Fisheries and Oceans Canada
Science

Pêches et Océans Canada
Sciences

C S A S

Canadian Science Advisory Secretariat

S C C S

Secrétariat canadien de consultation scientifique

Research Document 2004/013

Document de recherche 2004/013

Not to be cited without permission of the authors *

Ne pas citer sans autorisation des auteurs *

Trends in Abundance for Northern British Columbia chum salmon

Tendances de l'abondance du saumon kéta dans le nord de la Colombie-Britannique

Brian P. Spilsted

North Coast Area, Stock Assessment Unit
417 – 2nd Avenue West
Prince Rupert BC V8J 1G8

* This series documents the scientific basis for the evaluation of fisheries resources in Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

Research documents are produced in the official language in which they are provided to the Secretariat.

This document is available on the Internet at:

* La présente série documente les bases scientifiques des évaluations des ressources halieutiques du Canada. Elle traite des problèmes courants selon les échéanciers dictés. Les documents qu'elle contient ne doivent pas être considérés comme des énoncés définitifs sur les sujets traités, mais plutôt comme des rapports d'étape sur les études en cours.

Les documents de recherche sont publiés dans la langue officielle utilisée dans le manuscrit envoyé au Secrétariat.

Ce document est disponible sur l'Internet à:

http://www.dfo-mpo.gc.ca/csas/

ISSN 1499-3848 (Printed)

Canada

Table of Contents

Tables

Figures

Abstract

This research paper documents chum salmon escapement trends and provides 2003 escapement forecasts of northern coastal British Columbia (Statistical Areas 1 to 6).

Long-term escapement trends

The Queen Charlotte Islands (Q.C.I.) index stream aggregate shows generally stable escapement for the past 30 years. Area 1 escapements are highly variable, with no apparent trend. Area 2 West streams show a stable pattern of chum escapement, similar to the Q.C.I. aggregate. The 2 East index stream aggregate shows periods of both increasing and decreasing abundance. The overall trend is not clear. It is recommended that the current conservative management approach of terminal Q.C.I. net fisheries directed on identified surplus escapement should continue.

North Coast chum streams in Areas 3, 5 and 6 show a long-term decline over the years 1950 to 2002. Area 4 escapements are highly variable, with no apparent trend. Chum stocks in Areas 3 to 6 needs to be rebuilt.

2003 Escapement forecast

A summary of chum salmon escapement forecasts for index stream aggregate by Statistical Area and their characterization relative to a long-term mean and Department of Fisheries and Oceans Fisheries Management staff escapement goals is presented in the following Table:

Stat. Area	Stock	Escapement Goal	Mean Esc. (1950-2002)	2003 Forecast[1]	50% CI	Characterization of Status
1	index	$6.1x10^4$	$4.3x10^4$	$1.0x10^4$	$5.1x10^3$ - $2.1x10^4$	Below Esc. Goal and Mean Esc., variable without trend
2E	index	$2.2x10^5$	$1.3x10^5$	$6.5x10^4$	$4.2x10^4$ - $1.0x10^5$	Below Esc. Goal and Mean Esc., variable with slight downward trend
2W	index	$1.4x10^5$	$9.0x10^4$	$6.8x10^4$	$4.2x10^4$ - $1.1x10^5$	Below Esc. Goal and Mean Esc., variable without trend
3	index	$7.2x10^4$	$3.8x10^4$	$3.3x10^4$	$2.2x10^4$ - $4.8x10^4$	Depressed, long term decline, anticipated 2003 returns below Esc. Goal and Mean Esc.
4	index	$3.7x10^4$	$1.4x10^4$	$4.2x10^3$	$2.3x10^3$ - $7.7x10^3$	Highly variable, no observable trend, 2003 returns well below Esc. Goal
5	index	$2.2x10^4$	$1.4x10^4$	$1.9x10^3$	$9.5x10^2$ - $4.0x10^3$	Depressed, long term decline, anticipated 2003 returns well below Esc. Goal and Mean Esc.
6	index	$2.9x10^5$	$1.3x10^5$	$1.1x10^5$	$6.5x10^4$ - $1.7x10^5$	Depressed, long term decline, anticipated 2003 returns well below Esc. Goal and Mean Esc.

[1]2003 forecast using 4YRA model for Areas 1, 2E, 4 and 5 and nYRA for Areas 2W, 3 and 6 as indicated by RMSE retrospective analysis (Table 9).

(Tables 10 to 12 provide forecast summaries using 4, 5 and n-YRA models for all stream aggregates and Tables 13 to 15 provide forecast summaries using 4, 5 and n-YRA models for index stream aggregates).

Résumé

Sont documentées les tendances des échappées du saumon kéta dans les cours d'eau de la côte nord de la Colombie-Britannique (zones statistiques 1 à 6) et présentées des prévisions des échappées en 2003.

Tendances des échappées à long terme

Les échappées étaient généralement stables dans l'ensemble des cours d'eau repères des îles de la Reine-Charlotte (IRC) au cours des trois dernières décennies. Elles ont fortement varié dans la zone 1 mais sans montrer une tendance. Les cours d'eau du secteur ouest de la zone 2 montrent une tendance stable, semblable à celle pour l'ensemble des cours d'eau des IRC, tandis que, pour l'ensemble des cours d'eau repères du secteur est de cette zone, les échappées affichent des périodes d'abondance à la hausse et à la baisse, sans tendance générale claire. On recommande que les mesures actuelles de gestion prudente, soit des pêches dirigées au filet en estuaire des excédents de reproducteurs continuent d'être appliquées.

L'abondance du kéta dans les cours d'eau de la côte nord situés dans les zones 3, 5 et 6 montre un déclin à long terme de 1950 à 2002. Les échappées dans la zone 4 varient fortement mais sans tendance apparente. Les stocks de kéta des zones 3 à 6 doivent être reconstitués.

Prévisions des échappées en 2003

Le tableau suivant résume les prévisions des échappées de saumon kéta pour l'ensemble des cours d'eau repères selon la zone statistique et de leur statut par rapport à la moyenne à long terme et aux objectifs d'échappées des gestionnaires du ministère des Pêches et des Océans.

Zone	Stock	Objectif d'échappée	Échappée moyenne (1950-2002)	Prévisions pour 2003[1]	IC à 50 %	Statut
1	repère	$6,1x10^4$	$4,3x10^4$	$1,0x10^4$	$5,1x10^3$ - $2,1x10^4$	sous l'objectif d'échappée et la moyenne, variable, aucune tendance
2E	repère	$2,2x10^5$	$1,3x10^5$	$6,5x10^4$	$4,2x10^4$ - $1,0x10^5$	sous l'objectif d'échappée et la moyenne., variable, légère tendance à la baisse
2W	repère	$1,4x10^5$	$9,0x10^4$	$6,8x10^4$	$4,2x10^4$ - $1,1x10^5$	sous l'objectif d'échappée et la moyenne, variable, aucune tendance
3	repère	$7,2x10^4$	$3,8x10^4$	$3,3x10^4$	$2,2x10^4$ - $4,8x10^4$	appauvri, déclin à long terme, remontes prévues en 2003 inférieures à l'objectif d'échappée et à la moyenne
4	repère	$3,7x10^4$	$1,4x10^4$	$4,2x10^3$	$2,3x10^3$ - $7,7x10^3$	fortement variable, aucune tendance évidente, remontes en 2003 bien inférieures à l'objectif d'échappée
5	repère	$2,2x10^4$	$1,4x10^4$	$1,9x10^3$	$9,5x10^2$ - $4,0x10^3$	appauvri, déclin à long terme, remontes en 2003 bien inférieures à l'objectif d'échappée
6	repère	$2,9x10^5$	$1,3x10^5$	$1,1x10^5$	$6,5x10^4$ - $1,7x10^5$	appauvri, déclin à long terme, remontes en 2003 bien inférieures à l'objectif d'échappée

[1]Prévision pour 2003 reposant sur un modèle en série chronologique 4-YRA pour les zones 1, 2E, 4 et 5 et n-YRA pour les zones 2W, 3 et 6 telle qu'indiquée par une analyse rétrospective RMSE (tableau 9).
(Les tableaux 10 à 12 résument les prévisions reposant sur des modèles en série chronologique de 4, 5 et n-YRA pour tous les ensembles de cours d'eau repères et les tableaux 13 à 15, les prévisions reposant sur des modèles en série chronologique 4, 5 et n-YRA pour les ensembles des cours d'eau repères.)

1. Introduction

This working paper details trends in abundance for North Coast (Statistical areas 1- 6, Fig. 1) wild chum salmon (*Oncorhynchus keta*) stocks. The North Coast has 466 streams with at least 1 recorded chum salmon escapement for the years encompassing 1950 to 2002. Table 1 provides a summary by Statistical Area of the number of wild streams (streams that have never received enhancement), enhanced streams (streams that have received fry releases for at least one year) and the number of streams used to calculate escapement indices.

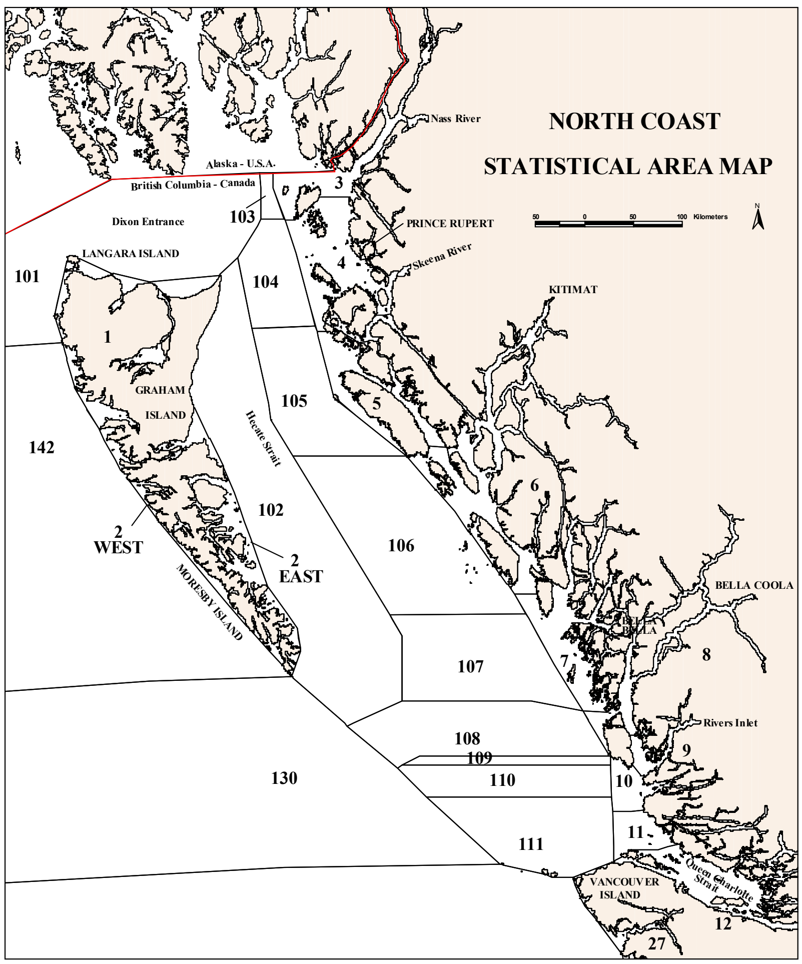


Figure 1. North Coast Statistical Area Map.

Chum salmon are harvested in the greatest numbers by commercial purse seine and gillnet fisheries, but are also taken by commercial troll, and in sport and subsistence fisheries.

Commercial net fisheries harvesting chum salmon in Areas 1, 2E and 2W have historically conducted terminal chum fisheries on streams with identified surplus stocks. Historic net interception fisheries that were located north in the Langara Island (Area 1) and Rennell Sound areas of the Queen Charlotte Islands harvested chum salmon of unknown origin as a by-catch. Historic troll interception fisheries occurring in the northern half of Dixon Entrance also harvested chum of unknown origin as a by-catch. Commercial net fisheries located in Areas 3 to 6 generally harvest chum as incidental by-catch in fisheries directed on sockeye and pink salmon stocks. Sockeye or pink salmon fisheries occur around the mouths of the Nass (Area 3) and Skeena (Area 4) Rivers. Pink salmon fisheries in Area 6 occur in the outer portions, located in the Gill Island area and harvest chum as an incidental by-catch. There are directed chum net fisheries in Area 6 which target on returning enhanced Kitimat River chum. Tables 2 to 5 summarize commercial catch data for the years 1952 to 2002. Figures 2 and 3 show total escapement and total commercial troll and net catch by year for Statistical Areas 1 to 6.

Chum enhancement in the northern British Columbia coast is summarized in Table 6. Major production occurs in the Queen Charlotte Islands (Q.C.I.) in Area 2 East at the Pallant Creek Hatchery on Pallant and Mathers Creeks and in the North Coast in Area 6 at the Kitimat Hatchery on the Kitimat, Dala and Kildala Rivers and Bish Creek.

2. Data Sources

Visual escapement estimates for streams in Statistical Areas 1 to 6 were obtained from stock assessment staff in the Prince Rupert Office. Data from 2002 are considered finalized for Areas 5 and 6. Data recorded for 2002 for other statistical areas should be considered preliminary and subject to revision.

Fisheries Management (FM) chum escapement goals were obtained in electronic format from the North Coast FM drive. These data reflect the manager's best estimate of the desired chum escapement for each stream, however there is no scientific basis for these estimates. Commercial catch data were obtained from the regional Department of Fisheries and Oceans (D.F.O.) Commercial Salmon Saleslip Database.

Coded Wire Tag (CWT) information was obtained from the regional D.F.O. database. Finclip data were obtained from a database held by the Enhancement Support and Assessment Unit.

3. Abundance Estimators

3.1 Escapement trends

Visual escapement counts were examined for trends in abundance using similar methodology as Sawada et al. 2003. North Coast chum abundance trends and stock forecasts have been documented by Wood et al. (1996 and 1999) and Rutherford and Wood (2000). Estimates of escapement to individual streams throughout B.C. have been made since at least 1950. These estimates are mostly based on visual inspections of the streams. The methods used to inspect the streams, and convert the counts to estimates of escapement, the frequency of surveys, etc., are largely undocumented. These methods are known to differ between systems and to have changed over time. Nevertheless it is believed that the time series do contain information about escapement trends in each area.

To extract that information, streams were selected that had not received any enhancement and had at least 10 years of data between the years 1950 and 2002. The escapement (*E*) was scaled in each stream *i* to the maximum escapement recorded in that stream across all years *t*:

$$p_{i,t} = \frac{E_{i,t}}{\max\left(E_i\right)} \quad (1)$$

Then the $p_{i,t}$ were averaged across all streams *i* within each year *t* to give a time series (p_{max}) for the area as a whole. The "average-stream" or index escapement was constructed by multiplying p_{max} by the average across the *i* streams of max (E_i). This procedure was carried out for various stream aggregates located within the northern B.C. coast. Index values were converted to numbers of fish by multiplying annual p_{max} values by the average of max (E_i). The 95% confidence limits of the p_{max} value were calculated as:

$$\pm t_{crit} \times \sigma / \sqrt{n} \quad (2)$$

where t_{crit} is the critical value of the t-distribution for $\alpha = 0.05$, 2-tailed test and appropriate degrees of freedom.

The intent of using this index is to remove the direct bias of missing data and to provide a balanced evaluation of escapement trends by weighting each stream equally. The error associated with stream survey methodology and estimation of a stream's total escapement is not quantified in this paper, therefore the uncertainty surrounding index escapement data is underestimated.

3.2 Escapement estimates

3.3 Fence Counts

There are no historic or current fence operations within the northern B.C. coast in which the primary focus is counting returning wild chum salmon. Consequently, only a small amount of fragmented wild chum fence count data exists from Lachmach coho key stream (Area 3) and West Arm Creek coho key stream (Area 6) programs. Fence count records for chum salmon document an unknown portion of the run in any year since the operational timing of these fence programs do not cover the entire in-stream arrival time series for this species. Fence count data were not summarized for wild chum streams since annual run timing and total escapement for chums could not be established.

Counts also exist for streams that have received chum enhancement. These include Yakoun pink count (Area 1) and Pallant and Mathers chum count (Area 2E) programs. Chum data from Yakoun River and Pallant and Mathers Creeks were not formally reviewed since escapement trends for these enhanced systems would not represent appropriate indicators of annual status of returns to wild streams.

3.3.1 Visual Escapement Estimates.

Indices of abundance were calculated for various stream aggregates for the years 1950 to 2002. Data were plotted separately for each Statistical Area (1 to 6), and for Q.C.I. (Areas 1, 2 East and 2 West combined) and North Coast (Areas 3, 4, 5 and 6 combined) geographic groupings. Q.C.I. streams were aggregated apart from those in the North Coast because of the apparent difference in general of stream arrival timing. Approximately 80 to 90 percent of Q.C.I. streams have in-stream arrival of chum salmon from early September to late October. North Coast Areas 3, 4 and 5 streams have approximately 87 to 97 percent of chum streams with early June to late August arrival timing. North Coast Area 6 streams have 51 percent of the chum streams with early June to late August arrival timing, with the remaining streams returning between early and mid-September. A review of chum timing data obtained from the North Coast Stock Assessment Unit

(Salmon Escapement and Timing Data, unpublished) is provided in Table 7. A third approach to group data was to aggregate streams by average escapement for the years 1950 to 2002. Q.C.I.

and North Coast streams were separately placed into one of the following average escapement intervals arbitrarily established by the author: <= 200, 201 to 500, 501 to 1,000, 1,001 to 5,000, and 5,001 to 40,000.

3.3.1.1 Q.C.I. Aggregate (Areas 1, 2 East and 2 West)

3.3.1.1.1 Geographic Aggregates of Index streams

3.3.1.1.1.1 Q.C.I. Geographic Aggregate

Annual escapement indices calculated for the Q.C.I. aggregate (Fig. 4) show largest values for 3 years in the early 1950's and suggest a possible rapid decline in abundance, whereupon there appears to be a relatively stable level of abundance from the mid 1950's to present. A review of historic Area History and Annual Narrative documents completed annually by Fishery Officers did not provide any evidence that the steep decline in 2E and 2W escapement in the early 1950's might be 'real' or whether it may be an artifact of a change in staff or methods. There are a total of 146 index streams for this aggregate, with many years in the time series with greater than 80 streams surveyed (average = 95). In general, there is an increasing trend in number of streams surveyed until the late 1980's whereupon the number surveyed began to decline. Figure 5 provides annual indices converted to fish (index escapement).

3.3.1.1.1.2 Area 1

There is a maximum of only 7 streams used to calculate the Area 1 escapement index. The index is highly variable, with no apparent trends (Fig. 4). The FM escapement goal is set at an index value of 0.45. Figure 5 provides annual indices converted to fish (index escapement).

3.3.1.1.1.3 Area 2E

Area 2E index streams show cyclical periods of decline followed by periods of at least a decade of increasing abundance (Fig. 4). There is a sharp decline noted after 1952. The peaks within each period of increasing abundance suggest a decline over the time series. The number of streams sampled throughout this period show a general increasing trend to the late 1980's and then a general decrease in inspections to recent years. Most years show at least 40 streams surveyed (average = 51). The Fisheries Management (FM) escapement goals for 2 East index streams produces an index value of 0.62. The dominant 4-year age class brood for 2003 shows an index value of 0.18. Figure 5 provides annual indices converted to fish (index escapement).

The Area 2E index stream aggregate was examined to determine whether number of years of data affected trend in abundance. The index aggregate of streams (streams with at least 10 of 52 years of data) were compared with an aggregate of streams with at least 47 of 52 years of data. Figure 6 plots p_{max} values and annual sample size for these two sets of data. Analysis of index values for these two time-series show high correlation (0.98), indicating that the stream selection criteria of at least 10 years of data used in this paper is appropriate.

3.3.1.1.1.4 Area 2W

Annual indices of abundance for Area 2 West streams show a similar rapid decline after 1952 as in 2 East, but have remained relatively stable since then (Fig. 4). The FM escapement goals for 2W index streams produce an index value of 0.31. The dominant 4-year age class brood for 2003 shows an index value of 0.27, the closest to the FM escapement goal since 1964. Figure 5 provides annual indices converted to fish (index escapement).

3.3.1.1.2 Average Escapement Aggregates of Index streams:

3.3.1.1.2.1 Q.C.I. Average Escapement Aggregate

Indices of abundance calculated for individual average escapement aggregates (Fig. 7) are similar for all escapement partitions. Index estimates for the period 1950 to 1952 were generally much higher for all escapement aggregates. A relatively stable pattern of annual abundance is indicated from the late 1960's to present.

3.3.1.2 North Coast Aggregate (Areas 3, 4, 5 and 6)

3.3.1.2.1 Geographic Aggregates of Index streams

3.3.1.2.1.1 North Coast Geographic Aggregate

The North Coast geographic stream aggregate (Fig. 8) indicates a general trend of declining abundance through the entire time series of data. There are a total of 183 index streams, with an average of 113 annual inspections over the time series. The large number of annual stream inspections resulted in tight confidence limits around index values. The dominant 4-year age class brood for 2003 shows an index value of 0.05, and represents the lowest level of abundance for all years reviewed. Figure 9 provides annual indices converted to fish (index escapement).

3.3.1.2.1.2 Area 3

This aggregate of 24 index streams shows fairly wide confidence limits over most of the data (Fig. 8) due to low number of annual stream inspections. There is an annual average of 13 streams inspected for chum salmon. The data does suggest however that escapement has been variable but with an overall declining trend. The large escapement in 1998 produced a poor return in 2002. The FM Area 3 chum escapement goal (converted to an index value) is 0.64, which has never been attained over the time series of data. The dominant 4-year age class brood for 2003 shows an index value of 0.07, which is one of the lowest values recorded in the data. Figure 9 provides annual indices converted to fish (index escapement).

3.3.1.2.1.3 Area 4

The Area 4 aggregate of 24 index streams (Fig. 8) has an annual average of 12 streams inspected for chum salmon. There is an annual average of 12 streams inspected for chum salmon. The data is highly variable, without a clear trend in abundance. The FM escapement goal equates to an abundance index value of 0.61.

Morrell (2000) provides a review of the status of Skeena salmon streams and identified 10 of 50 streams "at risk of extinction". These streams included 5 in the coastal area (Denise Cr., Johnston Cr., Khyex R., Kloiya R. and Silver Cr.), 2 in the lower Skeena (Andesite Cr. and Zymacord R.), 2 in the middle Skeena (Date Cr. and Kleanza Cr.) and 1 in the upper Skeena (Babine R.). A review by Slaney et al. (1996) identifies 8 of 72 chum streams "at risk of extinction". Gottesfeld et al. (2002) report "In general, one can conclude that, chum are probably the Skeena region salmon species in greatest danger of significant loss of spawning stocks and genetic diversity".

Figure 9 provides annual indices converted to fish (index escapement).

3.3.1.2.1.4 Area 5

There are a total of 33 streams in the Area 5 index of abundance stream aggregate (Fig. 8). Numbers of annual stream inspections have generally decreased from the mid to late 1960's. There are a number of years of data with large uncertainty surrounding abundance values, however there does appear to be a decreasing trend from the 1950's to the early 1970's. This was followed by an increase in abundance to the mid-1970's, after which, the data suggests further decline in abundance through to recent years. The FM escapement goals for Area 5 index streams produce an abundance value of 0.31, which has not been attained since the mid to late 1970's. The dominant 4-year age class brood for 2003 shows an index value of 0.03, one of the lowest on record. Figure 9 provides annual indices converted to fish (index escapement).

3.3.1.2.1.5 Area 6

Area 6 has the largest number of index streams (102) in the North Coast (Fig. 8). There has been an average of 68 streams inspected each year. Chum abundance appears to have been generally higher from the 1950's to the late 1960's than years after this period. Although less clear, the data does suggest a further general slow decline in abundance to recent years. The dominant 4-year age class brood for 2003 shows an index value of 0.04, which is one of the lowest on record for this time series. The FM escapement goal for Area 6 index streams is calculated to be 0.37. It should also be noted that the abundance estimate for the 4-year dominant brood year for 2004 shows the lowest index value on record (0.03). Figure 9 provides annual indices converted to fish (index escapement).

The Area 6 index stream aggregate was examined to determine whether number of years of data affected trend in abundance. The index aggregate of streams (streams with at least 10 of 52 years of data) were compared with an aggregate of streams with at least 47 of 52 years of data. Figure 10 plots p_{max} values and annual sample size for these two sets of data. Analysis of index values for these two time-series show high correlation (0.83), indicating that the stream selection criteria of at least 10 years of data used in this paper is appropriate.

3.3.1.2.2 Average Escapement Aggregates of Index streams:

3.3.1.2.2.1 North Coast Average Escapement Aggregate

A review of the average escapement stream aggregates (Fig. 11) indicate that streams with an average escapement of less than 5,000 generally show a decreasing level of abundance over time. The dominant 4-year age class brood for 2003 for these stream aggregates represents one of the lowest values in each of the data series. For stream aggregates with average escapement greater than 5,000 fish per year, the information suggests that a relatively stable level of abundance exists for these streams.

3.3.1.2.3 Northern B.C. Coast Aggregate (Areas 1, 2E, 2W, 3, 4, 5 and 6), Summer vs. Fall Run Timing

Escapement trends of northern B.C.index streams were aggregated using arrival timing information obtained from the D.F.O. North Coast Stock Assessment Unit which included Salmon Escapement and Timing Data (unpublished), electronic Stream Inspection Log data and the Stream Summary Catalogue series (unpublished) compiled by the Fish Habitat Inventory and Information Program, North Coast Division. Streams were grouped by stream arrival timing. Summer run timing in this paper is defined as freshwater arrival by the end of August. Fall run timing is defined in this paper as freshwater arrival by September or later. It should be noted that there is year to year variance in arrival timing information, which leads to some overlap of the September 1st cutoff date. Nevertheless, this does appear to be a useful exercise to examine escapement trends between streams of differing run timing.

Index escapement data for summer and fall arrival timing streams aggregated from Statistical Areas 1 to 6 are summarized for the years 1950 to 2002 in Fig. 12. Both summer and fall aggregates appear to show relatively similar trends in abundance, with highest abundance generally occurring in the 1950's and 1960's and lowest levels appearing to occur in the last two decades.

3.3.1.3 Southeast Alaska Aggregate (Districts 101, 102, 107, 108, 109, 110, 111, 112, 113, 114 and 115)

3.3.1.3.1 Geographic Aggregates of Index streams

Southeast Alaska stream peak escapement estimates for the years 1982 to 2002 were obtained from Heinl et al. (2003). This data represents a subset of the total number of streams located in Southeast Alaska (SEAK), representing streams with consistent and long-term survey counts. The SEAK stream group was divided into northern Southeast Alaska (NSEAK) and southern

Southeast Alaska (SSEAK) aggregates to investigate geographic differences in chum escapement trends. Alaskan data are presented in this paper in order to provide a larger regional perspective regarding chum escapement trend patterns for northern chum stocks.

3.3.1.3.1.1 Southeast Alaska Geographic Aggregate

The SEAK stream aggregate (Fig . 13) includes 82 chum streams for this analysis, with an average of 74 streams surveyed annually for the years 1982 to 2002. Index escapement for this time series suggests a generally increasing level of abundance. A large 'spike' in abundance is noted for 1996. The number of streams surveyed in SEAK each year has remained relatively stable.

3.3.1.3.1.2 Northern Southeast Alaska Geographic Aggregate

The NSEAK sub-group includes streams located in Districts 111, 112, 114 and 115. Index escapement for this geographic aggregate (Fig. 13) shows a similar increasing trend in abundance as noted for the larger SEAK aggregate. A large 'spike' in abundance is evident for 1996.

3.3.1.3.1.3 Southern Southeast Alaska Geographic Aggregate

The SSEAK sub-group includes streams that are located in Districts 101, 102, 107, 108, 109, 110 and 113. Index escapement data for this southern group of streams (Fig. 13) show a much less clear trend in chum abundance than is indicated for both SEAK and NSEAK stream aggregates. Data suggests chum abundance in SSEAK appears to be relatively stable over the time series. If abundance is increasing over time, it appears to be at a lower rate than what is noted for NSEAK streams. Chum abundance peaks in 1996, however there is no pronounced 'spike' in abundance as noted for SEAK and northern SEAK aggregates.

3.4 Correlation Analysis of Abundances among Stocks

Regional patterns in chum abundance among North Coast and Alaskan stocks were examined using Systat™ statistical software. A Pearson correlation matrix summarizing results from analysis of index escapement data for Statistical Areas 1 to 6 (1950 to 2002 time series), northern and southern SEAK (1982 to 2002 time series) and summer and fall run timing (Areas 1 to 6 combined) stream aggregates are provided in Table 8. A matrix of Bonferroni Probabilities which analyzes data pairs to test that the correlation is 0 is also provided in Table 8.

There appears to be relatively strong correlation in abundance trends between Area 2E and the fall run timing aggregate of streams for Areas 1 to 6 combined (0.86). Relatively good correlation was found between Area 6 and the summer run timing stream aggregate (0.77), Area 3 and the summer run timing stream aggregate (0.75), Area 4 and southern SEAK (0.75), Areas 5 and 6 (0.66) Area 6 and the fall run timing stream aggregate (0.65), Area 1 and the fall run timing stream aggregate (0.63) and between southern and northern SEAK (0.63). Moderate correlation was found between Area 5 and the summer run timing stream aggregate (0.60), Area 5 and the fall run timing stream aggregate (0.60), Areas 1 and 5 (0.58), Areas 2E and 6 (0.54), Areas 1 and 2W (0.51) and Areas 2E and 5 (0.50). All other pairs show weak positive or negative correlation.

4. Forecasting Methodology

4.1 Forecasting model

4.1.1 Time-series forecasts

The forecasting of chum escapement for Areas 1 through 6 was performed using 4, 5 and n-year running average (4YRA, 5YRA, nYRA) time series models used by Wood et al. (1996), Holtby (2002) and Holtby et al. (2003). The averaging period used encompasses 4, 5 and n (all years). The variable being forecast (v) is first transformed so that

$$Z = \Im(v) \qquad (3)$$

where $\Im$ is the transformation and Z is the transformed value of v. The Log transformation was used for escapement. The model is as follows where Z_{t+1} is the forecast value for time t+1:

Mnemonic	model	Equation
4YRA (3-Year running average)	$Z_{t+1} = \frac{\sum_{k=t-3,t} Z_k}{4} + \varepsilon_t$	(4)

Mnemonic	model	Equation
5 YRA (5-Year running average)	$Z_{t+1} = \frac{\sum_{k=t-4,t} Z_k}{5} + \varepsilon_t$	(5)
n YRA (n-Year running average)	$Z_{t+1} = \frac{\sum_{k=t-n+1,t} Z_k}{n} + \varepsilon_t$	(6)

For each model we assume that the error term is normally distributed $\left(\varepsilon \sim N(0,\sigma^2)\right)$ and is independent of time. For the purpose of estimating uncertainty in the forecast value (Z_{t+1}), an estimate of σ^2 was obtained for the distribution of observed minus predicted for years $1 \ldots t$.

A retrospective analysis (Table 9) was used to assess the relative performance of the differing forecasting methods for returns (R) averaged across the years (i = 1, n) using the Root Mean Squared Error (RMSE) $\{ \sum (R_{i,forecast} - R_{i,observed})^2 / n \}^{0.5}$. This criterion was judged by Wood et al. (1966) to be the most relevant indicator of performance because it best evaluates the ability of an algorithm to forecast unusually large or small stock sizes.

5. Forecasts of abundance and escapement

5.1 2003 Escapement forecasts

Escapement forecasts for 2003 for Areas 1 through 6 were calculated using the 4, 5 and n-YRA models. Forecasts were made for the total escapement (‘all streams’) and an ‘index stream’ aggregate for each Area. Results from the RMSE retrospective analysis of the performance of each of the forecasting models are recorded in Table 9. Results indicate that the nYRA forecasting model is most appropriate for Areas 2W, 3 and 6 index stream aggregates and the 4YRA model is most appropriate for Areas 1, 2E, 4 and 5 index stream aggregates.Escapement predictions and z-scores are listed in Tables 10, 11 and 12 for ‘all stream’ aggregates and Tables 13, 14 and 15 for ‘index stream’ aggregates. Predicted escapements for ‘all stream’ and ‘index stream’ aggregates by statistical area, in relation to the long-term time series of escapements, are displayed in Figures 14 to 27. Figure 28 provides cumulative probabilities for z-scores applicable to the escapement forecast time series.

5.1.1 Area 1

RMSE retrospective analysis of the 3, 5 and n YRA forecasting models indicate that the 4YRA for the index stream and all-stream aggregates is the most appropriate (Table 9).

The index and all-stream aggregates forecast range for 2003 using 50% CI (Table 16) show that lower (25th percentile) and upper (75th percentile) bounds are between 12 and 49 percent of the observed mean escapement (1950 - 2002) and between 8 and 35 percent of the FM escapement goal.

5.1.2 Area 2 East

RMSE retrospective analysis of the 3, 5 and n YRA forecasting models indicate that the 4YRA for the index stream and all-stream aggregates is the most appropriate (Table 9).

The index stream aggregate forecast range for 2003 using 50% CI (Table 16) show that lower (25th percentile) and upper (75th percentile) bounds are between 33 and 79 percent of the observed mean escapement (1950 - 2002) and between 19 and 45 percent of the FM escapement goal.

The all-stream aggregate forecast range for 2003 using 50% CI (Table 16) show that lower (25th percentile) and upper (75th percentile) bounds are between 42 and 93 percent of the observed mean escapement (1950 - 2002) and between 24 and 53 percent of the FM escapement goal.

5.1.3 Area 2 West

RMSE retrospective analysis of the 3, 5 and n YRA forecasting models indicate that the nYRA for the index stream and all-stream aggregates is the most appropriate (Table 9).

The index and all-stream aggregates forecast range for 2003 using 50% CI (Table 16) show that lower (25th percentile) and upper (75th percentile) bounds are between 46 and 121 percent of the observed mean escapement (1950 - 2002) and between 30 and 80 percent of the FM escapement goal.

5.1.4 Area 3

RMSE retrospective analysis of the 3, 5 and n YRA forecasting models indicate that the nYRA for the index stream and all-stream aggregates is the most appropriate (Table 9).

The index stream aggregate forecast range for 2003 using 50% CI (Table 17) show that lower (25^{th} percentile) and upper (75^{th} percentile) bounds are between 58 and 127 percent of the observed mean escapement (1950 - 2002) and between 30 and 67 percent of the FM escapement goal.

The all-stream aggregate forecast range for 2003 using 50% CI (Table 17) show that lower (25^{th} percentile) and upper (75^{th} percentile) bounds are between 59 and 125 percent of the observed mean escapement (1950 - 2002) and between 32 and 69 percent of the FM escapement goal.

5.1.5 Area 4

RMSE retrospective analysis of the 3, 5 and n YRA forecasting models indicate that the 4YRA for the index stream and all-stream aggregates is the most appropriate (Table 9).

The index stream aggregate forecast range for 2003 using 50% CI (Table 17) show that lower (25^{th} percentile) and upper (75^{th} percentile) bounds are between 17 and 56 percent of the observed mean escapement (1950 - 2002) and between 6 and 21 percent of the FM escapement goal.

The all-stream aggregate forecast range for 2003 using 50% CI (Table 17) show that lower (25^{th} percentile) and upper (75^{th} percentile) bounds are between 17 and 53 percent of the observed mean escapement (1950 - 2002) and between 6 and 20 percent of the FM escapement goal.

5.1.6 Area 5

RMSE retrospective analysis of the 3, 5 and n YRA forecasting models indicate that the 4YRA for the index stream and all-stream aggregates is the most appropriate (Table 9).

The index and all-stream aggregates forecast range for 2003 using 50% CI (Table 17) show that lower (25^{th} percentile) and upper (75^{th} percentile) bounds are between 6 and 28 percent of the observed mean escapement (1950 - 2002) and between 4 and 18 percent of the FM escapement goal.

5.1.7 Area 6

RMSE retrospective analysis of the 3, 5 and n YRA forecasting models indicate that the nYRA for the index stream aggregate and 4YRA for all-stream aggregate are the most appropriate (Table 9).

The index stream aggregate forecast range for 2003 using 50% CI (Table 17) show that lower (25^{th} percentile) and upper (75^{th} percentile) bounds are between 49 and 129 percent of the observed mean escapement (1950 - 2002) and between 23 and 60 percent of the FM escapement goal.

The all-stream aggregate forecast range for 2003 using 50% CI (Table 17) show that lower (25^{th} percentile) and upper (75^{th} percentile) bounds are between 42 and 113 percent of the observed mean escapement (1950 - 2002) and between 18 and 47 percent of the FM escapement goal.

5.2 Total Stock Estimates

5.2.1 Q.C.I. (Areas 1, 2E and 2W) Total Stock Estimates

Stacked area charts of annual commercial net and troll catch and escapement are presented for the Q.C.I. Area aggregate and Areas 1, 2 East and 2 West in Figure 2. Generally, large proportions of net catch are noted from the mid 1960's to the mid 1970's and from the mid 1980's to the late 1990's and are highly variable.

There are several problems associated with using a Statistical Area aggregate of commercial catch and escapement for determining total stock (Charles and Henderson, 1985, Wood et al., 1996, 1999 and Rutherford and Wood, 2000). Area 2 East will have heavy enhancement (Pallant and Mathers creeks) in both escapement and catch. Most commercial net harvests have generally been terminal (inlet specific), however there have been some modest harvests in Area 1 and 2 West interception net fisheries from the 1970's to early 1990's (D. Peacock, pers. comm.). Troll catch in Area 1 is mainly taken near the Alaskan border. Stock composition is unknown but presumed to contain a high proportion of U.S. and mainland Canada stocks. The assumptions used by Charles and Henderson (1985) for their Statistical Area reconstruction of Q.C.I. chum are so uncertain that the approach is of little value. A review of Q.C.I. commercial catch and escapement (Fig. 2) show relatively large amounts of troll caught chum occurred between 1984 and 1997 in Area 1. It would seem reasonable that an Area 1 troll fishery would likely intercept stocks bound for coastal streams located in other Areas. The proportion of local stocks in the Area 1 troll fishery is unknown.

An attempt was not made to reconstruct stocks or present stock recruitment data for Q.C.I. chum because of these uncertainties. These same uncertainties are why escapement indices are not compared to absolute values.

5.2.2 North Coast (Areas 3, 4, 5 and 6) Total Stock Estimates

Charles and Henderson (1985), Wood et al. (1996, 1999) and Rutherford and Wood (2000) conducted previous run reconstruction analyses of North Coast chum stocks. North Coast (Areas 3, 4, 5 and 6) commercial catch and escapement data (Fig. 3) show large net catches over each Area's time series relative to escapement. Two likely reasons for the large catch levels are that a very large proportion of returning stocks to each Area are caught in local fisheries, and secondly, there are likely interceptions of passing stocks. This catch data suggests that there would likely be passing Area 6 stocks harvested in commercial fisheries occurring in Areas 3, 4 and 5 due to fishing area locations and harvest timing. It is also likely that Area 6 chum were harvested in the historic Area 1 interception fisheries. Catch data and supporting run-timing information (Table 7) suggests that commercial chum catch data recorded for Area 6 is likely an underestimate of total commercial harvest of these stocks. Charles and Henderson (1985), Wood et al. (1996, 1999) and Rutherford and Wood (2000) did not identify the occurrence of interception of Area 6 chum salmon in commercial fisheries located in Areas 1 to 5 when calculating a total stock estimate. This does not seem reasonable in light of escapement timing of Area 6 chum stocks (Table 7) and the large historic catches occurring in Areas 3 to 5 relative to annual escapement levels (Fig. 3). Another major issue encountered when attempting to calculate total chum stock estimates is that enhancement production cannot be separated from catch and would bias the results. Previous analyses do not appear to have removed the enhanced component from catch or escapement and would not accurately reflect trends or status of wild stocks. The utility of using CWT and finclip data was examined for use in determining total stock. A detailed review of chum data from these collection programs was conducted with the assistance of staff from the Enhancement Support and Assessment Unit. Coded wire tag and finclip information is limited to releases from Kitimat (Area 6) and Pallant Creek (Area 2E) chum enhancement programs. Estimated recoveries (Kuhn et al., 1988) of CWT's and finclips were examined, however the data was not adequate to provide information for run reconstruction due to inconsistent coverage and sampling rates between Statistical Areas, between weeks and between years. Due to limited resources available, the CWT and finclip sampling program focused on sampling fisheries in locations where 'most' recoveries of these clipped enhanced fish were expected to occur (D. Bailey, pers. comm.). Most sampling of North Coast commercial fisheries occurs in Area 2E for recovery of Pallant CWT's and finclips and Area 6 for recovery of Kitimat CWT's and finclips. Very little CWT and finclip data are recorded for Areas 3 to 5 due to lack of sampling.

A DNA baseline chum salmon sampling program was conducted in the North Coast in 2002. Results from this analysis may have future application for identification of various genetic aggregates within the North Coast.

6. Conclusions

6.1 Escapement trends

Examination of the Q.C.I. (Areas 1, 2E and 2W combined) 'index stream' and 'average escapement' stream aggregates shows a variable but relatively stable level of chum escapement for the past 30 years. A review of index stream trends by Statistical Area shows variable escapement with a moderate decline over the time series of data (1950 to 2002) for Area 2 East.

Declines in chum escapement are indicated for the North Coast (Areas 3+4+5+6) and Areas 5 and 6 'index stream' aggregates. Area 3 escapement since the 1990's appear to be generally lower than returns in the 1950's and 1960's, although with a less pronounced decline that the previous aggregates. Area 4 data does not show a clear trend. The declining trends and current low escapement for Areas 5 and 6 are of particular concern.

Analysis of the 'average escapement' aggregates for North Coast streams generally show a declining trend in escapement over the time series of data for streams with average escapement less than 5,000 fish per year. The larger stocks (streams with average escapement greater than 5,000) do not show this trend.

6.2 Escapement forecasts

2003 escapement forecasts were calculated using 3, 5 and n-YRA models. These models were applied to each of the 'all stream' and 'index stream' aggregates for each Statistical Area. Tables

16 and 17 summarize 50% CI forecast ranges for each Statistical Area by aggregate by forecast model. The 'index stream' aggregate (streams with no history of enhancement and with at least 10 years of data) is a more appropriate approach for escapement forecasting of wild streams, since this eliminates the bias introduced from inclusion of enhanced streams. The annual mean escapement for the time series and the FM escapement goal are provided for comparison with computed forecasts.

A summary of chum salmon escapement forecasts for index stream aggregate by Statistical Area and their characterization relative to a long-term mean and Fisheries and Oceans Canada

Fisheries Management staff escapement goals is presented in the following Table:

Stat. Area	Stock	Escapement Goal	Mean Esc. (1950-2002)	2003 Forecast[1]	50% CI	Characterization of Status
1	index	$6.1x10^4$	$4.3x10^4$	$1.0x10^4$	$5.1x10^3$ - $2.1x10^4$	Below Esc. Goal and Mean Esc., variable without trend
2E	index	$2.2x10^5$	$1.3x10^5$	$6.5x10^4$	$4.2x10^4$ - $1.0x10^5$	Below Esc. Goal and Mean Esc., variable with slight downward trend
2W	index	$1.4x10^5$	$9.0x10^4$	$6.8x10^4$	$4.2x10^4$ - $1.1x10^5$	Below Esc. Goal and Mean Esc., variable without trend
3	index	$7.2x10^4$	$3.8x10^4$	$3.3x10^4$	$2.2x10^4$ - $4.8x10^4$	Depressed, long term decline, anticipated 2003 returns below Esc. Goal and Mean Esc.
4	index	$3.7x10^4$	$1.4x10^4$	$4.2x10^3$	$2.3x10^3$ - $7.7x10^3$	Highly variable, no observable trend, 2003 returns well below Esc. Goal
5	index	$2.2x10^4$	$1.4x10^4$	$1.9x10^3$	$9.5x10^2$ - $4.0x10^3$	Depressed, long term decline, anticipated 2003 returns well below Esc. Goal and Mean Esc.
6	index	$2.9x10^5$	$1.3x10^5$	$1.1x10^5$	$6.5x10^4$ - $1.7x10^5$	Depressed, long term decline, anticipated 2003 returns well below Esc. Goal and Mean Esc.

[1]2003 forecast using 4YRA model for Areas 1, 2E, 4 and 5 and nYRA for Areas 2W, 3 and 6 as indicated by RMSE retrospective analysis (Table 9).

(Tables 10 to 12 provide forecast summaries using 4, 5 and n-YRA models for all stream aggregates and Tables 13 to 15 provide forecast summaries using 4, 5 and n-YRA models for index stream aggregates).

Escapement goals used were calculated by summing goal values within each year for each stream with an escapement estimate. These annual sums were averaged over the time series 1950 to 2002 to produce an escapement goal estimate by stream aggregate for each Statistical Area. This approach was used to more closely represent the status of 2003 escapement forecast estimates in relation to FM spawner goals, rather than using the total value for all streams regardless of whether a stream was surveyed or not.

Recommendations

1. It is recommended that the current conservative management approach of inlet specific Q.C.I. (1, 2E, 2W) net fisheries directed on an identified escapement surplus (FM estimate) for a specific stream should continue.
2. Additional measures are recommended to rebuild chum stocks in North Coast Statistical Areas 3 to 6.

7. References

Charles, A.T. and M. A. Henderson. 1985. Chum salmon (Oncorhynchus keta) stock reconstructions for 1970 – 1982. Part I: Queen Charlotte Islands, North Coast and Central Coast British Columbia. Can. Man. Rep. Fish. Aquat. Sci. 1814: 91 p.

Gottesfeld, A.S., K.A. Rabnett and P.E. Hall. 2002. Conserving Skeena Fish Populations and their Habitat. Skeena Stage I Watershed-based Fish Sustainability Plan. Skeena Fisheries Commission: x + 236p.

Heinl, S.C., T.P. Zadina, A.J. McGregor and H.G. Geiger. 2003. Chum salmon stock status and escapement goals in Southeast Alaska. Alaska Department of Fish and Game. Regional Information Report No. 1J03-08: vii + 40p.

Holtby, L.B. 2002. Forecast for Central Coast sockeye, pink and chum salmon in 2002. Can. Stock Assessment Sec. Res. Doc. 2002/069.

Holtby, L.B., P. Van Will, J. Hepples and J. Sturhahn. 2003. Forecast for Central Coast (Areas 7 to 10) sockeye, pink and chum salmon in 2003. PSARC Working Paper S03-05.

Kuhn, B.R., L. Lapi and J.M. Hamer. 1988. An introduction to the Canadian database on marked Pacific Salmonids. Can. Tech. Rep. Fish. Aquat. Sci. 1649: viii + 56p.

Morrell, M. 2000. Status of salmon spawning stocks of the Skeena River system. Northwest Institute for Bioregional Research. 31p.

Rutherford, D.T. and C.C. Wood. 2000. Trends in abundance and pre-season 2000 stock-size forecasts for major sockeye, pink and chum salmon stocks in the central coast and selected salmon stocks in northern British Columbia. Can. Stock Assessment Sec. Res. Doc 2000/114.

Sawada, J.O., L.B. Holtby and B. Finnegan. 2003. Forecast for northern British Columbia coho salmon in 2003. Can. Stock Assessment Sec. Res. Doc. 2003/04: 17p.

Slaney, T.L., K.D. Hyatt, T.G. Northcote and R.J. Fielden. 1996. Status of anadromous salmon and trout in British Columbia and Yukon. Fisheries.21 (10): 20 - 35.

Wood, C.C., D.T. Rutherford, D. Peacock, and S. Cox-Rogers. 1996. Trends in abundance and pre-season 1997 run size forecasts for major sockeye, pink and chum salmon stocks in northern British Columbia. PSARC Working Paper S96-20.

Wood, C.C., D.T. Rutherford, and L. Jantz. 1999. Trends in abundance and pre-season 1999 stock size forecasts for major sockeye, pink and chum salmon stocks in Northern British Columbia. Can. Stock Assessment Sec. Res. Doc 99/126.

Table 1. Summary of wild streams (no enhancement), enhanced streams (enhancement for at least one year) and number of index streams by Statistical Area.

AREA	# 'WILD' STREAMS	# 'ENHANCED' STREAMS	TOTAL	# INDEX STREAMS
1	7	0	7	7
2 East	96	26	122	79
2 West	71	0	71	60
3	48	2	50	24
4	50	2	52	24
5	48	0	48	33
6	112	4	116	102
TOTAL	432	34	466	329

Table 2. Commercial Gillnet, Seine and Troll Chum Catch Data[1] (pieces) for Northern Canada (Areas 1 to 6), Q.C.I. (Areas 1, 2E and 2W) and North Coast Areas 3, 4, 5 and 6) aggregates.

	Northern Canada (1, 2E, 2W, 3, 4, 5, 6)							Q.C.I. (1, 2E, 2W)							North Coast (3, 4, 5, 6)						
Year	Gillnet	Seine	Net	Troll	Fr. Troll	Tot Troll	Net + Troll	Gillnet	Seine	Net	Troll	Fr. Troll	Tot Troll	Net + Troll	Gillnet	Seine	Net	Troll	Fr. Troll	Tot Troll	Net + Troll
1952	106,046	258,150	364,196	979	0	979	365,175	19,942	89,997	109,939	129	0	129	110,068	86,104	168,153	254,257	850	0	850	255,107
1953	281,555	386,946	668,501	913	0	913	669,414	16,304	125,854	142,158	391	0	391	142,549	265,251	261,092	526,343	522	0	522	526,865
1954	343,133	825,113	1,168,246	1,147	0	1,147	1,169,393	40,702	525,105	565,807	621	0	621	566,428	302,431	300,008	602,439	526	0	526	602,965
1955	149,637	93,146	242,783	1,007	0	1,007	243,790	20,247	63,115	83,362	802	0	802	84,164	129,390	30,031	159,421	205	0	205	159,626
1956	384,209	316,295	700,504	1,551	0	1,551	702,055	20,454	127,376	147,830	831	0	831	148,661	363,755	188,919	552,674	720	0	720	553,394
1957	448,364	221,687	670,051	1,412	0	1,412	671,463	17,791	67,281	85,072	737	0	737	85,809	430,573	154,406	584,979	675	0	675	585,654
1958	269,553	351,946	621,499	1,733	0	1,733	623,232	12,473	20,437	32,910	884	0	884	33,794	257,080	331,509	588,589	849	0	849	589,438
1959	161,611	96,055	257,666	584	0	584	258,250	1,976	14,576	16,552	311	0	311	16,863	159,635	81,479	241,114	273	0	273	241,387
1960	240,072	131,506	371,578	675	0	675	372,253	2,201	4,092	6,293	268	0	268	6,561	237,871	127,414	365,285	407	0	407	365,692
1961	198,121	151,687	349,808	1,300	0	1,300	351,108	30,383	40,001	70,384	396	0	396	70,780	167,738	111,686	279,424	904	0	904	280,328
1962	260,711	175,818	436,529	1,713	0	1,713	438,242	63,395	47,585	110,980	383	0	383	111,363	197,316	128,233	325,549	1,330	0	1,330	326,879
1963	281,621	140,056	421,677	3,840	0	3,840	425,517	79,557	64,562	144,119	1,213	0	1,213	145,332	202,064	75,494	277,558	2,627	0	2,627	280,185
1964	584,897	674,431	1,259,328	6,899	0	6,899	1,266,227	311,467	484,447	795,914	1,297	0	1,297	797,211	273,430	189,984	463,414	5,602	0	5,602	469,016
1965	249,952	190,188	440,140	5,531	0	5,531	445,671	77,159	101,531	178,690	1,558	0	1,558	180,248	172,793	88,657	261,450	3,973	0	3,973	265,423
1966	368,177	336,060	704,237	2,322	0	2,322	706,559	63,723	146,243	209,966	943	0	943	210,909	304,454	189,817	494,271	1,379	0	1,379	495,650
1967	413,865	280,537	694,402	1,465	0	1,465	695,867	278,490	177,112	455,602	969	0	969	456,571	135,375	103,425	238,800	496	0	496	239,296
1968	896,926	532,053	1,428,979	3,180	0	3,180	1,432,159	444,207	216,834	661,041	781	0	781	661,822	452,719	315,219	767,938	2,399	0	2,399	770,337
1969	227,290	79,046	306,336	991	0	991	307,327	85,866	54,505	140,371	694	0	694	141,065	141,424	24,541	165,965	297	0	297	166,262
1970	738,690	418,427	1,157,117	8,757	0	8,757	1,165,874	312,043	276,376	588,419	2,141	0	2,141	590,560	426,647	142,051	568,698	6,616	0	6,616	575,314
1971	407,720	218,853	626,573	3,226	14	3,240	629,813	244,169	176,545	420,714	1,801	6	1,807	422,521	163,551	42,308	205,859	1,425	8	1,433	207,292
1972	920,073	545,399	1,465,472	6,472	109	6,581	1,472,053	265,444	186,945	452,389	2,346	79	2,425	454,814	654,629	358,454	1,013,083	4,126	30	4,156	1,017,239
1973	602,957	463,236	1,066,193	2,992	16	3,008	1,069,201	273,017	276,005	549,022	1,157	7	1,164	550,186	329,940	187,231	517,171	1,835	9	1,844	519,015
1974	491,649	203,878	695,527	3,382	246	3,628	699,155	162,765	72,988	235,753	1,577	246	1,823	237,576	328,884	130,890	459,774	1,805	0	1,805	461,579
1975	82,265	51,778	134,043	1,674	6	1,680	135,723	23,384	32,381	55,765	1,047	4	1,051	56,816	58,881	19,397	78,278	627	2	629	78,907
1976	79,155	40,149	119,304	2,003	6	2,009	121,313	30,307	22,198	52,505	901	6	907	53,412	48,848	17,951	66,799	1,102	0	1,102	67,901
1977	351,548	282,895	634,443	4,318	55	4,373	638,816	120,135	74,428	194,563	1,935	2	1,937	196,500	231,413	208,467	439,880	2,383	53	2,436	442,316
1978	322,371	279,145	601,516	7,522	295	7,817	609,333	91,919	40,256	132,175	4,162	276	4,438	136,613	230,452	238,889	469,341	3,360	19	3,379	472,720
1979	119,224	118,734	237,958	6,005	810	6,815	244,773	1,388	15,526	16,914	4,106	757	4,863	21,777	117,836	103,208	221,044	1,899	53	1,952	222,996
1980	512,533	305,515	818,048	10,558	4,330	14,888	832,936	121,474	68,609	190,083	7,978	4,038	12,016	202,099	391,059	236,906	627,965	2,580	292	2,872	630,837
1981	133,611	117,973	251,584	6,217	1,615	7,832	259,416	41,029	18,525	59,554	5,019	1,521	6,540	66,094	92,582	99,448	192,030	1,198	94	1,292	193,322
1982	145,285	242,463	387,748	4,991	1,316	6,307	394,055	19,495	71,963	91,458	3,171	1,023	4,194	95,652	125,790	170,500	296,290	1,820	293	2,113	298,403
1983	127,691	191,471	319,162	8,707	2,199	10,906	330,068	394	8,673	9,067	4,884	1,842	6,726	15,793	127,297	182,798	310,095	3,823	357	4,180	314,275
1984	330,595	557,321	887,916	39,290	23,299	62,589	950,505	67,255	317,246	384,501	32,254	21,357	53,611	438,112	263,340	240,075	503,415	7,036	1,942	8,978	512,393
1985	447,913	737,503	1,185,416	88,868	59,399	148,267	1,333,683	298,266	460,785	759,051	83,078	55,062	138,140	897,191	149,647	276,718	426,365	5,790	4,337	10,127	436,492
1986	289,021	563,535	852,556	35,133	21,779	56,912	909,468	145,507	198,207	343,714	22,785	18,017	40,802	384,516	143,514	365,328	508,842	12,348	3,762	16,110	524,952
1987	138,123	349,640	487,763	25,274	37,115	62,389	550,152	67,797	130,287	198,084	22,182	36,156	58,338	256,422	70,326	219,353	289,679	3,092	959	4,051	293,730
1988	562,288	980,872	1,543,160	64,847	90,141	154,988	1,698,148	143,905	260,541	404,446	46,373	79,439	125,812	530,258	418,383	720,331	1,138,714	18,474	10,702	29,176	1,167,890
1989	181,907	234,101	416,008	26,599	45,714	72,313	488,321	70,468	70,497	140,965	21,036	44,037	65,073	206,038	111,439	163,604	275,043	5,563	1,677	7,240	282,283
1990	137,013	471,765	608,778	14,419	19,191	33,610	642,388	67,220	284,171	351,391	12,276	17,755	30,031	381,422	69,793	187,594	257,387	2,143	1,436	3,579	260,966
1991	226,538	375,529	602,067	19,418	27,268	46,686	648,753	127,974	183,143	311,117	14,729	25,630	40,359	351,476	98,564	192,386	290,950	4,689	1,638	6,327	297,277
1992	210,265	221,415	431,680	24,479	40,454	64,933	496,613	68,517	80,561	149,078	15,481	35,786	51,267	200,345	141,748	140,854	282,602	8,998	4,668	13,666	296,268
1993	354,417	454,215	808,632	71,644	189,451	261,095	1,069,727	36,515	112,633	149,148	44,865	174,943	219,808	368,956	317,902	341,582	659,484	26,779	14,508	41,287	700,771
1994	418,279	283,868	702,147	23,802	33,531	57,333	759,480	40,465	112,778	153,243	13,265	29,747	43,012	196,255	377,814	171,090	548,904	10,537	3,784	14,321	563,225
1995	365,179	333,212	698,391	45,134	133,139	178,273	876,664	27,387	20,291	47,678	30,827	123,729	154,556	202,234	337,792	312,921	650,713	14,307	9,410	23,717	674,430
1996	246,854	299,948	546,802	16,727	24,951	41,678	588,480	36,229	86,496	122,725	6,654	17,934	24,588	147,313	210,625	213,452	424,077	10,073	7,017	17,090	441,167
1997	136,767	160,798	297,565	7,309	33,238	40,547	338,112	39,365	59,023	98,388	6,803	32,290	39,093	137,481	97,402	101,775	199,177	506	948	1,454	200,631
1998	374,243	438,770	813,013	3,197	7,161	10,358	823,371	31,418	75,037	106,455	2,850	7,064	9,914	116,369	342,825	363,733	706,558	347	97	444	707,002
1999	99,218	300,312	399,530	325	1,016	1,341	400,871	39,773	180,276	220,049	325	1,016	1,341	221,390	59,445	120,036	179,481	0	0	0	179,481
2000[2]	108,648	105,844	214,492	3,139	1,093	4,232	218,724	55,566	42,250	97,816	3,139	1,093	4,232	102,048	53,082	63,594	116,676	0	0	0	116,676
2001[2]	80,553	98,594	179,147	2,953	0	2,953	182,100	14,676	34,350	49,026	2,804	0	2,804	51,830	65,877	64,244	130,121	149	0	149	130,270
2002[2]	188,605	230,257	418,862	1,003	0	1,003	419,865	17,866	113,100	130,966	961	0	961	131,927	170,739	117,157	287,896	42	0	42	287,938

[1]Data source: Regional Commercial Salmon Saleslip Database.

[2]Data is considered preliminary.

Table 3. Q.C.I. Commercial Gillnet, Seine and Troll Chum Catch Data[1] (pieces) for Statistical Areas 1, 2 East and 2 West.

	Statistical Area / Geartype																				
	1							2E							2W						
Year	Gillnet	Seine	Net	Troll	Fr. Troll	Tot Troll	Net + Troll	Gillnet	Seine	Net	Troll	Fr. Troll	Tot Troll	Net + Troll	Gillnet	Seine	Net	Troll	Fr. Troll	Tot Troll	Net + Troll
1952	129	2,232	2,361	129	0	129	2,490	14,656	54,856	69,512	0	0	0	69,512	5,157	32,909	38,066	0	0	0	38,066
1953	809	12,742	13,551	373	0	373	13,924	9,543	17,988	27,531	9	0	9	27,540	5,952	95,124	101,076	9	0	9	101,085
1954	2,265	31,107	33,372	569	0	569	33,941	36,930	291,223	328,153	52	0	52	328,205	1,507	202,775	204,282	0	0	0	204,282
1955	16	6,686	6,702	802	0	802	7,504	19,340	36,052	55,392	0	0	0	55,392	891	20,377	21,268	0	0	0	21,268
1956	4,527	12,899	17,426	790	0	790	18,216	15,783	31,546	47,329	40	0	40	47,369	144	82,931	83,075	1	0	1	83,076
1957	5,481	51,060	56,541	684	0	684	57,225	12,310	9,055	21,365	47	0	47	21,412	0	7,166	7,166	6	0	6	7,172
1958	5,423	3,459	8,882	848	0	848	9,730	2,727	13,027	15,754	32	0	32	15,786	4,323	3,951	8,274	4	0	4	8,278
1959	168	1,777	1,945	296	0	296	2,241	6	0	6	15	0	15	21	1,802	12,799	14,601	0	0	0	14,601
1960	1,757	105	1,862	260	0	260	2,122	444	2,744	3,188	8	0	8	3,196	0	1,243	1,243	0	0	0	1,243
1961	603	217	820	292	0	292	1,112	29,545	36,667	66,212	100	0	100	66,312	235	3,117	3,352	4	0	4	3,356
1962	2,754	230	2,984	317	0	317	3,301	59,277	47,355	106,632	58	0	58	106,690	1,364	0	1,364	8	0	8	1,372
1963	4,078	108	4,186	956	0	956	5,142	75,478	64,454	139,932	134	0	134	140,066	1	0	1	123	0	123	124
1964	6,050	7,565	13,615	955	0	955	14,570	277,226	292,350	569,576	294	0	294	569,870	28,191	184,532	212,723	48	0	48	212,771
1965	7,750	2,267	10,017	1,208	0	1,208	11,225	49,458	26,471	75,929	241	0	241	76,170	19,951	72,793	92,744	109	0	109	92,853
1966	11,848	9,324	21,172	515	0	515	21,687	46,870	85,484	132,354	359	0	359	132,713	5,005	51,435	56,440	69	0	69	56,509
1967	20,108	4,158	24,266	841	0	841	25,107	246,249	146,435	392,684	97	0	97	392,781	12,133	26,519	38,652	31	0	31	38,683
1968	23,589	941	24,530	656	0	656	25,186	407,073	163,915	570,988	109	0	109	571,097	13,545	51,978	65,523	16	0	16	65,539
1969	33,848	2,277	36,125	353	0	353	36,478	43,393	7,243	50,636	327	0	327	50,963	8,625	44,985	53,610	14	0	14	53,624
1970	28,768	4,062	32,830	714	0	714	33,544	259,085	104,565	363,650	1,356	0	1,356	365,006	24,190	167,749	191,939	71	0	71	192,010
1971	30,281	6,140	36,421	629	0	629	37,050	210,764	91,375	302,139	1,103	3	1,106	303,245	3,124	79,030	82,154	69	3	72	82,226
1972	41,324	8,000	49,324	1,754	8	1,762	51,086	205,353	76,135	281,488	325	58	383	281,871	18,767	102,810	121,577	267	13	280	121,857
1973	22,110	31,340	53,450	891	0	891	54,341	240,380	190,240	430,620	189	4	193	430,813	10,527	54,425	64,952	77	3	80	65,032
1974	13,598	6,022	19,620	881	3	884	20,504	128,484	21,438	149,922	279	242	521	150,443	20,683	45,528	66,211	417	1	418	66,629
1975	8,057	3,280	11,337	758	1	759	12,096	1,729	214	1,943	280	3	283	2,226	13,598	28,887	42,485	9	0	9	42,494
1976	1,103	1,092	2,195	567	0	567	2,762	28,862	18,597	47,459	310	6	316	47,775	342	2,509	2,851	24	0	24	2,875
1977	1,756	3,569	5,325	852	0	852	6,177	110,209	60,314	170,523	867	2	869	171,392	8,170	10,545	18,715	216	0	216	18,931
1978	1,943	3,980	5,923	2,828	76	2,904	8,827	89,522	25,794	115,316	657	196	853	116,169	454	10,482	10,936	677	4	681	11,617
1979	852	5,330	6,182	2,522	192	2,714	8,896	0	0	0	651	408	1,059	1,059	536	10,196	10,732	933	157	1,090	11,822
1980	2,698	8,060	10,758	6,176	3,251	9,427	20,185	98,544	23,846	122,390	501	326	827	123,217	20,232	36,703	56,935	1,301	461	1,762	58,697
1981	6,386	10,296	16,682	3,583	838	4,421	21,103	34,215	2,559	36,774	423	302	725	37,499	428	5,670	6,098	1,013	381	1,394	7,492
1982	242	12,171	12,413	2,126	220	2,346	14,759	18,021	10,698	28,719	403	307	710	29,429	1,232	49,094	50,326	642	496	1,138	51,464
1983	360	2,277	2,637	4,065	1,290	5,355	7,992	0	0	0	480	407	887	887	34	6,396	6,430	339	145	484	6,914
1984	275	6,004	6,279	30,639	19,925	50,564	56,843	65,121	215,549	280,670	503	436	939	281,609	1,859	95,693	97,552	1,112	996	2,108	99,660
1985	15,270	39,971	55,241	59,108	47,663	106,771	162,012	281,089	365,211	646,300	2,402	3,025	5,427	651,727	1,907	55,603	57,510	21,568	4,374	25,942	83,452
1986	52,176	53,781	105,957	17,001	11,170	28,171	134,128	93,277	123,878	217,155	3,411	3,287	6,698	223,853	54	20,548	20,602	2,373	3,560	5,933	26,535
1987	1,570	5,283	6,853	10,792	15,146	25,938	32,791	66,227	124,968	191,195	1,277	1,569	2,846	194,041	0	36	36	10,113	19,441	29,554	29,590
1988	1,889	6,212	8,101	43,215	74,756	117,971	126,072	141,800	250,995	392,795	561	1,479	2,040	394,835	216	3,334	3,550	2,597	3,204	5,801	9,351
1989	789	4,609	5,398	12,022	20,242	32,264	37,662	68,707	65,226	133,933	980	1,689	2,669	136,602	972	662	1,634	8,034	22,106	30,140	31,774
1990	684	8,008	8,692	8,511	10,698	19,209	27,901	66,376	231,221	297,597	429	526	955	298,552	160	44,942	45,102	3,336	6,531	9,867	54,969
1991	530	2,426	2,956	11,049	17,384	28,433	31,389	121,509	143,541	265,050	1,055	4,739	5,794	270,844	5,935	37,176	43,111	2,625	3,507	6,132	49,243
1992	1,137	7,970	9,107	10,963	32,870	43,833	52,940	65,014	67,619	132,633	1,552	2,401	3,953	136,586	2,366	4,972	7,338	2,966	515	3,481	10,819
1993	1,265	22,629	23,894	35,708	132,156	167,864	191,758	35,214	79,121	114,335	1,229	1,752	2,981	117,316	36	10,883	10,919	7,928	41,035	48,963	59,882
1994	3,075	10,885	13,960	8,100	21,428	29,528	43,488	37,390	96,495	133,885	926	357	1,283	135,168	0	5,398	5,398	4,239	7,962	12,201	17,599
1995	6,753	17,165	23,918	28,962	103,636	132,598	156,516	20,634	3,126	23,760	617	4,328	4,945	28,705	0	0	0	1,248	15,765	17,013	17,013
1996	866	89	955	5,543	17,467	23,010	23,965	35,363	86,407	121,770	140	375	515	122,285	0	0	0	971	92	1,063	1,063
1997	20,335	26,759	47,094	6,205	29,102	35,307	82,401	19,030	31,028	50,058	85	263	348	50,406	0	1,236	1,236	513	2,925	3,438	4,674
1998	1,412	1	1,413	29	45	74	1,487	30,006	60,892	90,898	63	0	63	90,961	0	14,144	14,144	2,758	7,019	9,777	23,921
1999	1,199	0	1,199	1	555	556	1,755	38,220	89,859	128,079	0	0	0	128,079	354	90,417	90,771	324	461	785	91,556
2000[2]	244	21	265	299	1,050	1,349	1,614	55,322	8,147	63,469	2,829	0	2,829	66,298	0	34,082	34,082	11	43	54	34,136
2001[2]	0	0	0	2,385	0	2,385	2,385	14,676	34,350	49,026	386	0	386	49,412	0	0	0	33	0	33	33
2002[2]	60	0	60	537	0	537	597	17,806	113,100	130,906	122	0	122	131,028	0	0	0	302	0	302	302

[1]Data source: Regional Commercial Salmon Saleslip Database.

[2]Data is considered preliminary.

Table 4. North Coast Commercial Gillnet, Seine and Troll Chum Catch Data[1] (pieces) for Statistical Areas 3 and 4.

	Statistical Area / Geartype													
	3							4						
Year	Gillnet	Seine	Net	Troll	Fr. Troll	Tot Troll	Net + Troll	Gillnet	Seine	Net	Troll	Fr. Troll	Tot Troll	Net + Troll
1952	20,948	78,052	99,000	352	0	352	99,352	36,988	109	37,097	438	0	438	37,535
1953	84,103	89,346	173,449	328	0	328	173,777	55,650	182	55,832	154	0	154	55,986
1954	39,107	49,202	88,309	235	0	235	88,544	115,142	5,675	120,817	260	0	260	121,077
1955	58,903	8,926	67,829	163	0	163	67,992	28,835	712	29,547	34	0	34	29,581
1956	249,954	110,732	360,686	654	0	654	361,340	51,112	266	51,378	33	0	33	51,411
1957	139,937	85,836	225,773	542	0	542	226,315	35,389	233	35,622	57	0	57	35,679
1958	89,396	88,190	177,586	700	0	700	178,286	43,317	38	43,355	131	0	131	43,486
1959	101,799	68,465	170,264	225	0	225	170,489	31,824	56	31,880	33	0	33	31,913
1960	122,994	59,018	182,012	317	0	317	182,329	20,896	420	21,316	25	0	25	21,341
1961	62,179	40,290	102,469	540	0	540	103,009	26,255	240	26,495	126	0	126	26,621
1962	25,758	5,104	30,862	512	0	512	31,374	21,466	26	21,492	91	0	91	21,583
1963	23,247	4,952	28,199	854	0	854	29,053	25,831	695	26,526	202	0	202	26,728
1964	43,752	48,867	92,619	628	0	628	93,247	37,490	533	38,023	389	0	389	38,412
1965	29,740	10,965	40,705	372	0	372	41,077	7,689	28	7,717	276	0	276	7,993
1966	57,052	15,695	72,747	337	0	337	73,084	37,265	0	37,265	161	0	161	37,426
1967	45,818	69,267	115,085	233	0	233	115,318	26,500	31	26,531	82	0	82	26,613
1968	139,977	96,293	236,270	641	0	641	236,911	44,031	854	44,885	346	0	346	45,231
1969	58,643	8,221	66,864	204	0	204	67,068	16,505	68	16,573	50	0	50	16,623
1970	158,661	25,512	184,173	977	0	977	185,150	33,211	113	33,324	198	0	198	33,522
1971	53,235	15,234	68,469	852	0	852	69,321	37,918	838	38,756	266	0	266	39,022
1972	301,667	50,526	352,193	1,136	0	1,136	353,329	115,698	3,631	119,329	593	1	594	119,923
1973	168,752	71,488	240,240	585	0	585	240,825	82,355	6,627	88,982	404	0	404	89,386
1974	161,177	54,183	215,360	1,421	0	1,421	216,781	51,012	9,895	60,907	184	0	184	61,091
1975	21,515	5,435	26,950	292	0	292	27,242	17,249	5,355	22,604	157	0	157	22,761
1976	18,638	7,579	26,217	299	0	299	26,516	11,691	2,187	13,878	104	0	104	13,982
1977	139,445	146,251	285,696	1,919	0	1,919	287,615	55,721	10,770	66,491	259	39	298	66,789
1978	68,991	80,614	149,605	2,065	0	2,065	151,670	54,121	7,341	61,462	338	0	338	61,800
1979	41,030	21,668	62,698	945	0	945	63,643	51,830	2,673	54,503	469	0	469	54,972
1980	212,090	100,862	312,952	1,467	203	1,670	314,622	70,618	3,177	73,795	308	0	308	74,103
1981	22,934	20,974	43,908	605	0	605	44,513	35,226	7,736	42,962	211	59	270	43,232
1982	19,729	51,231	70,960	937	39	976	71,936	35,779	26,793	62,572	428	162	590	63,162
1983	69,493	113,944	183,437	2,367	217	2,584	186,021	24,391	0	24,391	710	48	758	25,149
1984	140,987	176,351	317,338	4,560	402	4,962	322,300	98,250	29,023	127,273	1,489	1,347	2,836	130,109
1985	19,319	111,759	131,078	2,859	786	3,645	134,723	85,203	27,603	112,806	1,918	476	2,394	115,200
1986	56,844	128,759	185,603	5,934	337	6,271	191,874	51,137	6,858	57,995	2,217	792	3,009	61,004
1987	23,143	101,300	124,443	2,543	190	2,733	127,176	24,228	5,597	29,825	427	578	1,005	30,830
1988	44,230	116,297	160,527	12,752	5,040	17,792	178,319	210,106	17,742	227,848	2,718	273	2,991	230,839
1989	34,136	140,986	175,122	4,378	1,410	5,788	180,910	59,402	4,847	64,249	737	9	746	64,995
1990	12,101	36,416	48,517	1,487	665	2,152	50,669	33,673	2,140	35,813	241	156	397	36,210
1991	28,251	133,235	161,486	3,345	541	3,886	165,372	50,874	1,747	52,621	594	803	1,397	54,018
1992	58,013	80,879	138,892	6,124	1,746	7,870	146,762	75,208	14,175	89,383	1,650	2,068	3,718	93,101
1993	144,877	294,159	439,036	24,569	10,943	35,512	474,548	162,261	31,123	193,384	1,766	2,464	4,230	197,614
1994	170,893	111,733	282,626	9,605	3,365	12,970	295,596	163,277	460	163,737	314	58	372	164,109
1995	144,884	256,325	401,209	11,048	7,539	18,587	419,796	166,578	24,872	191,450	496	304	800	192,250
1996	96,645	134,816	231,461	8,777	5,467	14,244	245,705	104,919	37,647	142,566	561	896	1,457	144,023
1997	30,907	88,551	119,458	75	100	175	119,633	56,756	4,372	61,128	335	736	1,071	62,199
1998	79,641	169,131	248,772	0	0	0	248,772	19,071	0	19,071	0	0	0	19,071
1999	29,262	115,321	144,583	0	0	0	144,583	417	0	417	0	0	0	417
2000[2]	25,277	47,019	72,296	0	0	0	72,296	20,110	8,744	28,854	0	0	0	28,854
2001[2]	9,006	20,630	29,636	2	0	2	29,638	12,137	6,603	18,740	133	0	133	18,873
2002[2]	25,109	18,810	43,919	3	0	3	43,922	9,994	2,934	12,928	0	0	0	12,928

[1]Data source: Regional Commercial Salmon Saleslip Database.
[2]Data is considered preliminary.

Table 5. North Coast Commercial Gillnet, Seine and Troll Chum Catch Data[1] (pieces) for Statistical Areas 5 and 6.

	Statistical Area / Geartype													
	5							6						
Year	Gillnet	Seine	Net	Troll	Fr. Troll	Tot Troll	Net + Troll	Gillnet	Seine	Net	Troll	Fr. Troll	Tot Troll	Net + Troll
1952	9,169	16,180	25,349	37	0	37	25,386	18,999	73,812	92,811	23	0	23	92,834
1953	64,539	14,827	79,366	7	0	7	79,373	60,959	156,737	217,696	33	0	33	217,729
1954	50,126	34,268	84,394	10	0	10	84,404	98,056	210,863	308,919	21	0	21	308,940
1955	10,970	7,355	18,325	0	0	0	18,325	30,682	13,038	43,720	8	0	8	43,728
1956	15,540	10,996	26,536	20	0	20	26,556	47,149	66,925	114,074	13	0	13	114,087
1957	58,588	13,792	72,380	26	0	26	72,406	196,659	54,545	251,204	50	0	50	251,254
1958	23,261	31,068	54,329	7	0	7	54,336	101,106	212,213	313,319	11	0	11	313,330
1959	10,742	4,113	14,855	9	0	9	14,864	15,270	8,845	24,115	6	0	6	24,121
1960	29,331	8,054	37,385	34	0	34	37,419	64,650	59,922	124,572	31	0	31	124,603
1961	20,003	13,178	33,181	57	0	57	33,238	59,301	57,978	117,279	181	0	181	117,460
1962	60,880	27,800	88,680	217	0	217	88,897	89,212	95,303	184,515	510	0	510	185,025
1963	51,145	10,821	61,966	841	0	841	62,807	101,841	59,026	160,867	730	0	730	161,597
1964	70,991	42,052	113,043	554	0	554	113,597	121,197	98,532	219,729	4,031	0	4,031	223,760
1965	44,158	9,124	53,282	971	0	971	54,253	91,206	68,540	159,746	2,354	0	2,354	162,100
1966	78,700	60,631	139,331	265	0	265	139,596	131,437	113,491	244,928	616	0	616	245,544
1967	17,772	7,058	24,830	107	0	107	24,937	45,285	27,069	72,354	74	0	74	72,428
1968	75,375	58,093	133,468	357	0	357	133,825	193,336	159,979	353,315	1,055	0	1,055	354,370
1969	21,475	1,202	22,677	16	0	16	22,693	44,801	15,050	59,851	27	0	27	59,878
1970	62,198	17,085	79,283	838	0	838	80,121	172,577	99,341	271,918	4,603	0	4,603	276,521
1971	26,687	5,388	32,075	133	0	133	32,208	45,711	20,848	66,559	174	8	182	66,741
1972	56,249	13,453	69,702	584	16	600	70,302	181,015	290,844	471,859	1,813	13	1,826	473,685
1973	18,816	6,514	25,330	383	0	383	25,713	60,017	102,602	162,619	463	9	472	163,091
1974	13,436	3,551	16,987	61	0	61	17,048	103,259	63,261	166,520	139	0	139	166,659
1975	8,375	3,598	11,973	57	0	57	12,030	11,742	5,009	16,751	121	2	123	16,874
1976	12,484	934	13,418	43	0	43	13,461	6,035	7,251	13,286	656	0	656	13,942
1977	26,273	6,093	32,366	107	0	107	32,473	9,974	45,353	55,327	98	14	112	55,439
1978	33,754	6,177	39,931	206	0	206	40,137	73,586	144,757	218,343	751	19	770	219,113
1979	13,003	2,215	15,218	116	11	127	15,345	11,973	76,652	88,625	369	42	411	89,036
1980	33,749	6,782	40,531	89	6	95	40,626	74,602	126,085	200,687	716	83	799	201,486
1981	7,909	1,107	9,016	40	0	40	9,056	26,513	69,631	96,144	342	35	377	96,521
1982	12,797	7,686	20,483	77	2	79	20,562	57,485	84,790	142,275	378	90	468	142,743
1983	18,257	1,752	20,009	165	54	219	20,228	15,156	67,102	82,258	581	38	619	82,877
1984	14,097	13,980	28,077	143	7	150	28,227	10,006	20,721	30,727	844	186	1,030	31,757
1985	4,962	11,229	16,191	371	2,385	2,756	18,947	40,163	126,127	166,290	642	690	1,332	167,622
1986	16,057	23,597	39,654	397	271	668	40,322	19,476	206,114	225,590	3,800	2,362	6,162	231,752
1987	4,265	14,772	19,037	43	16	59	19,096	18,690	97,684	116,374	79	175	254	116,628
1988	15,150	24,139	39,289	619	968	1,587	40,876	148,897	562,153	711,050	2,385	4,421	6,806	717,856
1989	12,750	8,045	20,795	219	217	436	21,231	5,151	9,726	14,877	229	41	270	15,147
1990	6,228	13,528	19,756	48	64	112	19,868	17,791	135,510	153,301	367	551	918	154,219
1991	11,902	14,194	26,096	156	94	250	26,346	7,537	43,210	50,747	594	200	794	51,541
1992	6,912	5,188	12,100	424	423	847	12,947	1,615	40,612	42,227	800	431	1,231	43,458
1993	8,075	7,390	15,465	363	1,043	1,406	16,871	2,689	8,910	11,599	81	58	139	11,738
1994	21,336	6,063	27,399	273	354	627	28,026	22,308	52,834	75,142	345	7	352	75,494
1995	21,701	8,539	30,240	881	1,374	2,255	32,495	4,629	23,185	27,814	1,882	193	2,075	29,889
1996	8,434	12,165	20,599	256	290	546	21,145	627	28,824	29,451	479	364	843	30,294
1997	5,318	1,381	6,699	66	19	85	6,784	4,421	7,471	11,892	30	93	123	12,015
1998	1,599	31	1,630	0	0	0	1,630	242,514	194,571	437,085	347	97	444	437,529
1999	0	0	0	0	0	0	0	29,766	4,715	34,481	0	0	0	34,481
2000[2]	0	0	0	0	0	0	0	7,695	7,831	15,526	0	0	0	15,526
2001[2]	0	0	0	0	0	0	0	44,732	37,011	81,743	14	0	14	81,757
2002[2]	0	0	0	0	0	0	0	135,636	95,413	231,049	39	0	39	231,088

[1]Data source: Regional Commercial Salmon Saleslip Database.

[2]Data is considered preliminary.

Table 6. Northern British Columbia Chum fry releases.

Brood Year	Rel. Year	Start Date	End Date	Hatchery	Rel. Area	Release Site	Mark Code With CWT	Mark Code No CWT	Lgth. (mm)	Wt. (gm)	Stage Code	No. with CWT Adclip	No. No CWT Adclip	No. No CWT No Adclip	Total Rel.
1978	1979	/ /	1979/05/24	Pallant Cr	QCI	Pallant Cr		5002		1	FF		76515	16781	93296
1978	1979	/ /	1979/05/25	Pallant Cr	QCI	Causeway Bay		0001		1.6	FFS			896734	896734
1978	1979	1979/04/05	1979/05/30	Pallant Cr	QCI	Pallant Cr		0002		0.5	UF			30723	30723
1979	1980	/ /	1980/03/31	Sewell In Str	QCI	Waterfall Cr				0.43	UF			25000	25000
1979	1980	1980/05/08	1980/05/25	Pallant Cr	QCI	Deer Bay		0001		1.2	FFS			298354	298354
1980	1981	1981/03/01	1981/03/23	Sewell In Str	QCI	Big Goose Cr				0.43	UF			800	800
1980	1981	/ /	1981/03/31	Sewell In Str	QCI	Waterfall Cr				0.43	UF			25000	25000
1980	1981	1981/03/15	1981/04/15	Lyell Is	QCI	Powrivco Cr				0.43	UF			30000	30000
1980	1981	1981/03/15	1981/04/22	Sewell In Str	QCI	Clint Cr/ QCI				0.43	UF			74800	74800
1980	1981	/ /	1981/04/29	Mathers Cr	QCI	Mathers Cr		5001		1.2	FF		46039	50567	96606
1980	1981	1981/03/21	1981/04/29	Mathers Cr	QCI	Mathers Cr				0.5	FF			200252	200252
1980	1981	/ /	1981/04/29	Mathers Cr	QCI	Mathers Cr		5002		1.2	FF		47536	47511	95047
1980	1981	/ /	1981/05/09	Pallant Cr	QCI	Deer Bay		0002		1.7	FFS			387888	387888
1980	1981	/ /	1981/05/09	Pallant Cr	QCI	Deer Bay		0001		1.7	FFS			394010	394010
1980	1981	1981/05/01	1981/05/11	Pallant Cr	QCI	Deer Bay				1.7	FFS			2229614	2229614
1981	1982	/ /	1982/03/31	Gore Brk	QCI	Gore Brk				0.43	UF			9500	9500
1981	1982	/ /	1982/03/31	Lyell Is	QCI	Gate Cr				0.43	UF			25600	25600
1981	1982	/ /	1982/03/31	Sewell In Str	QCI	Clint Cr/ QCI				0.43	UF			25000	25000
1981	1982	/ /	1982/05/05	Pallant Cr	QCI	Deer Bay	5000			2.9	FFS	30286		362669	393262
1981	1982	/ /	1982/05/13	Pallant Cr	QCI	Deer Bay	5000			2.9	FFS	6112		0	6437
1981	1982	/ /	1982/05/13	Pallant Cr	QCI	Deer Bay	5000			2.9	FFS	24521		371832	397649
1981	1982	1982/04/14	1982/05/13	Pallant Cr	QCI	Deer Bay				1.06	FFS			6410041	6410041
1981	1982	1982/05/14	1982/05/16	Mathers Cr	QCI	Mathers Cr		0002		2.4	FF			78955	78955
1981	1982	1982/05/24	1982/05/26	Mathers Cr	QCI	Mathers Cr		0001		0.7	FF			439597	439597
1982	1983	/ /	1983/03/31	Charlie Hartie	QCI	Charlie Hartie				0.43	UF			3700	3700
1982	1983	/ /	1983/03/31	Sewell In Str	QCI	Big Goose Cr				0.43	UF			75000	75000
1982	1983	/ /	1983/04/15	Lyell Is	QCI	Powrivco Cr				0.43	UF			20000	20000
1982	1983	/ /	1983/04/18	Mathers Cr	QCI	Mathers Cr				1.1	FF			267500	267500
1982	1983	1983/04/06	1983/04/27	Pallant Cr	QCI	Deer Bay		0001		1.2	FFS			1657479	1657479
1982	1983	/ /	1983/05/03	Pallant Cr	QCI	Deer Bay				0.55	FFS			319000	319000
1982	1983	/ /	1983/05/04	Pallant Cr	QCI	Deer Bay		5002		1.1	FFS		55427	871653	927636
1982	1983	/ /	1983/05/15	Pallant Cr	QCI	Deer Bay		5001		1.7	FFS		52070	890866	943422
1983	1984	/ /	1984/04/15	Sewell In Str	QCI	Big Goose Cr				0	FF			40000	40000
1983	1984	/ /	1984/04/15	Sewell In Str	QCI	L Goose Cr				0	FF			41500	41500
1983	1984	/ /	1984/04/15	Sewell In Str	QCI	Sewell Hd Cr				0	FF			15000	15000
1983	1984	/ /	1984/04/30	Jarvis Cr	QCI	Jarvis Cr				0.8	FF			3200	3200
1983	1984	/ /	1984/05/05	Pallant Cr	QCI	Deer Bay		0002		1.1	FFS			396310	396310
1983	1984	/ /	1984/05/24	Pallant Cr	QCI	Deer Bay	5000			2.66	FFS	31648		371478	408171
1983	1984	/ /	1984/05/24	Pallant Cr	QCI	Deer Bay	5000			2.02	FFS	36187		351998	392206
1983	1984	/ /	1984/05/24	Pallant Cr	QCI	Deer Bay	5000			1.75	FFS	25722		361462	393615
1983	1984	1984/04/04	1984/05/24	Pallant Cr	QCI	Deer Bay				1.1	FFS			4448705	4448705
1983	1984	/ /	1984/05/24	Pallant Cr	QCI	Deer Bay	5000			1.93	FFS	33267		354159	393762
1983	1984	/ /	1984/05/24	Pallant Cr	QCI	Deer Bay	5000			1.8	FFS	18176		363955	382693
1983	1984	/ /	1984/05/24	Pallant Cr	QCI	Deer Bay	5000			1.11	FFS	35612		357535	395828
1983	1984	1984/05/17	1984/05/24	Pallant Cr	QCI	Mathers Cr		0001		1.1	FF			608948	608948
1984	1985	1985/04/13	1985/04/25	Pallant Cr	QCI	Deer Bay				1	FFS			2055365	2055365
1984	1985	/ /	1985/04/27	Pallant Cr	QCI	Pallant Cr		5001		0.5	UF		42947	449963	495165
1984	1985	/ /	1985/04/30	Sachs Cr	QCI	Haans Cr				0.43	UF			990	990
1984	1985	/ /	1985/05/	Skidegate	QCI	Tarundl Cr				0.43	UF			500	500
1984	1985	/ /	1985/05/07	Pallant Cr	QCI	Pallant Cr		0001		0.5	UF			504056	504056
1984	1985	/ /	1985/05/08	Pallant Cr	QCI	Deer Bay		0002		0.8	FFS			1518077	1518077
1984	1985	1985/04/20	1985/05/10	Sewell In Str	QCI	Big Goose Cr				0.5	FF			20000	20000
1984	1985	1985/04/20	1985/05/10	Sewell In Str	QCI	L Goose Cr				0.5	FF			20000	20000
1984	1985	1985/04/20	1985/05/10	Sewell In Str	QCI	Sewell Hd Cr				0.5	FF			20000	20000
1984	1985	1985/04/16	1985/05/19	Pallant Cr	QCI	Deer Bay				0.44	UF			525755	525755
1984	1985	/ /	1985/05/21	Pallant Cr	QCI	Deer Bay				1.5	FFS			1738583	1738583
1984	1985	/ /	1985/05/21	Pallant Cr	QCI	Deer Bay	5000			2.9	FFS	34978		435444	472734
1984	1985	/ /	1985/05/21	Pallant Cr	QCI	Deer Bay	5000			1.6	FFS	38175		452449	494913
1984	1985	/ /	1985/05/21	Pallant Cr	QCI	Deer Bay	5000			1.4	FFS	38372		455926	498351
1984	1985	/ /	1985/05/21	Pallant Cr	QCI	Deer Bay		5002		0.8	FFS		40889	432179	474313
1984	1985	1985/05/08	1985/05/27	Q Char Is Sch	QCI	Charlie Hartie				0.43	UF			3500	3500
1984	1985	/ /	1985/06/04	Pallant Cr	QCI	Deer Bay	5000			2.8	FFS	37912		1515935	1556535
1984	1985	/ /	1985/06/13	Jarvis Cr	QCI	Jarvis Cr				0.75	FF			1650	1650
1985	1986	/ /	1986/03/01	Jarvis Cr	QCI	Jarvis Cr				0.43	UF			19950	19950
1985	1986	/ /	1986/04/30	Lyell Is	QCI	Beljay Cr				0.8	FF			18500	18500
1985	1986	/ /	1986/04/30	Lyell Is	QCI	Powrivco Cr				0.8	FF			5000	5000
1985	1986	/ /	1986/04/30	Q Char Is Sch	QCI	Charlie Hartie				0.43	UF			1000	1000
1985	1986	/ /	1986/05/01	Sachs Cr	QCI	Haans Cr				1	FF			3000	3000
1985	1986	/ /	1986/05/01	Sachs Cr	QCI	Sachs Cr				1	FF			4500	4500
1985	1986	/ /	1986/05/01	Sewell In Str	QCI	Big Goose Cr				0.5	FF			49000	49000

Table 6 cont. Northern British Columbia Chum fry releases.

Brood Year	Rel. Year	Start Date	End Date	Hatchery	Rel. Area	Release Site	Mark Code With CWT	Mark Code No CWT	Lgth. (mm)	Wt. (gm)	Stage Code	No. with CWT Adclip	No. No CWT Adclip	No. No CWT No Adclip	Total Rel.
1985	1986	/ /	1986/05/27	Skidegate	QCI	Honna R				0.5	FF			10476	10476
1985	1986	/ /	1986/05/30	Pallant Cr	QCI	Mathers Lk		0002		0.9	FF			447113	447113
1985	1986	/ /	1986/06/02	Skidegate	QCI	Tarundl Cr				0.91	FF			27508	27508
1985	1986	/ /	1986/06/04	Pallant Cr	QCI	Cumshewa Head	5000			2	FFS	15282		326596	342190
1985	1986	/ /	1986/06/04	Pallant Cr	QCI	Cumshewa Head	5000			2	FFS	15885		336062	352108
1985	1986	/ /	1986/06/04	Pallant Cr	QCI	Cumshewa Head	5000			2	FFS	12564		289170	302977
1985	1986	/ /	1986/06/05	Pallant Cr	QCI	Mathers Cr		0001		1	FF			331437	331437
1985	1986	/ /	1986/06/07	Pallant Cr	QCI	Conglomerate P	5000			2.1	FFS	14817		256395	271514
1985	1986	/ /	1986/06/07	Pallant Cr	QCI	Conglomerate P	5000			2.1	FFS	15276		264348	279936
1985	1986	/ /	1986/06/07	Pallant Cr	QCI	Conglomerate P	5000			2.1	FFS	14999		262228	277691
1985	1986	/ /	1986/06/12	Pallant Cr	QCI	Deer Bay	5000			2.1	FFS	14815		62583	77856
1985	1986	/ /	1986/06/12	Pallant Cr	QCI	Deer Bay	5000			2.1	FFS	15249		63759	79319
1985	1986	/ /	1986/06/12	Pallant Cr	QCI	Deer Bay	5000			2.1	FFS	14788		61833	76923
1985	1986	1986/06/06	1986/06/16	Pallant Cr	QCI	Deer Bay				2.3	FFS			742262	742262
1985	1986	1986/05/16	1986/06/22	Pallant Cr	QCI	Pallant Cr				0.4	UF			149162	149162
1986	1987	/ /	1987/03/15	Q Char Is Sch	QCI	Charlie Hartie				0.43	UF			7500	7500
1986	1987	/ /	1987/03/31	Sachs Cr	QCI	Sachs Cr				0.93	FF			60000	60000
1986	1987	/ /	1987/04/14	Pallant Cr	QCI	Deer Bay				0.6	FF			19018	19018
1986	1987	/ /	1987/04/15	Lyell Is	QCI	Powrivco Cr				0.55	FF			11500	11500
1986	1987	/ /	1987/04/15	Lyell Is	QCI	Sandy Cr/QCI				0.55	FF			11500	11500
1986	1987	1987/04/01	1987/04/15	Sewell In Str	QCI	L Goose Cr				0.43	UF			33000	33000
1986	1987	1987/04/01	1987/04/15	Sewell In Str	QCI	Sewell Hd Cr				0.43	UF			47000	47000
1986	1987	/ /	1987/04/22	Skidegate	QCI	Tarundl Cr				0.37	UF			2257	2257
1986	1987	1987/04/01	1987/05/01	Pallant Cr	QCI	Deer Bay				0.4	UF			1993012	1993012
1986	1987	1987/03/27	1987/05/08	Pallant Cr	QCI	Deer Bay				1.7	FFS			1342180	1342180
1986	1987	/ /	1987/05/14	Pallant Cr	QCI	Mathers Cr		0002		1.8	FF			449031	449031
1986	1987	1987/05/14	1987/05/15	Pallant Cr	QCI	Mathers Lk		0001		1.7	FF			536831	536831
1986	1987	/ /	1987/05/15	Q Char Is Sch	QCI	Charlie Hartie		0002		2	FF			70	70
1986	1987	1987/05/01	1987/05/15	Sewell In Str	QCI	Big Goose Cr				0.43	UF			30000	30000
1986	1987	/ /	1987/05/16	Pallant Cr	QCI	Conglomerate P	5000			2.7	FFS	12973		255761	268839
1986	1987	/ /	1987/05/16	Pallant Cr	QCI	Conglomerate P	5000			2.7	FFS	12681		250004	262762
1986	1987	/ /	1987/05/16	Pallant Cr	QCI	Conglomerate P	5000			2.7	FFS	15696		309444	325235
1986	1987	/ /	1987/05/18	Pallant Cr	QCI	Deer Bay	5000			2.7	FFS	15258		277812	293350
1986	1987	/ /	1987/05/18	Pallant Cr	QCI	Deer Bay	5000			2.7	FFS	15111		275136	290462
1986	1987	/ /	1987/05/18	Pallant Cr	QCI	Deer Bay	5000			2.7	FFS	15313		278813	294281
1986	1987	1987/05/06	1987/05/19	Skidegate	QCI	Deena Cr				0.67	FF			23640	23640
1986	1987	1987/05/19	1987/05/20	Skidegate	QCI	Skowkona R				0.55	FF			34227	34227
1986	1987	1987/03/27	1987/05/21	Pallant Cr	QCI	Deer Bay				2	FFS			3768400	3768400
1986	1987	1987/05/15	1987/06/15	Q Char Is Sch	QCI	Charlie Hartie		0002		7	FFS			65	65
1987	1988	/ /	1988/03/15	Sachs Cr	QCI	Sachs Cr				0.7	FF			75000	75000
1987	1988	/ /	1988/03/21	Skidegate	QCI	Honna R				0.42	UF			96545	96545
1987	1988	/ /	1988/03/29	Pallant Cr	QCI	Deer Bay				2	FFS			490926	490926
1987	1988	/ /	1988/04/01	Q Char Is Sch	QCI	Charlie Hartie				0.43	UF			3000	3000
1987	1988	/ /	1988/04/24	Pallant Cr	QCI	Deer Bay				3.3	FFS			1067781	1067781
1987	1988	/ /	1988/05/01	Sewell In Str	QCI	Big Goose Cr				0.75	FF			135000	135000
1987	1988	1988/04/08	1988/05/02	Skidegate	QCI	Tarundl Cr				0.34	UF			113441	113441
1987	1988	1988/04/28	1988/05/03	Pallant Cr	QCI	Deer Bay				1	FF			1160094	1160094
1987	1988	/ /	1988/05/04	Pallant Cr	QCI	Cumshewa Head	5000		64	2.4	FFS	15933		390326	406556
1987	1988	/ /	1988/05/04	Pallant Cr	QCI	Cumshewa Head	5000		64	2.4	FFS	15347		375971	391692
1987	1988	/ /	1988/05/04	Pallant Cr	QCI	Cumshewa Head	5000		64	2.4	FFS	15482		379278	395131
1987	1988	/ /	1988/05/04	Pallant Cr	QCI	Deer Bay	5000		65	2.5	FFS	15652		405239	421071
1987	1988	/ /	1988/05/04	Pallant Cr	QCI	Deer Bay	5000		65	2.5	FFS	15838		410056	426284
1987	1988	/ /	1988/05/04	Pallant Cr	QCI	Deer Bay	5000		65	2.5	FFS	14611		378287	393412
1987	1988	/ /	1988/05/05	Pallant Cr	QCI	Conglomerate P	5000		64	2.4	FFS	14275		360266	374967
1987	1988	/ /	1988/05/05	Pallant Cr	QCI	Conglomerate P	5000		64	2.4	FFS	15562		392746	408593
1987	1988	/ /	1988/05/05	Pallant Cr	QCI	Conglomerate P	5000		64	2.4	FFS	15682		395775	411777
1987	1988	/ /	1988/05/05	Pallant Cr	QCI	Deer Bay				1.1	FFS			1374946	1374946
1987	1988	1988/04/16	1988/05/06	Skidegate	QCI	Deena Cr				0.4	UF			23222	23222
1987	1988	1988/05/03	1988/05/09	Pallant Cr	QCI	Pallant Cr				1.1	FF			3488723	3488723
1987	1988	/ /	1988/05/17	Pallant Cr	QCI	Mathers Cr		0002		2.3	FF			341785	341785
1987	1988	1988/04/29	1988/05/17	Pallant Cr	QCI	Mathers Lk		0001		2.3	FF			555962	555962
1987	1988	/ /	1988/06/15	Q Char Is Sch	QCI	Charlie Hartie				2	FF			64	64
1987	1988	/ /	1988/06/15	Sewell In Str	QCI	Big Goose Cr				1.75	FF			10000	10000
1988	1989	/ /	1989/03/29	Pallant Cr	QCI	Deer Bay				0.77	FFS			797135	797135
1988	1989	/ /	1989/03/29	Pallant Cr	QCI	Deer Bay				1.93	FFS			204629	204629
1988	1989	/ /	1989/03/29	Pallant Cr	QCI	Pallant Cr				0.59	FF			822288	822288
1988	1989	/ /	1989/04/04	Pallant Cr	QCI	Pallant Cr				0.36	UF			422334	422334
1988	1989	/ /	1989/04/13	Pallant Cr	QCI	Pallant Cr				0.93	FF			414516	414516
1988	1989	/ /	1989/04/13	Pallant Cr	QCI	Pallant Cr				0.44	FF			384678	384678
1988	1989	/ /	1989/04/26	Pallant Cr	QCI	Deer Bay	5000		70	2.8	FFS	16220		526390	542610

Table 6 cont. Northern British Columbia Chum fry releases.

Brood Year	Rel. Year	Start Date	End Date	Hatchery	Rel. Area	Release Site	Mark Code With CWT	Mark Code No CWT	Lgth. (mm)	Wt. (gm)	Stage Code	No. with CWT Adclip	No. No CWT Adclip	No. No CWT No Adclip	Total Rel.
1988	1989	/ /	1989/04/29	Pallant Cr	QCI	Conglomerate P	5000		70	2.9	FFS	15990		422821	438973
1988	1989	/ /	1989/04/29	Pallant Cr	QCI	Conglomerate P	5000		70	2.9	FFS	14818		391830	407106
1988	1989	/ /	1989/04/30	Pallant Cr	QCI	Cumshewa Head	5000		71	2.9	FFS	15769		395259	411350
1988	1989	/ /	1989/04/30	Pallant Cr	QCI	Cumshewa Head	5000		71	2.9	FFS	15323		384079	399557
1988	1989	/ /	1989/04/30	Pallant Cr	QCI	Cumshewa Head	5000		71	2.9	FFS	15156		379893	395202
1988	1989	/ /	1989/04/30	Sewell In Str	QCI	Waterfall Cr				1	FF			135000	135000
1988	1989	1989/04/30	1989/05/02	Pallant Cr	QCI	Pallant Cr				0.69	FF			1944032	1944032
1988	1989	/ /	1989/05/05	Pallant Cr	QCI	Deer Bay				1.94	FFS			1596925	1596925
1988	1989	/ /	1989/05/10	Pallant Cr	QCI	Mathers Cr		0002		1.1	FF			706195	706195
1988	1989	/ /	1989/05/10	Pallant Cr	QCI	Mathers Cr		0001		1.1	FF			513518	513518
1988	1989	/ /	1989/05/24	Skidegate	QCI	Tarundl Cr				1.01	FF			18117	18117
1988	1989	1989/05/18	1989/05/30	Skidegate	QCI	Deena Cr				1.2	FF			86911	86911
1988	1989	1989/05/29	1989/05/31	Skidegate	QCI	Honna R				1.44	FF			31872	31872
1989	1990	1990/03/22	1990/03/22	Pallant Cr	QCI	Deer Bay			54.4	1.67	FFS			848252	848252
1989	1990	1990/03/27	1990/03/27	Pallant Cr	QCI	Pallant Cr			43.9	0.64	FF			433316	433316
1989	1990	1990/04/18	1990/04/18	Pallant Cr	QCI	Deer Bay	5000		69.8	3.1	FFS	45416		2099141	2149335
1989	1990	1990/04/23	1990/04/23	Pallant Cr	QCI	Mathers Cr		0001	59	1.7	FF			2460801	2460801
1989	1990	1990/04/28	1990/04/28	Pallant Cr	QCI	Deer Bay	5000		63.4	2.2	FFS	52165		2918998	2973303
1989	1990	/ /	1990/04/30	Skidegate	QCI	Deena Cr				0.59	FF			31492	31492
1989	1990	/ /	1990/05/01	N'ern Trollers	QCI	Crabapple Cr				0.65	FF			26801	26801
1989	1990	/ /	1990/05/01	Skidegate	QCI	Tarundl Cr				0.47	FF			14263	14263
1989	1990	1990/05/04	1990/05/04	Pallant Cr	QCI	Deer Bay	5000		62	1.7	FFS	13218		2512747	2525965
1989	1990	1990/05/08	1990/05/08	Pallant Cr	QCI	Mathers Cr		0002	58.3	1.6	FF			2612536	2612536
1989	1990	1990/04/30	1990/05/20	Sewell In Str	QCI	Sewell In Strm				0.96	FF			78841	78841
1990	1991	/ /	1991/04/13	Pallant Cr	QCI	Deer Bay			54.2	1.4	FFS			381682	381682
1990	1991	1991/04/26	1991/04/26	Gold Cr	QCI	Gold Cr				2	FF			20000	20000
1990	1991	/ /	1991/04/26	Pallant Cr	QCI	Deer Bay		0001	57.5	1.6	FFS			3015649	3015649
1990	1991	1991/05/	1991/05/	N'ern Trollers	QCI	Slatechuck Cr				1	FF			50000	50000
1990	1991	1991/05/	1991/05/	Sewell In Str	QCI	Sewell #2 Cr				1	FF			70000	70000
1990	1991	1991/04/07	1991/05/01	Skidegate	QCI	Deena Cr				0.4	UF			71000	71000
1990	1991	1991/04/07	1991/05/01	Skidegate	QCI	Honna R				0.4	UF			51000	51000
1990	1991	1991/04/07	1991/05/01	Skidegate	QCI	Tarundl Cr				0.4	UF			70000	70000
1990	1991	/ /	1991/05/09	Pallant Cr	QCI	Deer Bay		5001	57.7	1.7	FFS		66008	2459976	2528378
1990	1991	/ /	1991/05/09	Pallant Cr	QCI	Deer Bay			43.3	0.66	FFS			382625	382625
1990	1991	/ /	1991/05/09	Pallant Cr	QCI	Mathers Cr		0002	51.9	1.12	FF			2094529	2094529
1990	1991	/ /	1991/05/22	Pallant Cr	QCI	Deer Bay		5002	49.9	1.1	FFS		64834	3029629	3098675
1990	1991	/ /	1991/05/22	Pallant Cr	QCI	Mathers Cr			54.1	1.22	FF			1843703	1843703
1991	1992	/ /	1992/03/13	Pallant Cr	QCI	Deer Bay		5001	48.5	1.02	FFS		71147	1885343	1959344
1991	1992	1992/04/	1992/04/	Sewell In Str	QCI	Sewell In Strm				0.4	FF			25000	25000
1991	1992	1992/03/23	1992/04/04	Pallant Cr	QCI	Deer Bay			37.5	0.37	UF			2944558	2944558
1991	1992	1992/04/09	1992/04/09	N'ern Trollers	QCI	Two Torrent Cr				0.61	FF			88000	88000
1991	1992	/ /	1992/04/13	Pallant Cr	QCI	Deer Bay		0001	56.2	1.56	FFS			2819426	2819426
1991	1992	/ /	1992/04/13	Pallant Cr	QCI	Mathers Cr		0002	51	1.1	FF			1000000	1000000
1991	1992	1992/04/15	1992/04/15	Sewell In Str	QCI	Sewell #2 Cr				0.9	FF			25090	25090
1991	1992	/ /	1992/04/27	Pallant Cr	QCI	Deer Bay		5002	60.2	1.94	FFS		24006	2724513	2750495
1991	1992	1992/05/08	1992/05/08	N'ern Trollers	QCI	Crabapple Cr				0.7	FF			59000	59000
1992	1993	/ /	1993/04/07	Pallant Cr	QCI	Deer Bay		5001	48.8	1	FFS		73245	1918552	1994574
1992	1993	1993/04/13	1993/04/13	N'ern Trollers	QCI	Crabapple Cr				0.75	FF			60000	60000
1992	1993	/ /	1993/04/23	Pallant Cr	QCI	Deer Bay		0001	51.1	1.2	FFS			2340784	2340784
1992	1993	/ /	1993/04/23	Pallant Cr	QCI	Mathers Cr		0002	49.2	1	FF			2048903	2048903
1992	1993	/ /	1993/04/23	Pallant Cr	QCI	Mathers Cr			41.3	0.55	FF			415807	415807
1992	1993	1993/04/26	1993/04/26	N'ern Trollers	QCI	Two Torrent Cr				0.75	FF			84000	84000
1992	1993	/ /	1993/05/06	Pallant Cr	QCI	Deer Bay		5002	55.2	1.4	FFS		75695	2402039	2480955
1992	1993	1993/05/17	1993/05/17	Sewell In Str	QCI	Sewell #2 Cr				0.82	FF			29000	29000
1993	1994	/ /	1994/03/31	Pallant Cr	QCI	Deer Bay		5001	58	1.64	FFS		72778	1935413	2013434
1993	1994	/ /	1994/04/16	Pallant Cr	QCI	Deer Bay		0001	56.4	1.5	FFS			2309753	2309753
1993	1994	/ /	1994/04/16	Pallant Cr	QCI	Mathers Cr		0002	58	1.6	FF			2931639	2931639
1993	1994	1994/04/25	1994/04/25	N'ern Trollers	QCI	Crabapple Cr				0.8	FF			75021	75021
1993	1994	/ /	1994/04/28	Pallant Cr	QCI	Deer Bay		5002	57	1.5	FFS		77068	1963570	2045876
1993	1994	1994/04/28	1994/05/01	Skidegate	QCI	Deena Cr				0.5	FF			70000	70000
1993	1994	1994/05/02	1994/05/02	Gold Cr	QCI	Gold Cr				2.1	FF			37100	37100
1993	1994	1994/05/05	1994/05/05	Sewell In Str	QCI	Sewell #2 Cr				0.99	FF			45878	45878
1993	1994	1994/05/08	1994/05/08	Skidegate	QCI	Tarundl Cr				0.65	FF			45000	45000
1993	1994	1994/05/12	1994/05/12	Skidegate	QCI	Honna R				0.68	FF			40000	40000
1994	1995	/ /	1995/04/11	Pallant Cr	QCI	Pallant Cr				1.3	FF			135668	135668
1994	1995	1995/04/25	1995/04/25	Gold Cr	QCI	Gold Cr				2	FF			97000	97000
1994	1995	/ /	1995/04/25	Pallant Cr	QCI	Deer Bay		0001	45.5	0.78	FF			4066492	4066492
1994	1995	/ /	1995/04/25	Pallant Cr	QCI	Mathers Cr		0002	45.5	0.72	FF			2094542	2094542
1994	1995	1995/04/28	1995/04/28	N'ern Trollers	QCI	Crabapple Cr				0	UF			52250	52250
1994	1995	1995/05/01	1995/05/01	Skidegate	QCI	Deena Cr				0.8	FF			410000	410000

Table 6 cont. Northern British Columbia Chum fry releases.

Brood Year	Rel. Year	Start Date	End Date	Hatchery	Rel. Area	Release Site	Mark Code With CWT	Mark Code No CWT	Lgth. (mm)	Wt. (gm)	Stage Code	No. with CWT Adclip	No. No CWT Adclip	No. No CWT No Adclip	Total Rel.
1995	1996	/ /	1996/04/19	Pallant Cr	QCI	Deer Bay		0001	50.6	1.2	FFS			4306086	4306086
1995	1996	1996/04/25	1996/04/25	N'ern Trollers	QCI	Crabapple Cr				1	FF			47800	47800
1995	1996	1996/04/26	1996/04/26	N'ern Trollers	QCI	Two Torrent Cr				1	FF			87200	87200
1995	1996	1996/05/	1996/05/	Sewell In Str	QCI	Clint Cr/ QCI				1	FF			25000	25000
1995	1996	1996/05/	1996/05/	Sewell In Str	QCI	George Bay Cr				1	FF			6000	6000
1995	1996	/ /	1996/05/06	Pallant Cr	QCI	Deer Bay		0001	47.4	0.88	FFS			5607093	5607093
1995	1996	/ /	1996/05/07	Pallant Cr	QCI	Mathers Cr		0002	49.5	0.97	FF			2726221	2726221
1996	1996	1996/05/07	1996/05/07	Sewell In Str	QCI	George Bay Cr				0.9	FF			52000	52000
1996	1997	1997/04/22	1997/05/02	Pallant Cr	QCI	Deer Bay		0001	45	0.76	FFS			9913086	9913086
1996	1997	/ /	1997/05/05	Pallant Cr	QCI	Pallant Cr			37.5	0.37	FF			515359	515359
1996	1997	1997/05/08	1997/05/08	N'ern Trollers	QCI	Crabapple Cr				0.43	FF			22878	22878
1996	1997	1997/05/07	1997/05/08	Pallant Cr	QCI	Mathers Cr		0002	47.6	0.89	FF			2603985	2603985
1996	1997	1997/05/09	1997/05/09	N'ern Trollers	QCI	Two Torrent Cr				0.43	FF			100232	100232
1996	1997	1997/05/20	1997/05/20	N'ern Trollers	QCI	Gore Brk				0.4	FF			15625	15625
1997	1998	/ /	1998/04/17	Pallant Cr	QCI	Deer Bay		0001	49.2	0.98	FFS			4691304	4691304
1997	1998	/ /	1998/05/03	Pallant Cr	QCI	Deer Bay			51.9	1.18	FFS			4744187	4744187
1997	1998	1998/05/05	1998/05/05	N'ern Trollers	QCI	Two Torrent Cr				0.53	FF			60472	60472
1997	1998	1998/05/21	1998/05/22	Pallant Cr	QCI	Mathers Cr			47.1	0.79	FF			4282152	4282152
1998	1999	1999/04/	1999/04/	N'ern Trollers	QCI	Slatechuck Cr				0.8	FF			35000	35000
1998	1999	1999/04/27	1999/04/27	Pallant Cr	QCI	Mathers Cr			45.95	0.8	FF			3171827	3171827
1998	1999	1999/04/22	1999/05/07	Pallant Cr	QCI	Deer Bay			52.26	1.26	FF			11017169	1.1E+07
1999	2000	2000/05/04	2000/05/05	Pallant Cr	QCI	Mathers Cr			49.93	0.98	FF			3553791	3553791
1999	2000	2000/04/24	2000/05/08	Pallant Cr	QCI	Deer Bay			57.18	1.74	FFS			18668754	1.9E+07
2000	2001	2001/04/24	2001/04/24	Pallant Cr	QCI	Mathers Cr			51.05	1.09	FF			4056005	4056005
2000	2001	2001/04/19	2001/05/03	Pallant Cr	QCI	Deer Bay			53.49	1.27	FFS			18202361	1.8E+07
2000	2001	2001/05/30	2001/05/30	Sewell In Str	QCI	MacMillan Cr				0.42	FF			15135	15135
2001	2002	2002/05/22	2002/05/22	Sewell In Str	QCI	Thorsen Cr/QCI				1	FF			58900	58900
2001	2002	2002/06/20	2002/06/20	N'ern Trollers	QCI	MacMillan Cr				0.5	FF			12000	12000
1991	1992	1992/04/	1992/04/	Kincolith R	NASS	Kincolith R				0	UF			5000	5000
1994	1995	1995/04/	1995/04/	Kincolith R	NASS	Kincolith R				0.4	UF			160000	160000
1995	1996	1996/02/	1996/02/	Kincolith R	NASS	Kincolith R				0.4	UF			10000	10000
1996	1997	1997/05/25	1997/05/25	Kincolith R	NASS	Kincolith R				1	FF			5282	5282
1997	1998	1998/04/08	1998/04/08	Kincolith R	NASS	Kincolith R			66	2	FF			2000	2000
1998	1999	1999/04/	1999/04/	Kincolith R	NASS	Kincolith R				0.4	FF			3905	3905
1986	1987	/ /	1987/03/31	Oldfield Cr	NCST	Denise Arm				0.43	UF			6000	6000
1986	1987	/ /	1987/04/15	Kitsumkalum R	SKNA	Andesite Ch				0.9	FF			98509	98509
1986	1987	1987/03/01	1987/04/30	Andesite Ch	SKNA	Andesite Ch				0.43	UFC			11200	11200
1987	1988	/ /	1988/04/15	Kitsumkalum R	SKNA	Andesite Ch				0.9	FF			131834	131834
1987	1988	1988/03/01	1988/04/30	Andesite Ch	SKNA	Andesite Ch				0.43	UFC			11200	11200
1988	1989	/ /	1989/03/31	Eby Street	SKNA	Kofoed Brk				0.43	UF			19000	19000
1988	1989	/ /	1989/03/31	Eby Street	SKNA	Zymacord R				0.43	UF			19000	19000
1988	1989	/ /	1989/04/21	Kitsumkalum R	SKNA	Andesite Ch				1.14	FF			165657	165657
1989	1990	/ /	1990/03/20	Eby Street	SKNA	Zymacord R				1	FF			8000	8000
1989	1990	/ /	1990/03/25	Eby Street	SKNA	Kofoed Brk				1	FF			3000	3000
1989	1990	/ /	1990/04/20	Kitsumkalum R	SKNA	Andesite Ch				1.52	FF			49235	49235
1998	1999	1999/04/01	1999/04/01	Kitsmkalum	SKNA	Andesite Ch				0.4	UF			115943	115943
1999	2000	2000/04/	2000/04/	Kitsumkalum R	SKNA	Andesite Ch				1	FF			20679	20679
1981	1982	1982/03/28	1982/04/18	Kitimat R	CCST	Kitimat R				2.7	FF			30345	30345
1984	1985	/ /	1985/03/14	Kitimat R	CCST	Hirsch Cr				2.2	FF			312745	312745
1984	1985	1985/03/14	1985/03/16	Kitimat R	CCST	Kitimat R		0001		2	FF			154853	154853
1984	1985	/ /	1985/03/18	Kitimat R	CCST	Humphreys Cr		5001		2.1	FF		25567	155328	183647
1984	1985	1985/03/26	1985/03/27	Kitimat R	CCST	Kitimat R		0002		2	FF			427930	427930
1984	1985	/ /	1985/04/01	Kitimat R	CCST	Humphreys Cr		5002		2.2	FF		25000	174364	201362
1984	1985	/ /	1985/04/02	Kitimat R	CCST	Dala R				2	FF			420000	420000
1984	1985	/ /	1985/04/04	Kitimat R	CCST	Kildala R				1.7	FF			295000	295000
1985	1986	1986/03/18	1986/03/19	Kitimat R	CCST	Humphreys Cr				1.3	FF			436207	436207
1985	1986	/ /	1986/03/20	Kitimat R	CCST	Hirsch Cr				1.1	FF			833333	833333
1985	1986	/ /	1986/03/24	Kitimat R	CCST	Bish Cr				1.2	FF			712921	712921
1985	1986	1986/03/24	1986/03/25	Kitimat R	CCST	Dala R				1.4	FF			793548	793548
1985	1986	1986/03/25	1986/03/26	Kitimat R	CCST	Kildala R		0002		0.95	FF			825260	825260
1985	1986	1986/03/27	1986/04/01	Kitimat R	CCST	Kitimat R				1.4	FF			546860	546860
1985	1986	/ /	1986/04/02	Kitimat R	CCST	Cecil Cr		5002		1.4	FF		35435	230698	271343
1985	1986	/ /	1986/04/02	Kitimat R	CCST	Cecil Cr		0001		1.4	FF			257330	257330
1985	1986	/ /	1986/04/02	Kitimat R	CCST	Cecil Cr	5000			1.4	FF	36062		214328	252089
1986	1987	/ /	1987/03/16	Kitimat R	CCST	Cecil Cr		0001		1.3	FF			356729	356729
1986	1987	/ /	1987/03/25	Kitimat R	CCST	Bish Cr				1.5	FF			232122	232122
1986	1987	/ /	1987/03/25	Kitimat R	CCST	Kildala R		5001		1.8	FF		47000	0	50901
1986	1987	/ /	1987/03/25	Kitimat R	CCST	Kildala R		5002		1.8	FF		49966	0	54485
1986	1987	/ /	1987/03/30	Kitimat R	CCST	Cecil Cr		0002		1.6	FF			353709	353709
1987	1988	/ /	1988/03/22	Kitimat R	CCST	Bish Cr				2.3	FF			315184	315184

Table 6 cont. Northern British Columbia Chum fry releases.

Brood Year	Rel. Year	Start Date	End Date	Hatchery	Rel. Area	Release Site	Mark Code With CWT	Mark Code No CWT	Lgth. (mm)	Wt. (gm)	Stage Code	No. with CWT Adclip	No. No CWT Adclip	No. No CWT No Adclip	Total Rel.
1988	1989	/ /	1989/03/28	Kitimat R	CCST	Humphreys Cr				1.2	FF			864053	864053
1988	1989	/ /	1989/03/29	Kitimat R	CCST	Bish Cr				1.3	FF			647806	647806
1988	1989	/ /	1989/03/29	Kitimat R	CCST	Hirsch Cr		5002		1.3	FF		50138	801401	854468
1988	1989	1989/03/27	1989/03/31	Kitimat R	CCST	Kitimat R		0001		1.3	FF			3136710	3136710
1988	1989	/ /	1989/04/03	Kitimat R	CCST	Kildala R		5001		1.7	FF		50033	691603	744264
1988	1989	/ /	1989/04/04	Kitimat R	CCST	Dala R				1.4	FF			503095	503095
1989	1990	1990/03/28	1990/03/28	Kitimat R	CCST	Bish Cr			53.5	1.3	FF			373827	373827
1989	1990	1990/03/28	1990/03/29	Kitimat R	CCST	Kildala R		5002	55.9	1.5	FF		99858	572435	679369
1989	1990	1990/03/29	1990/03/30	Kitimat R	CCST	Dala R			58	1.7	FF			695976	695976
1989	1990	1990/04/03	1990/04/03	Kitimat R	CCST	Humphreys Cr			57	1.5	FF			322336	322336
1989	1990	1990/04/04	1990/04/04	Kitimat R	CCST	Hirsch Cr			55.8	1.4	FF			682127	682127
1989	1990	1990/04/03	1990/04/04	Kitimat R	CCST	Kitimat R		0001	56	1.4	FF			2653436	2653436
1990	1991	/ /	1991/03/18	Kitimat R	CCST	Bish Cr			54.5	1.4	FF			775949	775949
1990	1991	/ /	1991/03/18	Kitimat R	CCST	Dala R			57.4	1.6	FF			118025	118025
1990	1991	/ /	1991/03/20	Kitimat R	CCST	Kildala R			53	1.2	FF			263633	263633
1990	1991	/ /	1991/03/22	Kitimat R	CCST	Hirsch Cr		5002	55	1.4	FF		99751	832140	937209
1990	1991	1991/03/14	1991/03/25	Kitimat R	CCST	Kitimat R		0002	55	1.3	FF			3892502	3892502
1991	1992	/ /	1992/03/09	Kitimat R	CCST	Bish Cr			54.9	1.5	FF			346484	346484
1991	1992	/ /	1992/03/09	Kitimat R	CCST	Hirsch Cr		5001	53.1	1.3	FF		99797	808797	914204
1991	1992	1992/03/06	1992/03/13	Kitimat R	CCST	Kitimat R		0001	53.7	1.25	FF			4360747	4360747
1991	1992	/ /	1992/03/16	Kitimat R	CCST	Dala R			51.7	1.2	FF			364230	364230
1991	1992	/ /	1992/03/16	Kitimat R	CCST	Kildala R			54.7	1.3	FF			436665	436665
1992	1993	1993/03/05	1993/03/08	Kitimat R	CCST	Kitimat R			48	0.8	FF			979230	979230
1992	1993	/ /	1993/03/11	Kitimat R	CCST	Bish Cr			47	0.9	FF			943476	943476
1992	1993	/ /	1993/03/11	Kitimat R	CCST	Hirsch Cr		0002	50	1	FF			892002	892002
1992	1993	1993/03/15	1993/03/16	Kitimat R	CCST	Dala R			51	1.1	FF			762645	762645
1992	1993	1993/03/16	1993/03/17	Kitimat R	CCST	Kildala R			51	0.9	FF			776686	776686
1993	1994	/ /	1994/03/21	Kitimat R	CCST	Hirsch Cr		5002	52	1.1	FF		101735	1339159	1442015
1993	1994	/ /	1994/03/24	Kitimat R	CCST	Kildala R			54	1.2	FF			681289	681289
1993	1994	1994/03/17	1994/03/30	Kitimat R	CCST	Kitimat R		0002	54	1.2	FF			3771139	3771139
1994	1995	/ /	1995/03/29	Kitimat R	CCST	Hirsch Cr		5002	55	1.26	FF		101333	912846	1016449
1994	1995	/ /	1995/03/30	Kitimat R	CCST	Kildala R			52	1.07	FF			596142	596142
1994	1995	1995/04/04	1995/04/11	Kitimat R	CCST	Kitimat R		0002	54	1.2	FF			3776533	3776533
1995	1996	/ /	1996/03/27	Kitimat R	CCST	Hirsch Cr			54	1.2	FF			1327860	1327860
1995	1996	1996/03/26	1996/03/27	Kitimat R	CCST	Kildala R		5002	52	1.1	FF		99727	635613	739859
1995	1996	1996/03/28	1996/04/10	Kitimat R	CCST	Kitimat R		0002	53	1.2	FF			3581366	3581366
1996	1997	/ /	1997/03/26	Kitimat R	CCST	Kildala R		5002	54	1.2	FF		100297	591725	695512
1996	1997	/ /	1997/03/27	Kitimat R	CCST	Hirsch Cr			51	1.1	FF			1275273	1275273
1996	1997	1997/03/26	1997/04/02	Kitimat R	CCST	Kitimat R		0002	53	1.2	FF			3026840	3026840
1997	1998	1998/03/24	1998/03/25	Kitimat R	CCST	Kildala R		5002	55	1.2	FF		100876	650809	753311
1997	1998	1998/03/25	1998/03/26	Kitimat R	CCST	Hirsch Cr			54	1.3	FF			1247823	1247823
1997	1998	1998/03/20	1998/04/01	Kitimat R	CCST	Kitimat R		0002	54	1.3	FF			3825988	3825988
1998	1999	/ /	1999/03/23	Kitimat R	CCST	Kildala R			53	1.2	FF			793004	793004
1998	1999	/ /	1999/03/25	Kitimat R	CCST	Hirsch Cr		0001	52	1.2	FF			1414705	1414705
1998	1999	1999/03/26	1999/04/01	Kitimat R	CCST	Kitimat R		0002	51	1.1	FF			4133742	4133742
1999	2000	2000/03/29	2000/03/29	Kitimat R	CCST	Hirsch Cr		0001	55	1.4	FF			860391	860391
1999	2000	2000/03/23	2000/04/03	Kitimat R	CCST	Kitimat R		0002	54	1.31	FF			3481281	3481281
2000	2001	2001/03/28	2001/03/28	Kitimat R	CCST	Hirsch Cr		0001	52.3	1.59	FF			850703	850703
2000	2001	2001/03/23	2001/03/30	Kitimat R	CCST	Kitimat R		0002	51.4	1.51	FF			3687613	3687613
2001	2002	2002/03/27	2002/03/27	Kitimat R	CCST	Hirsch Cr				1.21	FF			1118088	1118088
2001	2002	2002/04/04	2002/04/08	Kitimat R	CCST	Kitimat R				1.04	FF			3803098	3803098

Table 7. Summary of Stream Arrival Timing by Statistical Area showing proportions of streams with similar timing.

	DATE OF STREAM ARRIVAL																	
AREA	E. JUN.	M. JUN.	L. JUN.	E. JUL.	M. JUL.	L. JUL.	E. AUG.	M. AUG.	L. AUG.	E. SEP.	M. SEP.	L. SEP.	E. OCT.	M. OCT.	L. OCT.	E. JUN. TO L. AUG.	E. SEP. TO L. OCT.	n
1	0.11						0.11				0.33	0.44				0.22	0.78	7
2E									0.07	0.28	0.15	0.28	0.20	0.01		0.07	0.93	88
2W									0.10	0.45	0.33	0.12				0.10	0.90	49
3				0.06	0.12	0.12	0.30	0.18	0.09	0.06	0.06					0.88	0.12	33
4					0.03	0.03	0.58	0.16	0.16	0.03						0.97	0.03	31
5								0.17	0.70	0.13						0.87	0.13	30
6	0.01			0.05	0.05	0.07	0.09	0.14	0.09	0.38	0.11					0.51	0.49	76

Table 8. Pearson correlation matrix of index escapement aggregates and resultant table of probabilities.

	INDEX ESCAPEMENT AGGREGATE										
	1	2E	2W	3	4	5	6	SUMMER 1TO 6	FALL 1 TO 6	N. SEAK	S. SEAK
AREA1	1										
AREA2E	0.357	1									
AREA2W	0.509	0.088	1								
AREA3	0.397	0.136	0.325	1							
AREA4	-0.119	-0.134	-0.009	0.197	1						
AREA5	0.581	0.502	0.228	0.346	0.072	1					
AREA6	0.370	0.538	0.100	0.428	0.106	0.656	1				
SUMMER 1 TO 6	0.314	0.368	0.250	0.752	0.476	0.604	0.767	1			
FALL 1 TO 6	0.628	0.858	0.498	0.252	-0.142	0.598	0.648	0.439	1		
N_SEAK	-0.201	-0.404	0.128	-0.163	0.214	-0.200	-0.185	-0.231	-0.235	1	
S_SEAK	-0.089	0.010	0.067	0.088	0.750	0.063	0.107	0.256	0.042	0.627	1

	Bonferroni Probabilities										
	1	2E	2W	3	4	5	6	SUMMER 1TO 6	FALL 1 TO 6	N. SEAK	S. SEAK
AREA1	0.000										
AREA2E	1.000	0.000									
AREA2W	1.000	1.000	0.000								
AREA3	1.000	1.000	1.000	0.000							
AREA4	1.000	1.000	1.000	1.000	0.000						
AREA5	0.316	1.000	1.000	1.000	1.000	0.000					
AREA6	1.000	0.657	1.000	1.000	1.000	0.069	0.000				
SUMMER 1 TO 6	1.000	1.000	1.000	0.005	1.000	0.204	0.003	0.000			
FALL 1 TO 6	0.127	0.000	1.000	1.000	1.000	0.233	0.082	1.000	0.000		
N_SEAK	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	
S_SEAK	1.000	1.000	1.000	1.000	0.005	1.000	1.000	1.000	1.000	0.128	0.000

Table 9. Summary of RMSE Retrospective Analysis of 4, 5 and n-YRA forecasting models for Statistical Area index and all-stream aggregates.

	RMSE by Model (1973 to 2003)		
Aggrergate	RMSE (4YRA)	RMSE (5YRA)	RMSE (nYRA)
Area 1 Index	22,428	22,716	22,428
Area 1 All	22,457	22,743	22,573
Area 2E Index	39,813	42,489	42,937
Area 2E All	63,052	66,355	68,270
Area 2W Index	28,080	27,683	25,017
Area 2W All	28,075	27,671	25,070
Area 3 Index	22,901	21,823	21,490
Area 3 All	30,929	29,796	28,833
Area 4 Index	18,968	19,613	19,156
Area 4 All	19,237	19,902	19,405
Area 5 Index	5,962	6,181	7,489
Area 5 All	6,661	7,078	8,396
Area 6 Index	83,172	84,794	76,350
Area 6 All	162,858	167,238	163,877

Table 10. Four year running average (4YRA) forecasts and z-scores of 2003 total escapement of chum salmon for Statistical Areas 1, 2 East, 2 West, 3, 4, 5 and 6.

	Area 1		Area 2 East		Area 2 West	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	1.52E+05	2.87	5.18E+05	2.75	4.03E+05	3.36
95%	6.73E+04	0.64	3.45E+05	1.18	2.44E+05	1.65
90%	4.42E+04	0.03	2.80E+05	0.58	1.88E+05	1.05
75%	2.22E+04	-0.55	1.98E+05	-0.16	1.23E+05	0.35
50%	**1.04E+04**	**-0.87**	**1.36E+05**	**-0.73**	**7.71E+04**	**-0.14**
25%	4.90E+03	-1.01	9.31E+04	-1.12	4.83E+04	-0.45
10%	2.46E+03	-1.08	6.60E+04	-1.37	3.15E+04	-0.63
5%	1.62E+03	-1.10	5.35E+04	-1.48	2.43E+04	-0.71
1%	7.19E+02	-1.13	3.56E+04	-1.65	1.47E+04	-0.81

*probability of a lower value

	Area 3		Area 4		Area 5		Area 6	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	1.13E+05	2.33	3.63E+04	1.36	1.27E+04	-0.16	7.49E+05	3.84
95%	7.13E+04	0.82	1.90E+04	0.29	7.19E+03	-0.60	4.46E+05	1.73
90%	5.62E+04	0.27	1.35E+04	-0.04	5.36E+03	-0.75	3.41E+05	1.00
75%	3.80E+04	-0.39	7.79E+03	-0.40	3.32E+03	-0.91	2.20E+05	0.16
50%	**2.48E+04**	**-0.87**	**4.25E+03**	**-0.61**	**1.96E+03**	**-1.02**	**1.36E+05**	**-0.42**
25%	1.61E+04	-1.18	2.31E+03	-0.73	1.15E+03	-1.08	8.38E+04	-0.79
10%	1.09E+04	-1.37	1.33E+03	-0.79	7.14E+02	-1.12	5.40E+04	-0.99
5%	8.60E+03	-1.45	9.51E+02	-0.82	5.32E+02	-1.13	4.13E+04	-1.08
1%	5.42E+03	-1.57	4.96E+02	-0.84	3.02E+02	-1.15	2.46E+04	-1.20

*probability of a lower value

Table 11. Five year running average (5YRA) forecasts and z-scores of 2003 total escapement of chum salmon for Statistical Areas 1, 2 East, 2 West, 3, 4, 5 and 6.

	Area 1		Area 2 East		Area 2 West	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	1.87E+05	3.80	6.35E+05	3.81	4.61E+05	3.98
95%	8.33E+04	1.07	4.09E+05	1.76	2.75E+05	1.98
90%	5.49E+04	0.31	3.26E+05	1.00	2.11E+05	1.29
75%	2.77E+04	-0.41	2.24E+05	0.08	1.36E+05	0.49
50%	**1.31E+04**	**-0.80**	**1.49E+05**	**-0.61**	**8.38E+04**	**-0.07**
25%	6.17E+03	-0.98	9.91E+04	-1.07	5.18E+04	-0.41
10%	3.11E+03	-1.06	6.82E+04	-1.35	3.34E+04	-0.61
5%	2.05E+03	-1.09	5.44E+04	-1.47	2.56E+04	-0.70
1%	9.16E+02	-1.12	3.51E+04	-1.65	1.52E+04	-0.81

*probability of a lower value

	Area 3		Area 4		Area 5		Area 6	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	1.42E+05	3.38	4.79E+04	2.07	1.79E+04	0.26	1.16E+06	6.66
95%	9.29E+04	1.60	2.48E+04	0.65	1.00E+04	-0.37	6.75E+05	3.33
90%	7.45E+04	0.94	1.76E+04	0.21	7.45E+03	-0.58	5.12E+05	2.19
75%	5.19E+04	0.12	1.01E+04	-0.26	4.57E+03	-0.81	3.24E+05	0.89
50%	**3.49E+04**	**-0.50**	**5.44E+03**	**-0.54**	**2.67E+03**	**-0.96**	**1.97E+05**	**0.00**
25%	2.35E+04	-0.91	2.94E+03	-0.69	1.56E+03	-1.05	1.19E+05	-0.54
10%	1.64E+04	-1.17	1.68E+03	-0.77	9.56E+02	-1.10	7.56E+04	-0.84
5%	1.31E+04	-1.29	1.19E+03	-0.80	7.09E+02	-1.12	5.72E+04	-0.97
1%	8.59E+03	-1.45	6.18E+02	-0.84	3.99E+02	-1.14	3.35E+04	-1.14

*probability of a lower value

Table 12. N year running average (nYRA, all years in time series) forecasts and z-scores of 2003 total escapement of chum salmon for Statistical Areas 1, 2 East, 2 West, 3, 4, 5 and 6.

	Area 1		Area 2 East		Area 2 West	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	3.46E+05	8.04	7.61E+05	4.96	3.72E+05	3.02
95%	1.63E+05	3.17	4.99E+05	2.57	2.22E+05	1.42
90%	1.09E+05	1.74	3.98E+05	1.66	1.69E+05	0.84
75%	5.75E+04	0.38	2.79E+05	0.57	1.10E+05	0.21
50%	**2.83E+04**	**-0.39**	**1.88E+05**	**-0.26**	**6.77E+04**	**-0.24**
25%	1.40E+04	-0.77	1.27E+05	-0.82	4.18E+04	-0.52
10%	7.39E+03	-0.95	8.88E+04	-1.16	2.71E+04	-0.68
5%	4.94E+03	-1.01	7.09E+04	-1.32	2.06E+04	-0.75
1%	2.32E+03	-1.08	4.65E+04	-1.55	1.23E+04	-0.84

*probability of a lower value

	Area 3		Area 4		Area 5		Area 6	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	1.59E+05	3.98	7.39E+04	3.67	1.23E+05	8.65	8.82E+05	4.76
95%	1.06E+05	2.08	4.02E+04	1.60	5.67E+04	3.36	5.22E+05	2.26
90%	8.58E+04	1.34	2.91E+04	0.91	3.76E+04	1.83	3.95E+05	1.38
75%	6.12E+04	0.45	1.74E+04	0.20	1.96E+04	0.39	2.54E+05	0.40
50%	**4.20E+04**	**-0.24**	**9.88E+03**	**-0.27**	**9.50E+03**	**-0.41**	**1.55E+05**	**-0.29**
25%	2.88E+04	-0.72	5.59E+03	-0.53	4.60E+03	-0.81	9.50E+04	-0.71
10%	2.06E+04	-1.02	3.35E+03	-0.67	2.40E+03	-0.98	6.11E+04	-0.94
5%	1.66E+04	-1.16	2.42E+03	-0.73	1.59E+03	-1.05	4.62E+04	-1.05
1%	1.11E+04	-1.36	1.32E+03	-0.79	7.34E+02	-1.12	2.73E+04	-1.18

*probability of a lower value

Table 13. Four year running average (4YRA) forecasts and z-scores of 2003 chum salmon index stream escapement for Statistical Areas 1, 2 East, 2 West, 3, 4, 5 and 6.

	Area 1		Area 2 East		Area 2 West	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	1.52E+05	2.89	2.77E+05	1.94	3.99E+05	3.36
95%	6.74E+04	0.65	1.78E+05	0.66	2.42E+05	1.65
90%	4.43E+04	0.03	1.42E+05	0.19	1.87E+05	1.05
75%	2.22E+04	-0.55	9.76E+04	-0.38	1.22E+05	0.35
50%	**1.04E+04**	**-0.86**	**6.48E+04**	**-0.81**	**7.66E+04**	**-0.14**
25%	4.90E+03	-1.01	4.30E+04	-1.09	4.80E+04	-0.45
10%	2.46E+03	-1.08	2.96E+04	-1.26	3.14E+04	-0.63
5%	1.62E+03	-1.10	2.36E+04	-1.34	2.42E+04	-0.71
1%	7.17E+02	-1.12	1.52E+04	-1.45	1.47E+04	-0.82

*probability of a lower value

	Area 3		Area 4		Area 5		Area 6	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	7.00E+04	1.54	3.99E+04	1.63	1.24E+04	-0.15	3.24E+05	2.11
95%	4.35E+04	0.26	2.02E+04	0.40	7.07E+03	-0.60	1.92E+05	0.64
90%	3.40E+04	-0.19	1.42E+04	0.03	5.28E+03	-0.75	1.46E+05	0.13
75%	2.28E+04	-0.73	8.00E+03	-0.36	3.28E+03	-0.92	9.35E+04	-0.45
50%	**1.46E+04**	**-1.12**	**4.25E+03**	**-0.60**	**1.94E+03**	**-1.03**	**5.73E+04**	**-0.86**
25%	9.39E+03	-1.38	2.25E+03	-0.72	1.15E+03	-1.10	3.51E+04	-1.10
10%	6.27E+03	-1.52	1.27E+03	-0.78	7.12E+02	-1.13	2.25E+04	-1.24
5%	4.91E+03	-1.59	8.91E+02	-0.80	5.32E+02	-1.15	1.71E+04	-1.30
1%	3.05E+03	-1.68	4.52E+02	-0.83	3.03E+02	-1.17	1.01E+04	-1.38

*probability of a lower value

Table 14. Five Year running average (5YRA) forecasts and z-scores of 2003 chum salmon index stream escapement for Statistical Areas 1, 2 East, 2 West, 3, 4, 5 and 6.

	Area 1		Area 2 East		Area 2 West	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	1.87E+05	3.83	3.54E+05	2.95	4.57E+05	3.98
95%	8.34E+04	1.08	2.19E+05	1.19	2.73E+05	1.98
90%	5.49E+04	0.32	1.71E+05	0.57	2.09E+05	1.29
75%	2.77E+04	-0.41	1.14E+05	-0.17	1.35E+05	0.49
50%	**1.31E+04**	**-0.79**	**7.25E+04**	**-0.71**	**8.34E+04**	**-0.07**
25%	6.16E+03	-0.98	4.63E+04	-1.05	5.16E+04	-0.42
10%	3.10E+03	-1.06	3.08E+04	-1.25	3.33E+04	-0.61
5%	2.04E+03	-1.09	2.40E+04	-1.33	2.55E+04	-0.70
1%	9.11E+02	-1.12	1.48E+04	-1.45	1.52E+04	-0.81

*probability of a lower value

	Area 3		Area 4		Area 5		Area 6	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	9.15E+04	2.57	5.23E+04	2.40	1.74E+04	0.27	4.90E+05	3.95
95%	5.92E+04	1.02	2.63E+04	0.78	9.83E+03	-0.37	2.84E+05	1.66
90%	4.73E+04	0.45	1.84E+04	0.29	7.31E+03	-0.58	2.14E+05	0.88
75%	3.27E+04	-0.26	1.03E+04	-0.22	4.51E+03	-0.82	1.34E+05	0.00
50%	**2.18E+04**	**-0.78**	**5.43E+03**	**-0.52**	**2.65E+03**	**-0.97**	**8.08E+04**	**-0.59**
25%	1.46E+04	-1.13	2.87E+03	-0.68	1.56E+03	-1.06	4.86E+04	-0.95
10%	1.01E+04	-1.34	1.60E+03	-0.76	9.59E+02	-1.11	3.06E+04	-1.15
5%	8.04E+03	-1.44	1.12E+03	-0.79	7.14E+02	-1.13	2.30E+04	-1.24
1%	5.20E+03	-1.58	5.65E+02	-0.83	4.04E+02	-1.16	1.33E+04	-1.34

*probability of a lower value

Table 15. N year running average (nYRA, all years in time series) forecasts and z-scores of 2003 chum salmon index stream escapement for Statistical Areas 1, 2 East, 2 West, 3, 4, 5 and 6.

	Area 1		Area 2 East		Area 2 West	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	3.44E+05	8.01	5.02E+05	4.86	3.70E+05	3.03
95%	1.62E+05	3.15	3.14E+05	2.42	2.21E+05	1.42
90%	1.08E+05	1.73	2.44E+05	1.52	1.68E+05	0.85
75%	5.72E+04	0.38	1.64E+05	0.48	1.09E+05	0.21
50%	**2.82E+04**	**-0.39**	**1.06E+05**	**-0.27**	**6.75E+04**	**-0.24**
25%	1.39E+04	-0.77	6.81E+04	-0.76	4.17E+04	-0.52
10%	7.35E+03	-0.95	4.59E+04	-1.05	2.71E+04	-0.68
5%	4.91E+03	-1.01	3.57E+04	-1.18	2.06E+04	-0.75
1%	2.31E+03	-1.08	2.23E+04	-1.36	1.23E+04	-0.84

*probability of a lower value

	Area 3		Area 4		Area 5		Area 6	
*P**	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score	Forecast Escapement	z-score
99%	1.31E+05	4.47	7.62E+04	3.90	1.17E+05	8.61	5.97E+05	5.14
95%	8.62E+04	2.31	4.05E+04	1.67	5.44E+04	3.37	3.54E+05	2.45
90%	6.89E+04	1.48	2.89E+04	0.95	3.62E+04	1.85	2.69E+05	1.49
75%	4.84E+04	0.50	1.70E+04	0.20	1.90E+04	0.40	1.73E+05	0.43
50%	**3.27E+04**	**-0.26**	**9.42E+03**	**-0.27**	**9.30E+03**	**-0.41**	**1.06E+05**	**-0.31**
25%	2.20E+04	-0.77	5.22E+03	-0.53	4.54E+03	-0.81	6.52E+04	-0.77
10%	1.55E+04	-1.08	3.07E+03	-0.67	2.39E+03	-0.99	4.21E+04	-1.02
5%	1.24E+04	-1.23	2.19E+03	-0.72	1.59E+03	-1.06	3.19E+04	-1.14
1%	8.14E+03	-1.44	1.17E+03	-0.79	7.40E+02	-1.13	1.89E+04	-1.28

*probability of a lower value

Table 16. Summary of 2003 escapement forecasts using 4, 5 and n YRA models at 50% CI for Statistical Areas 1, 2 East and 2 West by stream aggregate with observed mean for time series and Fish Management escapement goals.

Statistical Area	Stream Aggregate	Observed mean (1950 – 2002)	Fish. Mgmt. Esc. Goal[1]	Forecast Model (YRA)	Forecast Range 50% CI **Lower** 25th Percentile	 50th Percentile	 **Upper** 75th Percentile
1	all	43,149	61,011	4	5,137	10,440	21,218
1	all	43,149	61,011	5	6,431	13,070	26,562
1	all	43,149	61,011	n	13,954	28,329	57,515
1	index	42,954	60,642	4	5,135	10,434	21,200
1	index	42,954	60,642	5	6,425	13,055	26,527
1	index	42,954	60,642	n	13,884	28,182	57,205
2E	all	216,211	383,835	4	91,466	135,907	201,940
2E	all	216,211	383,835	5	100,377	149,148	221,614
2E	all	216,211	383,835	n	126,632	188,050	279,256
2E	index	127,010	223,005	4	41,675	64,777	100,686
2E	index	127,010	223,005	5	46,652	72,514	112,711
2E	index	127,010	223,005	n	68,119	105,812	164,361
2W	all	90,418	138,194	4	47,543	77,054	124,884
2W	all	90,418	138,194	5	51,735	83,849	135,896
2W	all	90,418	138,194	n	41,812	67,718	109,675
2W	index	89,955	137,433	4	47,321	76,607	124,016
2W	index	89,955	137,433	5	51,501	83,374	134,971
2W	index	89,955	137,433	n	41,727	67,503	109,201

[1]The Fish. Management Escapement Goal was calculated by summing escapement goal values within each year for streams with an escapement estimate. These annual sums were averaged over the time series 1950 to 2002 to produce the escapement goal estimate for each Statistical Area.

Table 17. Summary of 2003 escapement forecasts using 4, 5 and n YRA models at 50% CI for Statistical Areas 3, 4, 5 and 6 by stream aggregate with observed mean for time series and Fish Management escapement goals.

Statistical Area	Stream Aggregate	Observed mean (1950 – 2002)	Fish. Mgmt. Esc. Goal[1]	Forecast Model (YRA)	Forecast Range 50% CI		
					Lower 25th Percentile	50th Percentile	**Upper** 75th Percentile
3	all	48,703	88,906	4	16,994	24,763	36,083
3	all	48,703	88,906	5	23,979	34,941	50,914
3	all	48,703	88,906	n	28,845	42,009	61,179
3	index	38,034	71,981	4	9,859	14,617	21,670
3	index	38,034	71,981	5	14,719	21,823	32,354
3	index	38,034	71,981	n	22,046	32,666	48,402
4	all	14,223	37,541	4	2,401	4,246	7,509
4	all	14,223	37,541	5	3,076	5,440	9,621
4	all	14,223	37,541	n	5,589	9,875	17,449
4	index	13,771	36,802	4	2,349	4,246	7,676
4	index	13,771	36,802	5	3,004	5,432	9,820
4	index	13,771	36,802	n	5,216	9,422	17,020
5	all	14,684	22,573	4	947	1,957	4,042
5	all	14,684	22,573	5	1,293	2,670	5,515
5	all	14,684	22,573	n	4,604	9,500	19,603
5	index	14,211	22,151	4	947	1,939	3,972
5	index	14,211	22,151	5	1,293	2,648	5,424
5	index	14,211	22,151	n	4,544	9,298	19,022
6	all	196,859	470,328	4	82,988	135,773	222,132
6	all	196,859	470,328	5	120,184	196,627	321,692
6	all	196,859	470,328	n	94,972	155,266	253,840
6	index	134,293	289,347	4	35,152	57,317	93,459
6	index	134,293	289,347	5	49,582	80,847	131,826
6	index	134,293	289,347	n	65,232	106,289	173,187

[1]The Fisheries Management Escapement Goal was calculated by summing escapement goal values within each year for streams with an escapement estimate. These annual sums were averaged over the time series 1950 to 2002 to produce the escapement goal estimate for each Statistical Area.

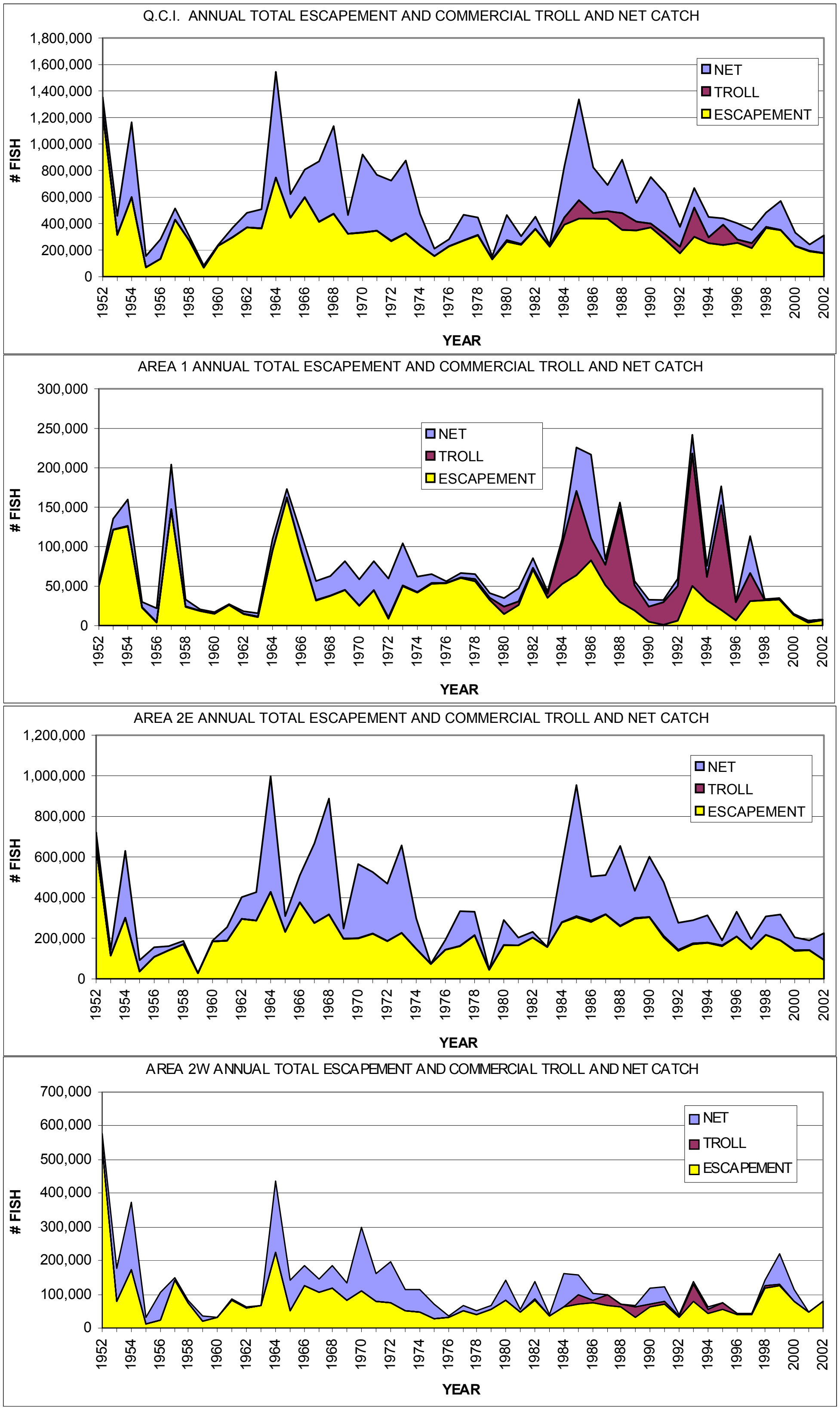


Figure 2. Stacked area charts of annual total escapement and total commercial net and troll catch for Q.C.I. (1+2E+2W) and Areas 1, 2 East and 2 West.

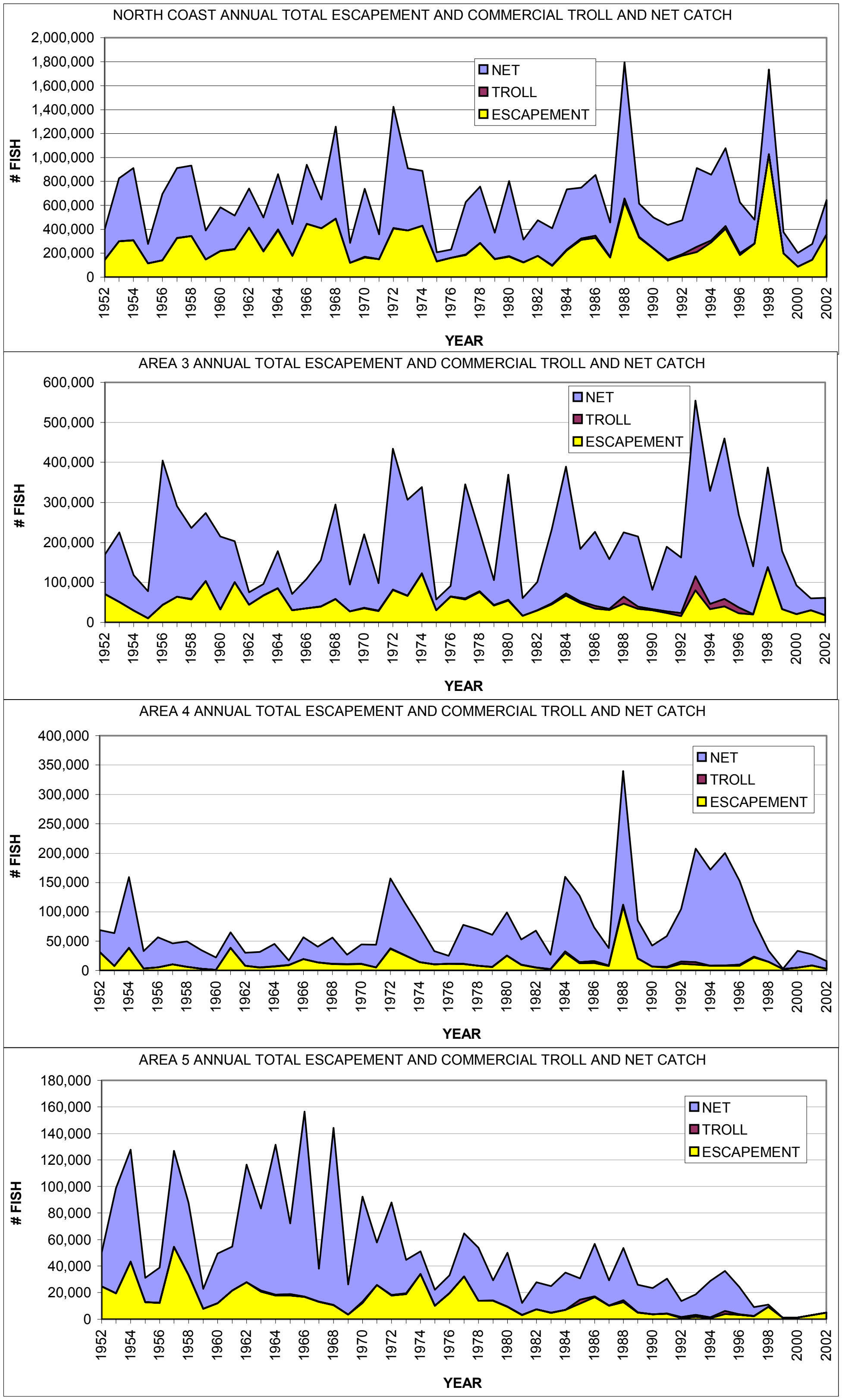


Figure 3. Stacked area charts of annual total escapement and total commercial net and troll catch for North Coast (3+4+5+6) and Areas 3, 4, 5 and 6.

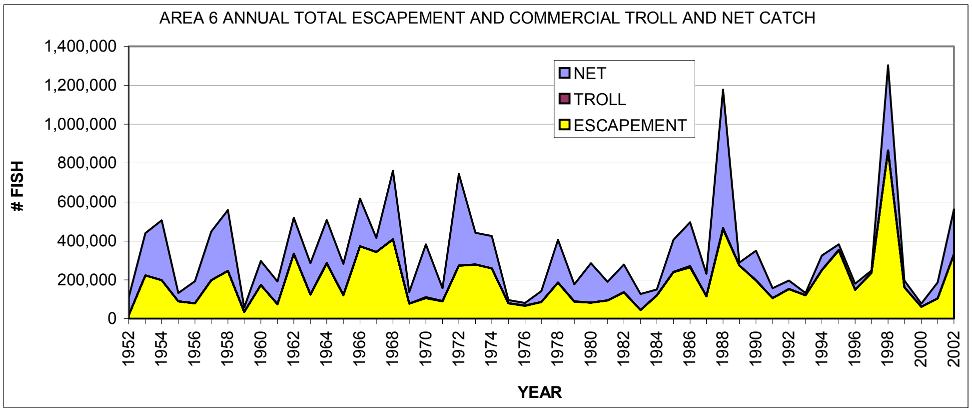


Figure 3 cont. Stacked area charts of annual total escapement and total commercial net and troll catch for North Coast.(3+4+5+6) and Areas 3, 4, 5, and 6.

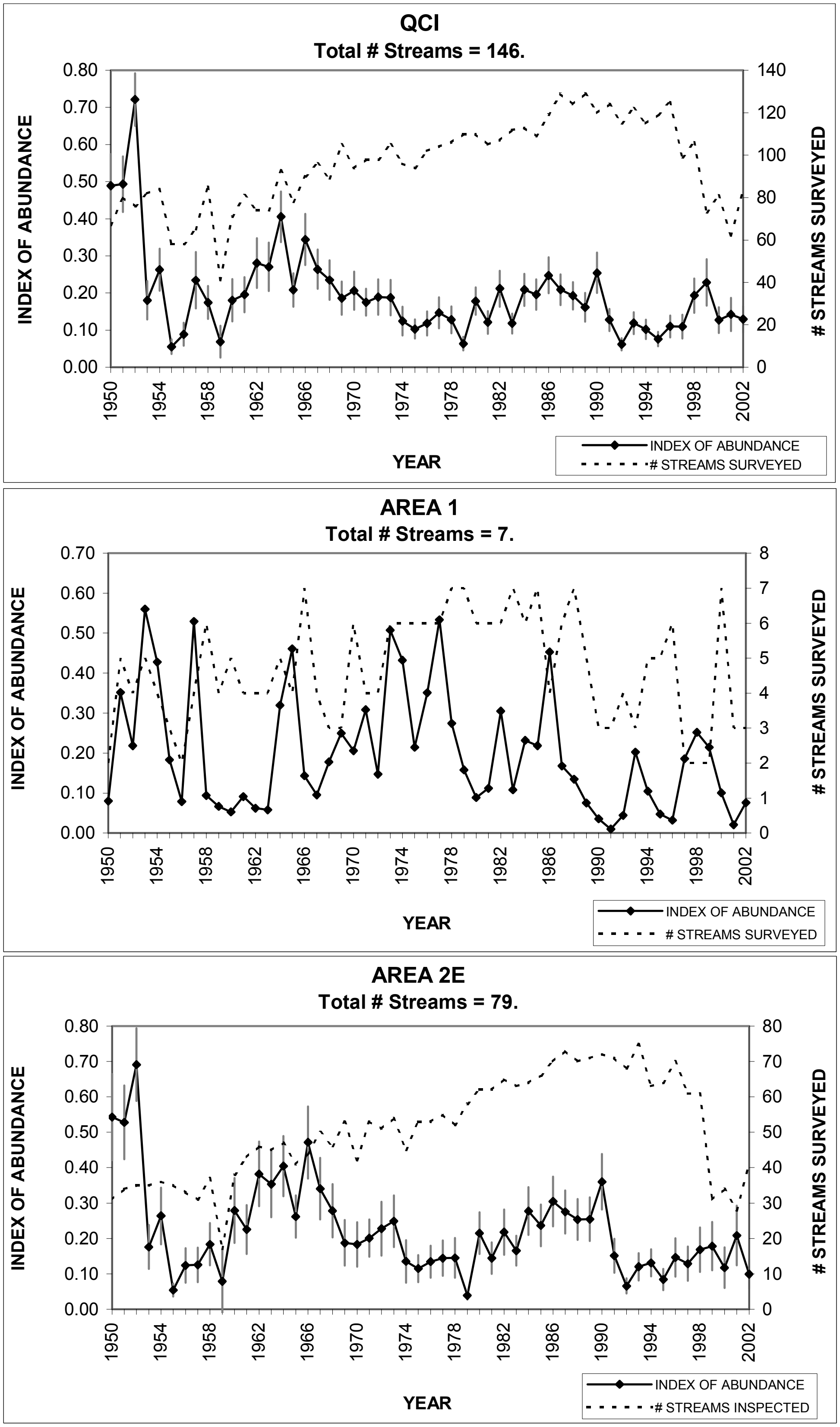


Figure 4. Trends in chum spawning escapement index with associated 95% confidence limits for the escapement estimate and number of streams surveyed for Q.C.I., Area 1, Area 2 East and Area 2 West aggregates.

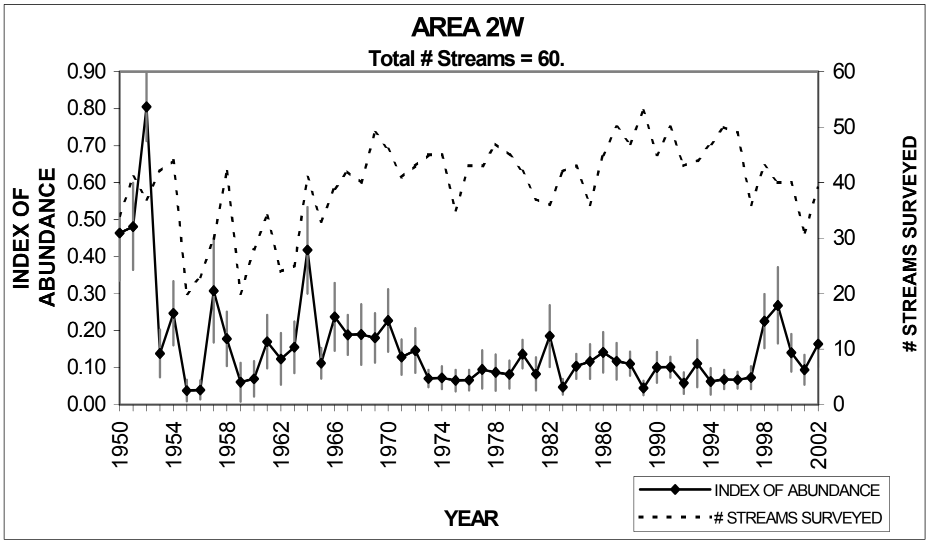


Figure 4 cont. Trends in chum spawning escapement index with associated 95% confidence limits for the escapement estimate and number of streams surveyed for QCI, Area 1, Area 2 East and Area 2 West aggregates.

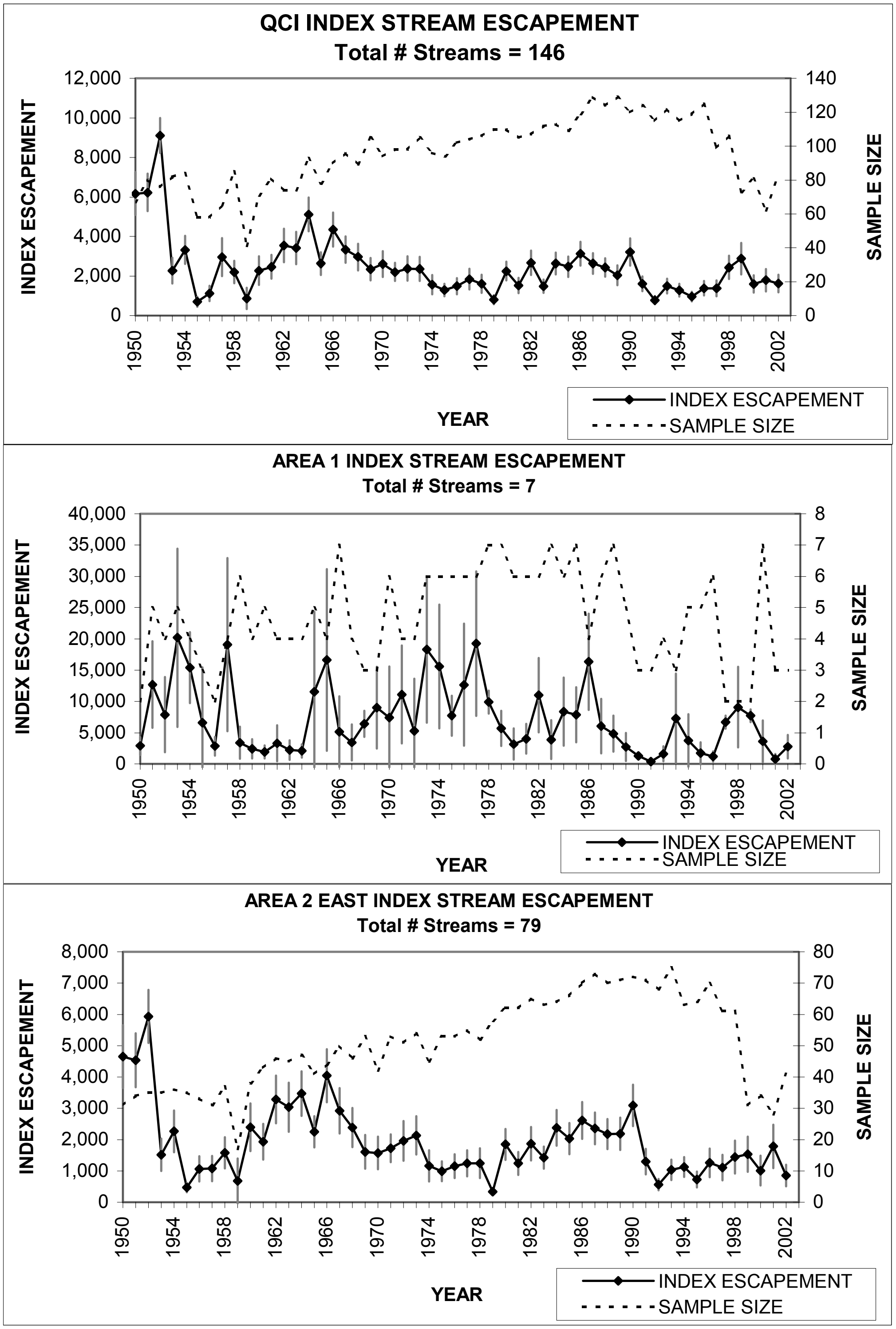


Figure 5. Trends in chum spawning index escapement with associated 95% confidence limits for the escapement estimate and number of streams surveyed for Q.C.I., Area 1, Area 2 East and Area 2 West aggregates.

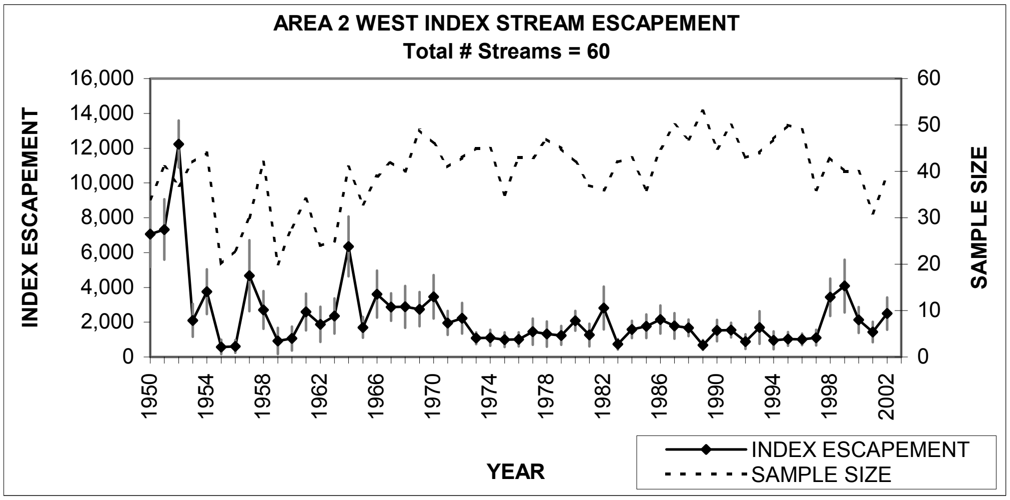
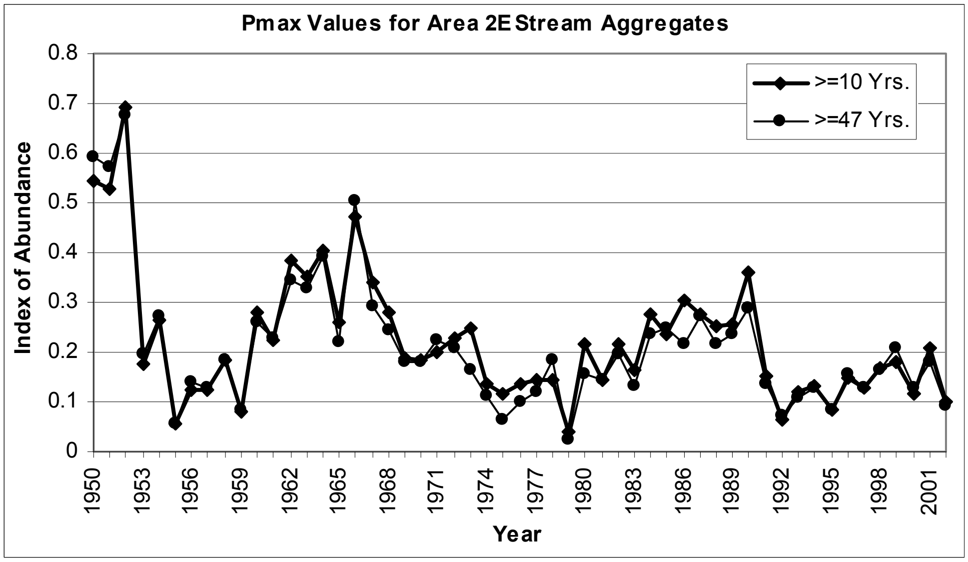


Figure 5 cont. Trends in chum spawning index escapement with associated 95% confidence limits for the escapement estimate and number of streams surveyed for QCI, Area 1, Area 2 East and Area 2 West aggregates.



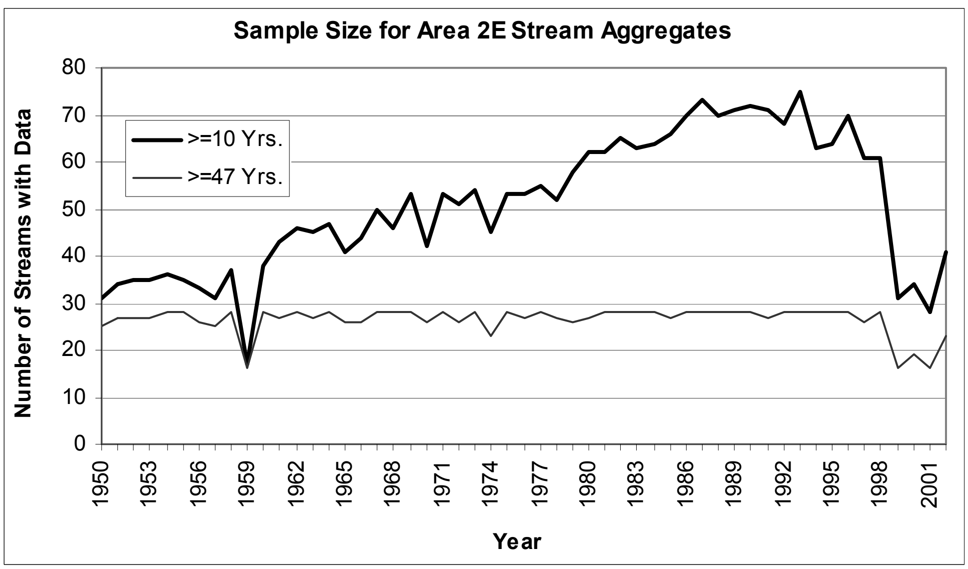


Figure 6. Comparison of escapement trends and sample size of Area 2 East aggregates of streams with at least 10 years of data and streams with at least 47 years of data.

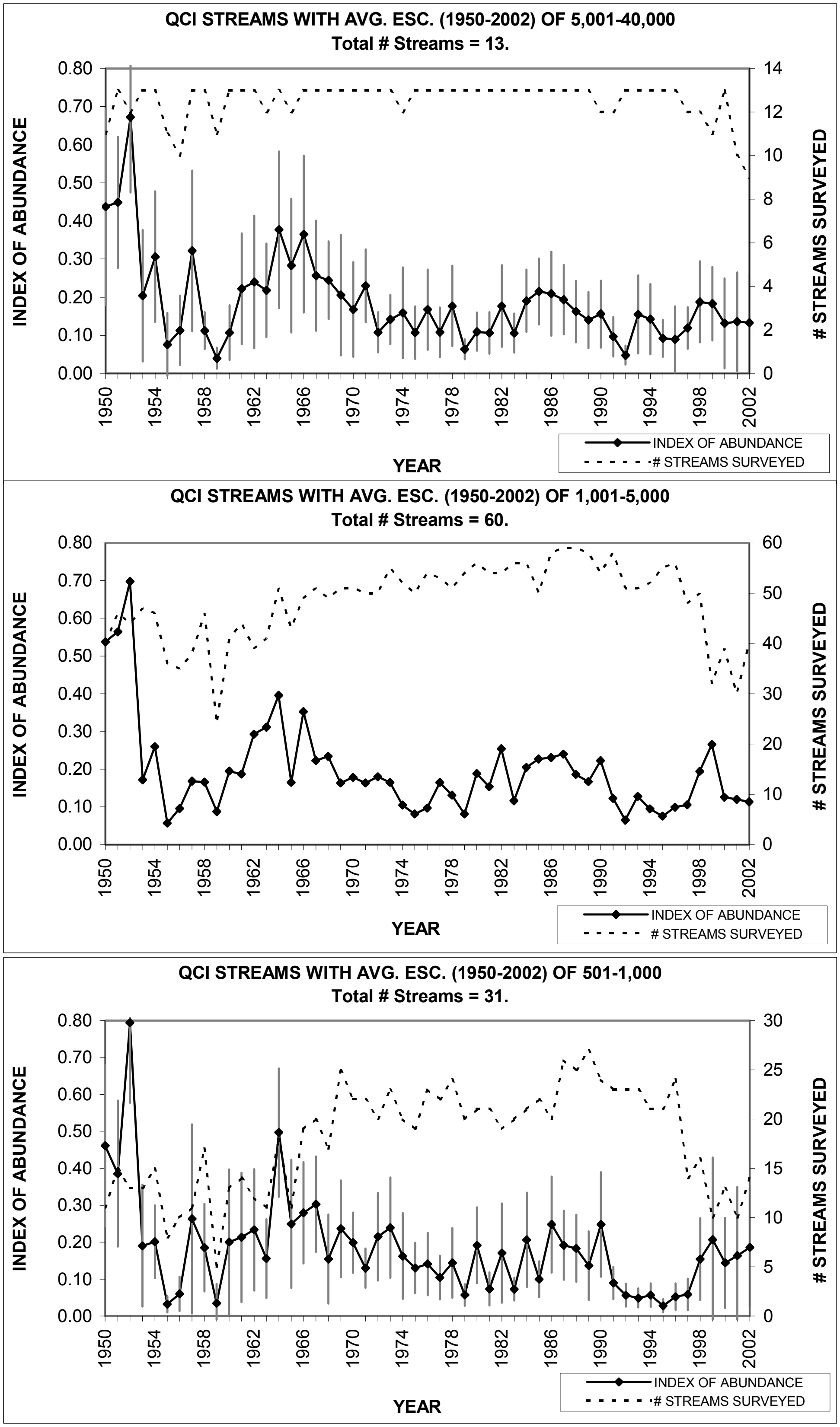


Figure 7. Trends in Q.C.I. chum spawning escapement index (average escapement aggregate) with associated 95% confidence limits for the escapement estimate and number of streams surveyed.

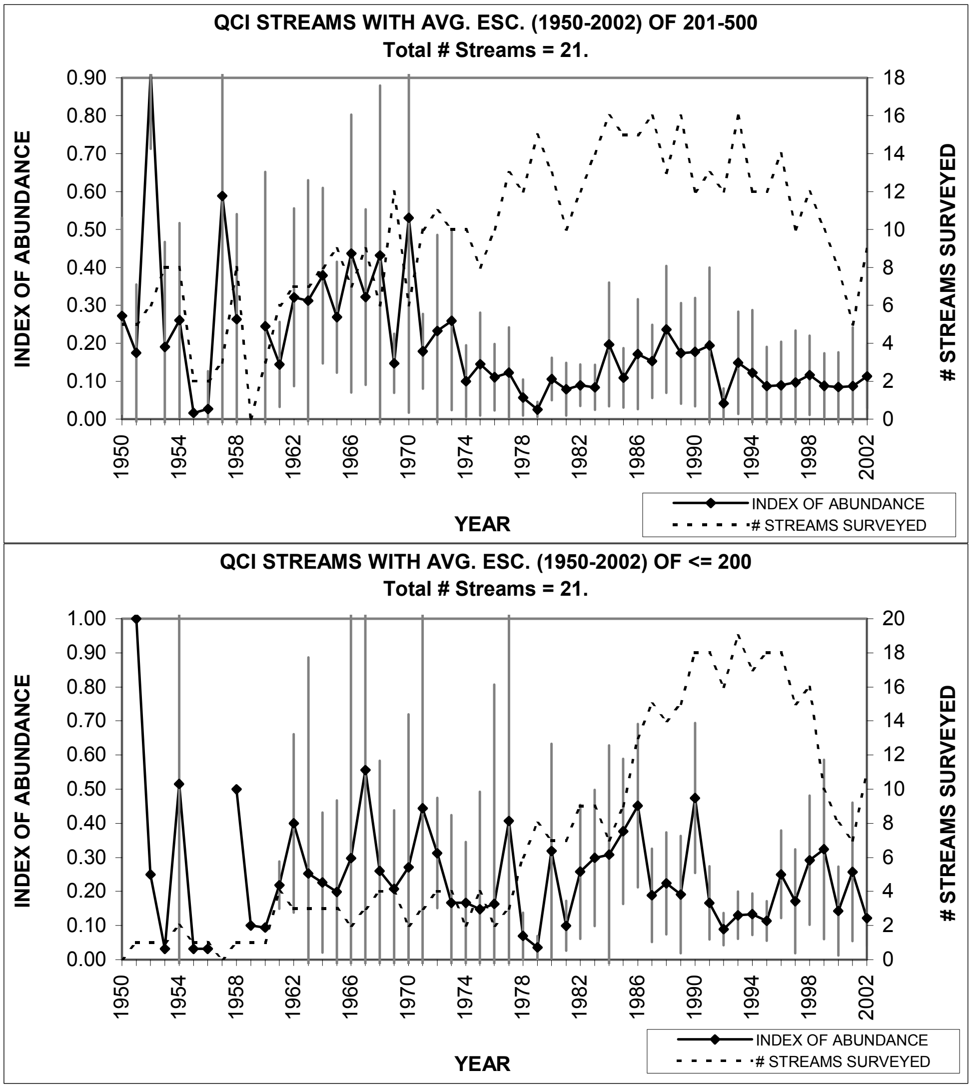


Figure 7 cont. Trends in QCI chum spawning escapement index (average escapement aggregate) with associated 95% confidence limits for the escapement estimate and number of streams surveyed.

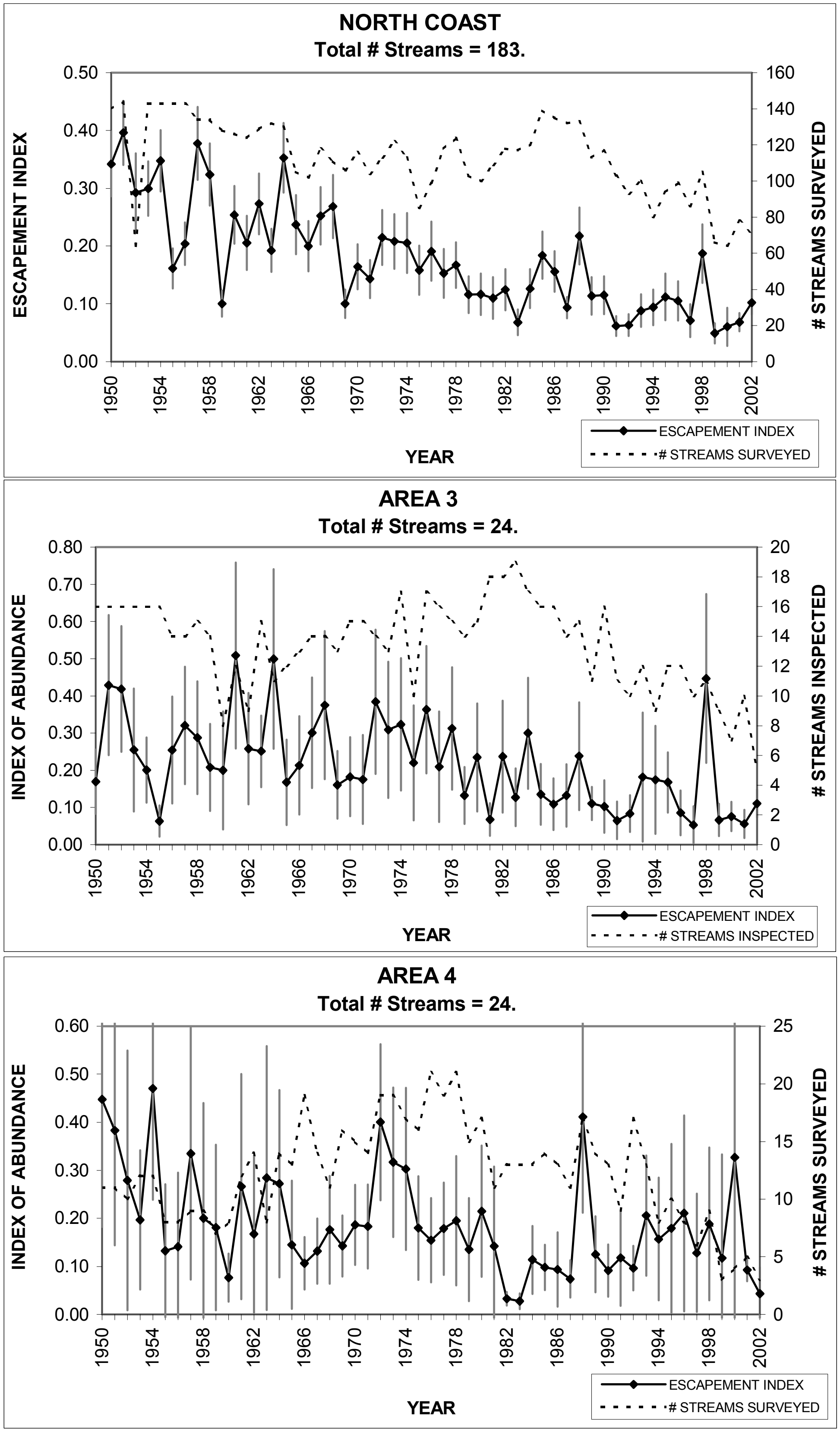


Figure 8. Trends in chum spawning escapement index with associated 95% confidence limits for the escapement estimate and number of streams surveyed for North Coast (3+4+5+6), Area 3, Area 4, Area 5 and Area 6 aggregates.

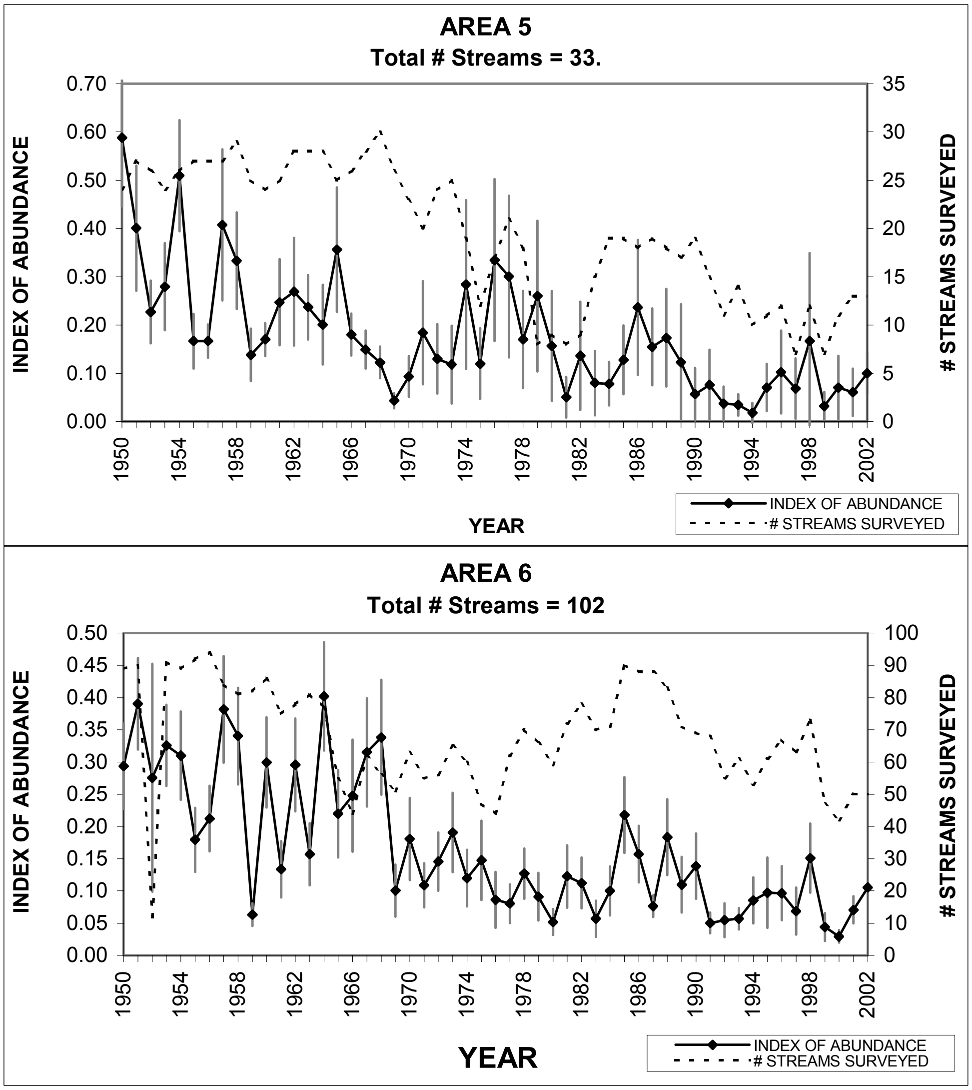
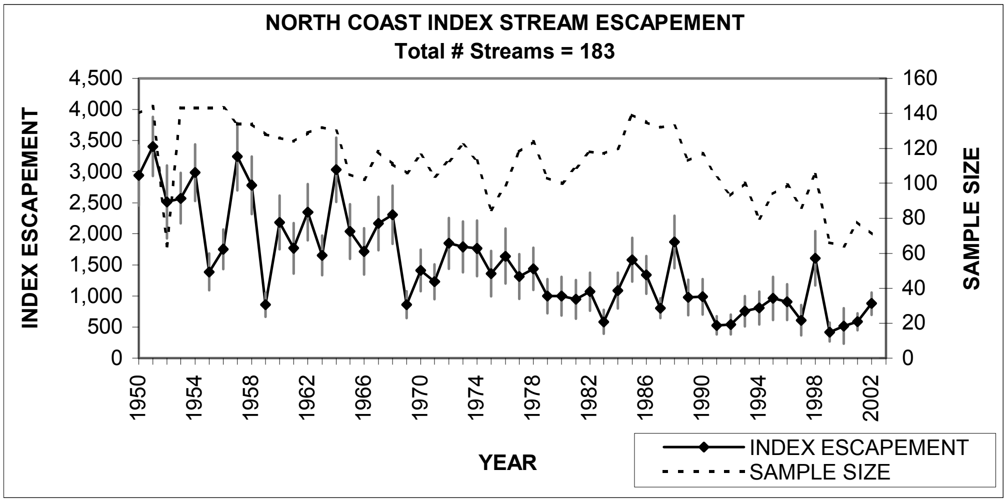
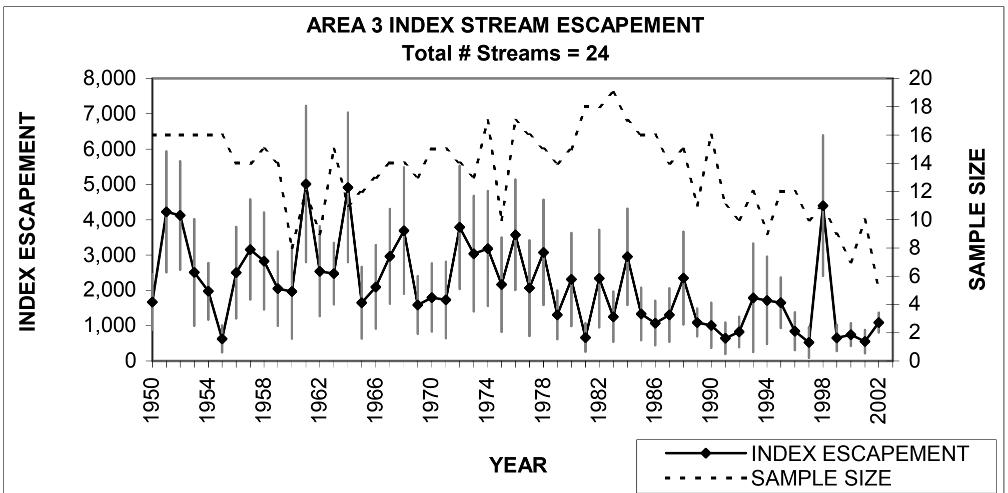


Figure 8 cont. Trends in chum spawning escapement index with associated 95% confidence limits for the escapement estimate and number of streams surveyed for North Coast, Area 3, Area 4, Area 5 and Area 6 aggregates.





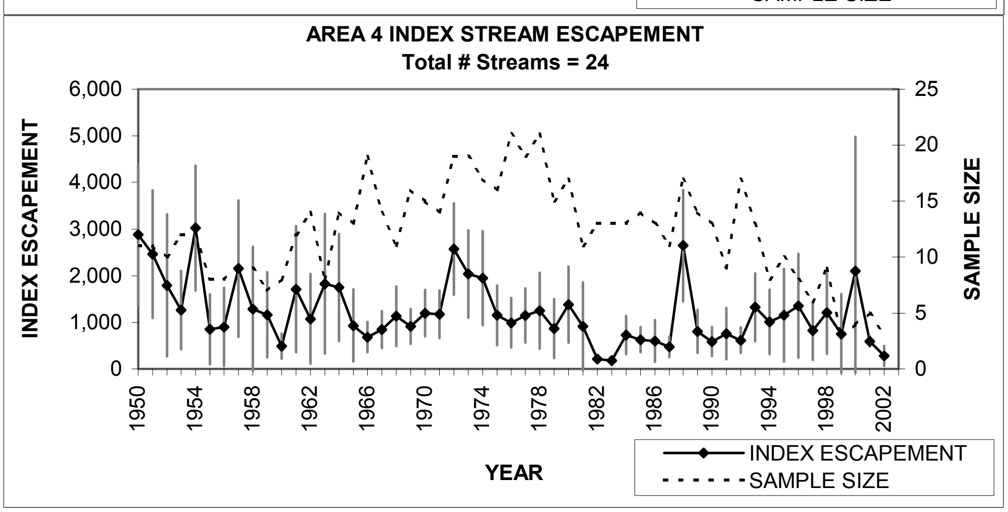
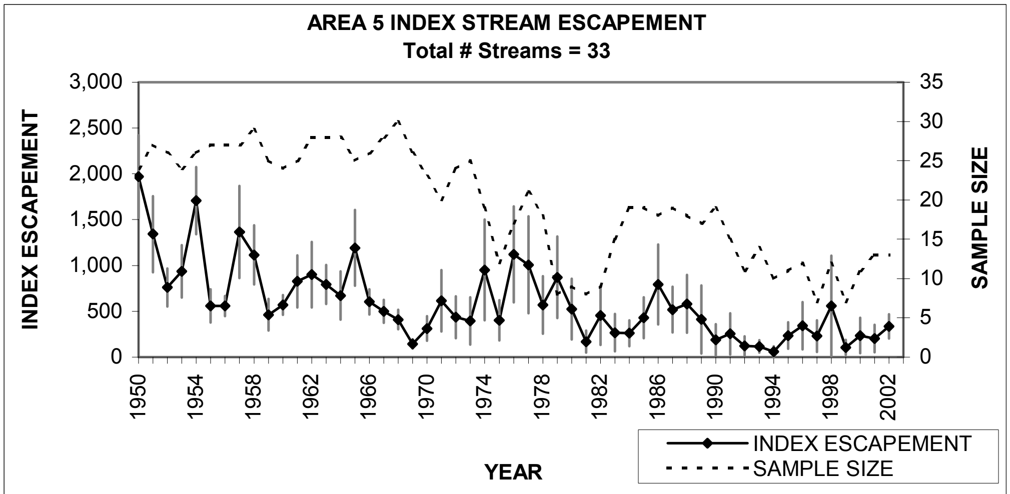


Figure 9. Trends in chum spawning index escapement with associated 95% confidence limits for the escapement estimate and number of streams surveyed for North Coast (3+4+5+6), Area 3, Area 4, Area 5 and Area 6 aggregates.



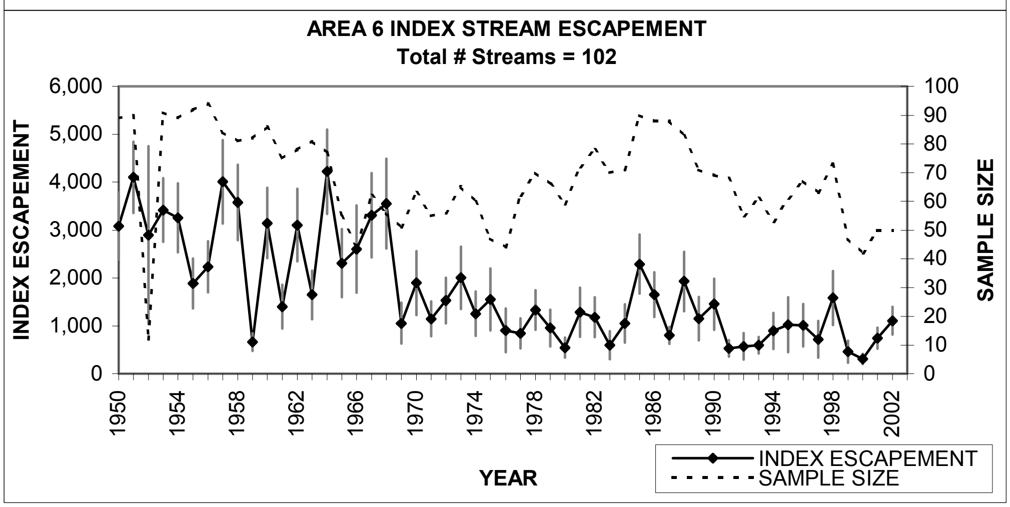
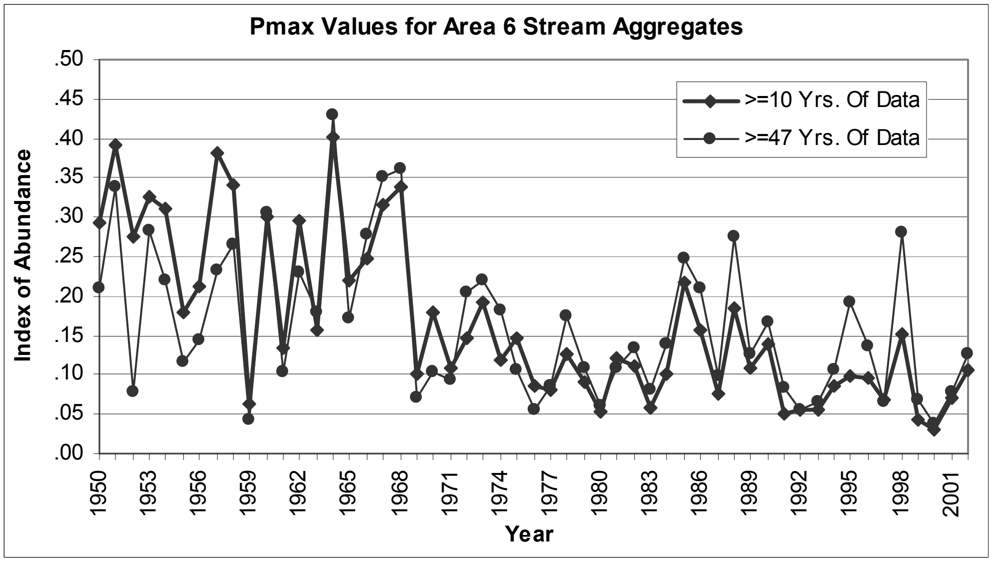


Figure 9 cont. Trends in chum spawning index escapement with associated 95% confidence limits for the escapement estimate and number of streams surveyed for North Coast, Area 3, Area 4, Area 5 and Area 6 aggregates.



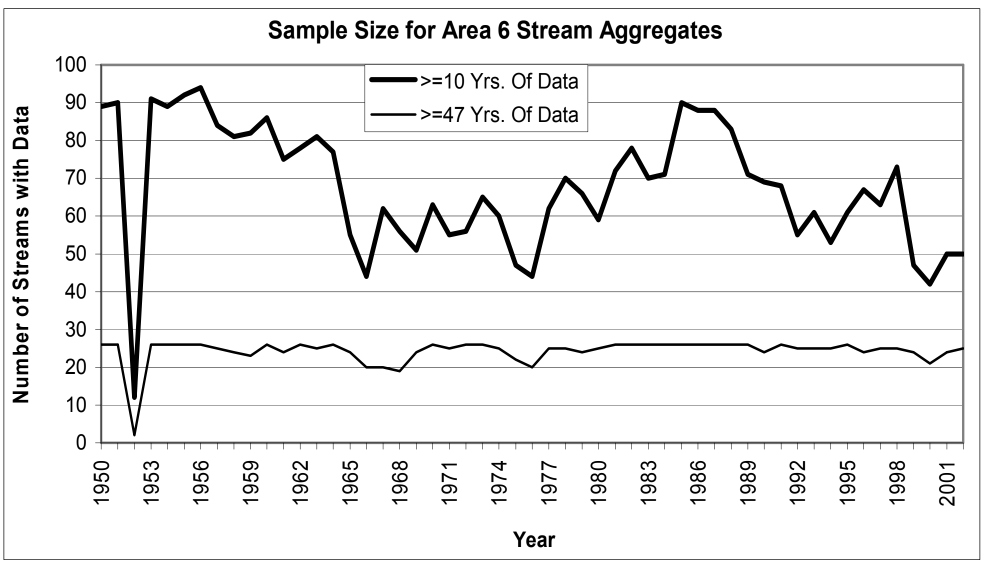


Figure 10. Comparison of escapement trends and sample size of Area 6 aggregates of streams with at least 10 years of data and streams with at least 47 years of data.

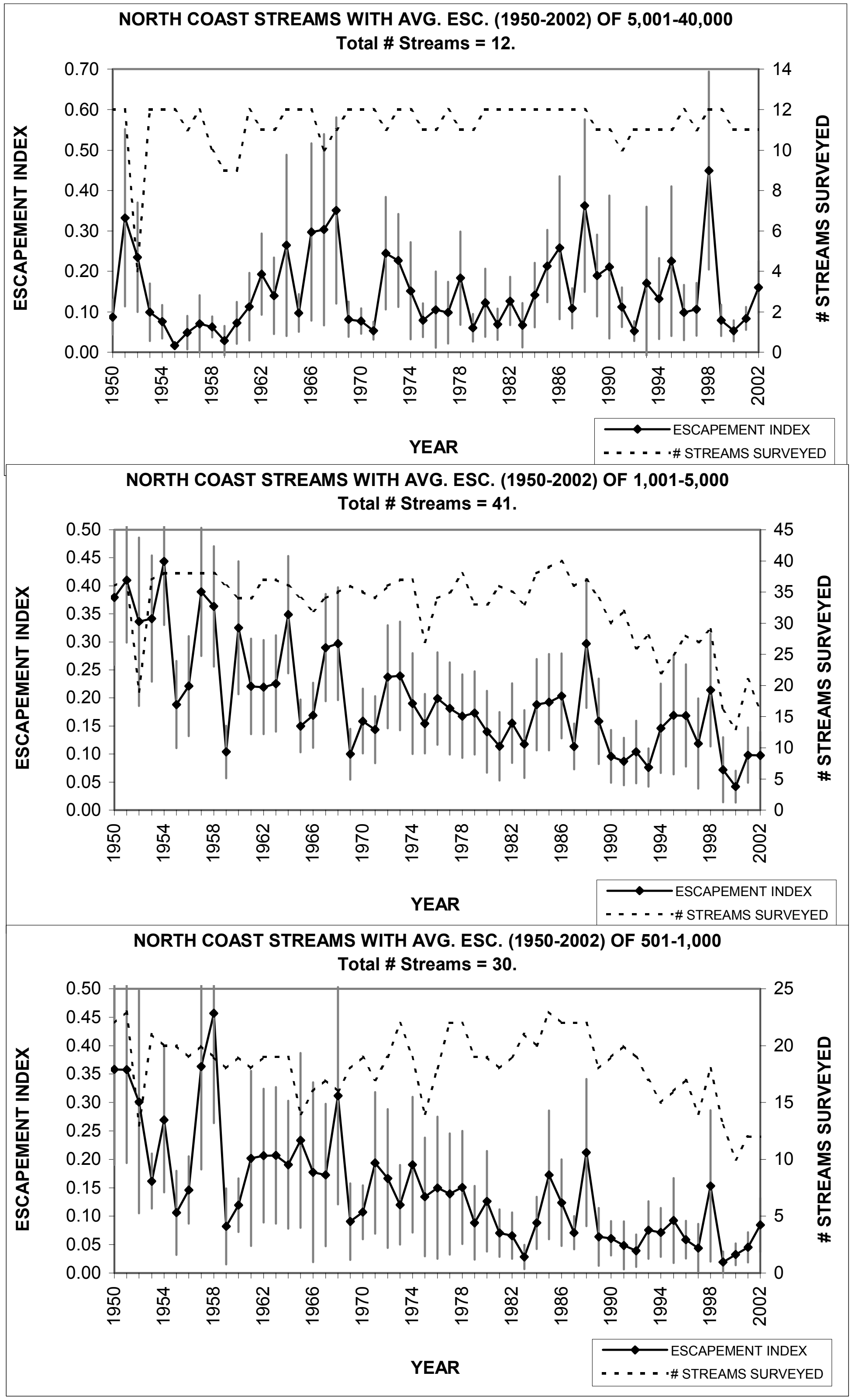


Figure 11. Trends in North Coast (3+4+5+6) chum spawning escapement index (average escapement aggregate) with associated 95% confidence limits for the escapement estimate and number of streams surveyed.

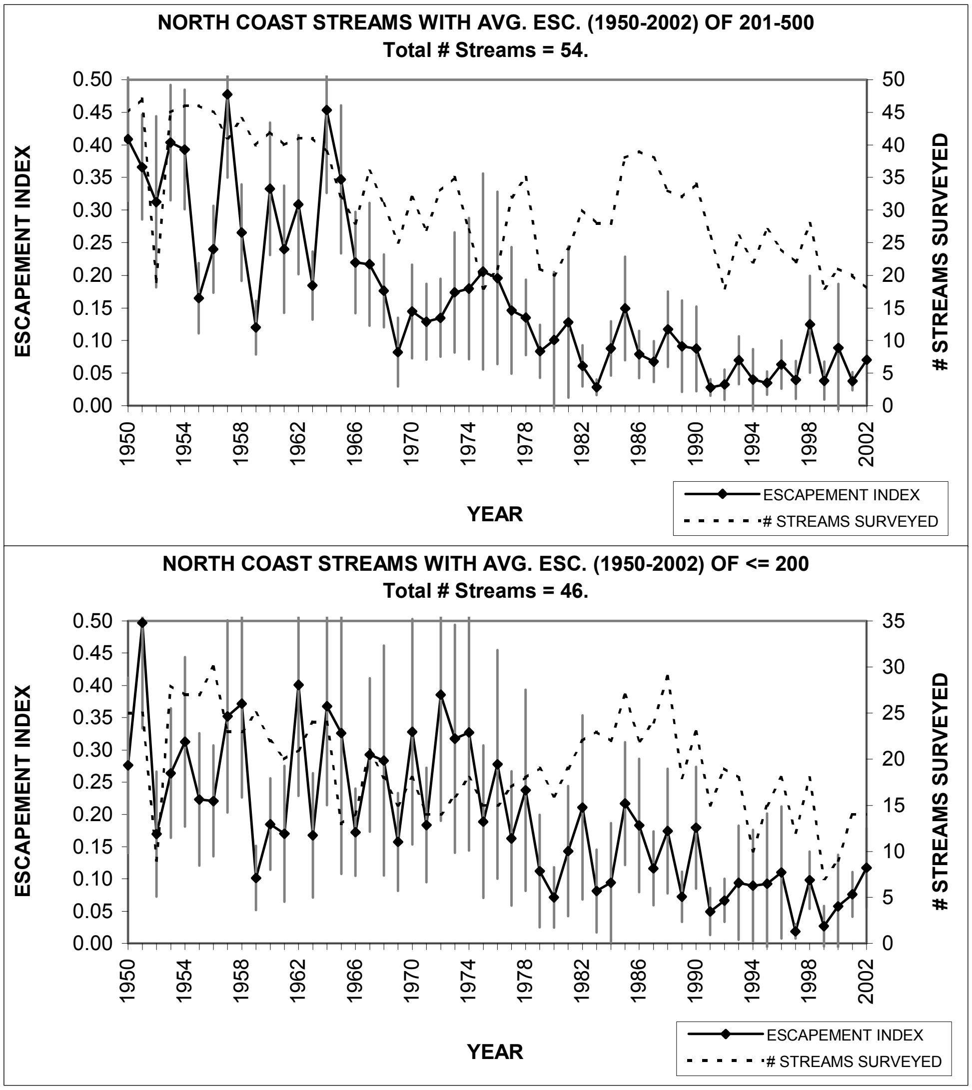
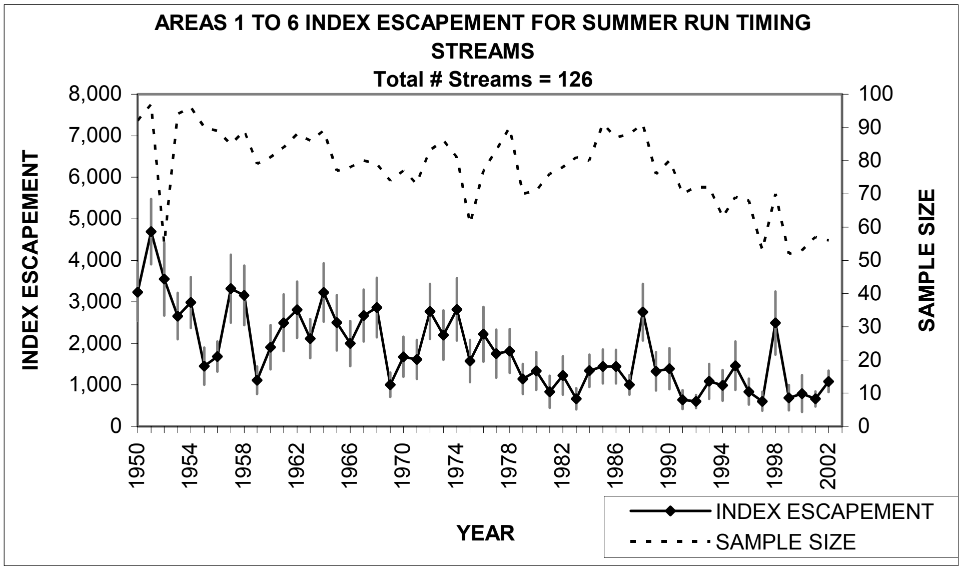


Figure 11 cont. Trends in North Coast chum spawning escapement index (average escapement aggregate) with associated 95% confidence limits for the escapement estimate and number of streams surveyed.



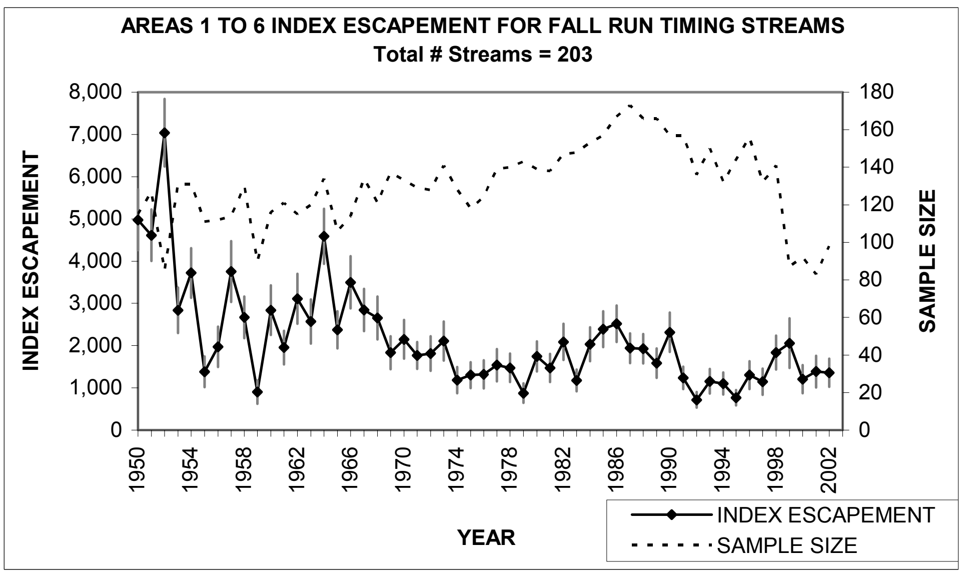
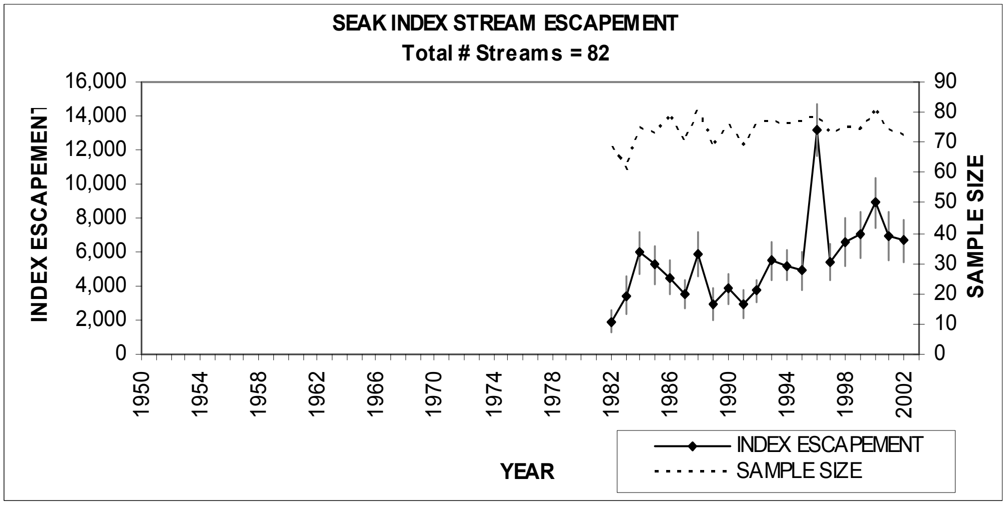
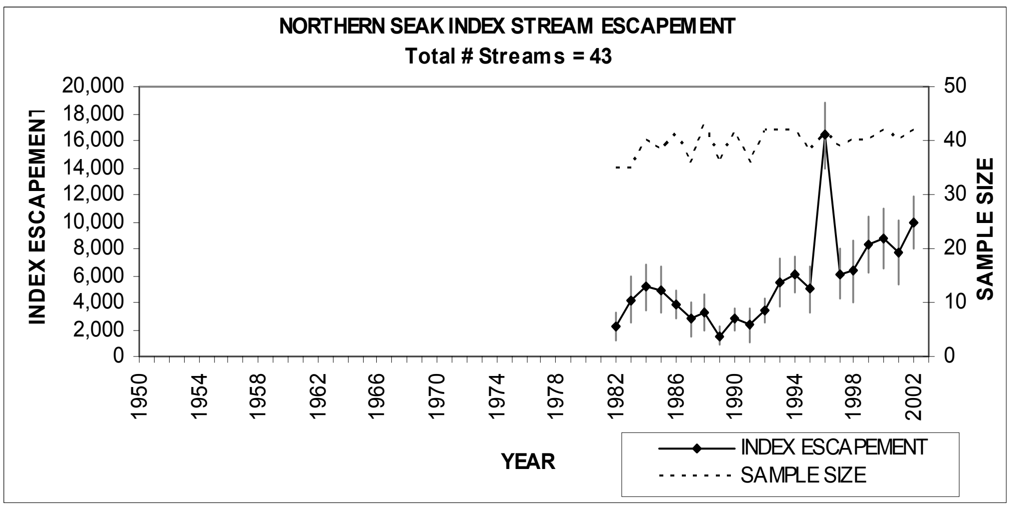


Figure 12. Index escapement trends for summer vs. fall run timing streams in northern B.C., Statistical Areas 1 to 6.





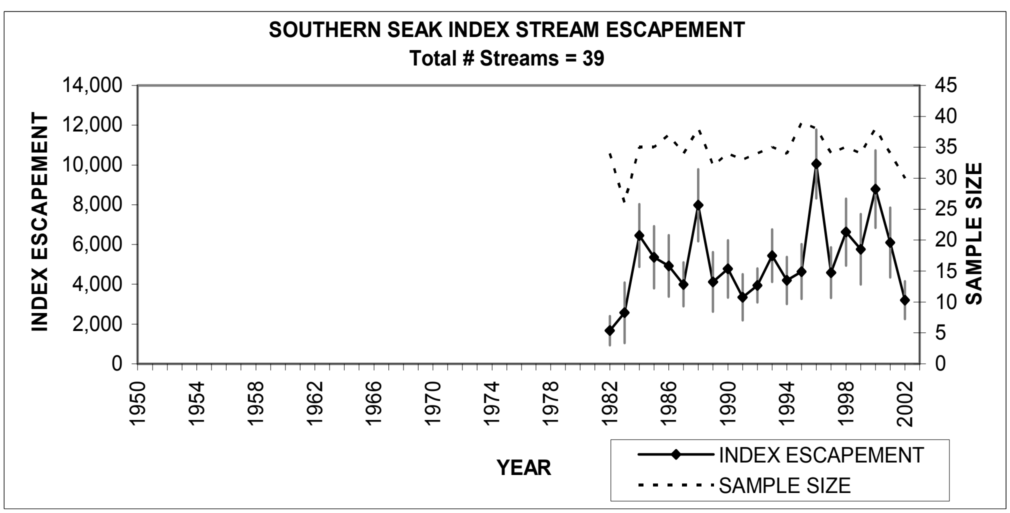


Figure 13. Trends in chum spawning index escapement with associated 95% confidence limits for the escapement estimate and number of streams surveyed for Southeast Alaska (SEAK), northern Southeast Alaska (NSEAK) and southern Southeast Alaska (SSEAK) aggregates.

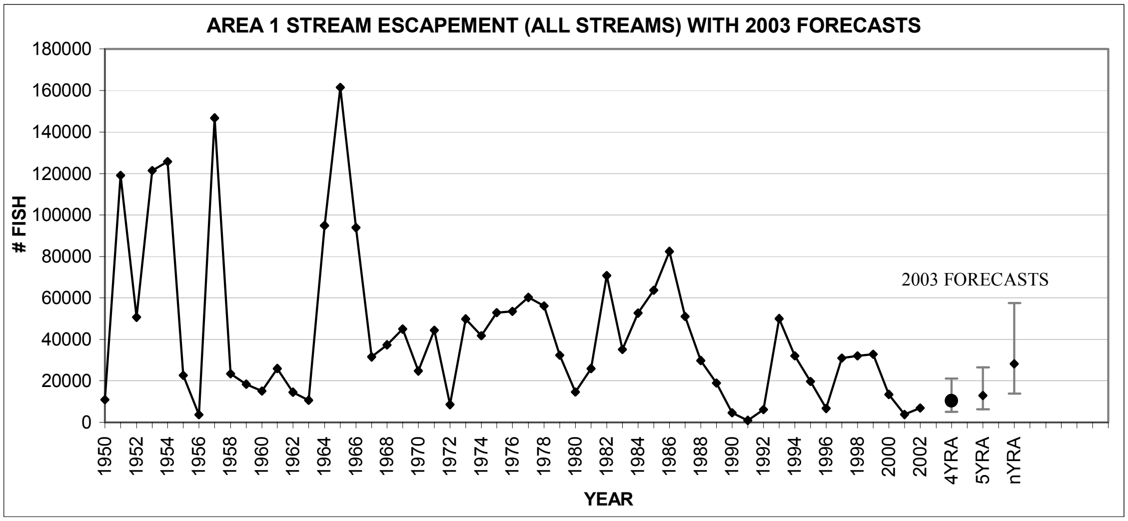


Figure 14. Forecast of total chum escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates 4YRA of the all stream aggregate the more appropriate forecasting model for Area 1. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 1 from 1950 to 2002.

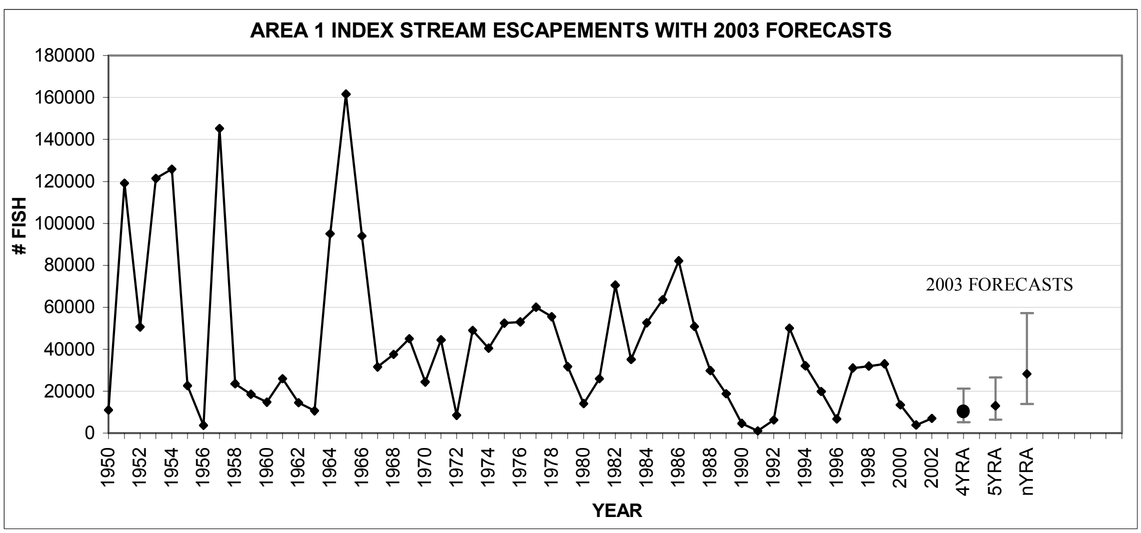


Figure 15. Forecast of index escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates 4YRA of the index aggregate the more appropriate forecasting model for Area 1. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 1 from 1950 to 2002.

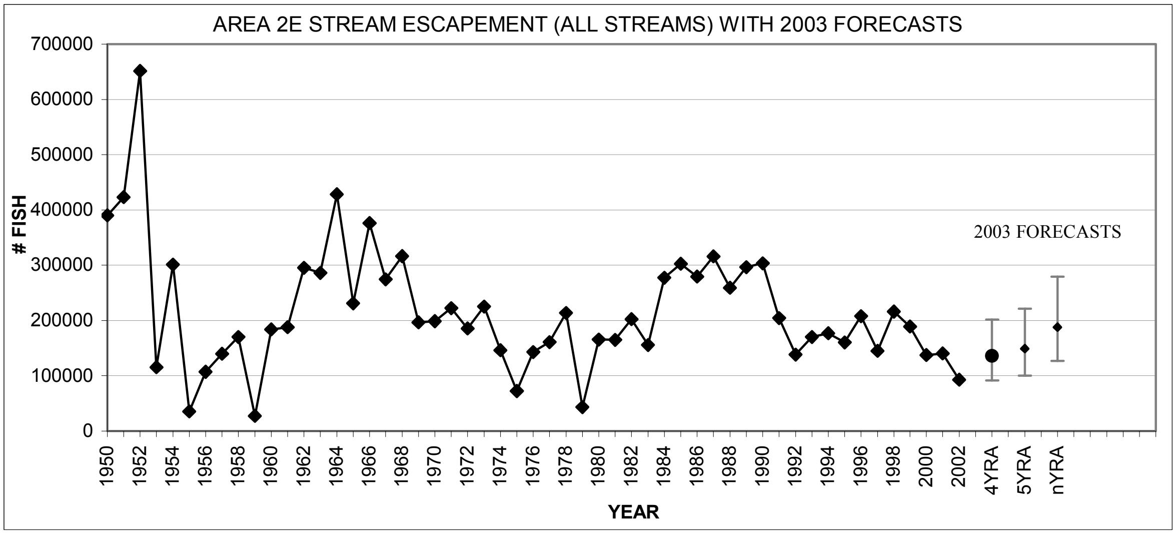


Figure 16. Forecast of total chum escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates 4YRA of the all stream aggregate the more appropriate forecasting model for Area 2 East. Error bars represent 50% CI around the estimate. The time series of escapement estimates are based on visual surveys of chum adults in Area 2 East from 1950 to 2002.

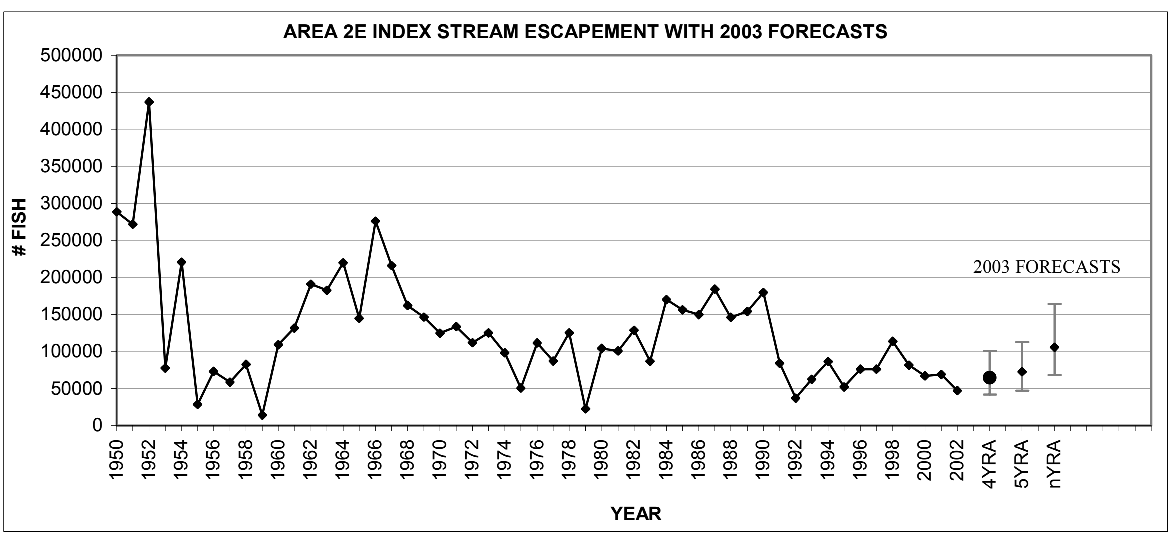


Figure 17. Forecast of index stream escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates 4YRA of the index stream aggregate the more appropriate forecasting model for Area 2 East. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 1 from 1950 to 2002.

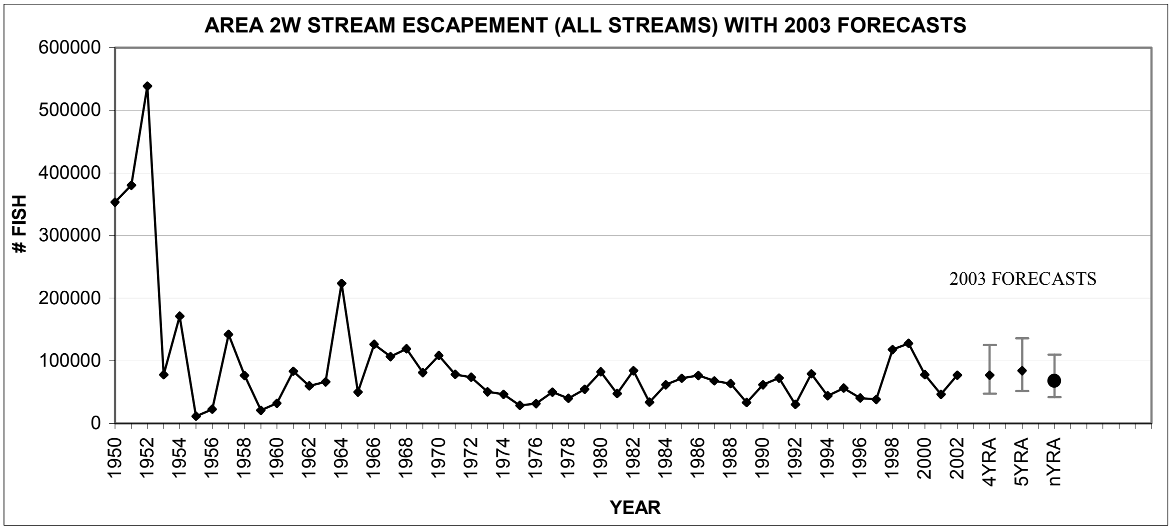


Figure 18. Forecast of total chum escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates nYRA of the all stream aggregate the more appropriate forecasting model for Area 2 West. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 2 West from 1950 to 2002.

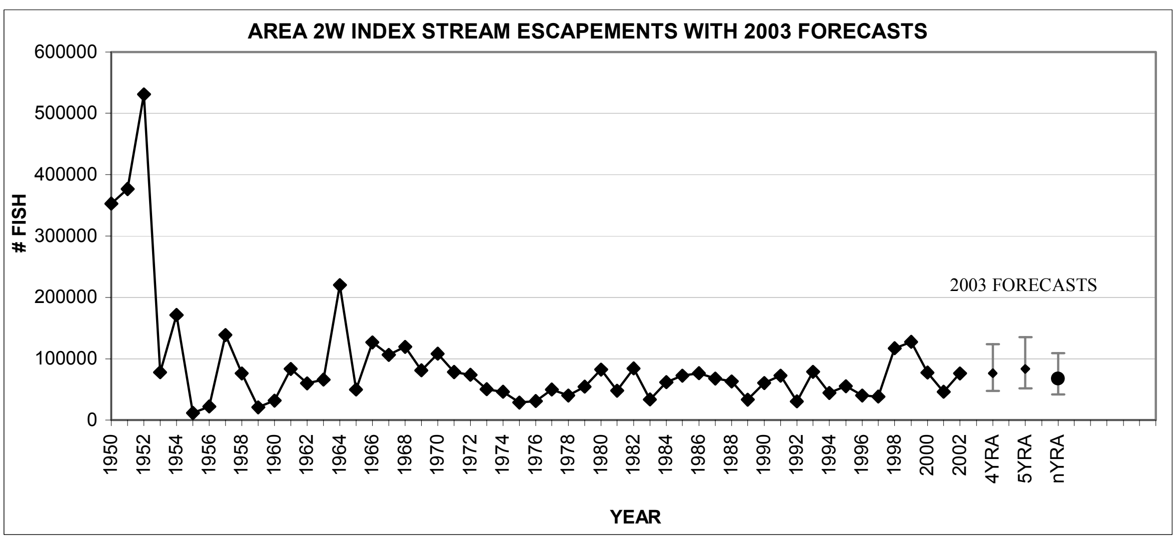


Figure 19. Forecast of index stream escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates nYRA of the index stream aggregate the more appropriate forecasting model for Area 2 West. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 2 West from 1950 to 2002.

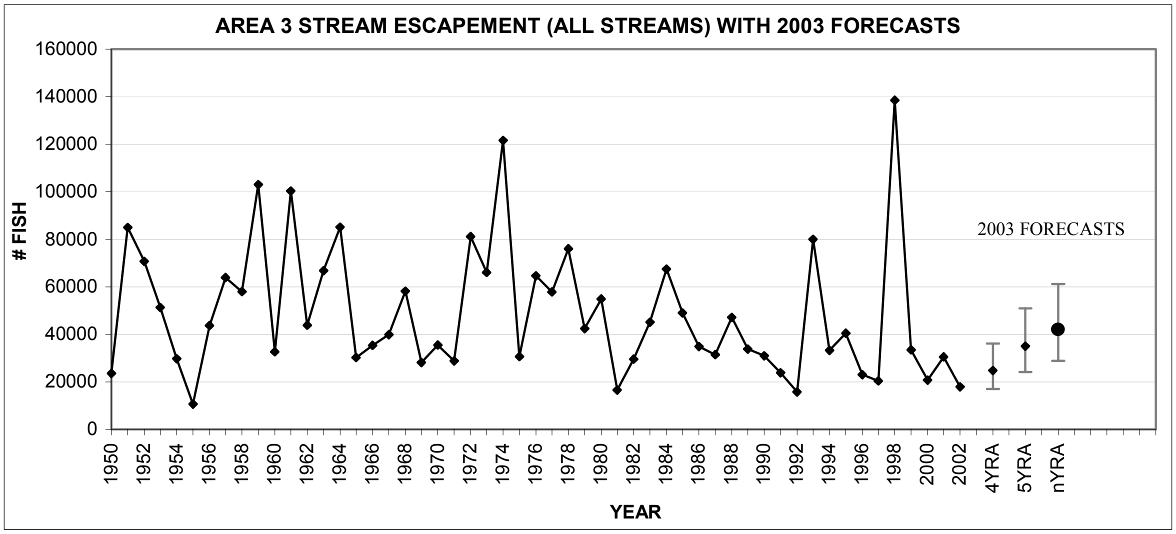


Figure 20. Forecast of total chum escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates nYRA of the all stream aggregate the more appropriate forecasting model for Area 3. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 3 from 1950 to 2002.

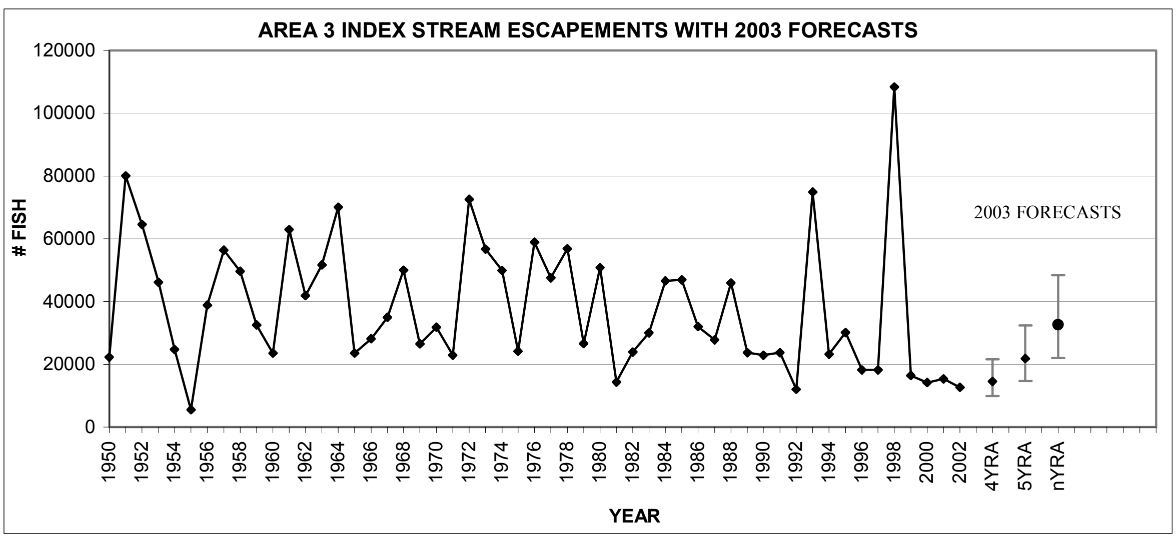


Figure 21. Forecast of index stream escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates nYRA of the index stream aggregate the more appropriate forecasting model for Area 3. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 3 from 1950 to 2002.

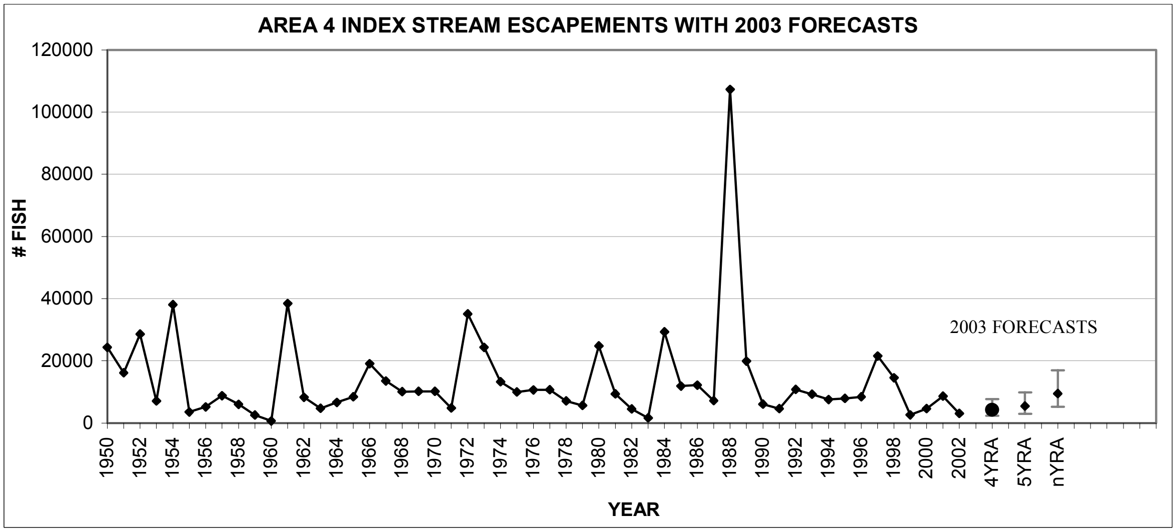


Figure 22. Forecast of total chum escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates 4YRA of the all stream aggregate the more appropriate forecasting model for Area 4. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 4 from 1950 to 2002.

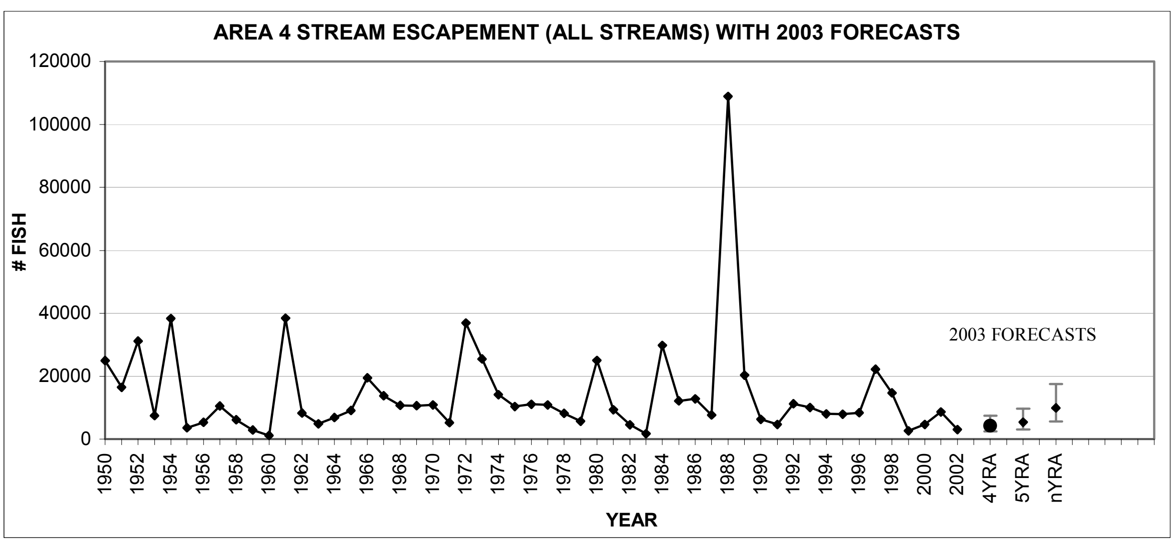


Figure 23. Forecast of index stream escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates 4YRA of the index stream aggregate the more appropriate forecasting model for Area 4. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 4 from 1950 to 2002.

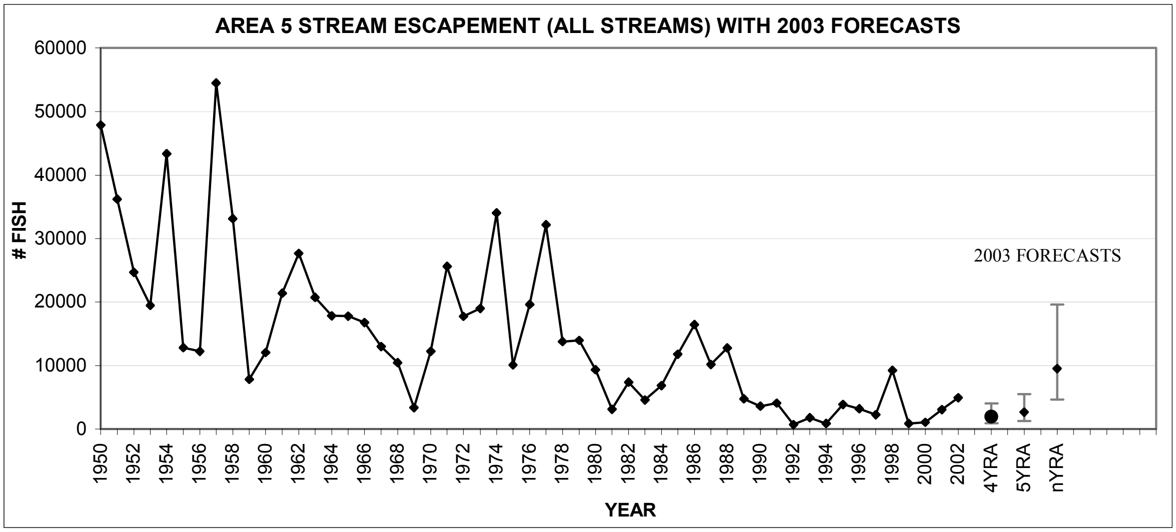


Figure 24. Forecast of total chum escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates 4YRA of the all stream aggregate the more appropriate forecasting model for Area 5. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 5 from 1950 to 2002.

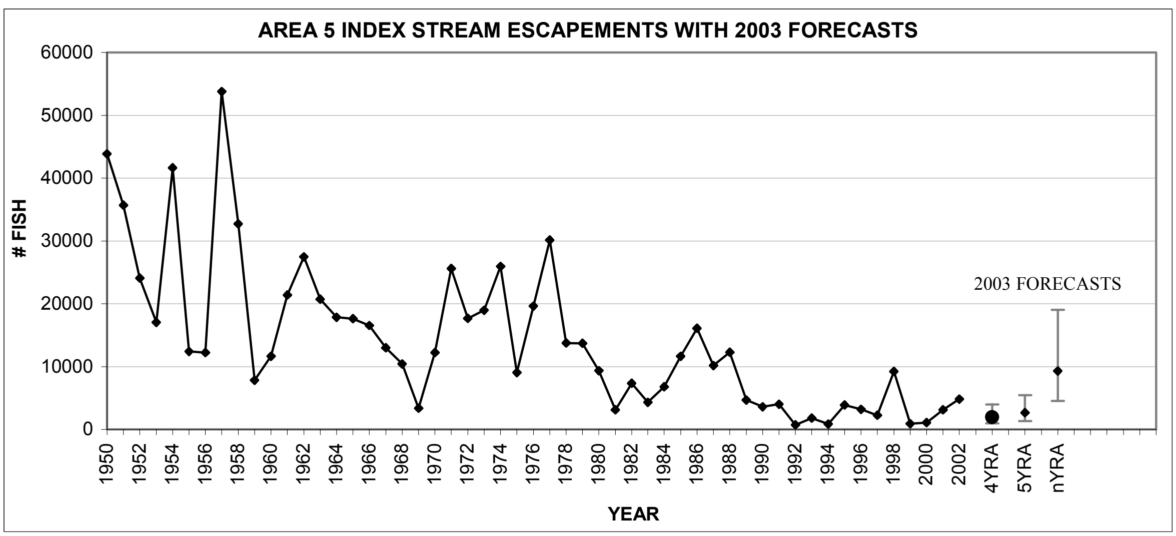


Figure 25. Forecast of index stream escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates 4YRA of the index stream aggregate the more appropriate forecasting model for Area 5. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 5 from 1950 to 2002.

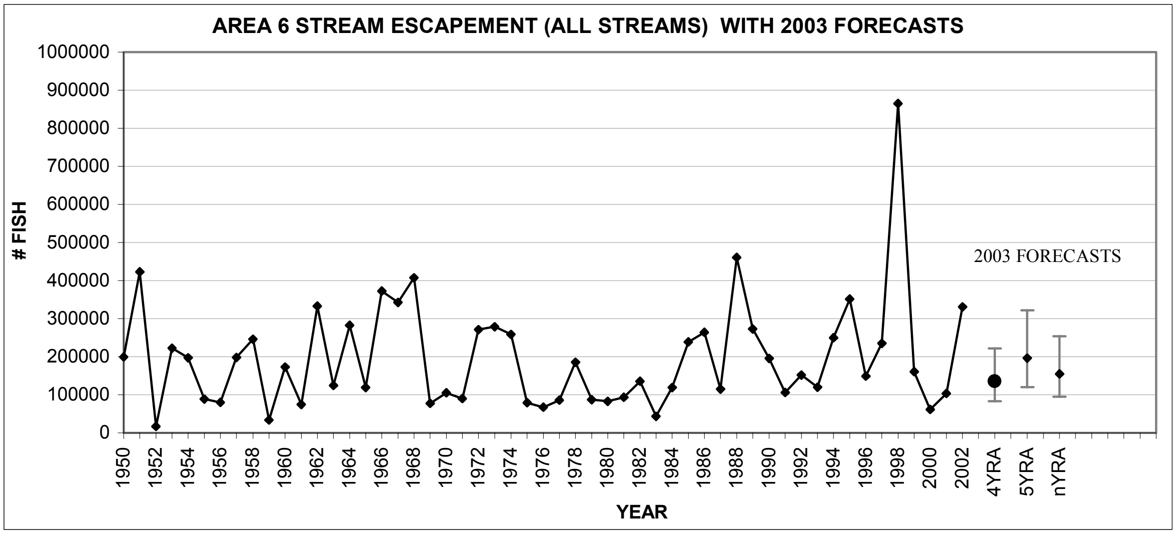


Figure 26. Forecast of total chum escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates 4YRA of the all stream aggregate the more appropriate forecasting model for Area 6. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 6 from 1950 to 2002.

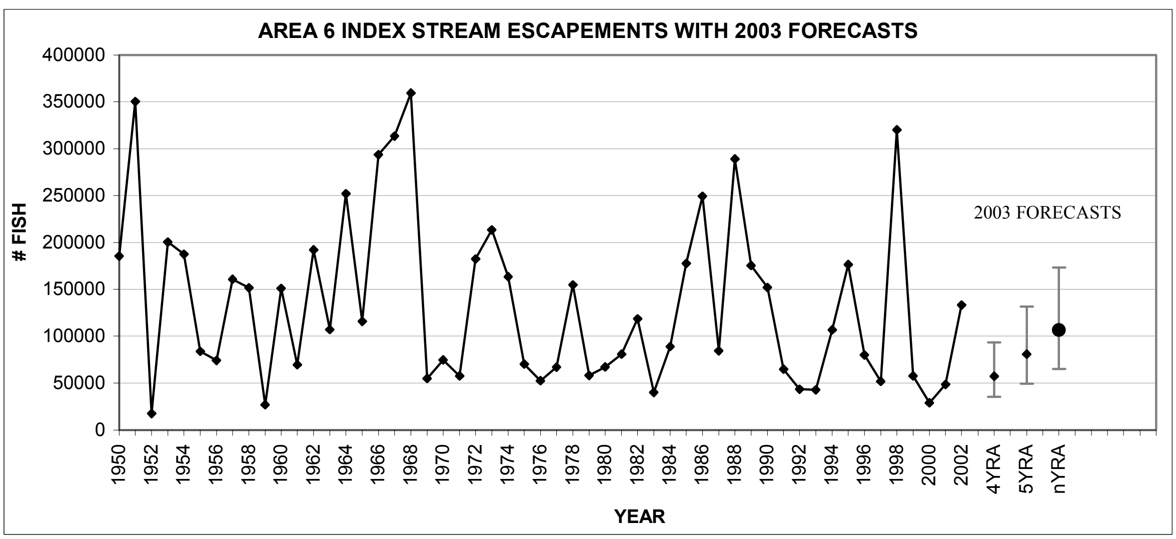


Figure 27. Forecast of index stream escapement for 2003 using a 4, 5 and n-year running average. RMSE retrospective analysis indicates nYRA of the index stream aggregate the more appropriate forecasting model for Area 6. Error bars represent 50% CI around the estimate. The time series of escapement estimates is based on visual surveys of chum adults in Area 6 from 1950 to 2002.

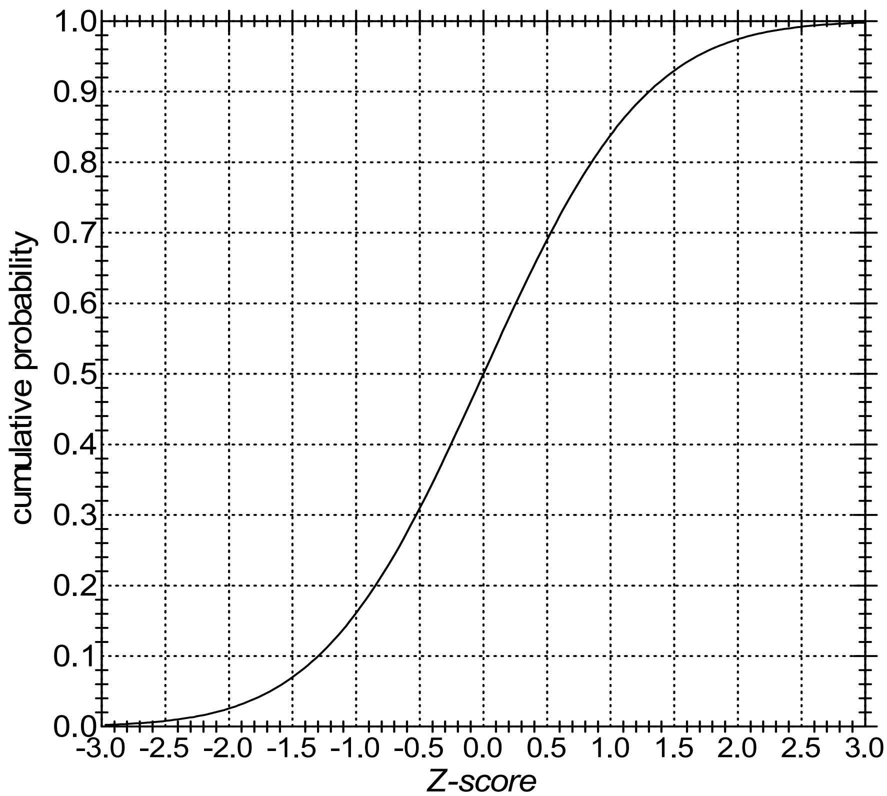


Figure 28. Cumulative probabilities for Z-scores applicable to the escapement time series for Statistical Areas 1, 2 East, 2 West, 3, 4, 5 and 6.