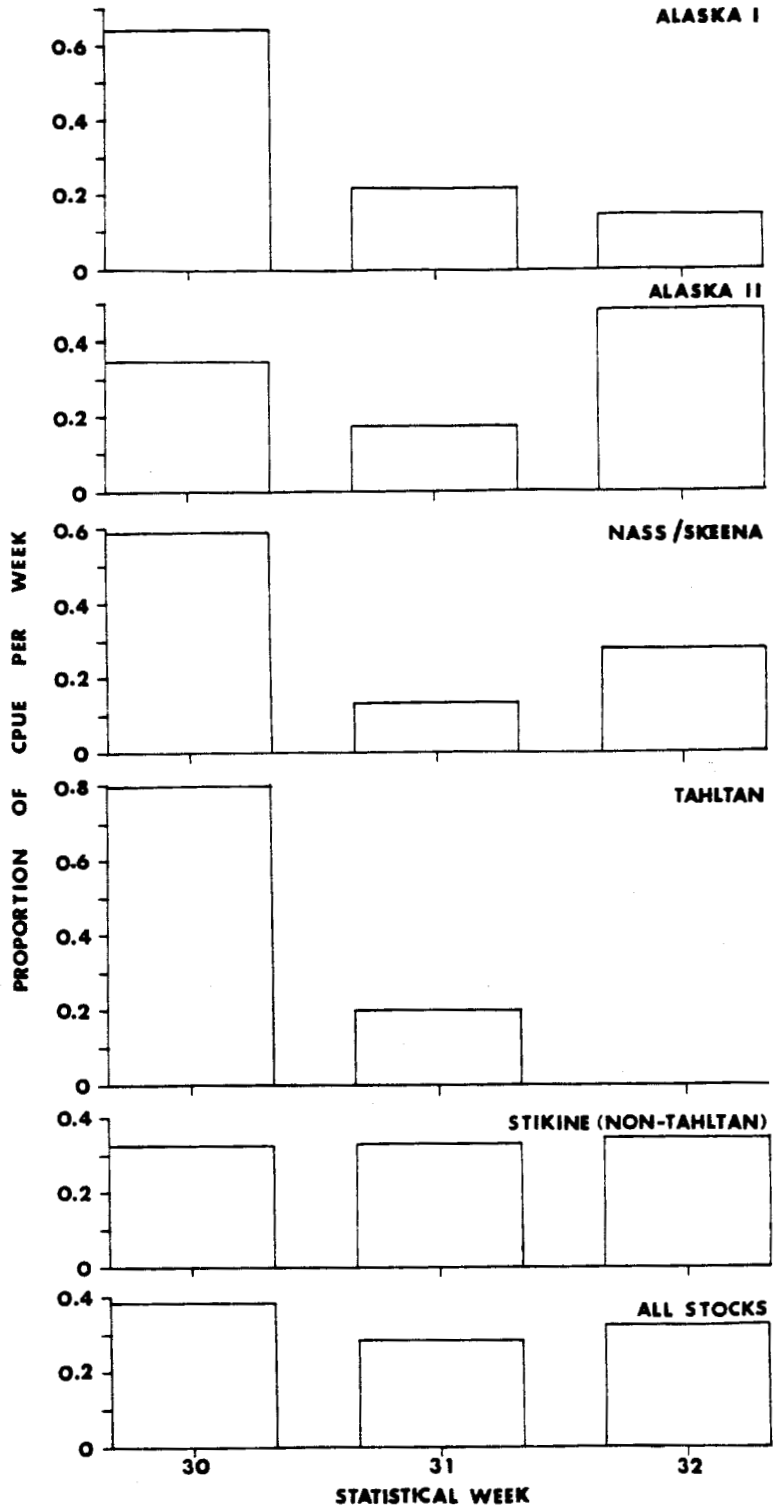

Figure 13. Migratory timing of major sockeye salmon stock groups as indicated by the weekly proportion of a total stock group CPUE occurring each week in Alaska's District 108 commercial drift gill net fishery, 1986.

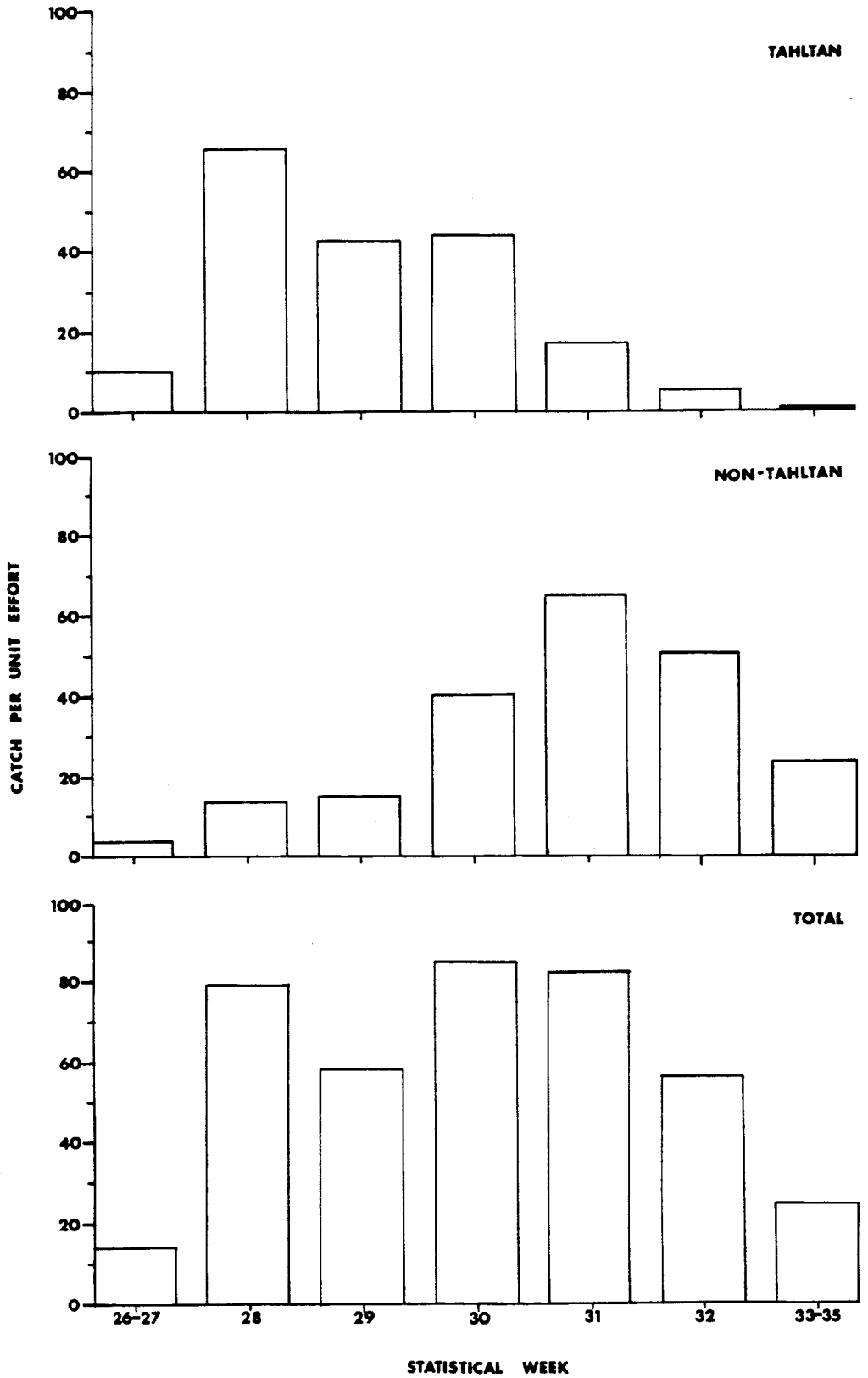

Figure 14. Weekly CPUE of sockeye salmon stock groups harvested in Canada's Stikine River commercial fishery, 1986.

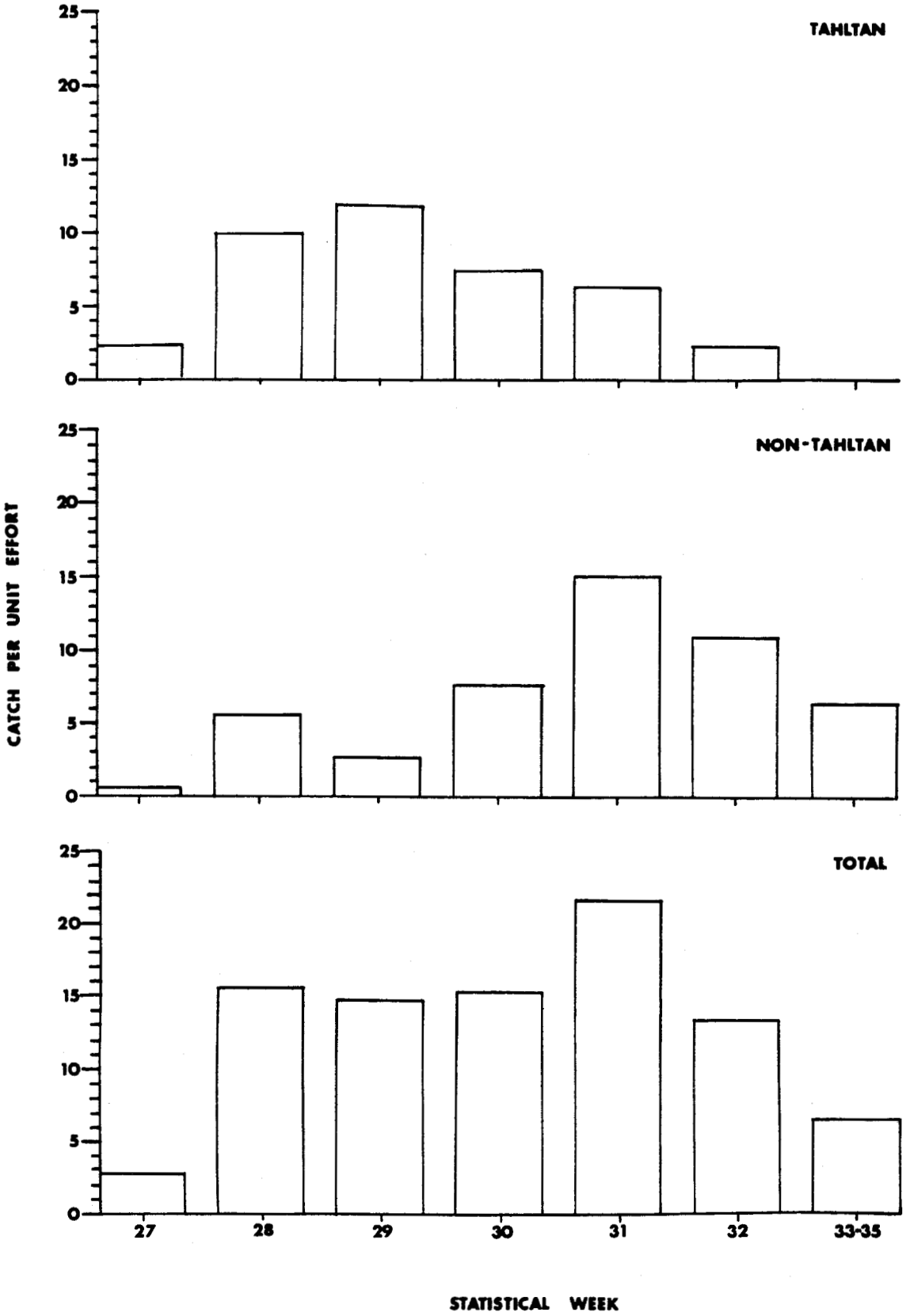

Figure 15. Weekly CPUE of sockeye salmon stock groups caught in the Stikine River test fishery.

APPENDICES

Appendix A.1. Sample sizes from the in-season sockeye salmon stock composition estimates from Alaska's Districts 106 and 108 and Canada's Stikine River commercial gill net fisheries, 1986.

Stat Week	Date	Sample Size by Age Group 1.2	1.3	2.2	2.3	Total
106-41						
25	6/15-6/21	62	100	0	44	206
26	6/22-6/28	50	100	0	45	195
27	6/29-7/05	64	100	32	43	239
28	7/06-7/12	No Commercial Opening				
29	7/13-7/19	No Commercial Opening				
30	7/20-7/26	40	100	0	40	180
31	7/27-8/02	30	100	36	58	224
32	8/03-8/09	108	100	50	52	310
		354	600	118	282	1354
106-30						
25	6/15-6/21	0	74	0	0	74
26	6/22-6/28	0	100	0	0	100
27	6/29-7/05	42	100	20	22	184
28	7/06-7/12	No Commercial Opening				
29	7/13-7/19	61	100	46	77	284
30	7/20-7/26	0	100	0	0	100
31	7/27-8/02	25	100	0	33	158
32	8/03-8/09	49	100	30	76	255
		177	674	96	208	1155
108						
30	7/20-7/26	0	100	0	19	119
31	7/27-8/02	0	100	0	0	100
32	8/03-8/09	0	100	0	0	100
		0	300	0	19	319
Stikine, Canadian						
26	6/22-6/28	0	100	0	0	100
27	6/29-7/05	0	100	0	0	100
28	7/06-7/12	0	100	0	0	100
29	7/13-7/19	0	100	0	0	100
30	7/20-7/26	0	100	0	0	100
31	7/27-8/02	0	100	0	0	100
32	8/03-8/09	0	100	0	0	100
		0	700	0	0	700

Appendix A.2. Sample sizes from the postseason sockeye salmon stock composition estimates from Alaska's Districts 106 and 108 and Canada's Stikine River commercial gill net fisheries, 1986.

Stat Week	Date	Sample Size by Age Group				
		1.2	1.3	2.2	2.3	Total
106-41						
25	6/15-6/21	100	101	43	52	296
26	6/22-6/28	84	100	35	52	271
27	6/29-7/05	65	100	33	43	241
28	7/06-7/12	No Commercial Opening				
29	7/13-7/19	No Commercial Opening				
30	7/20-7/26	72	100	51	92	315
31	7/27-8/02	55	100	65	102	322
32	8/03-8/09	108	100	95	102	405
33	8/10-8/16	62	100	98	102	362
34	8/17-8/23	84	100	103	102	389
35-39	8/24-9/27	22	76	30	28	156
		652	877	553	675	2757
106-30						
25	6/15-6/21	38	74			112
26	6/22-6/28	41	100	33	47	221
27	6/29-7/05	50	100	47	22	219
28	7/06-7/12	No Commercial Opening				
29	7/13-7/19	61	100	47	77	285
30	7/20-7/26	66	100	63	97	326
31	7/27-8/02	73	100	77	107	357
32	8/03-8/09	82	100	91	105	378
33	8/10-8/16	87	100	97	107	391
34-35	8/17-8/30	100	100	103	89	392
		598	874	558	651	2681
108						
30	7/20-7/26	16	100	24	19	159
31	7/27-8/02	27	100	19	17	163
32	8/03-8/09	20	100	23	6	149
		63	300	66	42	471
Stikine, Canadian						
26-27	6/22-7/05		100		15	115
28	7/06-7/12		100		23	123
29	7/13-7/19		100		20	120
30	7/20-7/26		100		29	129
31	7/27-8/02		100			100
32	8/03-8/09		100			100
33	8/10-8/16		100		21	121
		0	700	0	108	808

Appendix A.3. Sample sizes from the postseason sockeye salmon stock composition estimates from Alaska's Districts 106 and 108 and Canada's Stikine River gill net test fisheries, 1986.

Stat Week	Date	Sample Size by Age Group 1.2	1.3	2.2	2.3	Total
106-41						
24	6/08-6/14					
25	6/15-6/21		45			45
26	6/22-6/28	16	55	20	15	106
27	6/29-7/05	25	74	11	18	128
28	7/06-7/12	28	100	27	24	179
29	7/13-7/19	16	98	9	27	150
		85	372	67	84	608
106-30						
24	6/08-6/14		19			19
25	6/15-6/21					
26	6/22-6/28					
27	6/29-7/05	15	79			94
28	7/06-7/12	51	100	37	41	229
		66	198	37	41	342
108-30/40						
26	6/22-6/28		22			22
27	6/29-7/05		44			44
28	7/06-7/12		11			11
29	7/13-7/19		21			21
30	7/20-7/26		13			13
		0	111	0	0	111
108-50/60						
26	6/22-6/28		45			45
27	6/29-7/05		64			64
28	7/06-7/12		72			72
29	7/13-7/19		100			100
30	7/20-7/26		36			36
		0	317	0	0	317
Stikine, Canadian						
27	6/29-7/05		9			9
28	7/06-7/12		46			46
29	7/13-7/19		47			47
30	7/20-7/26		53			53
31	7/27-8/02		73			73
32	8/03-8/09		49			49
33	8/10-8/16		22			22
		0	290	0	0	290

Appendix A.4. Scale variables used for age -1.2, -1.3, -2.2, and -2.3 sockeye salmon scale pattern analysis.

Variable Number	Description
	First Freshwater (FW) Annular Zone
1	Number of circuli in the zone
2	Distance across the zone
3	Distance: scale focus (CO) to the second circulus in zone (C2)
4	Distance: C0 to C4
5	Distance: C0 to C6
6	Distance: C0 to C8
7	Distance: C2 to C4
8	Distance: C2 to C6
9	Distance: C2 to C8
10	Distance: C4 to C6
11	Distance: C4 to C8
12	Distance: fourth from the last circulus of zone to end of zone
13	Distance: second from the last circulus of zone to end of zone
14	Distance: C2 to end of zone
15	Distance: C4 to end of zone
16	Relative Distance: (Variable #3)/(Variable #2)
17	Relative Distance: (Variable #4)/(Variable #2)
18	Relative Distance: (Variable #5)/(Variable #2)
19	Relative Distance: (Variable #6)/(Variable #2)
20	Relative Distance: (Variable #7)/(Variable #2)
21	Relative Distance: (Variable #8)/(Variable #2)
22	Relative Distance: (Variable #9)/(Variable #2)
23	Relative Distance: (Variable #10)/(Variable #2)
24	Relative Distance: (Variable #11)/(Variable #2)
25	Relative Distance: (Variable #12)/(Variable #2)
26	Relative Distance: (Variable #13)/(Variable #2)
27	Average Distance between circuli: (Variable #2)/(Variable #1)
28	Number of circuli in the first 3/4 of the zone
29	Maximum distance between two adjacent circuli in the zone
30	Relative Distance: (Variable #29)/(Variable #2)
	Second Freshwater (FW) Annular Zone
31	Number of circuli in the zone
32	Distance across the zone
33	Distance: end first annular zone (E1FW) to second circulus in zone
34	Distance: E1FW to C4
35	Distance: E1FW to C6
36	Distance: E1FW to C8
37	Distance: C2 to C4
38	Distance: C2 to C6

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Variable Number	Description
39	Distance: C2 to C8
40	Distance: C4 to C6
41	Distance: C4 to C8
42	Distance: fourth from the last circulus of zone to end of zone
43	Distance: second from the last circulus of zone to end of zone
44	Distance: C2 to end of zone
45	Distance: C4 to end of zone
46	Relative Distance: Variable #33/Variable #32
47	Relative Distance: Variable #34/Variable #32
48	Relative Distance: Variable #35/Variable #32
49	Relative Distance: Variable #36/Variable #32
50	Relative Distance: Variable #37/Variable #32
51	Relative Distance: Variable #38/Variable #32
52	Relative Distance: Variable #39/Variable #32
53	Relative Distance: Variable #40/Variable #32
54	Relative Distance: Variable #41/Variable #32
55	Relative Distance: Variable #42/Variable #32
56	Relative Distance: Variable #43/Variable #32
57	Average Distance between circuli: Variable 32/Variable 31
58	Number of circuli in first 3/4 of zone
59	Maximum distance between two adjacent circuli in the zone
60	Relative Distance: Variable 59/Variable 32
	Freshwater Plus Growth (PG)
61	Number of circuli in the zone
62	Distance across the zone
	Combined Freshwater Zones
63	Total number annular circuli, Variable 1 + Variable 31
64	Total distance across freshwater zones, Variable 2 + Variable 32
65	Total number of circuli in the combined zones, NC1FW+NC2FW+NCPG
66	Total distance across the combined zones, S1FW+S2FW+SPGZ
67	Relative Distance: (Variable #2)/(Variable #66)
	First Marine (C) Annular Zone
70	Number of circuli in the zone
71	Distance across the zone
72	Distance: end of FW (EFW) to the third circulus in zone (C3)
73	Distance: EFW to C6
74	Distance: EFW to C9
75	Distance: EFW to C12

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Variable Number	Description
76	Distance: EFW to C15
77	Distance: C3 to C6
78	Distance: C3 to C9
79	Distance: C3 to C12
80	Distance: C3 to C15
81	Distance: C6 to C9
82	Distance: C6 to C12
83	Distance: C6 to C15
84	Distance: C9 to C15
85	Distance: sixth from the last circulus of zone to end of zone
86	Distance: third from the last circulus of zone to end of zone
87	Distance: C3 to end of zone
88	Distance: C9 to end of zone
89	Distance: C15 to end of zone
90	Relative Distance: (Variable #72)/(Variable #71)
91	Relative Distance: (Variable #73)/(Variable #71)
92	Relative Distance: (Variable #74)/(Variable #71)
93	Relative Distance: (Variable #75)/(Variable #71)
94	Relative Distance: (Variable #76)/(Variable #71)
95	Relative Distance: (Variable #77)/(Variable #71)
96	Relative Distance: (Variable #78)/(Variable #71)
97	Relative Distance: (Variable #79)/(Variable #71)
98	Relative Distance: (Variable #80)/(Variable #71)
99	Relative Distance: (Variable #81)/(Variable #71)
100	Relative Distance: (Variable #82)/(Variable #71)
101	Relative Distance: (Variable #83)/(Variable #71)
102	Relative Distance: (Variable #84)/(Variable #71)
103	Relative Distance: (Variable #85)/(Variable #71)
104	Relative Distance: (Variable #86)/(Variable #71)
105	Relative Distance: (Variable #87)/(Variable #71)
106	Number of circuli in the first 1/2 of the zone
107	Maximum distance between two adjacent circuli in the zone
108	Relative Distance: (Variable #107)/(Variable #71)

Appendix B.1. Classification matrices from linear discriminant function models used to classify age-1.2 sockeye salmon from Alaska's District 106 and 108 commercial and test gill net fisheries, 1986.

Actual Group of Origin	Sample Size	Classified Group of Origin			
4 way model:		Ak. I	Ak. II	Nas/Ske	Stikine
Ak. I	197	0.660	0.168	0.076	0.096
Ak. II	49	0.204	0.735	0.000	0.061
Nas/Ske	200	0.080	0.015	0.820	0.085
Stikine	65	0.185	0.123	0.108	0.585
Mean Proportion Correctly Classified					0.700
3 way model:		Ak. I	Ak. II	Nas/Ske	
Ak. I	197	0.685	0.208	0.107	
Ak. II	49	0.265	0.735	0.000	
Nas/Ske	200	0.100	0.010	0.890	
Mean Proportion Correctly Classified					0.770
3 way model:		Ak. I		Nas/Ske	Stikine
Ak. I	197	0.710		0.077	0.213
Nas/Ske	200	0.075		0.825	0.100
Stikine	65	0.200		0.092	0.708
Mean Proportion Correctly Classified					0.748
3 way model:			Ak. II	Nas/Ske	Stikine
Ak. II	49		0.939	0.020	0.041
Nas/Ske	200		0.030	0.860	0.110
Stikine	65		0.169	0.169	0.662
Mean Proportion Correctly Classified					0.820
2 way model:		Ak. I		Nas/Ske	
Ak. I	197	0.903		0.097	
Nas/Ske	200	0.110		0.890	
Mean Proportion Correctly Classified					0.897
2 way model:		Ak. I			Stikine
Ak. I	197	0.807			0.193
Stikine	65	0.231			0.769
Mean Proportion Correctly Classified					0.788

Appendix B.2. Classification matrices from linear discriminant function models used to classify age-1.3 sockeye salmon from Alaska's District 106 and 108 and Canada's Stikine River commercial and test gill net fisheries, 1986.

Actual Group of Origin	Sample Size	Classified Group of Origin				
5 way model:		Ak. I	Ak. II	Nas/Ske	Tahltan	Stikine
Ak. I	184	0.641	0.136	0.049	0.098	0.076
Ak. II	100	0.150	0.560	0.020	0.020	0.250
Nas/Ske	200	0.040	0.020	0.740	0.130	0.070
Tahltan	200	0.055	0.010	0.145	0.760	0.030
Stikine	200	0.055	0.230	0.080	0.055	0.580
Mean Proportion Correctly Classified						0.656
4 way model:		Ak. I	Ak. II	Nas/Ske	Tahltan	
Ak. I	184	0.641	0.190	0.049	0.120	
Ak. II	100	0.160	0.770	0.030	0.040	
Nas/Ske	200	0.020	0.040	0.785	0.155	
Tahltan	200	0.040	0.015	0.125	0.820	
Mean Proportion Correctly Classified						0.754
3 way model:		Ak. I	Ak. II	Nas/Ske		
Ak. I	184	0.723	0.185	0.092		
Ak. II	100	0.180	0.790	0.030		
Nas/Ske	200	0.060	0.045	0.895		
Mean Proportion Correctly Classified						0.803
3 way model:		Ak. I		Nas/Ske	Tahltan	
Ak. I	184	0.809		0.077	0.113	
Nas/Ske	200	0.060		0.800	0.140	
Tahltan	200	0.055		0.135	0.810	
Mean Proportion Correctly Classified						0.806
3 way model:			Ak. II		Tahltan	Stikine
Ak. II	100		0.670		0.040	0.290
Tahltan	200		0.020		0.930	0.050
Stikine	200		0.245		0.100	0.655
Mean Proportion Correctly Classified						0.752
2 way model:		Ak. I		Nas/Ske		
Ak. I	184	0.918		0.082		
Nas/Ske	200	0.065		0.935		
Mean Proportion Correctly Classified						0.926
2 way model:		Ak. I				Stikine
Ak. I	184	0.815				0.185
Stikine	200	0.150				0.850
Mean Proportion Correctly Classified						0.833
2 way model :					Tahltan	Stikine
Tahltan	200				0.940	0.060
Stikine	200				0.100	0.900
Mean Proportion Correctly Classified						0.920

Appendix B.3. Classification matrices from linear discriminant function models used to classify age-2.2 sockeye salmon from Alaska's District 106 and 108 commercial and test gill net fisheries, 1986.

Actual Group of Origin	Sample Size	Classified Group of Origin	
2 way model:		Ak. I	Nas/Ske
Ak. I	191	0.874	0.126
Nas/Ske	100	0.100	0.900
Mean Proportion Correctly Classified			0.887

Appendix B.4. Classification matrices from linear discriminant function models used to classify age-2.3 sockeye salmon from Alaska's District 106 and 108 and Canada's Stikine River commercial and test gill net fisheries, 1986.

Actual Group of Origin	Sample Size	Classified Group of Origin				
5 way model:		Ak. I	Ak. II	Nas/Ske	Tahltan	Stikine
Ak. I	146	0.534	0.171	0.082	0.055	0.158
Ak. II	102	0.108	0.814	0.000	0.010	0.069
Nas/Ske	100	0.070	0.000	0.780	0.080	0.070
Tahltan	58	0.052	0.017	0.017	0.707	0.207
Stikine	39	0.128	0.128	0.103	0.282	0.359
Mean Proportion Correctly Classified						0.639
4 way model:		Ak. I	Ak. II	Nas/Ske	Tahltan	
Ak. I	146	0.610	0.199	0.103	0.089	
Ak. II	102	0.157	0.824	0.000	0.020	
Nas/Ske	100	0.090	0.010	0.820	0.080	
Tahltan	58	0.034	0.034	0.086	0.845	
Mean Proportion Correctly Classified						0.774
4 way model:		Ak. I	Ak. II	Nas/Ske		Stikine
Ak. I	146	0.562	0.151	0.116		0.171
Ak. II	102	0.137	0.794	0.000		0.069
Nas/Ske	100	0.080	0.000	0.810		0.110
Stikine	39	0.179	0.103	0.103		0.615
Mean Proportion Correctly Classified						0.695
3 way model:		Ak. I	Ak. II	Nas/Ske		
Ak. I	146	0.726	0.164	0.110		
Ak. II	102	0.186	0.814	0.000		
Nas/Ske	100	0.120	0.020	0.860		
Mean Proportion Correctly Classified						0.8
3 way model:		Ak. I	Ak. II	Nas/Ske	Tahltan	Stikine
Ak. I	156	0.744		0.090		0.167
Nas/Ske	100	0.070		0.820		0.110
Stikine	39	0.179		0.128		0.692
Mean Proportion Correctly Classified						0.752
3 way model:			Ak. II	Nas/Ske		Stikine
Ak. II	102		0.892	0.000		0.108
Nas/Ske	100		0.030	0.850		0.120
Stikine	39		0.154	0.128		0.718
Mean Proportion Correctly Classified						0.82
2 way model:		Ak. I		Nas/Ske		
Ak. I	156	0.872		0.128		
Nas/Ske	100	0.110		0.890		
Mean Proportion Correctly Classified						0.881
2 way model:					Tahltan	Stikine
Tahltan	58				0.776	0.224
Stikine	39				0.359	0.641
Mean Proportion Correctly Classified						0.708

Appendix C.1. Estimated contributions of sockeye salmon stock groups to Alaska's Subdistrict 106-41 commercial drift gill net fishery, 1986.

Dates	Group	Catch By Age Class 1.2	1.3	2.2	2.3	Other	Total	Percent	Standard Error[a] of Total	90% C.I.[a] Lower	Upper
6/15-6/21	Ak. I	253	1,166	96	130	14	1,659	85.3	70.5	1,543	1,775
Week 25	Ak. II	0	0	0	0	0	0	0.0			
	Nas/Ske	34	149	43	59	2	287	14.7	70.3	171	403
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	287	1,315	139	189	16	1,946				
6/22-6/28	Ak. I	425	1,694	177	198	33	2,527	82.9	154.9	2,272	2,782
Week 26	Ak. II	6	0	0	8	0	14	0.5	54.7	0	104
	Nas/Ske	61	265	23	89	6	444	14.6	124.6	239	649
	Tahltan	0	48	0	13	1	62	2.0	111.0	0	245
	Stikine	0	0	0	0	0	0	0.0			
	Total	492	2,007	200	308	40	3,047				
6/29-7/05	Ak. I	1,662	5,872	656	235	160	8,585	65.6	926.2	7,061	10,109
Week 27	Ak. II	0	363	0	163	10	536	4.1	637.7	0	1,585
	Nas/Ske	205	1,453	322	353	44	2,377	18.2	537.6	1,493	3,261
	Tahltan	0	960	0	193	22	1,175	9.0	630.5	138	2,212
	Stikine	0	0	0	412	8	420	3.2	537.5	0	1,304
	Total	1,867	8,648	978	1,356	244	13,093				
7/06-7/12 Week 28		No commercial fishery opening									
7/13-7/19 Week 29		No commercial fishery opening									
7/20-7/26	Ak. I	1,026	3,213	820	233	16	5,308	41.9	787.3	4,013	6,603
Week 30	Ak. II	102	3,017	0	1,420	14	4,553	35.9	710.4	3,384	5,722
	Nas/Ske	374	1,818	224	320	8	2,744	21.7	469.7	1,971	3,517
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	64	0	0	0	0	64	0.5	126.5	0	272
	Total	1,566	8,048	1,044	1,973	38	12,669				
7/27-8/02	Ak. I	1,374	3,418	1,978	563	36	7,369	38.3	1122.3	5,523	9,215
Week 31	Ak. II	0	4,469	0	2,087	33	6,589	34.2	995.0	4,952	8,226
	Nas/Ske	624	2,467	548	898	23	4,560	23.7	724.8	3,368	5,752
	Tahltan	0	708	0	0	4	712	3.7	583.5	0	1,672
	Stikine	16	0	0	0	0	16	0.1	217.6	0	374
	Total	2,014	11,062	2,526	3,548	96	19,246				
8/03-8/09	Ak. I	1,299	2,099	1,554	621	64	5,637	38.2	718.8	4,455	6,819
Week 32	Ak. II	0	3,238	0	1,166	52	4,456	30.2	657.2	3,375	5,537
	Nas/Ske	1,342	2,074	529	682	54	4,681	31.7	493.0	3,870	5,492
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	2,641	7,411	2,083	2,469	170	14,774				
8/10-8/16	Ak. I	286	1,133	1,516	393	27	3,355	23.9	613.4	2,346	4,364
Week 33	Ak. II	127	1,771	0	1,180	26	3,104	22.1	539.0	2,217	3,991
	Nas/Ske	1,301	3,882	1,069	1,172	62	7,486	53.2	519.5	6,631	8,341
	Tahltan	0	0	0	120	1	121	0.9	115.0	0	310
	Stikine	0	0	0	0	0	0	0.0			
	Total	1,714	6,786	2,585	2,865	116	14,066				
8/17-8/23	Ak. I	335	279	322	145	14	1,095	22.2	194.4	775	1,415
Week 34	Ak. II	0	677	0	237	12	926	18.8	172.3	643	1,209
	Nas/Ske	413	1,262	602	591	38	2,906	59.0	174.2	2,619	3,193
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	748	2,218	924	973	64	4,927				
8/24-9/27	Ak. I	85	186	121	68	6	466	31.6	91.7	315	617
Wk 35-39	Ak. II	4	174	0	99	3	280	19.0	71.5	162	398
	Nas/Ske	121	351	177	70	9	728	49.4	75.0	605	851
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	1	0	0	0	0	1	0.1	26.7	0	45
	Total	211	711	298	237	18	1,475				
	Ak. I	6,745	19,060	7,240	2,586	370	36,001	42.2	1924.9	32,835	39,167
	Ak. II	239	13,709	0	6,360	150	20,458	24.0	1631.5	17,774	23,142
Fishery	Nas/Ske	4,475	13,721	3,537	4,234	246	26,213	30.8	1266.6	24,129	28,297
Total	Tahltan	0	1,716	0	326	28	2,070	2.4	873.8	633	3,507
	Stikine	81	0	0	412	8	501	0.6	594.1	0	1,478
	Total	11,540	48,206	10,777	13,918	802	85,243				

[a] The standard errors are minimum estimates since no estimates of the variance for stocks contributing 0 fish during a given week or for the "other" age class are available. The 90% confidence intervals are affected in like manner.

Appendix C.2. Estimated CPUE and migratory timing of sockeye salmon stock groups in Alaska's Subdistrict 106-41 commercial drift gill net fishery, 1986.

CPUE (Catch per Boat Day)

Stat Week	Days Open	Average Number Boats	Stock Group					
			Ak. I	Ak. II	Nas-Ske	Tahltan	Stikine	Total
25	2	69	12	0	2	0	0	14
26	2	90	14	0	2	0	0	17
27	2	104	41	3	11	6	2	63
28	No fishery opening							
29	No fishery opening							
30	2	61	44	37	22	0	1	104
31	2	90	41	37	25	4	0	107
32	2	90	31	25	26	0	0	82
33	3	78	14	13	32	1	0	60
34	3	57	6	5	17	0	0	29
35-39	3	126	1	1	2	0	0	4
Total			205	121	141	10	3	480

Migratory Timing (Proportion of Catch per Boat Day)

Stat Week	Stock Group					
	Ak. I	Ak. II	Nas-Ske	Tahltan	Stikine	Total
25	0.06	0.00	0.01	0.00	0.00	0.03
26	0.07	0.00	0.02	0.03	0.00	0.04
27	0.20	0.02	0.08	0.54	0.77	0.13
28	No fishery opening					
29	No fishery opening					
30	0.21	0.31	0.16	0.00	0.20	0.22
31	0.20	0.30	0.18	0.38	0.03	0.22
32	0.15	0.21	0.18	0.00	0.00	0.17
33	0.07	0.11	0.23	0.05	0.00	0.13
34	0.03	0.04	0.12	0.00	0.00	0.06
35-39	0.01	0.01	0.01	0.00	0.00	0.01
Total	1.00	1.00	1.00	1.00	1.00	1.00

Appendix C.3. Estimated contributions of sockeye salmon stock groups to Alaska's Subdistrict 106-30 commercial drift gill net fishery, 1986.

Dates	Group	Catch By Age Class 1.2	1.3	2.2	2.3	Other	Total	Percent	Standard error[a]	90% C.I.[a] Lower	Upper
6/15-6/21	Ak. I	176	324	39	14	0	553	85.9	43.5	481	625
Week 25	Ak. II	0	19	0	8	0	27	4.2	33.2	0	82
	Nas/Ske	2	34	23	5	0	64	9.9	26.6	20	108
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	178	377	62	27	0	644				
6/22-6/28	Ak. I	93	357	41	37	9	537	83.4	46.7	460	614
Week 26	Ak. II	21	1	0	23	1	46	7.1	37.7	0	108
	Nas/Ske	0	22	23	13	1	59	9.2	25.4	17	101
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	114	380	64	73	11	642				
6/29-7/05	Ak. I	642	2,405	276	125	91	3,539	82.4	266.8	3,100	3,978
Week 27	Ak. II	0	0	0	72	2	74	1.7	53.0	0	161
	Nas/Ske	55	276	152	173	17	673	15.7	157.8	413	933
	Tahltan	0	0	0	9	0	9	0.2	31.3	0	61
	Stikine	0	0	0	0	0	0	0.0			
	Total	697	2,681	428	379	110	4,295				
7/06-7/12 Week 28		No commercial fishery opening									
7/13-7/19	Ak. I	755	4,279	414	556	82	6,086	79.8	521.9	5,227	6,945
Week 29	Ak. II	64	661	0	375	15	1,115	14.6	441.6	389	1,841
	Nas/Ske	74	30	202	112	6	424	5.6	234.5	38	810
	Tahltan	0	0	0	2	0	2	.0	43.0	0	73
	Stikine	0	0	0	0	0	0	0.0			
	Total	893	4,970	616	1,045	103	7,627				
7/20-7/26	Ak. I	639	3,400	691	624	46	5,400	61.5	538.6	4,514	6,286
Week 30	Ak. II	183	1,096	0	795	18	2,092	23.8	457.5	1,339	2,845
	Nas/Ske	226	579	312	167	11	1,295	14.7	287.2	822	1,768
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	1,048	5,075	1,003	1,586	75	8,787				
7/27-8/02	Ak. I	892	2,579	1,392	691	36	5,590	39.0	796.7	4,279	6,901
Week 31	Ak. II	244	3,562	0	1,913	37	5,756	40.1	733.4	4,550	6,962
	Nas/Ske	673	1,487	372	442	19	2,993	20.9	458.2	2,239	3,747
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	1,809	7,628	1,764	3,046	92	14,339				
8/03-8/09	Ak. I	316	1,666	1,047	554	76	3,659	36.4	550.1	2,754	4,564
Week 32	Ak. II	234	2,320	0	725	71	3,350	33.3	492.2	2,540	4,160
	Nas/Ske	610	1,605	262	392	62	2,931	29.2	357.0	2,344	3,518
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	69	0	0	34	2	105	1.0	6.8	94	116
	Total	1,229	5,591	1,309	1,705	211	10,045				
8/10-8/16	Ak. I	207	843	618	356	18	2,042	35.2	263.9	1,608	2,476
Week 33	Ak. II	21	603	0	425	9	1,058	18.3	214.7	705	1,411
	Nas/Ske	728	1,221	378	346	23	2,696	46.5	204.7	2,359	3,033
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	956	2,667	996	1,127	50	5,796				
8/17-9/27	Ak. I	188	469	829	238	8	1,732	20.9	318.5	1,208	2,256
Wk 34-39	Ak. II	129	753	0	331	6	1,219	14.7	260.5	791	1,647
	Nas/Ske	1,136	2,470	965	740	25	5,336	64.4	285.1	4,867	5,805
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	1,453	3,692	1,794	1,309	39	8,287				
Fishery Total	Ak. I	3,908	16,322	5,347	3,195	366	29,138	48.2	1321.4	26,964	31,312
	Ak. II	896	9,015	0	4,667	159	14,737	24.4	1141.8	12,859	16,615
	Nas/Ske	3,504	7,724	2,689	2,390	164	16,471	27.2	790.1	15,171	17,771
	Tahltan	0	0	0	11	0	11	.0	53.2	0	98
	Stikine	69	0	0	34	2	105	0.2	166.8	0	379
	Total	8,377	33,061	8,036	10,297	691	60,462				

[a] The standard errors are minimum estimates since no estimates of the variance for stocks contributing 0 fish during a given week or for the 'other' age class are available. The 90% confidence intervals are affected in like manner.

Appendix C.4. Estimated CPUE and migratory timing of sockeye salmon stock groups in Alaska's Subdistrict 106-30 commercial drift gill net fishery, 1986.

CPUE (Catch per Boat Day)

Stat Week	Days Open	Average Number Boats	Stock Group					
			Ak. I	Ak. II	Nas-Ske	Tahltan	Stikine	Total
25	2	31	9	0	1	0	0	10
26	2	32	8	1	1	0	0	10
27	2	38	47	1	9	0	0	57
28	0	0						
29	1	89	68	13	5	0	0	86
30	2	41	66	26	16	0	0	107
31	2	67	42	43	22	0	0	107
32	2	83	22	20	18	0	1	61
33	3	65	10	5	14	0	0	30
34-39	3	204	3	2	9	0	0	14
Total			275	111	94	0	1	481

Migratory Timing (Proportion of Catch per Boat Day)

Stat Week	Stock Group					
	Ak. I	Ak. II	Nas-Ske	Tahltan	Stikine	Total
25	0.03	0.00	0.01	0.00	0.00	0.02
26	0.03	0.01	0.01	0.00	0.00	0.02
27	0.17	0.01	0.09	0.84	0.00	0.12
28						
29	0.25	0.11	0.05	0.16	0.00	0.18
30	0.24	0.23	0.17	0.00	0.00	0.22
31	0.15	0.39	0.24	0.00	0.00	0.22
32	0.08	0.18	0.19	0.00	1.00	0.13
33	0.04	0.05	0.15	0.00	0.00	0.06
34-39	0.01	0.02	0.09	0.00	0.00	0.03
Total	1.000	1.000	1.000	1.000	1.000	1.000

Appendix C.5. Estimated contributions of sockeye salmon stock groups to Alaska's District 106 commercial drift gill net fisheries, 1982-1986.[a]

Stat. Week	Group	Harvest of Sockeye Salmon 1982[b] 13-19	1983 12-18	1984 17-23	1985 16-22	1986 15-21
25	Alaska[c]	4,126	not	1,364	9,279	2,239
	Nas-Ske	2,897	open	201	1,477	351
	Tahltan[d]			112	1,444	0
	Stikine	129		8	3	0
	Total	7,152		1,685	12,203	2,590
26	Alaska	18,625	3,155	2,671	6,909	3,124
	Nas-Ske	11,806	1,587	562	1,789	503
	Tahltan		507	280	1,365	62
	Stikine	6,540	104	180	170	0
	Total	36,971	5,353	3,693	10,233	3,689
27	Alaska	25,978	4,037	5,475	14,314	12,734
	Nas-Ske	13,240	1,647	1,078	6,003	3,050
	Tahltan		1,327	844	7,801	1,184
	Stikine	5,932	51	312	270	420
	Total	45,150	7,062	7,709	28,388	17,388
28	Alaska	15,318	4,389	6,884	17,689	not
	Nas-Ske	12,197	913	2,563	13,132	open
	Tahltan		736	1,134	6,288	
	Stikine	9,900	44	50	492	
	Total	37,415	6,082	10,631	37,601	
29	Alaska	9,110	3,411	13,314	21,025	7,201
	Nas-Ske	4,108	250	3,135	15,424	424
	Tahltan		355	307	7,152	2
	Stikine	4,686	240	2,420	299	0
	Total	17,904	4,256	19,176	43,900	7,627
30	Alaska	15,781	9,251	15,035	21,491	17,353
	Nas-Ske	10,975	1,451	6,937	24,173	4,039
	Tahltan		1,626	0	0	0
	Stikine	7,990	65	416	1,305	64
	Total	34,746	12,393	22,388	46,969	21,456
31[e]	Alaska	5,249	4,599	8,388	19,507	25,304
	Nas-Ske	6,573	3,227	6,654	30,943	7,553
	Tahltan		136	0	0	712
	Stikine	2,458	0	401	0	16
	Total	14,280	7,962	15,443	50,450	33,585
32	Alaska		883	4,042	7,891	17,102
	Nas-Ske		357	1,631	5,602	7,612
	Tahltan		129	0	0	0
	Stikine		36	97	46	105
	Total		1,405	5,770	13,539	24,819
33	Alaska		1,561	1,812	5,287	9,559
	Nas-Ske		762	1,080	7,259	10,182
	Tahltan		133	0	0	121
	Stikine		74	120	182	0
	Total		2,530	3,012	12,728	19,862
34	Alaska		790	1,382	3,560	4,972
	Nas-Ske		143	820	4,702	8,242
	Tahltan		51	0	0	0
	Stikine		2	80	196	0
	Total		986	2,282	8,458	13,214
35-40	Alaska		595			746
	Nas-Ske		274			728
	Tahltan		30			0
	Stikine		16			1
	Total		915			1,475
Totals	Alaska	94,187	32,671	60,367	126,952	100,334
	Nas-Ske	61,796	10,611	24,661	110,504	42,684
	Tahltan	0	5,030	2,677	24,050	2,081
	Stikine	37,635	632	4,084	2,963	606
	Total	193,618	48,944	91,789	264,469	145,705

[a] 106-30 was open but 106-41 was not during weeks 25-28 in 1984, week 26 in 1985, and week 29 in 1986.
[b] Dates are of statistical week 25 (June).
[c] Ak. I and II stock composition estimates (1986) were combined to facilitate comparision with the historical analyses.
[d] Tahltan and Stikine (non-Tahltan) were not separated in the 1982 analysis.
[e] The last figures in each column include catch from that week through the end of the season.

Appendix C.6. Estimated relative contributions of sockeye salmon stock groups to Alaska's District 106 commercial drift gill net fisheries, 1982-1986.[a]

Stat. Week	Group	Weekly Relative Harvest Contributions 1982[b] 13-19	1983 12-18	1984 17-23	1985 16-22	1986 15-21
25	Alaska[c]	0.577	not	0.809	0.760	0.864
	Nas-Ske	0.405	open	0.119	0.121	0.136
	Tahltan[d]			0.066	0.118	0.000
	Stikine	0.018		0.005	0.000	0.000
26	Alaska	0.504	0.589	0.723	0.675	0.847
	Nas-Ske	0.319	0.296	0.152	0.175	0.136
	Tahltan		0.095	0.076	0.133	0.017
	Stikine	0.177	0.019	0.049	0.017	0.000
27	Alaska	0.575	0.572	0.710	0.504	0.732
	Nas-Ske	0.293	0.233	0.140	0.211	0.175
	Tahltan		0.188	0.109	0.275	0.068
	Stikine	0.131	0.007	0.040	0.010	0.024
28	Alaska	0.409	0.722	0.648	0.470	not
	Nas-Ske	0.326	0.150	0.241	0.349	open
	Tahltan		0.121	0.107	0.167	
	Stikine	0.265	0.007	0.005	0.013	
29	Alaska	0.509	0.801	0.694	0.479	0.944
	Nas-Ske	0.229	0.059	0.163	0.351	0.056
	Tahltan		0.083	0.016	0.163	0.000
	Stikine	0.262	0.056	0.126	0.007	0.000
30	Alaska	0.454	0.746	0.672	0.458	0.809
	Nas-Ske	0.316	0.117	0.310	0.515	0.188
	Tahltan		0.131	0.000	0.000	0.000
	Stikine	0.230	0.005	0.019	0.028	0.003
31[e]	Alaska	0.368	0.578	0.543	0.387	0.753
	Nas-Ske	0.460	0.405	0.431	0.613	0.225
	Tahltan	0.000	0.017	0.000	0.000	0.021
	Stikine	0.172	0.000	0.026	0.000	0.000
32	Alaska		0.628	0.701	0.583	0.689
	Nas-Ske		0.254	0.283	0.414	0.307
	Tahltan		0.092	0.000	0.000	0.000
	Stikine		0.026	0.017	0.003	0.004
33	Alaska		0.617	0.602	0.415	0.481
	Nas-Ske		0.301	0.359	0.570	0.513
	Tahltan		0.053	0.000	0.000	0.006
	Stikine		0.029	0.040	0.014	0.000
34	Alaska		0.801	0.606	0.387	0.376
	Nas-Ske		0.145	0.359	0.588	0.624
	Tahltan		0.052	0.000	0.000	0.000
	Stikine		0.002	0.035	0.025	0.000
35-40	Alaska		0.650		0.436	0.506
	Nas-Ske		0.299		0.516	0.494
	Tahltan		0.033		0.000	0.000
	Stikine		0.017		0.048	0.001
Totals	Alaska	0.486	0.668	0.658	0.480	0.689
	Nas-Ske	0.319	0.217	0.269	0.418	0.293
	Tahltan	0.000	0.103	0.029	0.091	0.014
	Stikine	0.194	0.013	0.044	0.011	0.004

[a] 106-30 was open but 106-41 was not during weeks 25-28 in 1984, week 26 in 1985, and week 29 in 1986.
[b] Dates are of statistical week 25 (June).
[c] Ak. I and II stock composition estimates (1986) were combined to facilitate comparision with the historical analyses.
[d] Tahltan and Stikine (non-Tahltan) were not separated in the 1982 analysis.
[e] The last figures in each column include catch from that week though the end of the season.

Appendix C.7. Estimated contributions of sockeye salmon stock groups to Alaska's Subdistrict 106-30 and 106-41 commercial drift gill net fisheries, 1985-1986.

		Number of Sockeye Salmon			
		106-30		106-41	
Stat. Week	Group	1985 16-22[a]	1986 15-21	1985 16-22	1986 15-21
25	Alaska[b]	1,821	580	7,458	1,659
	Nas-Ske	285	64	1,192	287
	Tahltan	451	0	993	0
	Stikine	3	0	0	0
	Total	2,560	644	9,643	1,946
26	Alaska	6,909	583	not	2,541
	Nas-Ske	1,789	59	open	444
	Tahltan	1,365	0		62
	Stikine	170	0		0
	Total	10,233	642		3,047
27	Alaska	4,879	3,613	9,435	9,121
	Nas-Ske	2,099	673	3,904	2,377
	Tahltan	558	9	7,243	1,175
	Stikine	0	0	270	420
	Total	7,536	4,295	20,852	13,093
28	Alaska	5,985	not	11,704	not
	Nas-Ske	5,165	open	7,967	open
	Tahltan	19		6,269	
	Stikine	361		131	
	Total	11,530		26,071	
29	Alaska	3,642	7,201	17,383	not
	Nas-Ske	4,067	424	11,357	open
	Tahltan	2,856	2	4,296	
	Stikine	17	0	282	
	Total	10,582	7,627	33,318	
30	Alaska	7,544	7,492	13,947	9,861
	Nas-Ske	11,215	1,295	12,958	2,744
	Tahltan	0	0	0	0
	Stikine	502	0	803	64
	Total	19,261	8,787	27,708	12,669
31	Alaska	6,349	11,346	13,158	13,958
	Nas-Ske	10,626	2,993	20,317	4,560
	Tahltan	0	0	0	712
	Stikine	0	0	0	16
	Total	16,975	14,339	33,475	19,246
32	Alaska	2,730	7,009	5,161	10,093
	Nas-Ske	1,109	2,931	4,493	4,681
	Tahltan	0	0	0	0
	Stikine	46	105	0	0
	Total	3,885	10,045	9,654	14,774
33	Alaska	2,640	3,100	2,647	6,459
	Nas-Ske	2,582	2,696	4,677	7,486
	Tahltan	0	0	0	121
	Stikine	72	0	110	0
	Total	5,294	5,796	7,434	14,066
34[c]	Alaska	1,890	2,951	1,207	2,021
	Nas-Ske	3,152	5,336	1,550	2,906
	Tahltan	0	0	0	0
	Stikine	81	0	115	0
	Total	5,123	8,287	2,872	4,927
35-40	Alaska			463	746
	Nas-Ske			547	728
	Tahltan			0	0
	Stikine			51	1
	Total			1,061	1,475
Totals	Alaska	44,389	43,875	82,563	56,459
	Nas-Ske	42,089	16,471	68,962	26,213
	Tahltan	5,249	11	18,801	2,070
	Stikine	1,252	105	1,762	501
	Total	92,979	60,462	172,088	85,243

[a] Dates are of statistical week 25 (June).
[b] Ak. I and II stock contribution estimates (1986) were combined to facilitate comparison with the historical analyses.
[c] The last figures in each column include catch from that week through the end of the season.

Appendix C.8. Estimated relative contributions of sockeye salmon stock groups to Alaska's Subdistrict 106-30 and 106-41 commercial drift gill net fisheries, 1985-1986.

		Weekly Relative Harvest Contributions			
		106-30		106-41	
Stat. Week	Group	1985 16-22[a]	1986 15-21	1985 16-22	1986 15-21
25	Alaska [b]	0.711	0.901	0.773	0.853
	Nas-Ske	0.111	0.099	0.124	0.147
	Tahltan	0.176	0.000	0.103	0.000
	Stikine	0.001	0.000	0.000	0.000
26	Alaska	0.675	0.908	not	0.834
	Nas-Ske	0.175	0.092	open	0.146
	Tahltan	0.133	0.000		0.020
	Stikine	0.017	0.000		0.000
27	Alaska	0.647	0.841	0.452	0.697
	Nas-Ske	0.279	0.157	0.187	0.182
	Tahltan	0.074	0.002	0.347	0.090
	Stikine	0.000	0.000	0.013	0.032
28	Alaska	0.519	not	0.449	not
	Nas-Ske	0.448	open	0.306	open
	Tahltan	0.002		0.240	
	Stikine	0.031		0.005	
29	Alaska	0.344	0.944	0.522	not
	Nas-Ske	0.384	0.056	0.341	open
	Tahltan	0.270	0.000	0.129	
	Stikine	0.002	0.000	0.008	
30	Alaska	0.392	0.853	0.503	0.778
	Nas-Ske	0.582	0.147	0.468	0.217
	Tahltan	0.000	0.000	0.000	0.000
	Stikine	0.026	0.000	0.029	0.005
31	Alaska	0.374	0.791	0.393	0.725
	Nas-Ske	0.626	0.209	0.607	0.237
	Tahltan	0.000	0.000	0.000	0.037
	Stikine	0.000	0.000	0.000	0.001
32	Alaska	0.703	0.698	0.535	0.683
	Nas-Ske	0.285	0.292	0.465	0.317
	Tahltan	0.000	0.000	0.000	0.000
	Stikine	0.012	0.010	0.000	0.000
33	Alaska	0.499	0.535	0.356	0.459
	Nas-Ske	0.488	0.465	0.629	0.532
	Tahltan	0.000	0.000	0.000	0.009
	Stikine	0.014	0.000	0.015	0.000
34 [c]	Alaska	0.369	0.356	0.420	0.410
	Nas-Ske	0.615	0.644	0.540	0.590
	Tahltan	0.000	0.000	0.000	0.000
	Stikine	0.016	0.000	0.040	0.000
35-40	Alaska			0.436	0.506
	Nas-Ske			0.516	0.494
	Tahltan			0.000	0.000
	Stikine			0.048	0.001
Totals	Alaska	0.477	0.726	0.480	0.662
	Nas-Ske	0.453	0.272	0.401	0.308
	Tahltan	0.056	0.000	0.109	0.024
	Stikine	0.013	0.002	0.010	0.006

[a] Dates are of statistical week 25 (June).
[b] Ak. I and II stock contribution estimates (1986) were combined to facilitate comparison with the historical analysis.
[c] The last figures in each column include catch from that week through the end of the season.

Appendix C.9. Estimated contributions of sockeye salmon stock groups to Alaska's District 108 commercial drift gill net fishery, 1986.

Dates	Group	Catch By Age Class 1.2	1.3	2.2	2.3	0.	Other	Total	Percent	Standard Error[a] of Total	90% C.I.[a] Lower	Upper
6/15-7/26	Ak. I	10	94	29	0	0	0	133	6.5	113.3	0	319
Wk 25-30	Ak. II	0	275	0	28	0	1	304	14.8	244.4	0	706
[b]	Nas/Ske	9	22	9	8	0	0	48	2.3	91.3	0	198
	Tahltan	0	353	0	0	0	1	354	17.2	109.5	174	534
	Stikine	51	1,066	0	37	58	2	1,214	59.1	255.3	794	1,634
	Total	70	1,810	38	73	58	4	2,053				
7/27-8/02	Ak. I	0	0	12	8	0	0	20	2.9	11.8	1	39
Week 31	Ak. II	0	65	0	0	0	0	65	9.5	67.2	0	176
	Nas/Ske	0	0	3	2	0	0	5	0.7	7.3	0	17
	Tahltan	0	38	0	0	0	0	38	5.6	26.6	0	82
	Stikine	48	446	0	15	46	0	555	81.3	76.7	429	681
	Total	48	549	15	25	46	0	683				
8/03-9/13	Ak. I	0	0	12	11	0	0	23	1.6	26.5	0	67
Wk 32-37	Ak. II	26	291	0	0	0	1	318	21.9	180.5	21	615
[b]	Nas/Ske	10	0	4	3	0	0	17	1.2	16.0	0	43
	Tahltan	0	0	0	0	0	0	0	0.0			
	Stikine	48	844	0	21	177	3	1,093	75.3	182.1	793	1,393
	Total	84	1,135	16	35	177	4	1,451				
	Ak. I	10	94	53	19	0	0	176	4.2	116.4	0	367
	Ak. II	26	631	0	28	0	2	687	16.4	311.2	175	1,199
Fishery	Nas/Ske	19	22	16	13	0	0	70	1.7	92.6	0	222
Total	Tahltan	0	391	0	0	0	1	392	9.4	112.7	207	577
	Stikine	147	2,356	0	73	281	5	2,862	68.4	322.8	2,331	3,393
	Total	202	3,494	69	133	281	8	4,187				

Actual Weekly Catches

Sub-District	Statistical week 25	26[c]	30	31	32	33	34	35	36	37
30-40	19	14	N/O	N/O	N/O	140	93	18	3	8
50-60	11	N/O	2,009	683	788	311	72	15	1	N/O
42									2	
Total	30	14	2,009	683	788	451	165	33	6	8

[a] The standard errors are minimum estimates since no estimates of the variance for stocks contributing fish during a given week or for the "other" age class are available. The 90% conficence intervals are affected in like manner.

[b] Small catches occured in some weeks and samples were insufficient to calculate stock compostions, therefore weeks 25, 26, and 30 were combined as were weeks 32-37. Actual catches by sub-district;

[c] There were no openings in Alaska's District 108 drift gill net fishery in weeks 27-29 in 1986.

Appendix C.10. Estimated CPUE and migratory timing of sockeye salmon stock groups in Alaska's District 108 commercial drift gill net fishery, 1986.

CPUE (Catch per Boat Day)

Stat Week	Days Open	Average Number Boats	Stock Group Ak. I	Ak. II	Nas-Ske	Tahltan	Stikine	Total
Entire Season								
25-30	2	20	3	8	1	9	30	51
31	2	6	2	5	<1	3	46	57
32-37	3	39	<1	3	<1	0	10	13
Totals			5	16	2	13	86	121
3 Weeks with Samples								
30	2	13	5	11	2	13	46	77
31	2	6	2	6	<1	3	46	57
32	2	6	1	14	1	0	49	66
Totals			8	31	3	16	141	200

Migratory Timing (Proportion of Catch per Boat Day)

Stat Week	Stock Group Ak. I	Ak. II	Nas-Ske	Tahltan	Stikine	Total
Entire Season						
25-30	0.64	0.48	0.68	0.74	0.35	0.42
31	0.32	0.34	0.24	0.26	0.53	0.47
32-37	0.04	0.18	0.09	0.00	0.11	0.11
Totals	1.00	1.00	1.00	1.00	1.00	1.00
3 Weeks with Samples						
30	0.65	0.37	0.60	0.81	0.32	0.39
31	0.22	0.17	0.14	0.19	0.33	0.28
32	0.14	0.46	0.26	0.00	0.35	0.33
Totals	1.00	1.00	1.00	1.00	1.00	1.00

Appendix C.11. Estimated contributions of Tahltan and non-Tahltan sockeye salmon stock groups to Canada's Stikine River commercial fishery, 1986.[a]

		Catch by Age Class [b c]								Standard Error [d]	90% C.I. [d]	
Dates	Group	1.2	1.3	2.2	2.3	0.	Other	Total	Percent	of Total	Lower	Upper
6/22-7/05	Tahltan	6	510	1	36	0	0	553	73.1	37.35	492	614
Wks 26-27	non-Tahltan	48	138	1	0	17	0	204	26.9	36.12	145	263
	Total	54	648	2	36	17	0	757				
7/06-7/12	Tahltan	33	2,442	0	167	0	0	2,642	82.7	149.69	2,396	2,888
Week 28	non-Tahltan	129	330	0	70	22	0	551	17.3	145.06	312	790
	Total	162	2,772	0	237	22	0	3,193				
7/13-7/19	Tahltan	17	1,130	22	113	0	5	1,287	73.9	84.50	1,148	1,426
Week 29	non-Tahltan	129	286	22	0	17	1	455	26.1	80.51	323	587
	Total	146	1,416	44	113	17	6	1,742				
7/20-7/26	Tahltan	13	749	35	79	0	3	879	51.9	81.99	744	1,014
Week 30	non-Tahltan	206	416	77	67	45	3	814	48.1	79.26	684	944
	Total	219	1,165	112	146	45	6	1,693				
7/27-8/02	Tahltan	5	611	10	15	0	0	641	20.6	141.00	409	873
Week 31	non-Tahltan	434	1,719	107	73	137	0	2,470	79.4	149.74	2,224	2,716
	Total	439	2,330	117	88	137	0	3,111				
8/03-8/09	Tahltan	1	83	1	3	0	2	90	9.5	46.89	13	167
Week 32	non-Tahltan	190	551	27	14	65	8	855	90.5	52.15	769	941
	Total	191	634	28	17	65	10	945				
8/10-8/30	Tahltan	0	0	0	0	0	0	0	0.0			
Wk. 33-35	non-Tahltan	158	680	35	36	53	8	970	100.0	41.67	901	1,039
	Total	158	680	35	36	53	8	970				
Fishery	Tahltan	75	5,525	69	413	0	10	6,092	49.1	244.79	5,689	6,495
Totals	non-Tahltan	1,294	4,120	269	260	356	20	6,319	50.9	247.50	5,912	6,726
	Total	1,369	9,645	338	673	356	30	12,411				

[a] Catch numbers from DFO, Whitehorse, Yukon.

[b] Sample sizes for the age-1.2 and -2.2 fish were insufficient to analyze with linear discriminant function analysis of scale patterns, therefore stock allocations for these age groups were based on the stock composition estimates for the age-1.3 fish and the age compositions of the escapements of the two groups.

[c] Age-0. fish have never been found in samples from Tahltan weir, therefore all age-0. fish were assigned to the non-Tahltan stock group.

[d] The standard errors are minimum estimates since no variances are available for the stock composition estimates for fish other than the age -1.3, -2.3, and -0. or for the final time period stock allocation when estimates for estimated Tahltan contribution was 0. The 90% confidence intervals are affected in like manner.

Appendix C.12. Estimated CPUE and migratory timing of the Tahltan and non-Tahltan sockeye salmon stock groups in Canada's Stikine River commercial fishery, 1986.[a]

				Catch per Fishing Day by Stock Group		
Stat. Week	Fishing Effort	Days	Fishing Days	Tahltan	non-Tahltan	Total
26-27	53	1.0	53	10.434	3.849	14.283
28	20	2.0	40	66.050	13.775	79.825
29	20	1.5	30	42.900	15.167	58.067
30	20	1.0	20	43.950	40.700	84.650
31	19	2.0	38	16.868	65.000	81.868
32	17	1.0	17	5.294	50.294	55.588
33-35	41	1.0	41	0.000	23.659	23.659
				185.497	212.443	397.940

Migratory Timing Estimates

	Proportion of CPUE			Proportion of Catch Adjusted by Sonar Counts		
Stat. Week	Tahltan	non-Tahltan	Total	Tahltan	non-Tahltan	Total
26-27	0.056	0.018	0.036	0.160	0.076	0.123
28	0.356	0.065	0.201	0.276	0.074	0.188
29	0.231	0.071	0.146	0.293	0.133	0.223
30	0.237	0.192	0.213	0.208	0.248	0.225
31	0.091	0.306	0.206	0.050	0.250	0.138
32	0.029	0.237	0.140	0.012	0.152	0.074
33-35	0.000	0.111	0.059	0.000	0.066	0.029
	1.000	1.000	1.000	1.000	1.000	1.000

[a] Effort and days from DFO, Whitehorse, Yukon.

Appendix C.13. Estimated contributions of the Tahltan and non-Tahltan sockeye salmon stock groups to the Stikine River test fishery, 1986.[a]

		Catch by Age Class [b c]									90% C.I. [d]	
Dates	Group	1.2	1.3	2.2	2.3	0.	Other	Total	Percent	Standard Error [d]	Lower	Upper
6/29-7/05	Tahltan	0	7	0	1	0	0	8	80.0	1.70	5	11
Week 27	non-Tahltan	0	2	0	0	0	0	2	20.0	1.50	0	4
	Total	0	9	0	1	0	0	10				
7/06-7/12	Tahltan	1	33	0	2	0	0	36	64.3	4.31	29	43
Week 28	non-Tahltan	7	13	0	0	0	0	20	35.7	3.88	14	26
	Total	8	46	0	2	0	0	56				
7/13-7/19	Tahltan	2	48	1	1	0	0	52	81.3	4.56	44	60
Week 29	non-Tahltan	4	7	0	0	1	0	12	18.8	3.72	6	18
	Total	6	55	1	1	1	0	64				
7/20-7/26	Tahltan	0	31	1	0	0	0	32	49.2	4.98	24	40
Week 30	non-Tahltan	3	27	3	0	0	0	33	50.8	4.93	25	41
	Total	3	58	4	0	0	0	65				
7/27-8/02	Tahltan	0	23	1	4	0	0	28	29.5	5.17	19	37
Week 31	non-Tahltan	11	49	3	1	3	0	67	70.5	5.77	58	76
	Total	11	72	4	5	3	0	95				
8/03-8/09	Tahltan	0	9	0	2	0	0	11	16.7	4.02	4	18
Week 32	non-Tahltan	7	44	0	1	3	0	55	83.3	4.89	47	63
	Total	7	53	0	3	3	0	66				
8/10-8/23	Tahltan	0	0	0	0	0	0	0	0.0			
Wks 33-34	non-Tahltan	4	56	0	4	0	0	64	100.0	4.19	57	71
	Total	4	56	0	4	0	0	64				
Fishery	Tahltan	3	151	3	10	0	0	167	39.8	10.85	149	185
Totals	non-Tahltan	36	198	6	6	7	0	253	60.2	11.41	234	272
	Total	39	349	9	16	7	0	420				

[a] Catch numbers from DFO, Whitehorse, Yukon.

[b] Sample sizes for the age -1.2, -2.2, and -2.3 fish were insufficient to analyze with linear discriminant function analysis of scale patterns therefore stock allocations for these age groups were based on the stock composition estimates for the age -1.3 fish and the age compositions of the escapements of the two groups.

[c] Age -0. fish have never been found in samples from Tahltan weir, therefore all age 0. fish were assigned to the non-Tahltan stock group.

[d] The standard errors are minimum estimates since no variances are available for the stock composition estimates for fish other than the age -1.3 and -0. or for the final time period stock allocation when the estimated Tahltan contribution was 0. The 90% confidence intervals are affected in like manner.

Appendix C.14. Estimated CPUE and migratory timing the of Tahltan and non-Tahltan sockeye salmon stock groups in the Stikine River test fishery, 1986.[a]

CPUE

Statistical Week		Catch	Number Drifts	Days	Total CPUE by Week	Prop. Tahltan
27	6/29-7/05	10	21	4	1.675	0.8000
28	7/06-7/12	56	25	5	11.200	0.6429
29	7/13-7/19	64	31	6	12.600	0.8125
30	7/20-7/26	65	30	6	13.000	0.4923
31	7/27-8/02	95	30	6	18.400	0.2947
32	8/03-8/09	66	35	7	13.200	0.1667
33	8/10-8/16	42	42	7	8.400	0.0000
34	8/17-8/23	22	42	7	4.400	0.0000

Migratory Timing Estimates

	Interpolated CPUE (7 day)			Proportion of CPUE		
Stat. Week	Tahltan	non-Tahltan	Total	Tahltan	non-Tahltan	Total
27	2.345	0.586	2.931	0.058	0.011	0.031
28	10.080	5.600	15.680	0.250	0.101	0.163
29	11.944	2.756	14.700	0.296	0.050	0.153
30	7.467	7.700	15.167	0.185	0.139	0.158
31	6.327	15.140	21.467	0.157	0.272	0.224
32	2.200	11.000	13.200	0.055	0.198	0.138
33	0.000	8.400	8.400	0.000	0.151	0.088
34	0.000	4.400	4.400	0.000	0.079	0.046
	40.362	55.582	95.945	1.0000	1.0000	1.0000

[a] The method for calculating interpolated CPUE was arrived at by the Transboundary Technical Committee (Norma Jean Sands, Alaska Department of Fish and Game and Chris Wood, Canadian Department of Fisheries and Oceans, personal communication).

Appendix C.15. Migratory timing of the Tahltan and non-Tahltan sockeye salmon stock groups in the Stikine River, 1986.[a]

Statistical Week		Weekly Proportion of CPUE	Test Fishery: Number Caught	Test Fishery: Sample Size	Proportion of Fish by Period: Tahltan	Proportion of Fish by Period: non-Tahltan	Adjusted Weekly Proportions[b]: Tahltan	Adjusted Weekly Proportions[b]: non-Tahltan
27	6/29-7/05	0.0305	10	10	0.8000	0.2000	0.024	0.006
28	7/06-7/12	0.1634	56	56	0.6429	0.3571	0.105	0.058
29	7/13-7/19	0.1532	64	56	0.8125	0.1875	0.124	0.029
30	7/20-7/26	0.1581	65	60	0.4923	0.5077	0.078	0.080
31	7/27-8/02	0.2237	95	94	0.2947	0.7053	0.066	0.158
32	8/03-8/09	0.1376	66	61	0.1667	0.8333	0.023	0.115
33	8/10-8/16	0.0876	42	17	0.0000	1.0000	0.000	0.088
34	8/17-8/23	0.0459	22	9	0.0000	1.0000	0.000	0.046
Total		1.0000	420	363	0.3976	0.6024	0.421	0.579

Variances, Standard Errors, and Confidence Intervals of Adjusted Proportions[c]

Stat. Week	Variances of Proportions[d]: Tahltan	Variances of Proportions[d]: non-Tahltan	Standard Errors: Tahltan	Standard Errors: non-Tahltan	90% Confidence Intervals: Tahltan Upper	90% Confidence Intervals: Tahltan Lower	90% Confidence Intervals: non-Tahltan Upper	90% Confidence Intervals: non-Tahltan Lower
27	0.00009	0.00002	0.009	0.005	0.009	0.040	-0.002	0.014
28	0.00044	0.00022	0.021	0.015	0.071	0.140	0.034	0.083
29	0.00052	0.00010	0.023	0.010	0.087	0.162	0.012	0.045
30	0.00033	0.00034	0.018	0.018	0.048	0.108	0.050	0.110
31	0.00022	0.00058	0.015	0.024	0.042	0.090	0.118	0.197
32	0.00008	0.00046	0.009	0.021	0.008	0.038	0.079	0.150
33	0.00000	0.00037	0.000	0.019	0.000	0.000	0.056	0.119
34	0.00000	0.00035	0.000	0.019	0.000	0.000	0.015	0.077
Totals	0.001	0.002	0.034	0.039	0.364	0.477	0.515	0.643

[a] Stock compositions were estimated with scale pattern analysis of Canadian test fishery samples provided by DFO, Whitehorse, Yukon.

[b] Stock composition estimates are adjusted by the weekly proportion of test fishery CPUE.

[c] The method for calculating variances was arrived at by the Transboundary Technical Committee (Norma Jean Sands, Alaska Department of Fish and Game and Chris Wood, Canadian Department of Fisheries and Oceans, personal communication).

[d] Variances are minimum estimates since no variances are available for the stock composition estimates for fish other than the age-1.3 and -0. or for the stock composition estimates for the last two time periods when the estimated Tahltan contribution were 0. Standard errors and confidence intervals are affected in like manner.

Appendix D.1. Estimated contributions of sockeye salmon stock groups to Alaska's Subdistrict 106-41 drift gill net test fishery, 1986.

		Catch by Age Class							Standard Error [a]	90% C.I. [a]	
Dates	Group	1.2	1.3	2.2	2.3	Other	Total	Percent	of Total	Lower	Upper
6/08-6/21	Ak. I	4	38	5	3	1	51	72.9	6.90	40	62
Wks 24-25	Ak. II	3	1	0	4	0	8	11.4	5.51	0	17
	Nas/Ske	1	8	2	0	0	11	15.7	4.03	4	18
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	8	47	7	7	1	70				
6/22-6/28	Ak. I	4	46	9	4	2	65	68.4	10.64	47	83
Week 26	Ak. II	3	8	0	4	0	15	15.8	8.42	1	29
	Nas/Ske	1	8	3	0	0	12	12.6	5.55	3	21
	Tahltan	0	3	0	0	0	3	3.2	4.66	0	11
	Stikine	0	0	0	0	0	0	0.0			
	Total	8	65	12	8	2	95				
6/29-7/05	Ak. I	21	55	8	0	1	95	69.9	12.48	74	116
Week 27	Ak. II	2	5	0	1	0	8	5.9	10.60	0	25
	Nas/Ske	2	16	4	1	0	23	16.9	6.64	12	34
	Tahltan	0	3	0	0	0	3	2.2	5.07	0	11
	Stikine	0	2	0	5	0	7	5.1	8.71	0	21
	Total	25	81	12	17	1	136				
7/06-7/12	Ak. I	37	251	43	20	1	352	73.6	34.58	295	409
Week 28	Ak. II	1	34	0	25	0	60	12.6	27.68	14	106
	Nas/Ske	12	43	7	2	0	64	13.4	20.79	30	98
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	2	0	0	0	0	2	0.4	6.39	0	13
	Total	52	328	50	47	1	478				
7/13-7/19	Ak. I	21	106	8	19	4	158	77.8	11.00	140	176
Week 29	Ak. II	0	0	0	7	0	7	3.4	4.91	0	15
	Nas/Ske	0	27	3	5	1	36	17.7	8.53	22	50
	Tahltan	0	0	0	2	0	2	1.0	2.72	0	6
	Stikine	0	0	0	0	0	0	0.0			
	Total	21	133	11	33	5	203				
	Ak. I	87	496	73	56	9	721	73.4	40.31	655	787
	Ak. II	9	48	0	41	0	98	10.0	31.59	46	150
Fishery	Nas/Ske	16	102	19	8	1	146	14.9	24.37	106	186
Total	Tahltan	0	6	0	2	0	8	0.8	7.40	0	20
	Stikine	2	2	0	5	0	9	0.9	10.80	0	27
	Total	114	654	92	112	10	982				

[a] The standard errors are minimum estimates since no variances for stocks contributing 0 fish during a given week or for the "other" age class are available. The 90% confidence intervals are affected in like manner.

Appendix D.2. Estimated CPUE and migratory timing of sockeye salmon stock groups in Alaska's Subdistrict 106-41 drift gill net test fishery, 1986.

CPUE (Catch per Boat Hour)

Stat Week	Boat hours	Stock Group					
		Ak.I	Ak.II	Nas-Ske	Tahltan	Stikine	Total
24-25	36.20	1.41	0.22	0.30	0.00	0.00	1.93
26	18.00	3.61	0.83	0.67	0.17	0.00	5.28
27	18.00	5.28	0.44	1.28	0.17	0.39	7.56
28	18.00	19.56	3.33	3.56	0.00	0.11	26.56
29	9.25	17.08	0.76	3.89	0.22	0.00	21.95
Total	99.450	46.93	5.59	9.70	0.55	0.50	63.27

Migratory Timing (Proportion of CPUE)

Stat Week	Stock Group					
	Ak.I	Ak.II	Nas-Ske	Tahltan	Stikine	Total
24-25	0.0300	0.0395	0.0313	0.0000	0.0000	0.0306
26	0.0769	0.1491	0.0688	0.3033	0.0000	0.0834
27	0.1125	0.0795	0.1318	0.3033	0.7778	0.1194
28	0.4167	0.5964	0.3667	0.0000	0.2222	0.4197
29	0.3639	0.1354	0.4014	0.3934	0.0000	0.3469
Total	1.000	1.000	1.000	1.000	1.000	1.000

Appendix D.3. Estimated contributions of sockeye salmon stock groups to Alaska's Subdistrict 106-30 drift gill net test fishery, 1986.

Dates	Group	Catch By Age Class 1.2	1.3	2.2	2.3	Other	Total	Percent	Standard Error[a] of Total	90% C.I.[a] Lower	Upper
6/08-6/14	Ak. I	3	19	3	2	1	28	82.4	4.48	21	35
Week 24	Ak. II	0	3	0	2	0	5	14.7	3.87	0	11
	Nas/Ske	0	1	0	0	0	1	2.9	2.03	0	4
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	3	23	3	4	1	34				
6/15-6/21	---	No samples were collected ---									
Week 25											
6/22-6/28	---	No samples were collected ---									
Week 26											
6/29-7/05	Ak. I	19	75	17	6	3	120	75.0	11.90	100	140
Week 27	Ak. II	0	18	0	7	1	26	16.3	9.71	10	42
	Nas/Ske	3	9	2	0	0	14	8.8	6.74	3	25
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	22	102	19	13	4	160				
7/06-7/12	Ak. I	46	195	30	17	5	293	80.7	25.69	251	335
Week 28	Ak. II	27	8	0	20	1	56	15.4	22.31	19	93
	Nas/Ske	0	11	3	0	0	14	3.9	11.51	0	33
	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	73	214	33	37	6	363				
	Ak. I	68	289	50	25	9	441	79.2	28.51	394	488
	Ak. II	27	29	0	29	2	87	15.6	24.53	47	127
Fishery	Nas/Ske	3	21	5	0	0	29	5.2	13.35	7	51
Total	Tahltan	0	0	0	0	0	0	0.0			
	Stikine	0	0	0	0	0	0	0.0			
	Total	98	339	55	54	11	557				

[a] The standard errors are minimum estimates since no variances for stocks contributing 0 fish during a given week or for the 'other' age class are available. The 90% confidence intervals are affected in like manner.

Appendix D.4. Estimated CPUE and migratory timing of sockeye salmon stock groups in Alaska's Subdistrict 106-30 drift gill net test fishery, 1986.

CPUE (Catch per Boat Hour)

Stat Week	Boat Hours	Stock Group Ak.I	Ak.II	Nas-Ske	Tahltan	Stikine	Total
24	24.40	1.15	0.20	0.04	0.00	0.00	1.39
25	25.48		----------No Samples----------				2.24
26	25.88		----------No Samples----------				2.43
27	23.50	5.11	1.11	0.60	0.00	0.00	6.81
28	23.25	12.60	2.41	0.60	0.00	0.00	15.61
Total	122.51	18.86	3.72	1.24	0.00	0.00	28.49

Migratory Timing (Proportion of CPUE by Week)

Stat Week	Stock Group Ak.I	Ak.II	Nas-Ske	Tahltan	Stikine	Total
24	0.0635	0.0575	0.0345	0.0000	0.0000	0.061
25		----------No Samples----------				
26		----------No Samples----------				
27	0.2721	0.2989	0.4828	0.0000	0.0000	0.287
28	0.6644	0.6437	0.4828	0.0000	0.0000	0.652
Total	1.0000	1.0000	1.0000	0.0000	0.0000	0.000

Appendix D.5. Estimated contributions of sockeye salmon stock groups to Alaska's Subdistrict 108-30/40 drift gill net test fishery, 1986.

		Catch by Age Class [a]								Standard Error [b]	90% C.I. [b]	
Dates	Group	1.2	1.3	2.2	2.3	0.	Other	Total	Percent	of Total	Lower	Upper
6/08-6/28	Ak. I		0			0		0	0.0			
Wks 24&26	Ak. II		0			0		0	0.0			
	Nas/Ske		0			0		0	0.0			
	Tahltan		29			0		29	60.4	5.23	20	38
	Stikine		10			1		11	22.9	4.47	4	18
	Total	1	39	2	5	1	0	48				
6/29-7/05	Ak. I		0			0		0	0.0			
Week 27	Ak. II		0			0		0	0.0			
	Nas/Ske		0			0		0	0.0			
	Tahltan		44			0		44	69.8	4.59	36	52
	Stikine		7			0		7	11.1	3.60	1	13
	Total	2	51	2	8	0	0	63				
7/06-7/12	Ak. I		4			0		4	15.4	3.77	0	10
Week 28	Ak. II		0			0		0	0.0			
	Nas/Ske		0			0		0	0.0			
	Tahltan		12			0		12	46.2	3.73	6	18
	Stikine		3			0		3	11.5	3.88	0	9
	Total	3	19	2	2	0	0	26				
7/20-7/26	Ak. I		0			0		0	0.0			
Week 30	Ak. II		0			0		0	0.0			
	Nas/Ske		0			0		0	0.0			
	Tahltan		3			0		3	11.5	2.53	0	7
	Stikine		16			0		16	61.5	3.35	10	22
	Total	1	19	5	1	0	0	26				
	Ak. I		8					8	3.7	6.34	0	18
	Ak. II		0					0	0.0	3.83	0	6
Fishery	Nas/Ske		4					4	1.9	3.28	0	9
Total	Tahltan		91					92	42.6	8.89	77	107
	Stikine		50					50	24.1	8.96	37	67
	Total	11	153	17	32	2	0	216				

[a] Samples were too small to estimate stock composition for other than age-1.3 and -0. fish.
[b] The standard errors are minimum estimates since not all age groups were classified.

Appendix D.6. Estimated CPUE and migratory timing of sockeye salmon stock groups in Alaska's Subdistrict 108-30/40 drift gill net test fishery, 1986.[a]

CPUE (Catch per Boat Hour)

Stat Week	Boat Hours	Stock Group					
		Ak.I	Ak.II	Nas-Ske	Tahltan	Stikine	Total
26	11.58	0.00	0.00	0.00	2.50	0.95	3.45
27	11.17	0.00	0.00	0.00	3.94	0.63	4.57
28	10.08	0.40	0.00	0.00	1.19	0.30	1.88
29	11.25	0.36	0.00	0.36	0.36	1.33	2.40
30	11.25	0.00	0.00	0.00	0.27	1.42	1.69
Total	55.33	0.75	0.00	0.36	8.26	4.63	13.99

Migratory Timing (Proportion of CPUE by Week)

Stat Week	Stock Group					
	Ak.I	Ak.II	Nas-Ske	Tahltan	Stikine	Total
24-26	0.0000	0.0000	0.0000	0.3033	0.2052	0.2468
27	0.0000	0.0000	0.0000	0.4771	0.1354	0.3263
28	0.5274	0.0000	0.0000	0.1442	0.0643	0.1347
29	0.4726	0.0000	1.0000	0.0431	0.2880	0.1715
30	0.0000	0.0000	0.0000	0.0323	0.3072	0.1207
Total	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000

[a] Analysis is for age-1.3 and -0. fish only since samples were too small to estimate stock composition of other age groups. Age-1.3 fish comprised 71% of the total catch.

Appendix D.7. Estimated contributions of sockeye salmon stock groups to Alaska's Subdistrict 108-50/60 drift gill net test fishery, 1986.

		Catch by Age Class [a]								Standard Error [b]	90% C.I. [b]	
Dates	Group	1.2	1.3	2.2	2.3	0.	Other	Total	Percent	of Total	Lower	Upper
6/08-6/28	Ak. I		14			0		14	16.7	6.75	3	25
Wks 24&26	Ak. II		0			0		0	0.0			
	Nas/Ske		5			0		5	6.0	7.19	0	17
	Tahltan		52			0		52	61.9	9.25	37	67
	Stikine		2			0		2	2.4	4.32	0	9
	Total	0	73	1	10	0	0	84				
6/29-7/05	Ak. I		16			0		16	18.4	6.37	6	26
Week 27	Ak. II		0			0		0	0.0			
	Nas/Ske		7			0		7	8.0	6.75	0	18
	Tahltan		51			0		51	58.6	8.41	37	65
	Stikine		5			0		5	5.7	4.62	0	13
	Total	5	79	0	3	0	0	87				
7/06-7/12	Ak. I		3			0		3	2.5	6.60	0	14
Week 28	Ak. II		12			0		12	9.9	10.37	0	29
	Nas/Ske		6			0		6	5.0	7.66	0	19
	Tahltan		67			0		67	55.4	10.06	50	84
	Stikine		15			4		19	15.7	10.60	2	36
	Total	2	103	1	10	4	1	121				
7/13-7/19	Ak. I		12			0		12	5.7	10.60	0	29
Week 29	Ak. II		13			0		13	6.2	20.82	0	47
	Nas/Ske		7			0		7	3.3	9.93	0	23
	Tahltan		56			0		56	26.8	12.49	35	77
	Stikine		90			5		95	45.5	22.89	57	133
	Total	13	178	1	12	5	0	209				
7/20-7/26	Ak. I		0			0		0	0.0			
Week 30	Ak. II		10			0		10	15.9	4.91	2	18
	Nas/Ske		0			0		0	0.0			
	Tahltan		0			0		0	0.0			
	Stikine		42			5		47	74.6	11.62	28	66
	Total	4	52	1	1	5	0	63				
	Ak. I		45			0		45	8.0	15.56	19	71
	Ak. II		35			0		35	6.2	25.45	0	77
Fishery	Nas/Ske		25			0		25	4.4	15.96	0	51
Total	Tahltan		226			0		226	40.1	20.33	193	259
	Stikine		154			14		168	29.8	28.49	121	215
	Total	24	485	4	36	14	0	564				

[a] Samples were too small to estimate stock composition for other than age-1.3 and -0. fish.
[b] The standard errors are minimum estimates since only two ages were classified.

Appendix D.8. Estimated CPUE and migratory timing of sockeye salmon stock groups in Alaska's Subdistrict 108-50/60 drift gill net test fishery, 1986.[a]

CPUE (Catch per Boat Hour)

Stat Week	Boat hours	Stock Group					
		Ak.I	Ak.II	Nas-Ske	Tahltan	Stikine	Total
26	10.00	1.40	0.00	0.50	5.20	0.20	7.30
27	10.70	1.50	0.00	0.65	4.77	0.47	7.38
28	10.75	0.28	1.12	0.56	6.23	1.77	9.95
29	10.25	1.17	1.27	0.68	5.46	9.27	17.85
30	10.75	0.00	0.93	0.00	0.00	4.37	5.30
Total	52.45	4.35	3.31	2.40	21.66	16.08	47.79

Migratory Timing (Proportion of CPUE by Week)

Stat Week	Stock Group					
	Ak.I	Ak.II	Nas-Ske	Tahltan	Stikine	Total
24-26	0.3222	0.0000	0.2087	0.2400	0.0124	0.1527
27	0.3441	0.0000	0.2731	0.2200	0.0291	0.1545
28	0.0642	0.3368	0.2330	0.2877	0.1099	0.2083
29	0.2694	0.3826	0.2851	0.2522	0.5766	0.3736
30	0.0000	0.2806	0.0000	0.0000	0.2720	0.1109
Total	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

a Analysis is for age-1.3 and -0. fish only since samples were too small to estimate stock composition of other age groups, age-1.3 fish comprised 86% of the total catch.

Appendix D.9. A comparison of stock composition estimates for sockeye salmon caught in the District 106 commercial and test drift gill net fisheries, 1986.

Date and Statistical Week		106-41		106-30	
		Catch	Test	Catch	Test
6/15-6/21	Ak. I	1,659	51	553	28
Week 25	Ak. II	0	8	27	5
	Nas/Ske	287	11	64	1
	Tahltan	0	0	0	0
	Stikine	0	0	0	0
	Total	1,946	70	644	34
6/22-6/28	Ak. I	2,527	65	537	
Week 26	Ak. II	14	15	46	
	Nas/Ske	444	12	59	
	Tahltan	62	3	0	
	Stikine	0	0	0	
	Total	3,047	95	642	
6/29-7/05	Ak. I	8,585	95	3,539	120
Week 27	Ak. II	536	8	74	26
	Nas/Ske	2,377	23	673	14
	Tahltan	1,175	3	9	0
	Stikine	420	7	0	0
	Total	13,093	136	4,295	160
	Ak. I	12,771	211	4,629	148
	Ak. II	550	31	147	31
Fishery	Nas/Ske	3,108	46	796	15
Total	Tahltan	1,237	6	9	0
	Stikine	420	7	0	0
	Total	18,086	301	5,581	194

Appendix E.1. Log-likelihood (G) values for a comparison of the weekly in-season and postseason stock composition estimates for Alaska's Subdistrict 106-41 commercial drift gill net sockeye salmon harvest, 1986.

Date and Week	Estimate	Stock Grouping				Total	G
		Alaska	Nass/Ske	Tahltan	Stikine		
6/15-6/21	In	564	110	23	7	703	
Week 25	Post	608	106	1	1	716	
	Total	1172	216	24	8	1419	30.740
6/22-6/28	In	469	63	51	15	598	
Week 26	Post	496	88	13	1	598	
	Total	966	150	64	16	1196	43.872
6/29-7/05	In	380	61	93	26	559	
Week 27	Post	410	107	53	19	589	
	Total	790	168	146	44	1148	25.219
7/06-7/12 Week 28	No Commercial Fishery						
7/13-7/19 Week 29	No Commercial Fishery						
7/20-7/26	In	499	154	1	1	655	
Week 30	Post	511	143	1	4	659	
	Total	1010	297	2	5	1314	2.797
7/27-8/02	In	385	145	27	12	570	
Week 31	Post	437	143	22	1	602	
	Total	822	288	49	13	1172	16.222
8/03-8/09	In	571	504	171	9	1255	
Week 32	Post	603	471	219	1	1294	
	Total	1174	975	390	10	2549	14.777
	In	2797	700	199	63	3759	
Totals	Post	2929	801	87	23	3840	
	Total	5726	1501	287	85	7599	73.643

Appendix E.2. A comparison of the in-season and postseason initial and adjusted weekly stock composition estimates for Alaska's Subdistrict 106-41 commercial drift gill net sockeye salmon harvest, 1986.

Stat. week	Group	Initial Estimates			Adjusted Estimates		
		In	Post	Change	In	Post	Change
6/15-6/21	Alaska	64.9	80.7	15.9	80.5	85.3	4.8
Week 25	Nas/Ske	21.1	15.6	-5.5	15.6	14.7	-0.9
	Tahltan	10.6	3.1	-7.5	3.1	0.0	-3.1
	Stikine	3.4	0.5	-2.9	0.8	0.0	-0.8
6/22-6/28	Alaska	59.7	68.7	8.9	78.8	83.4	4.5
Week 26	Nas/Ske	19.3	18.3	-1.0	10.4	14.6	4.2
	Tahltan	15.6	7.9	-7.7	8.4	2.0	-6.4
	Stikine	5.4	5.1	-0.2	2.4	0.0	-2.4
6/29-7/05	Alaska	49.4	59.2	9.8	67.9	69.7	1.8
Week 27	Nas/Ske	22.2	18.9	-3.3	10.9	18.2	7.2
	Tahltan	21.7	14.3	-7.4	16.6	9.0	-7.6
	Stikine	6.7	7.6	0.9	4.6	3.2	-1.4
7/06-7/12	No fishery						
Week 28							
7/13-7/19	No fishery						
Week 29							
7/20-7/26	Alaska	59.1	67.7	8.6	76.5	77.8	1.3
Week 30	Nas/Ske	27.3	21.6	-5.7	23.5	21.7	-1.9
	Tahltan	8.6	2.0	-6.6	0.0	0.0	0.0
	Stikine	5.1	8.7	3.7	0.0	0.5	0.5
7/27-8/02	Alaska	50.5	59.2	8.7	67.6	72.5	4.9
Week 31	Nas/Ske	32.9	24.7	-8.3	25.5	23.7	-1.8
	Tahltan	10.5	8.0	-2.5	4.7	3.7	-1.0
	Stikine	6.0	8.2	2.2	2.1	0.1	-2.1
8/03-8/09	Alaska	53.6	58.7	5.1	73.3	68.3	-5.0
Week 32	Nas/Ske	32.9	30.9	-2.0	24.8	31.7	6.9
	Tahltan	8.6	1.6	-7.0	1.2	0.0	-1.2
	Stikine	4.9	8.8	3.9	0.7	0.0	-0.7
	Alaska	53.4	61.9	8.5	71.5	72.9	1.4
Fishery	Nas/Ske	28.7	23.7	-5.0	21.0	23.3	2.3
Totals	Tahltan	12.3	6.5	-5.8	5.6	3.0	-2.5
	Stikine	5.6	7.9	2.3	1.9	0.8	-1.1

Appendix E.3. Age specific initial in-season stock composition estimates for sockeye salmon harvested in Alaska's Subdistrict 106-41 commercial drift gill net fishery, 1986.

Date	Stat. Week	Proportion of Fish by Age Class				
		1.2	1.3	2.2	2.3	Other
Alaska						
6/15-6/21	25	0.903	0.540	[a]	0.614	0.557
6/22-6/28	26	0.820	0.460		0.489	0.483
6/29-7/05	27	0.828	0.310	0.750	0.349	0.413
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.708	0.320		0.900	0.436
7/27-8/02	31	0.500	0.280	0.611	0.741	0.436
8/03-8/09	32	0.596	0.280	0.680	0.635	0.449
Nass/Skeena						
6/15-6/21	25	0.081	0.210		0.295	0.182
6/22-6/28	26	0.140	0.160		0.289	0.156
6/29-7/05	27	0.125	0.180	0.250	0.302	0.186
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.275	0.250		0.075	0.202
7/27-8/02	31	0.500	0.270	0.389	0.155	0.284
8/03-8/09	32	0.365	0.240	0.320	0.269	0.276
Tahltan						
6/15-6/21	25	0.016	0.120	[b]	0.068	0.091
6/22-6/28	26	0.040	0.160		0.133	0.126
6/29-7/05	27	0.047	0.220	0.000	0.279	0.181
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.025	0.090		0.025	0.063
7/27-8/02	31	0.000	0.150	0.000	0.034	0.091
8/03-8/09	32	0.038	0.110	0.000	0.058	0.072
Stikine						
6/15-6/21	25	[b]	0.040	[b]	0.023	0.000
6/22-6/28	26		0.053		0.089	0.000
6/29-7/05	27		0.073	0.000	0.070	0.056
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30		0.060		0.000	0.037
7/27-8/02	31		0.068	0.000	0.069	0.052
8/03-8/09	32		0.068	0.000	0.038	0.041

[a] No age-2.2 fish were analyzed in weeks 25, 26, or 30.
[b] The were no historical standards for Tahltan age-2.2 fish and Stikine age-1.2 and -2.2 fish.

Appendix E.4. Age specific adjusted in-season stock composition estimates for sockeye salmon harvested in Alaska's Subdistrict 106-41 commercial drift gill net fishery, 1986.

Date	Stat. Week	Proportion of Fish by Age Class				
		1.2	1.3	2.2	2.3	Other
Alaska						
6/15-6/21	25	1.000	0.780	[a]	0.670	0.742
6/22-6/28	26	1.000	0.763		0.608	0.726
6/29-7/05	27	1.000	0.614	0.788	0.398	0.651
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.843	0.697		0.960	0.697
7/27-8/02	31	0.662	0.624	0.633	0.855	0.672
8/03-8/09	32	0.638	0.747	0.709	0.808	0.727
Nass/Skeena						
6/15-6/21	25	0.000	0.176		0.263	0.144
6/22-6/28	26	0.000	0.105		0.272	0.095
6/29-7/05	27	0.000	0.126	0.212	0.038	0.105
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.157	0.303		0.040	0.214
7/27-8/02	31	0.338	0.254	0.367	0.145	0.253
8/03-8/09	32	0.362	0.216	0.291	0.192	0.246
Tahltan						
6/15-6/21	25	0.000	0.033	[b]	0.067	0.028
6/22-6/28	26	0.000	0.099		0.119	0.077
6/29-7/05	27	0.000	0.195		0.294	0.159
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.000	0.000		0.000	0.000
7/27-8/02	31	0.000	0.084		0.000	0.047
8/03-8/09	32	0.000	0.023		0.000	0.012
Stikine						
6/15-6/21	25	[b]	0.011	[b]	0.000	0.000
6/22-6/28	26		0.033		0.000	0.000
6/29-7/05	27		0.065		0.000	0.044
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30		0.000		0.000	0.000
7/27-8/02	31		0.038		0.000	0.021
8/03-8/09	32		0.014		0.000	0.007

[a] No age-2.2 fish were analyzed in weeks 25, 26, or 30.
[b] The were no historical standards for Tahltan age-2.2 fish and Stikine age-1.2 and -2.2 fish.

Appendix E.5. Age specific initial postseason stock composition estimates for sockeye salmon harvested in Alaska's Subdistrict 106-41 commercial drift gill net fishery, 1986.

Date	Stat. Week	Proportion of Fish by Age Class				
		1.2	1.3	2.2	2.3	Other
Alaska						
6/15-6/21	25	0.810	0.851	0.651	0.557	0.795
6/22-6/28	26	0.762	0.670	0.800	0.596	0.677
6/29-7/05	27	0.797	0.580	0.636	0.359	0.581
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.639	0.650	0.725	0.794	0.675
7/27-8/02	31	0.546	0.560	0.723	0.666	0.597
8/03-8/09	32	0.473	0.610	0.695	0.657	0.598
Nass/Skeena						
6/15-6/21	25	0.160	0.109	0.349	0.327	0.154
6/22-6/28	26	0.202	0.160	0.200	0.288	0.180
6/29-7/05	27	0.141	0.170	0.364	0.256	0.186
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.250	0.220	0.275	0.141	0.215
7/27-8/02	31	0.327	0.220	0.277	0.235	0.240
8/03-8/09	32	0.481	0.240	0.305	0.255	0.292
Tahltan						
6/15-6/21	25	0.000	0.040	0.000	0.038	0.031
6/22-6/28	26	0.000	0.110	0.000	0.058	0.078
6/29-7/05	27	0.000	0.180	0.000	0.209	0.141
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.000	0.020	0.000	0.043	0.019
7/27-8/02	31	0.000	0.120	0.000	0.049	0.078
8/03-8/09	32	0.000	0.030	0.000	0.000	0.015
Stikine						
6/15-6/21	25	0.030	0.000	0.000	0.007	0.000
6/22-6/28	26	0.036	0.060	0.000	0.058	0.000
6/29-7/05	27	0.063	0.070	0.000	0.186	0.074
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.111	0.110	0.000	0.022	0.087
7/27-8/02	31	0.127	0.100	0.000	0.049	0.080
8/03-8/09	32	0.046	0.120	0.000	0.088	0.083

Appendix E.6. Age specific adjusted postseason stock composition estimates for sockeye salmon harvested in Alaska's Subdistrict 106-41 commercial drift gill net fishery, 1986.

Date	Stat. Week	Proportion of Fish by Age Class				
		1.2	1.3	2.2	2.3	Other
Alaska						
6/15-6/21	25	0.883	0.887	0.690	0.688	0.853
6/22-6/28	26	0.876	0.844	0.883	0.669	0.834
6/29-7/05	27	0.890	0.721	0.671	0.294	0.697
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.720	0.774	0.786	0.838	0.778
7/27-8/02	31	0.682	0.713	0.783	0.747	0.725
8/03-8/09	32	0.492	0.720	0.746	0.724	0.683
Nass/Skeena						
6/15-6/21	25	0.117	0.113	0.310	0.312	0.147
6/22-6/28	26	0.124	0.132	0.117	0.290	0.146
6/29-7/05	27	0.110	0.168	0.329	0.260	0.182
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.239	0.226	0.214	0.162	0.217
7/27-8/02	31	0.310	0.223	0.217	0.253	0.237
8/03-8/09	32	0.508	0.280	0.254	0.276	0.317
Tahltan						
6/15-6/21	25	0.000	0.000	0.000	0.000	0.000
6/22-6/28	26	0.000	0.024	0.000	0.041	0.020
6/29-7/05	27	0.000	0.111	0.000	0.142	0.090
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.000	0.000	0.000	0.000	0.000
7/27-8/02	31	0.000	0.064	0.000	0.000	0.037
8/03-8/09	32	0.000	0.000	0.000	0.000	0.000
Stikine						
6/15-6/21	25	0.000	0.000	0.000	0.000	0.000
6/22-6/28	26	0.000	0.000	0.000	0.000	0.000
6/29-7/05	27	0.000	0.000	0.000	0.304	0.032
7/06-7/12	28	No fishery				
7/13-7/19	29	No fishery				
7/20-7/26	30	0.041	0.000	0.000	0.000	0.005
7/27-8/02	31	0.008	0.000	0.000	0.000	0.001
8/03-8/09	32	0.000	0.000	0.000	0.000	0.000

Appendix E.7. Log-likelihood (G) values for a comparison of the weekly in-season and postseason stock composition estimates for Alaska's Subdistrict 106-30 commercial drift gill net sockeye salmon harvest, 1986.

Date and Week	Estimate	Stock Grouping				Total	G
		Alaska	Nass/Ske	Tahltan	Stikine		
6/15-6/21	In	123	22	4	2	152	
Week 25	Post	132	15	1	1	149	
	Total	255	37	5	3	301	4.099
6/22-6/28	In	165	90	1	1	257	
Week 26	Post	230	24	1	1	256	
	Total	395	114	2	2	513	51.215
6/29-7/05	In	256	42	42	15	355	
Week 27	Post	296	56	2	1	355	
	Total	552	98	44	16	710	66.190
7/06-7/12 Week 28		No Commercial Fishery					
7/13-7/19	In	490	82	4	22	599	
Week 29	Post	573	35	1	1	610	
	Total	1063	117	6	23	1209	52.125
7/20-7/26	In	215	35	14	10	274	
Week 30	Post	501	88	1	1	591	
	Total	717	122	15	11	865	43.993
7/27-8/02	In	461	135	1	10	608	
Week 31	Post	496	132	1	1	630	
	Total	958	267	2	11	1238	9.918
8/03-8/09	In	605	519	224	7	1355	
Week 32	Post	627	531	223	1	1382	
	Total	1232	1050	447	8	2737	5.531
	In	1734	542	64	47	2387	
Totals	Post	2181	532	1	8	2721	
	Total	3915	1074	65	55	5108	142.263

Appendix E.8. A comparison of the in-season and postseason initial and adjusted weekly stock composition estimates for Alaska's Subdistrict 106-30 commercial drift gill net sockeye salmon harvest, 1986.

Stat. Week	Group	Initial Estimates			Adjusted Estimates		
		In	Post	Change	In	Post	Change
6/15-6/21	Alaska	69.4	82.4	13.0	82.8	90.1	7.3
Week 25	Nas/Ske	16.2	13.0	-3.2	14.2	9.9	-4.3
	Tahltan	10.8	3.5	-7.3	2.3	0.0	-2.3
	Stikine	3.6	1.1	-2.5	0.8	0.0	-0.8
6/22-6/28	Alaska	76.7	77.0	0.3	64.8	90.5	25.7
Week 26	Nas/Ske	18.0	18.9	0.8	35.2	9.2	-26.0
	Tahltan	4.0	0.6	-3.4	0.0	0.0	0.0
	Stikine	1.3	3.5	2.2	0.0	0.0	0.0
6/29-7/05	Alaska	64.2	70.6	6.4	72.6	84.1	11.5
Week 27	Nas/Ske	17.3	19.0	1.7	11.6	15.7	4.1
	Tahltan	13.2	7.2	-6.0	11.8	0.2	-11.6
	Stikine	5.3	3.2	-2.2	3.9	0.0	-3.9
7/06-7/12 Week 28	No fishery						
7/13-7/19	Alaska	74.7	81.1	6.3	82.2	94.4	12.2
Week 29	Nas/Ske	15.7	12.8	-2.9	13.7	5.6	-8.1
	Tahltan	4.2	1.9	-2.4	0.6	.0	-0.6
	Stikine	5.4	4.3	-1.1	3.5	0.0	-3.5
7/20-7/26	Alaska	65.0	73.9	8.9	79.4	85.3	5.9
Week 30	Nas/Ske	15.0	21.9	6.9	12.5	14.7	2.2
	Tahltan	12.0	0.8	-11.2	4.9	0.0	-4.9
	Stikine	8.0	3.3	-4.7	3.2	0.0	-3.2
7/27-8/02	Alaska	67.7	71.0	3.3	76.2	79.1	2.9
Week 31	Nas/Ske	20.2	23.4	3.3	22.2	20.9	-1.4
	Tahltan	4.7	3.5	-1.2	0.0	0.0	0.0
	Stikine	7.4	2.1	-5.3	1.5	0.0	-1.5
8/03-8/09	Alaska	65.3	57.3	-8.0	68.0	69.8	1.8
Week 32	Nas/Ske	26.0	28.2	2.1	29.3	29.2	-0.2
	Tahltan	5.5	3.5	-2.1	0.8	0.0	-0.8
	Stikine	3.1	11.1	8.0	1.8	1.0	-0.8
	Alaska	67.6	70.5	2.9	75.4	81.6	6.1
Fishery	Nas/Ske	19.4	21.7	2.3	20.0	18.2	-1.8
Totals	Tahltan	7.1	3.0	-4.1	2.1	.0	-2.1
	Stikine	5.9	4.8	-1.1	2.4	0.2	-2.2

Appendix E.9. Age specific initial in-season stock composition estimates for sockeye salmon harvested in Alaska's Subdistrict 106-30 commercial drift gill net fishery, 1986.

Date	Stat. Week	Proportion of Fish by Age Class				
		1.2	1.3	2.2	2.3	Other
Alaska						
6/15-6/21	25		0.694	a		0.417
6/22-6/28	26		0.767			0.426
6/29-7/05	27	0.857	0.627	0.600	0.409	0.628
7/06-7/12	28	No fishery				
7/13-7/19	29	0.887	0.743	0.652	0.714	0.739
7/20-7/26	30		0.650			0.359
7/27-8/02	31	0.560	0.707	0.000	0.667	0.583
8/03-8/09	32	0.612	0.647	0.773	0.632	0.642
Nass/Skeena						
6/15-6/21	25		0.162			0.097
6/22-6/28	26		0.180			0.100
6/29-7/05	27	0.143	0.120	0.400	0.409	0.169
7/06-7/12	28	No fishery				
7/13-7/19	29	0.097	0.140	0.348	0.169	0.155
7/20-7/26	30		0.150			0.083
7/27-8/02	31	0.400	0.180	0.000	0.152	0.174
8/03-8/09	32	0.367	0.250	0.267	0.224	0.256
Tahltan						
6/15-6/21	25		0.108	b		0.065
6/22-6/28	26		0.040			0.022
6/29-7/05	27	0.000	0.190		0.045	0.129
7/06-7/12	28	No fishery				
7/13-7/19	29	0.016	0.050		0.052	0.042
7/20-7/26	30		0.120			0.066
7/27-8/02	31	0.040	0.070		0.000	0.041
8/03-8/09	32	0.020	0.060		0.105	0.055
Stikine						
6/15-6/21	25	b	0.036	b		0.000
6/22-6/28	26		0.013			0.000
6/29-7/05	27		0.063		0.136	0.052
7/06-7/12	28	No fishery				
7/13-7/19	29		0.067		0.065	0.053
7/20-7/26	30		0.080			0.044
7/27-8/02	31		0.043		0.182	0.064
8/03-8/09	32		0.043		0.039	0.031

[a] Only age-1.3 fish were analyzed in weeks 25, 26, and 30.
[b] The were no historical standards for Tahltan age-2.2 fish and Stikine age-1.2 and -2.2 fish.

Appendix E.10. Age specific adjusted in-season stock composition estimated for sockeye salmon harvested in Alaska's Subdistrict 106-30 commercial drift gill net fishery, 1986.

Date	Stat. Week	Proportion of Fish by Age Class				
		1.2	1.3	2.2	2.3	Other
Alaska						
6/15-6/21	25		0.653	a		0.392
6/22-6/28	26		0.648			0.360
6/29-7/05	27	1.000	0.549	0.620	0.354	0.595
7/06-7/12	28	No fishery				
7/13-7/19	29	1.000	0.689	0.678	0.877	0.743
7/20-7/26	30		0.603			0.333
7/27-8/02	31	0.685	0.541	0.000	0.964	0.579
8/03-8/09	32	0.628	0.392	0.769	0.817	0.538
Nass/Skeena						
6/15-6/21	25		0.112			0.067
6/22-6/28	26		0.352			0.196
6/29-7/05	27	0.000	0.048	0.380	0.360	0.095
7/06-7/12	28	No fishery				
7/13-7/19	29	0.000	0.130	0.322	0.088	0.124
7/20-7/26	30		0.095			0.052
7/27-8/02	31	0.315	0.241	0.000	0.036	0.169
8/03-8/09	32	0.372	0.238	0.231	0.149	0.232
Tahltan						
6/15-6/21	25		0.018	b		0.011
6/22-6/28	26		0.000			0.000
6/29-7/05	27	0.000	0.147		0.000	0.097
7/06-7/12	28	No fishery				
7/13-7/19	29	0.000	0.000		0.035	0.005
7/20-7/26	30		0.037			0.020
7/27-8/02	31	0.000	0.000		0.000	0.000
8/03-8/09	32	0.000	0.000		0.035	0.006
Stikine						
6/15-6/21	25	b	0.006	b		0.000
6/22-6/28	26		0.000			0.000
6/29-7/05	27		0.049		0.000	0.032
7/06-7/12	28	No fishery				
7/13-7/19	29		0.050		0.000	0.032
7/20-7/26	30		0.025			0.014
7/27-8/02	31		0.023		0.000	0.012
8/03-8/09	32		0.027		0.000	0.015

[a] Only age-1.3 fish were analyzed in weeks 25, 26, and 30.
[b] There were no historical standards for Tahltan age-2.2 fish and Stikine age-1.2 and -2.2 fish.

Appendix E.11. Age specific initial postseason stock composition estimates for sockeye salmon harvested in Alaska's Subdistrict 106-30 commercial drift gill net fishery, 1986.

Date	Stat. Week	Proportion of Fish by Age Class				
		1.2	1.3	2.2	2.3	Other
Alaska						
6/15-6/21	25	0.298	0.947	0.838	0.606	0.745
6/22-6/28	26	0.298	0.853	0.802	0.606	0.745
6/29-7/05	27	0.318	0.760	0.760	0.617	0.500
7/06-7/12	28	No fishery				
7/13-7/19	29	0.377	0.803	0.872	0.638	0.754
7/20-7/26	30	0.526	0.682	0.790	0.651	0.804
7/27-8/02	31	0.542	0.576	0.760	0.727	0.813
8/03-8/09	32	0.410	0.457	0.604	0.736	0.648
Nass/Skeena						
6/15-6/21	25	0.053	0.095	0.394	0.213	0.117
6/22-6/28	26	0.122	0.149	0.394	0.213	0.174
6/29-7/05	27	0.200	0.110	0.383	0.409	0.175
7/06-7/12	28	No fishery				
7/13-7/19	29	0.164	0.069	0.362	0.156	0.117
7/20-7/26	30	0.258	0.180	0.349	0.124	0.197
7/27-8/02	31	0.384	0.180	0.273	0.131	0.206
8/03-8/09	32	0.432	0.228	0.264	0.219	0.251
Tahltan						
6/15-6/21	25	0.000	0.054	0.000	0.000	0.032
6/22-6/28	26	0.000	0.010	0.000	0.000	0.006
6/29-7/05	27	0.000	0.100	0.000	0.045	0.066
7/06-7/12	28	No fishery				
7/13-7/19	29	0.000	0.020	0.000	0.026	0.017
7/20-7/26	30	0.000	0.010	0.000	0.010	0.008
7/27-8/02	31	0.000	0.050	0.000	0.019	0.031
8/03-8/09	32	0.000	0.050	0.000	0.019	0.031
Stikine						
6/15-6/21	25	0.000	0.014	0.000	0.043	0.000
6/22-6/28	26	0.024	0.040	0.000	0.043	0.000
6/29-7/05	27	0.040	0.030	0.000	0.045	0.029
7/06-7/12	28	No fishery				
7/13-7/19	29	0.033	0.039	0.000	0.065	0.039
7/20-7/26	30	0.061	0.020	0.000	0.062	0.030
7/27-8/02	31	0.041	0.010	0.000	0.037	0.018
8/03-8/09	32	0.111	0.119	0.000	0.114	0.099

Appendix E.12. Age specific adjusted postseason stock composition estimates for sockeye salmon harvested in Alaska's Subdistrict 106-30 commercial drift gill net fishery, 1986.

Date	Stat. Week	Proportion of Fish by Age Class				
		1.2	1.3	2.2	2.3	Other
Alaska						
6/15-6/21	25	0.990	0.985	0.638	0.777	0.950
6/22-6/28	26	1.000	0.862	0.638	0.777	0.834
6/29-7/05	27	0.912	0.922	0.635	0.517	0.842
7/06-7/12	28	No fishery				
7/13-7/19	29	0.939	0.967	0.663	0.830	0.909
7/20-7/26	30	0.793	0.862	0.683	1.000	0.850
7/27-8/02	31	0.589	0.699	0.832	0.947	0.757
8/03-8/09	32	0.411	0.533	0.778	0.762	0.580
Nass/Skeena						
6/15-6/21	25	0.010	0.015	0.362	0.223	0.050
6/22-6/28	26	0.000	0.138	0.362	0.223	0.154
6/29-7/05	27	0.088	0.065	0.365	0.426	0.123
7/06-7/12	28	No fishery				
7/13-7/19	29	0.061	0.033	0.337	0.105	0.072
7/20-7/26	30	0.207	0.138	0.317	0.000	0.140
7/27-8/02	31	0.411	0.160	0.144	0.053	0.160
8/03-8/09	32	0.449	0.260	0.222	0.174	0.257
Tahltan						
6/15-6/21	25	0.000	0.000	0.000	0.000	0.000
6/22-6/28	26	0.000	0.000	0.000	0.000	0.000
6/29-7/05	27	0.000	0.013	0.000	0.056	0.013
7/06-7/12	28	No fishery				
7/13-7/19	29	0.000	0.000	0.000	0.000	0.000
7/20-7/26	30	0.000	0.000	0.000	0.000	0.000
7/27-8/02	31	0.000	0.000	0.000	0.000	0.000
8/03-8/09	32	0.000	0.000	0.000	0.000	0.000
Stikine						
6/15-6/21	25	0.000	0.000	0.000	0.000	0.000
6/22-6/28	26	0.000	0.000	0.000	0.000	0.000
6/29-7/05	27	0.000	0.000	0.000	0.000	0.000
7/06-7/12	28	No fishery				
7/13-7/19	29	0.000	0.000	0.000	0.065	0.010
7/20-7/26	30	0.000	0.000	0.000	0.000	0.000
7/27-8/02	31	0.000	0.142	0.024	0.000	0.076
8/03-8/09	32	0.140	0.207	0.000	0.064	0.142

Appendix E.13. Log-likelihood (G) values for a comparison of the weekly in-season and postseason stock composition estimates for Canada's Stikine River commercial sockeye salmon harvest, 1986.

Date and Week	Estimate	Stock Grouping: Tahltan	Stock Grouping: non-Tahltan	Total	G
6/22-7/05	In	223	74	297	
Wks 26-27	Post	248	91	339	
	Total	471	165	636	0.238
7/06-7/12	In	215	44	259	
Week 28	Post	245	51	296	
	Total	460	95	555	0.001
7/13-7/19	In	206	49	255	
Week 29	Post	230	80	310	
	Total	436	129	565	3.829
7/20-7/26	In	129	86	215	
Week 30	Post	157	144	301	
	Total	286	230	516	3.396
7/27-8/02	In	71	182	253	
Week 31	Post	66	253	319	
	In	797	482	1279	
Totals	Post	895	670	1565	
	Total	1692	1152	2844	7.664

Appendix E.14. A comparison of the in-season and postseason initial and adjusted weekly stock composition estimates for Canada's Stikine River commercial sockeye salmon harvest, 1986.

Age 1.3 only

Stat. Week	Stock	Initial Estimates In	Initial Estimates Post	Initial Estimates Change	Adjusted Estimates In	Adjusted Estimates Post	Adjusted Estimates Change
6/22-7/05	Tahltan	77.0	76.0	-1.0	81.2	78.6	-2.6
Wks 26-27	non-Tah	23.0	24.0		18.9	21.4	
7/06-7/12	Tahltan	80.0	84.0	4.0	84.8	88.1	3.3
Week 28	non-Tah	20.0	16.0		15.2	11.9	
7/13-7/19	Tahltan	79.0	77.0	-2.0	83.6	79.8	-3.8
Week 29	non-Tah	21.0	23.0		16.4	20.2	
7/20-7/26	Tahltan	64.0	64.0	0.0	65.3	64.3	-1.0
Week 30	non-Tah	36.0	36.0		34.7	35.7	
7/27-8/02	Tahltan	37.0	32.0	-5.0	32.4	26.2	-6.2
Week 31	non-Tah	63.0	68.0		67.6	73.8	
	Tahltan	64.3	63.6	-0.7	65.7	63.9	-1.8
	non-Tah	35.7	36.4		34.3	36.1	

Age-1.3 and -0. in-season vs all ages post season

Stat. Week	Stock	Initial In- vs Adjusted Post In	Initial In- vs Adjusted Post Post	Initial In- vs Adjusted Post Change	Adjusted Estimates In	Adjusted Estimates Post	Adjusted Estimates Change
6/22-7/05	Tahltan	71.3	73.1	1.8	75.2	73.1	-2.1
Wks 26-27	non-Tah	28.7	26.9		24.9	26.9	
7/06-7/12	Tahltan	78.4	82.7	4.3	83.1	82.7	-0.4
Week 28	non-Tah	21.6	17.3		16.9	17.3	
7/13-7/19	Tahltan	76.7	73.9	-2.8	81.2	73.9	-7.3
Week 29	non-Tah	23.3	26.1		18.8	26.1	
7/20-7/26	Tahltan	59.3	51.9	-7.4	60.5	51.9	-8.6
Week 30	non-Tah	40.7	48.1		39.5	48.1	
7/27-8/02	Tahltan	32.5	20.6	-11.9	28.4	20.6	-7.8
Week 31	non-Tah	67.5	79.4		71.6	79.4	
	Tahltan	60.9	57.2	-3.7	62.4	57.2	-5.2
	non-Tah	39.1	42.8		37.6	42.8	

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