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# Stock Assessment and Management Advice for the British Columbia Herring Fishery: 2009 Assessment and 2010 Forecasts

# Évaluation des stocks et conseils de gestion pour la pêche au hareng en Colombie-Britannique Évaluation de 2009 et prévisions pour 2010


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# Abstract

Herring stock abundance in British Columbia (B.C.) waters was assessed for 2009 and forecasts were made for 2010 using the herring catch-age model (HCAMv2), developed for the 2008 assessment. The B.C. herring fishery is managed as five major and two minor stock areas. Accordingly, catch and survey information is collected independently for each of these seven areas and Science advice is provided on the same scale. All available biological data on total harvest, spawn deposition, and age and size composition of the spawning runs were used to determine current abundance levels. Herring abundance increased coastwide in 2009 in all stock areas except the Prince Rupert District stock. The total estimated pre-fishery biomass for the major assessment regions was 103,470 metric tonnes (t), which represents a 9% increase over the 2008 abundance 95,076 t. The recruitment of the 2006 year class in 2009 was average for the Queen Charlotte Islands and the Central Coast, good for the Strait of Georgia, poor for west coast of Vancouver Island while recruitment in Prince Rupert was poor to average. The stock projections for 2010 indicate reduced abundance and poor recruitment in three major stock areas that will not support commercial harvest: Queen Charlotte Islands, west coast of Vancouver Island, and the Central Coast. Using formal decision rules that consider past stock status and recruitment, the estimated harvestable surplus of B.C. herring in 2010 (20% of the 2010 forecast spawning stock biomass) in the two remaining major areas is 3,100 t in the Prince Rupert area (average recruitment) and 9,000 t in the Strait of Georgia (poor recruitment). Harvest recommendations for the minor stock areas assume average recruitment and follow a precautionary 10% harvest rate: 135 t in Area 27 and 413 t in Area 2W.

# Résumé

L’abondance des stocks de hareng dans les eaux de la Colombie-Britannique a été évaluée pour 2009 et des prévisions ont été faites pour 2010 à l’aide du modèle des prises de hareng selon l’âge (HCAMv2), mis au point pour l’évaluation de 2008. La pèche au hareng en Colombie-Britannique est gérée en fonction de cinq principales zones d’évaluation des stocks et de deux zones secondaires. En conséquence, la collecte de l’information sur les prises et les relevés se fait indépendamment pour chacune des sept zones et les avis scientifiques sont donnés selon le même mode. Toutes les données biologiques disponibles sur les prises totales, la ponte ainsi que la composition selon l’âge et la taille des reproducteurs en migration ont été utilisées pour déterminer les niveaux d’abondance actuels. En 2009, l’abondance du hareng sur l’ensemble de la côte a augmenté dans toutes les zones de stocks sauf pour le stock du district de Prince Rupert. La biomasse totale estimée des harengs avant la pêche dans les principales zones d’évaluation était de 103 470 tonnes métriques (t), soit une augmentation de 9 % par rapport à l’abondance de 95 076 t en 2008. En 2009, on a obtenu un recrutement moyen de la classe d’âge de 2006 dans les îles de la Reine-Charlotte et la région de la côte centrale, tandis qu’il a été bon dans le détroit de Georgie, faible sur la côte ouest de l’île de Vancouver et que le recrutement à Prince Rupert a été de faible à moyen. Les projections relatives aux stocks pour 2010 indiquent une abondance réduite et un recrutement faible qui ne pourra soutenir la pêche commerciale dans trois principales zones d’évaluation, soit celles des îles de la Reine-Charlotte, de la côte ouest de l’île de Vancouver et de la côte centrale. En utilisant les règles de décision qui tiennent compte de la biomasse totale passée et du recrutement passé, l’estimation de l’excédant récoltable de harengs en Colombie-Britannique pour 2010 (20 % de la biomasse prévue du stock reproducteur de 2010), dans les deux autres zones principales, se situe à 3 100 tonnes pour la zone de Prince Rupert (recrutement moyen) et à 9 000 tonnes pour le détroit de Georgie (recrutement faible). Les recommandations concernant la capture dans les zones secondaires supposent un recrutement moyen et adoptent un taux de capture prudent de 10 %, soit de 135 t dans la zone 27 et de 413 t dans la zone 2W.

# Executive summary

The B.C. herring fishery is managed as five major and two minor stock areas. Accordingly, catch and survey information is collected independently for each of these seven areas and science advice is provided on the same scale. The 2009 stock assessment for the B.C. herring fishery was carried out using a version of a herring catch-age model (HCAMv2), developed for the 2008 assessment. Our approach involves fitting this catch-age model to the time series of commercial catch data, spawn index and proportions-at-age data within a Bayesian estimation framework. Model outputs for the time series include estimates of recruitment (3 year old fish), numbers at age, spawning stock biomass and pre-fishery forecasts of biomass, as well as estimates of natural mortality, fishing mortality and fishery selectivity by gear type. Biomass estimates represent median estimates from the marginal posterior distributions. Catch advice, presented in the form of decision tables, is based on model forecasts of repeat spawners and posterior distributions of recruitment under assumptions of poor, average and good recruitment. For the Strait of Georgia and West Coast Vancouver Island stocks, recruitment forecasts are based on results from the summer off-shore trawl survey. For the Queen Charlotte Islands, Prince Rupert District and Central Coast stocks, recruitment forecast rules are applied based on recent stock trends. For the two minor stocks, the recruitment forecast rule is to assume an average recruitment.

This year, two changes were made to the HCAMv2 model. The first relates to the way in which ageing samples are used by the model and the second relates to the way we parameterize initial fishing mortality rate. We discovered that the 2008 configuration of HCAMv2 omits a number of ageing samples from the analysis. Specifically, for a given area, ageing samples were being omitted in years where there is no catch for the roe seine fishery. This omission has been corrected in the 2009 configuration of HCAMv2 and implications of this change are discussed herein. Several points have been identified as outstanding issues in modelling herring stocks, including: understanding the relationship between natural mortality and steepness in recruitment productivity, estimating natural mortality, and applying fishing gear selectivity functions.

## Major stock areas:

### *Queen Charlotte Islands*

The estimated spawning biomass for 2009 is approximately 7,000 tonnes, a considerable increase from the 2008 estimate of spawning biomass (~5,000 tonnes). Model estimates of recruitment for this stock have alternated between poor and average over the last 10-years, with 2009 estimated as average recruitment. For the Queen Charlotte Islands stock, the recruitment forecast rule denotes poor recruitment, thus the forecast biomass for 2010 is ~5,800 tonnes. This stock is below cutoff. Following the herring harvest control rule, the recommendation is for no commercial harvest in this area.

### *Prince Rupert District*

The estimated spawning biomass for 2009 is approximately 15,000 tonnes. This is somewhat lower than the 2008 estimate of spawning biomass (~17,000). The 2009 model estimates of recruitment for this stock appear to be on the divide between poor and average. For the Prince Rupert District stock, the recruitment forecast rule denotes average recruitment, thus the forecast biomass for 2010 is ~15,500 tonnes. This stock is above cutoff. Following the herring harvest control rule, the available harvest, based on a 20% harvest rate, is 3,100 tonnes.

### *Central Coast*

The estimated spawning biomass for 2009 is approximately 10,000 tonnes, a considerable increase from the 2008 estimate of spawning biomass (~6,500 tonnes). Model estimates of recruitment for this stock have alternated between poor and average over the last 10-years, with one good recruitment year in 2003. For the Central Coast stock, the recruitment forecast rule denotes poor recruitment, thus forecast biomass for 2010 is ~7,500 tonnes. This stock is below cutoff. Following the herring harvest control rule, the recommendation is for no commercial harvest in this area.

*Strait of Georgia*

The estimated spawning biomass for 2009 is approximately 48,000 tonnes, a considerable increase from the 2008 estimate of spawning biomass (~34,000 tonnes). Model estimates of recruitment to this stock have alternated between average and good over the last 10-years, with one poor recruitment year in 2008. Recruitment in 2009 was estimated as good, reflecting predictions provided by the 2008 off-shore recruitment forecast survey. Results from the off-shore survey indicate recruitment for 2010 will be poor, thus the forecast biomass for 2010 is ~45,000 tonnes. This stock is above cutoff. Following the herring harvest control rule, the available harvest, based on a 20% harvest rate, is 9,000 tonnes.

*West Coast Vancouver Island*

The estimated spawning biomass for 2009 is approximately 5,000 tonnes. This is nearly double the 2008 estimate of spawning biomass (~2,700 tonnes). Model estimates of recruitment for this stock have been poor for the majority of the past 10-years. Recruitment in 2009 was estimated as poor, reflecting predictions provided by the 2008 off-shore recruitment forecast survey. Results from the off-shore survey indicate recruitment for 2010 will be poor, thus the forecast biomass for 2010 is ~6,000 tonnes. This stock is below cutoff. Following the herring harvest control rule, the recommendation is for no commercial harvest in this area.

## Minor stock areas:

*Area 27*

The estimated spawning biomass for 2009 is approximately 1,600 tonnes, up slightly from the 2008 estimate of spawning biomass (~1,400 tonnes). Model estimates of recruitment to this stock were poor in 2008 and good in 2009. For Minor Stock Area 27, the recruitment forecast rule denotes average recruitment, thus the forecast biomass for 2010 is ~1,350 tonnes. The available harvest, based on a 10% harvest rate, is 135 tonnes.

*Area 2W*

Estimates of spawning biomass were highly influenced by the inclusion of additional ageing samples, thus Minor Stock Area 2W results are presented using both the 2008 and 2009 configurations of the HCAMv2 model. The two estimates of spawning biomass for 2009 are ~2,900 and ~5,700 (A2W-A and A2W-B, respectively) and we conclude that the latter estimate is most representative for providing catch advice. Both model configurations indicate recruitment to this stock was good in 2009. The recruitment forecast rule denotes average recruitment, thus forecast biomass for 2010 is ~4,100 tonnes. The available harvest, based on a 10% harvest rate, is 413 tonnes.

# 1 Introduction

The objectives of this paper are two-fold: (1) to present the 2009 stock assessment advice for the B.C. herring fishery and (2) to provide a detailed description of the current assessment model and decision rules, bringing together model descriptions and equations previously reported in Haist and Schweigert (2006), Schweigert and Haist (2007), Schweigert et al. (2009) and Christensen et al. (2009).

B.C. herring are currently managed as five major and two minor stock areas. Accordingly, catch and survey information is collected independently for each of these seven areas and science advice is provided on the same scale. Since the early 1980's, a statistical catch-age model has been used to provide stock assessment advice for the major stock areas (Haist and Stocker 1984). In 2006 the catch-age model was termed the herring catch age model (HCAM, Haist and Schweigert 2006), used for the 2006 and 2007 stock assessments. A modified version, HCAMv2, was used in the 2008 and the current year's assessments (modifications to HCAM are documented in Christensen et al. 2009). During the 2008 assessment, Schweigert et al. (2009) determined that the time series of survey data for the minor stock areas was sufficiently long enough to implement a catch-age assessment, rather than using the escapement model from past years (Schweigert 2001). Thus, the HCAMv2 model is now implemented for all seven stock areas. However, it should be noted that decision rules for determining the PSARC Science recommended catch differ between major and minor stock areas (see Section 4.7).

# 2 B.C. herring stocks

The geographic boundaries used to delineate the B.C. herring stock assessment regions have remained consistent since 1993. Boundaries and locations of the major stock areas: Queen Charlotte Islands (QCI), Prince Rupert District (PRD), Central Coast (CC), Strait of Georgia (SOG), West Coast Vancouver Island (WCVI) and minor stock areas: Area 2W and Area 27, are identified in Figure 1.

The Queen Charlotte Islands stock assessment region includes most of Statistical Area 2E, spanning from Cumshewa Inlet in the north to Louscoone Inlet in the south. The Prince Rupert District stock assessment region encompasses Statistical Areas 03 to 05. The Central Coast assessment region separates the major migratory stocks from the minor spawning populations in the mainland inlets. The Central Coast assessment region includes Statistical Area 07 plus Kitasu Bay in Area 06, Kwakshua Channel in Section 085 and Fitz Hugh Sound in Section 086. The Strait of Georgia stock assessment region includes all of Statistical Areas 14 to 19, 28, and 29 (excluding Section 293), and Deepwater Bay and Okisollo Channel, both in Section 132. The west coast of Vancouver Island assessment region encompasses Statistical Areas 23 to 25. The minor stocks include all of Area 27 and Area 2W (excluding Louscoone Inlet in Section 006). Current geographic stock boundaries are outlined in Midgley (2003), although note that SOG sections 280 and 291 do not appear as they were added in 2006.

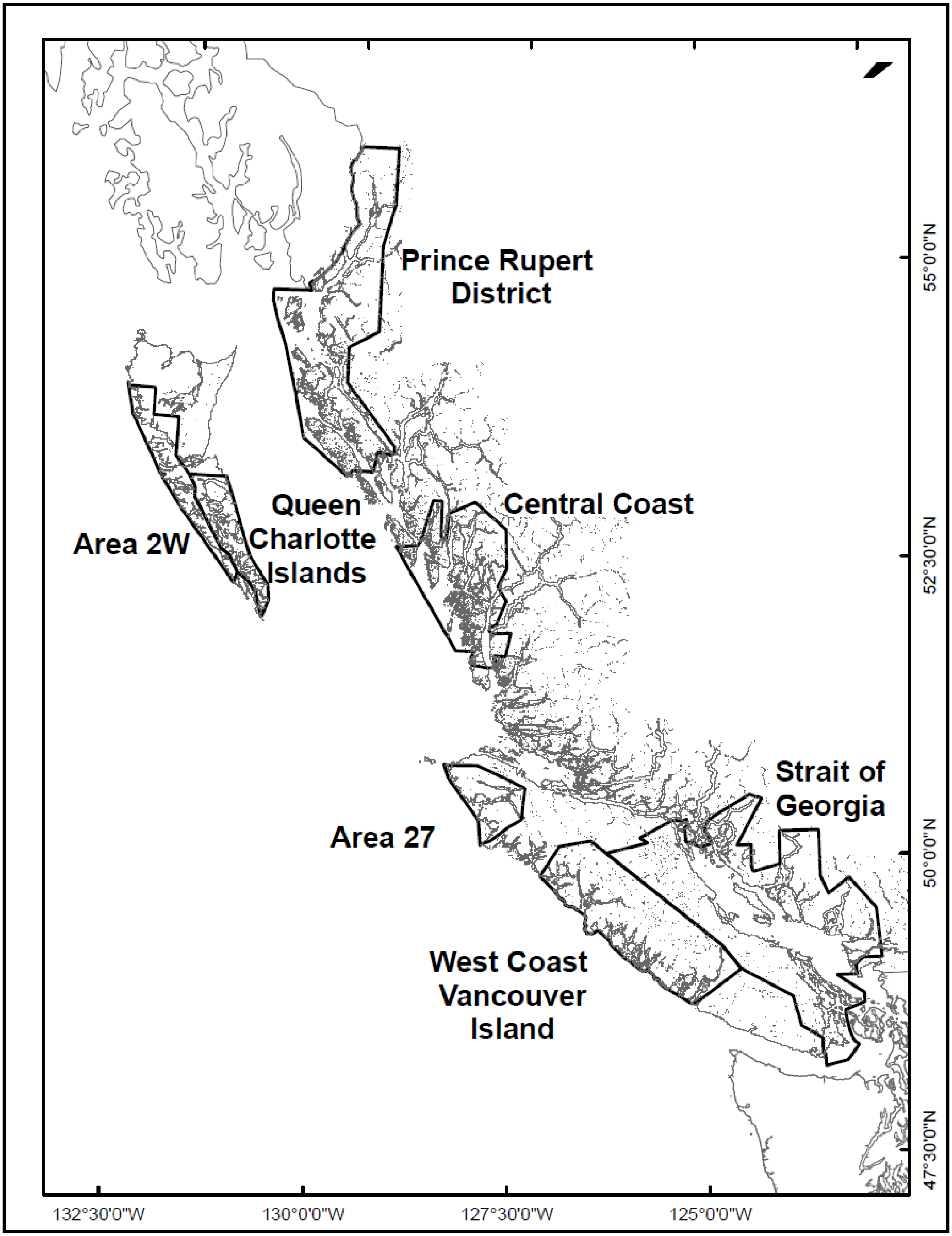


*Figure 1. B.C. herring major stock areas: Queen Charlotte Islands (QCI), Prince Rupert District (PRD), Central Coast (CC), Strait of Georgia (SOG), West Coast Vancouver Island (WCVI), and minor stock areas: Area 2W and Area 27.*

# 3 Data

The herring assessment model is driven by three sources of data: commercial catch landings, a spawn survey index and age composition data. Each of these times series of data represent the collective efforts of the herring industry, First Nations and DFO Science and FAM. For the purposes of stock assessment, we include fishery and survey data from 1951 onwards. These time series are stored in a MS Access database, referred to as the HSA or herring stock assessment fisheries database. Catch and biological information is also collected from the “minor” herring fisheries (food & bait, special use, spawn-on-kelp) and a database is currently being developed to incorporate these data.

## 3.1. Commercial catch data

Catch information is obtained from landing slips or monitoring of plant offload data. Historically, landing slip data were summed by fishery season (seasons run from July 1 to June 30). Beginning in the 1997/98 season, roe catch figures are based on verified plant offload weights, a result of the introduction of the individual vessel quota (‘pool fishery’) system for all fisheries except the Strait of Georgia and Prince Rupert gillnet fisheries which remained open fisheries. Beginning in the 1998/99 season, verified plant offload weights are available for all food and roe fisheries coast-wide.

The history of catches in the major assessment areas appear in Figure 2. Commercial landings from the spawn-on-kelp (SOK) fishery are not included in the model as catch because there is no basis for verifying mortality imposed on the population. Instead, beginning with the 2006 assessment, the validated landed weight of SOK product is used to estimate the egg removal from the spawning grounds and these data are converted to tonnes of fish equivalents based on data provided in Shields et al. (1985). These estimates are then added to the estimated spawning biomass for each area over the course of the SOK fishery from 1975 to present. Landings from the minor herring fisheries (food & bait, special use) are based on landing slip data or more recently logbook information.

The time series of commercial catch data is divided into three periods: fishing period 1 or the winter period, which primarily represents the reduction fishery (1951-1968), fishing period 2 which represents the roe seine fishery (1972-present), and fishing period 3 which represents the roe gillnet fishery (1972-present). The history of catches by fishing period is presented in Figure 3.

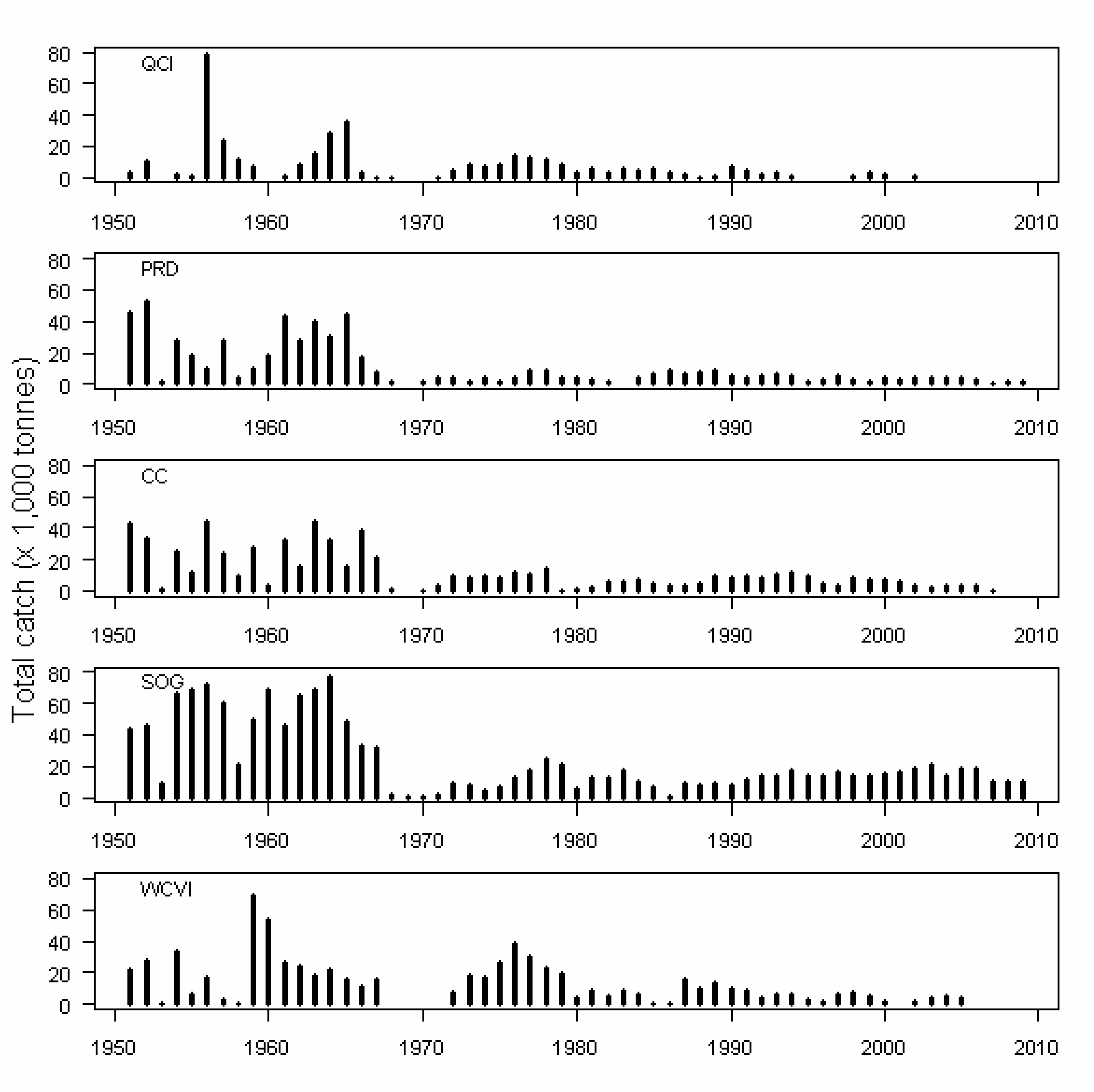


*Figure 2. Estimated total catch from all fisheries except spawn-on-kelp for each major stock area from 1951-2009*

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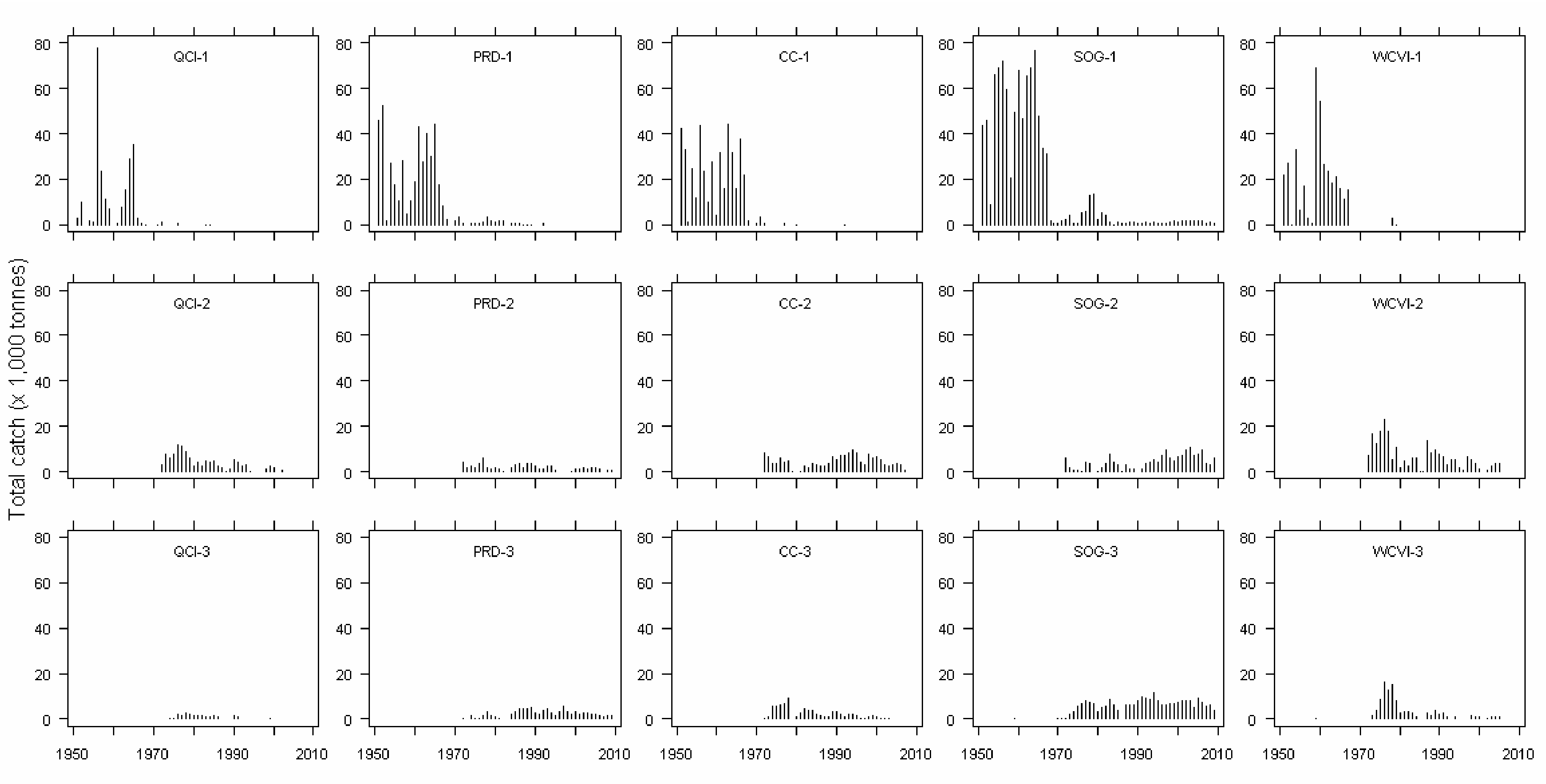


*Figure 3. Estimated total catch by fishing period for each major stock area from 1951-2009 (excludes spawn-on-kelp fishery). Upper row- Fishing period 1 – primarily seine and reduction fisheries, except recent years in SOG which represent food and bait/ special use fisheries; Middle row- Fishing period 2 (seine roe fishery); Bottom row- Fishing period 3 (gillnet roe fishery)*

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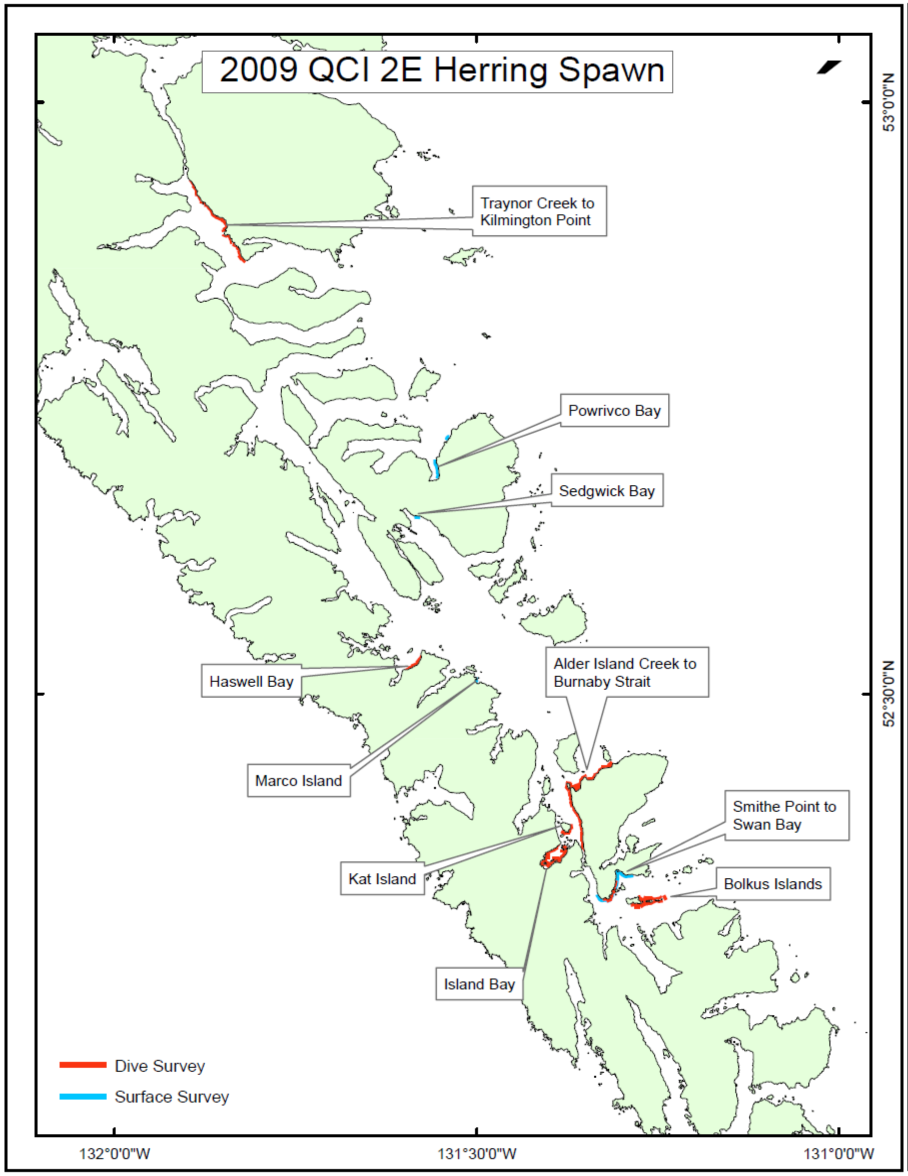
## 3.2. Spawn data (survey index)

Herring spawn surveys have been conducted throughout the B.C. coast beginning in the 1930s. In years prior to 1988, spawn surveys were conducted from the surface either by walking the beach at low tide or using a drag from a skiff to estimate the shoreline length and width of spawn. Egg layers were sampled visually and are used to calculate egg densities following the methods of Schweigert (2001). Beginning in 1988, herring spawn surveys using SCUBA methods were introduced and became coastwide within a couple of years initially being conducted by DFO staff but eventually through contract divers hired through the test fishing program. Prior to the Larocque ruling, the test fishing program was funded through an allocation of fish by industry. In years since the 2006 Larocque ruling, the availability of resources to conduct dive surveys in all areas has been reduced. For the 2009 survey, dive surveys were conducted in all major and minor assessment regions, with the exception of Area 2W where snorkeling and surface survey methods were also used. As in earlier years, a few minor spawning beds outside the main assessment areas were surveyed by SCUBA or surface methods where resources permitted.

Figure *4* shows locations of spawning beds in 2009 for the major and minor stock areas. Egg density estimates are used to calculate a fishery-independent estimate of herring spawners (in units of fish biomass), referred to as the spawn survey index (Schweigert 2001). The time series of survey index, from 1951-2009, for each of the major stock areas is shown in Figure 5.



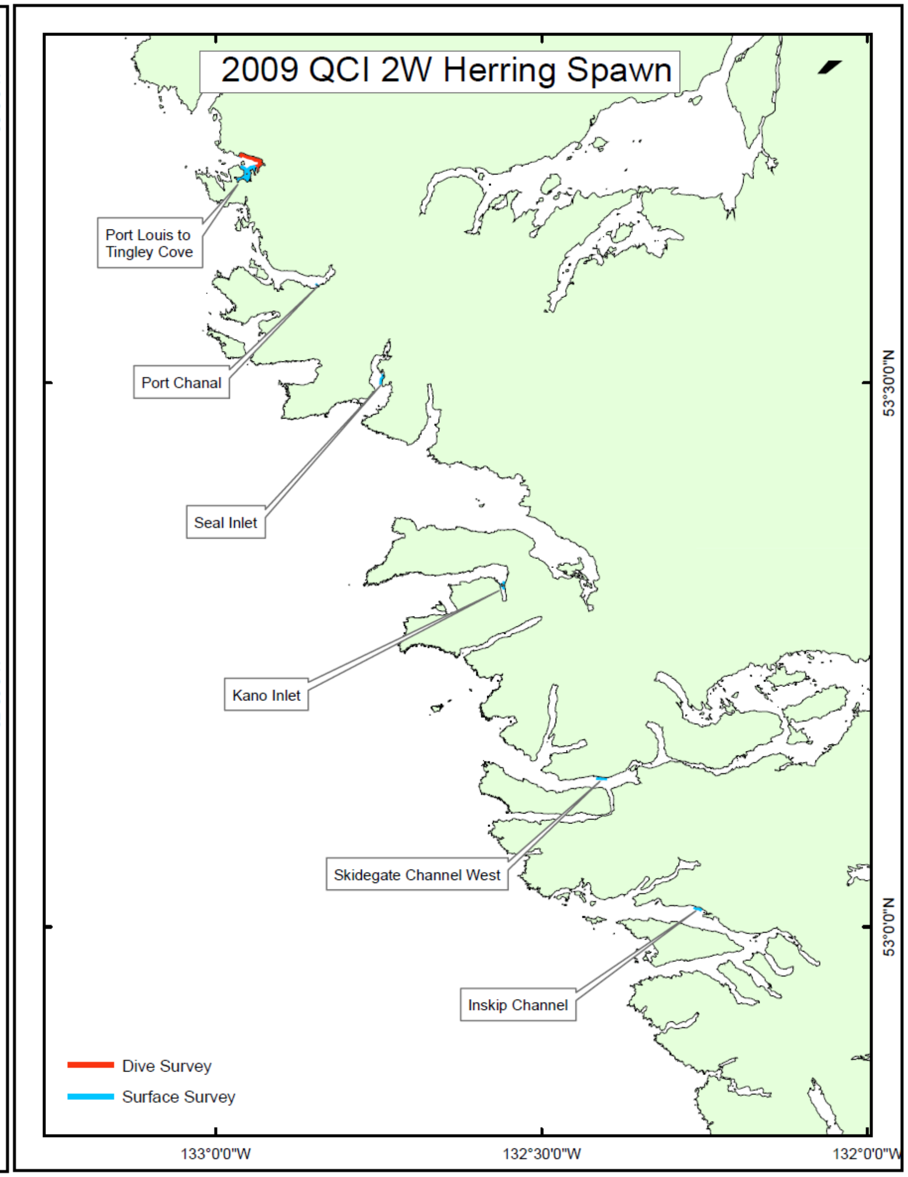




*Fig 4. QCI (major stock area)*

*Fig 4. Area 2W (minor stock area)*

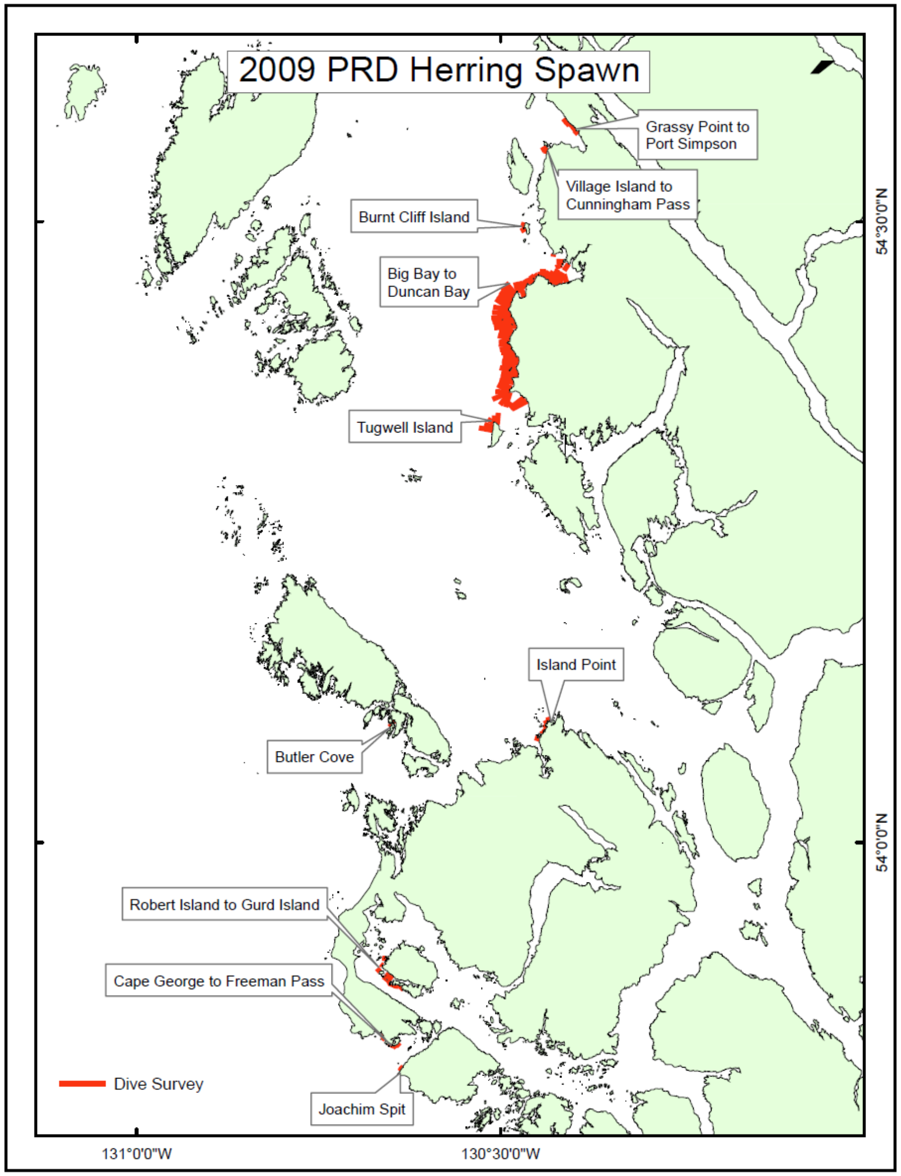



*Fig 4. PRD (major stock area)*

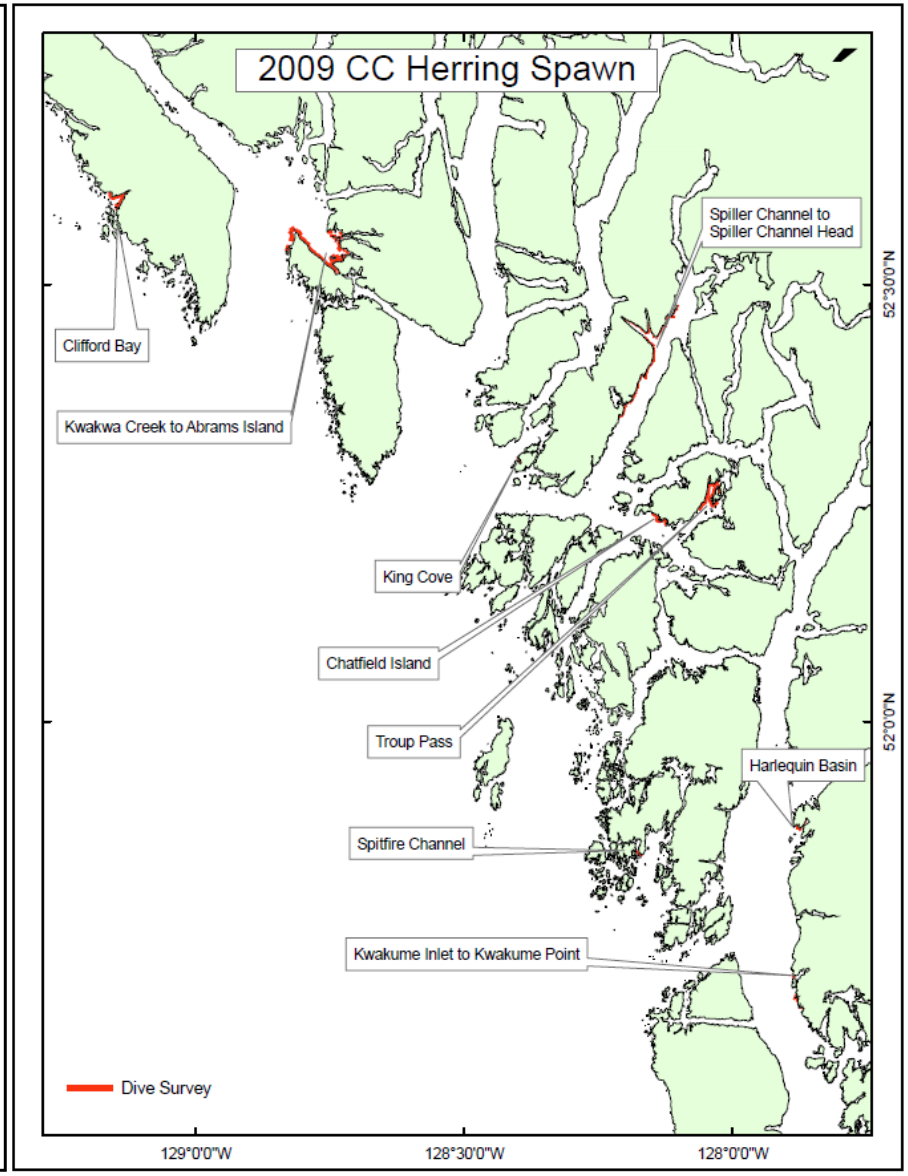
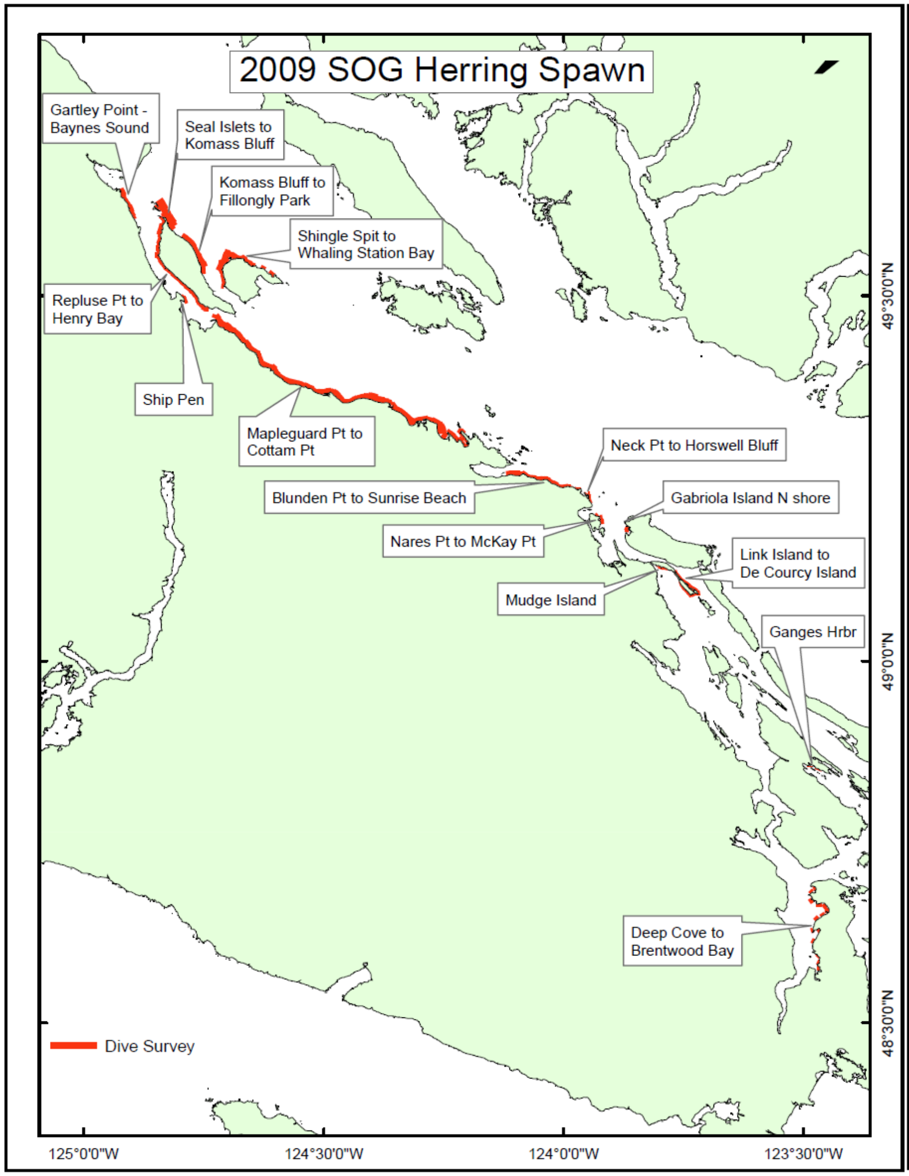



*Fig 4. CC (major stock area)*



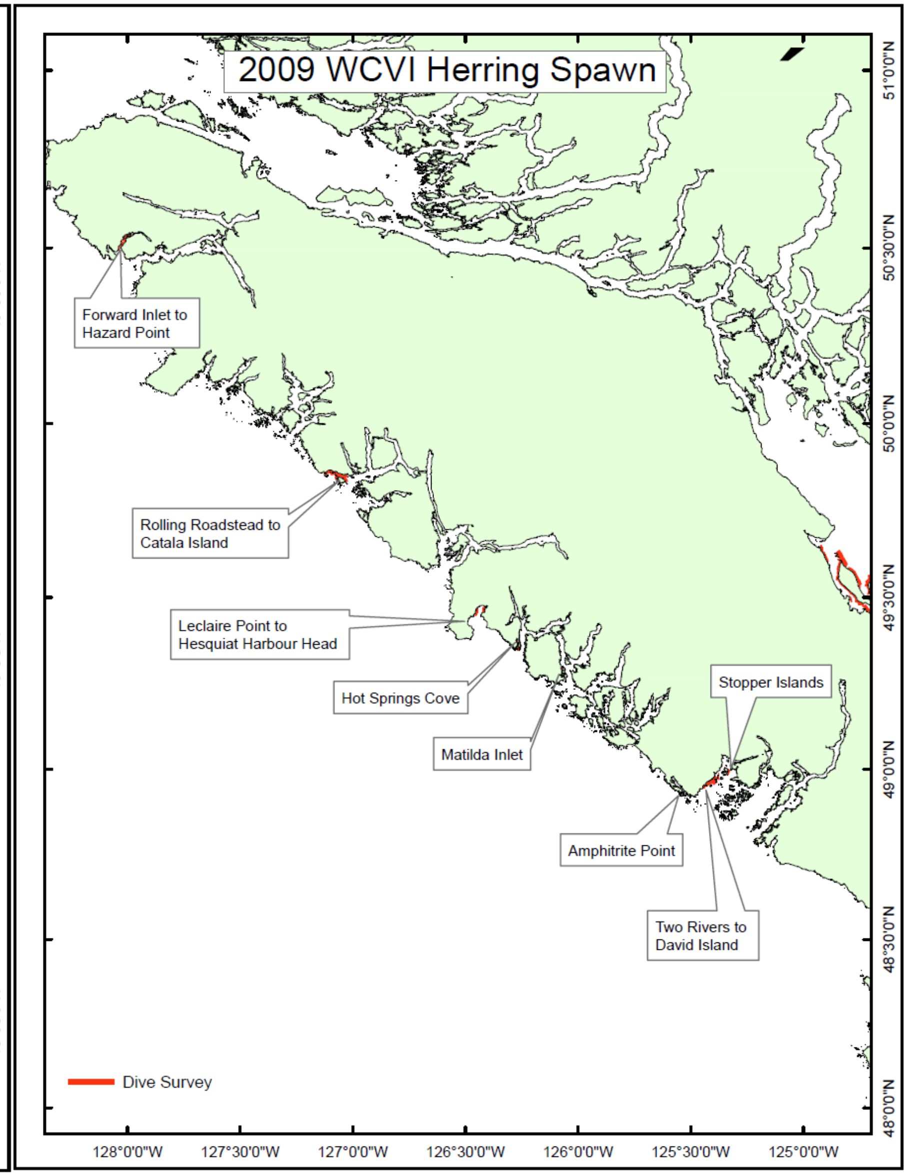




*Fig 4. SOG (major stock area)*

*Fig 4. WCVI (major stock area, includes Area 27)*

*Figure 4. Herring spawning bed locations for the 2009 survey year. Red lines denote locations surveyed by SCUBA; blue lines denote surface methods*

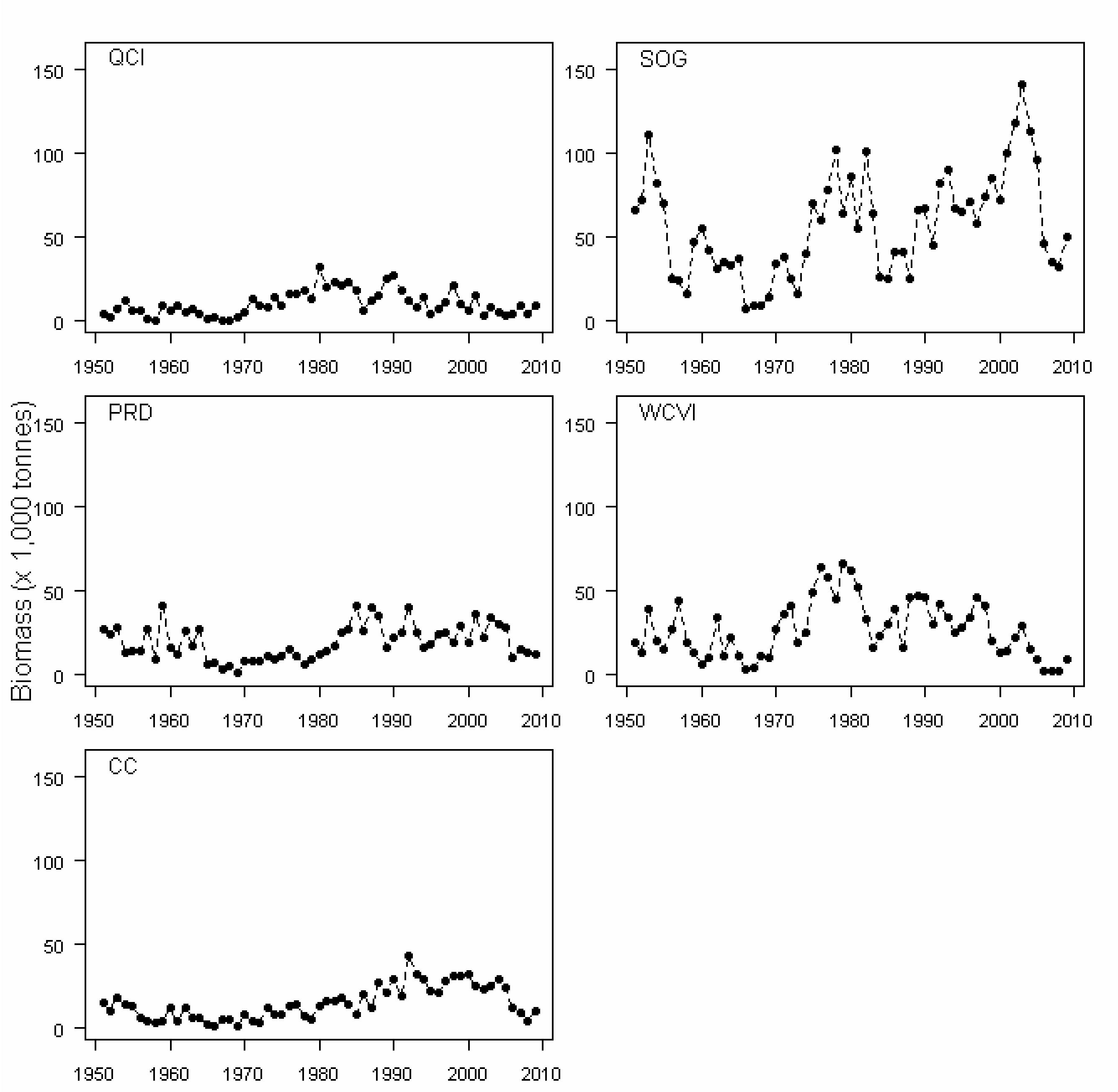



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*Figure 5. Spawn survey index for the major stock areas from 1951-2009.*

## 3.3. Biological samples

Biological samples are collected from both the commercial catch and from pre-fishery charters. Beginning in 1975, charters were intended to supplement biological samples in areas where catch samples are low or not representative of the entire stock, or in areas where fisheries are closed. Pre-fishery charters were also funded through an allocation of fish to the test program, thus since 2006 there has been a reduction in the number of biological samples collected by charter vessel. Through a contract with DFO, the Herring Conservation and Research Society (HCRS) sub-contracts a number of vessels to collect biological samples. Industry also conducts pre-season test sets for roe-quality testing (in open areas only) and supplementary biological samples are provided as part of this program. For each of these samples, fish length, weight, age, sex, and maturity is recorded, information which then becomes input data for the assessment model.

During the 2008/09 season a total of 222 biological samples were collected, of which 58 were collected from the roe fishery, 11 from the food & bait fishery, 127 from the test fishery, 17 from SOK operations, and 9 from research surveys. Note that each "sample" collected is comprised of approximately 100 fish. A summary of biological samples collected from commercial and pre-fishery charters from 2002/03-2008/09 is presented in Table 1.

*Table 1. Summary of biological samples collected and processed from commercial and pre-fishery charters from 2002/03-2008/09.*

| Fishing season | Commercial fishery samples | Charter and research samples | Total[1] |
|---|---|---|---|
| 2008/09 | 86 | 136 | 222 |
| 2007/08 | 116 | 103 | 219 |
| 2006/07 | 114 | 85 | 199 |
| 2005/06 | 49 | 164 | 213 |
| 2004/05[2] | 83 | 191 | 274 |
| 2003/04 | 79 | 222 | 301 |
| 2002/03 | 120 | 287 | 407 |

[1] One-sample ≈ 100 fish.
[2] DFO ageing lab implemented an annual cap for the Pelagics group, which is now set at 28,400.

### 3.3.1. Age composition data

Ageing data, through the reading of fish scales, are collected from the biological samples taken from the commercial fisheries and pre-fishery charters. Age composition data is used to determine the catch-at-age and is an essential source of input data to the herring stock assessment model. Percent age composition for each area by year and gear-type are included in Appendix Tables 1.1 to 1.7. Observed proportions-at-age for each of the five major stock areas from 1951-2009 are presented in Figure 6.

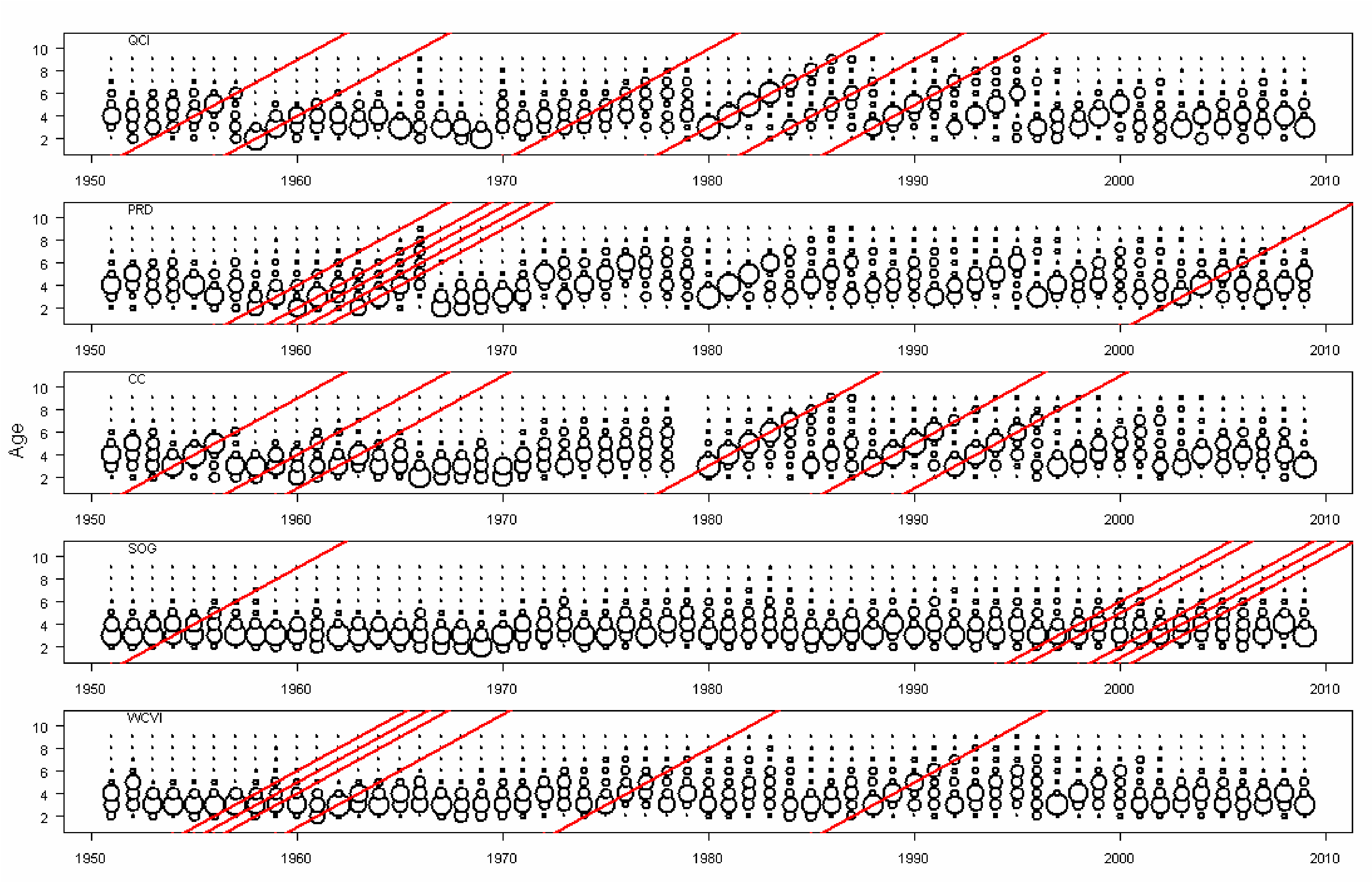



Figure 6. Bubble plots represent observed age proportions for the five major stock assessment regions from 1951-2009. Red lines identify a number of strong year classes, defined as years with the top 10% of model-predicted age-3 recruits.

Above average or strong year classes are represented by diagonal red lines. These cohorts are named for their year of hatch (i.e., age 0). For example, the 1977 year class is strongly visible in the northern stocks, QCI, PRD and CC, recruiting to the fishery as 3-year olds in 1980. Several strong year classes appear in the WCVI stock, for example: the 1985, 1989 and 1994 year classes, recruiting to the fishery in 1988, 1992 and 1997, respectively. In the most recent years, 2006 appears to be a strong year class for QCI, CC, SOG and WCVI, recruiting to the fishery this year in 2009.

Proportion-at-age bubble plots are a useful tool for tracking cohort strength within a given stock area, however, it is important to avoid drawing conclusions about the size of cohorts across stocks because each bubble plot is scaled to the number of fish within each stock. Furthermore, red lines in Figure 6 identify years with the top 10% of model-predicted age-3 recruits but they don't necessarily identify all years considered to be strong year classes (e.g., PRD 1977 is not included).

### 3.3.2. Weight-at-age

From the mid-1970s until the present, there has been a measureable decline in weight-at-age for all ages in all major stock areas (Figure 7). Samples collected during the 2008/09 fishing year indicate weights-at-age that are among the lowest on record (Figure 8- blue circles). This declining weight-at-age may be attributed to any number of factors, including: fishing effects (i.e., gear selectivity), environmental effects (changes in ocean productivity), or it may even be attributed to changes in sampling protocols (shorter time frame over which samples are collected). Declining weight-at-age has been observed in all five of the major stocks, and despite area closures over the last 10-years, has continued to occur in the QCI and WCVI stocks. Although the direct cause of this decline is still to be investigated, this trend has been observed in B.C. and U.S. waters, from California to Alaska (Schweigert et al. 2002), and merits further research.

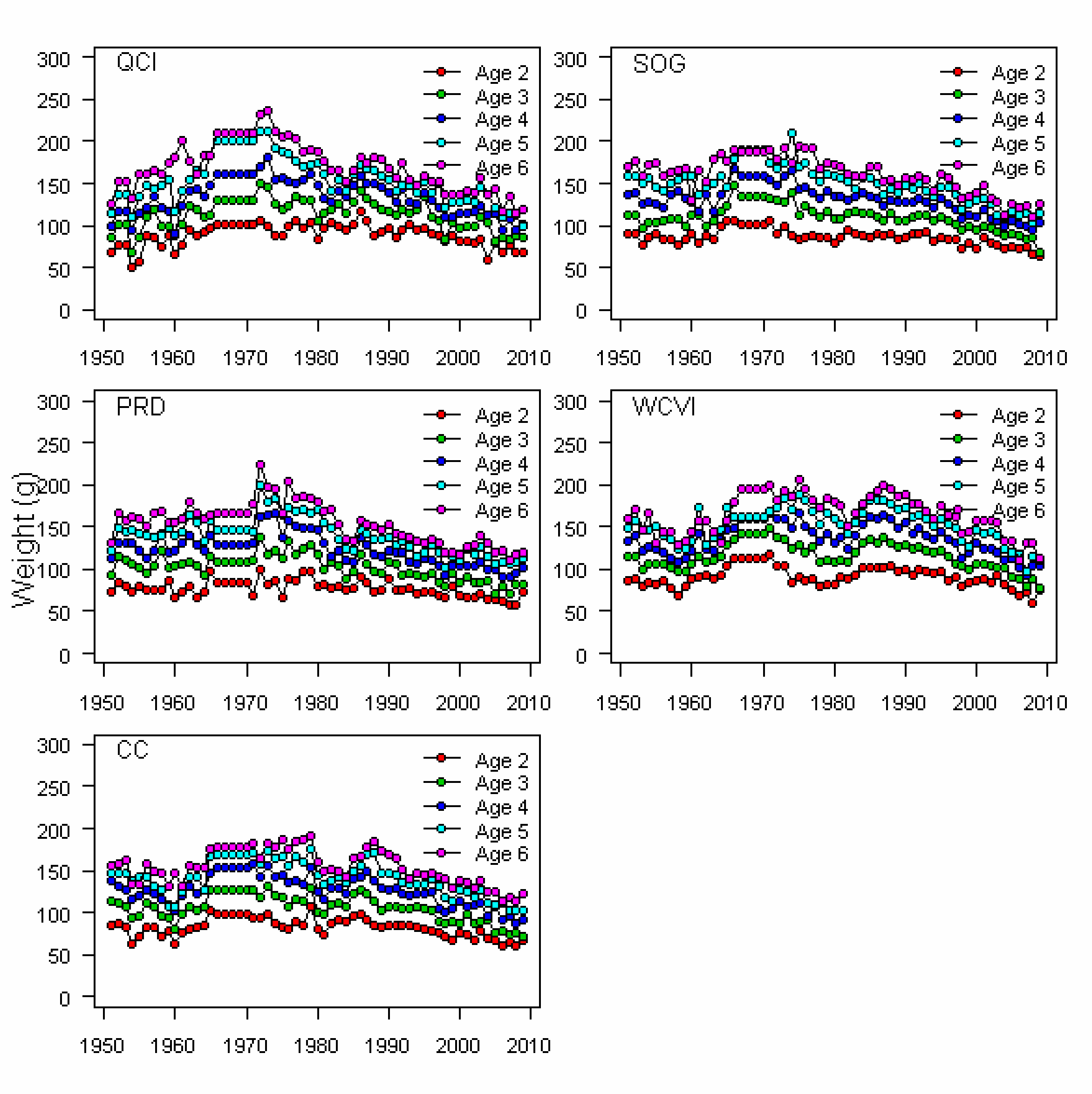



*Figure 7. Time series of mean weight-at-age (in grams) for herring ages 2-6 for all major stock areas. Note that data extrapolation methods were used to fill in weight-at-age data for years following the reduction fishery closure (1965-1970).*

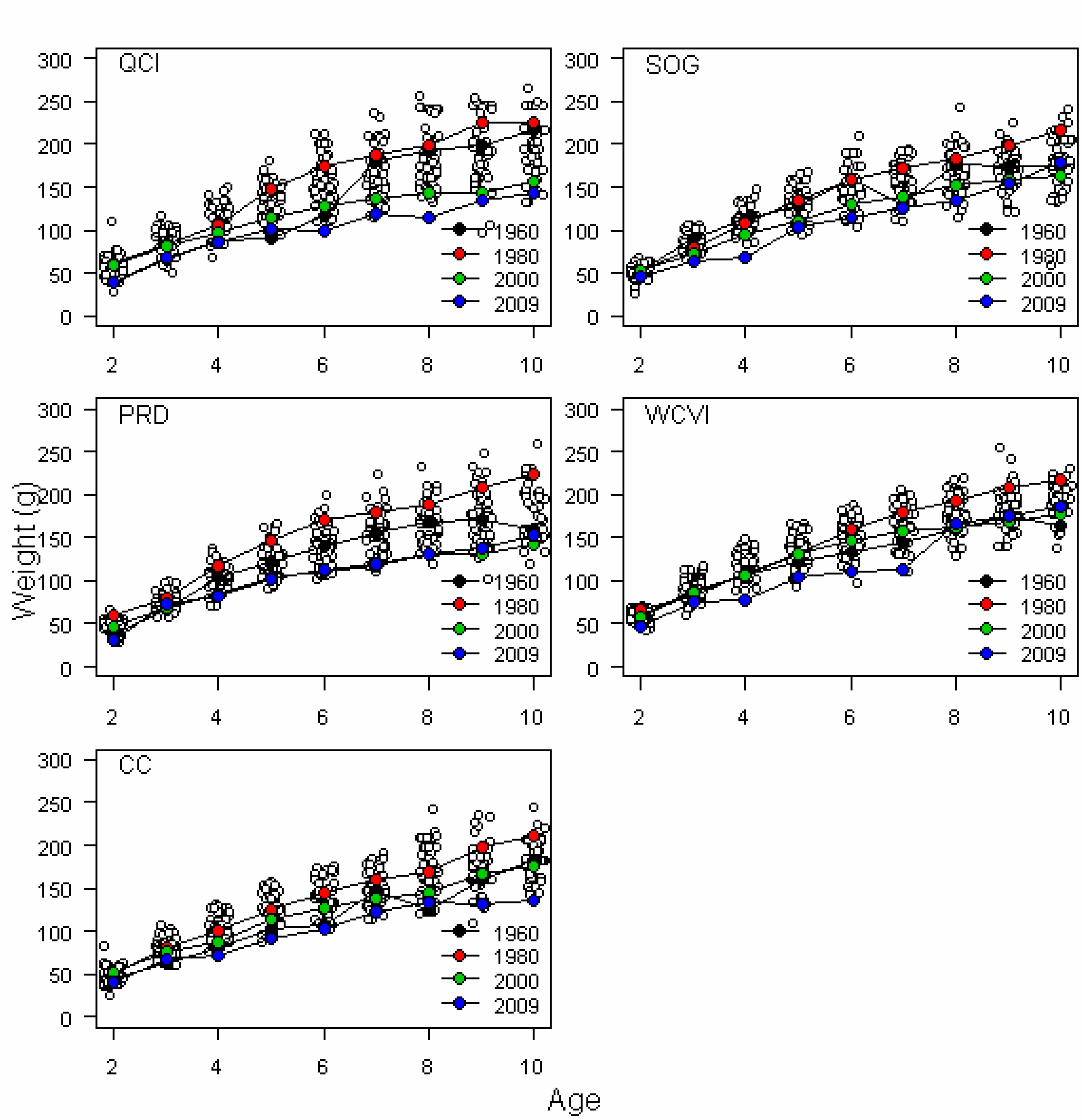



*Figure 8. Mean weight versus age for all years from 1951-2009. Open circles represent mean weight for ages 2-10 for years 1951-2009. Coloured circles (black, red, green and blue) show 20-year increments of mean weight for each age.*

# 4 Methods

Input data and a complete description of the herring catch age model (HCAMv2) is provided in Appendices A and B, respectively. Additional details on model choice can be found in Christensen et al. (2009) and Haist and Schweigert (2006) while management of the B.C. herring fishery is summarized in Stocker (1993).

Overall, this year's assessment uses the same modelling approach as was used in the 2008 herring stock assessment. Two changes were made to the HCAMv2 model, the first relates to the way in which ageing samples are used by the model and the second relates to the bounds of the fishing mortality rate. We discovered that for the 2008 assessment, a number of ageing samples were not making it into the assessment model. Specifically, for each area, ageing samples were being missed in years where there is no catch for the roe seine fishery. This change led to minor differences in estimated spawning stock biomass and pre-fishery biomass for the QCI and CC stocks (not shown) and noticeable differences for minor stock Area 2W. Results presented in the 2009 assessment reflect this year's adjustment to the HCAMv2 model, as well as a related adjustment to the lower bounds used to constrain the fishing mortality rate. The only exception occurs in Section 6, where for comparative purposes, we've included Area 2W-A, the 2008 configuration of HCAMv2, and Area 2W-B, reflecting this year's changes.

## 4.1. Modelling approach

The general modelling approach used in the herring stock assessment is to fit a catch-age model to a time series of commercial catch data, spawn index and proportions-at-age data within a Bayesian estimation framework. The objective function contains four likelihood components related to: 1) age composition, 2) commercial catch, 3) spawn data, and 4) prior distributions for model parameters. The model allows parameters to be estimated using Bayesian estimation procedures whereby marginal posteriors are approximated using the Markov Chain Monte Carlo (MCMC) routines built into AD Model Builder (Otter Research, 1994). Posterior samples were drawn systematically every 1,000 iterations from a chain of length 2,000,0000, resulting in a sample of 2,000 points for the QCI, CC and WCVI stocks. Problems with model convergence prompted us to use longer chains for PRD and SOG where posterior samples were drawn every 10,000 iterations from chains of length 20,000,000 to yield a sample size of 2,000 points.

Model runs were examined for convergence using visual inspection of the trace plots. Where possible, we provide comparisons between the mode of the posterior distribution, MPD, also equivalent to the maximum likelihood estimate (MLE), and median estimates from the marginal posterior distributions. Catch advice is based on model forecasts calculated from the posterior distributions under assumptions of poor, average and good recruitment.

## 4.2. Parameter estimation

A significant component of model implementation is parameter estimation. The 2009 implementation of HCAMv2 estimates 136 parameters plus fishing mortality parameters for each period-year combination, for a total of 208, 242, 228, 271 and 220 parameters for the QCI, PRD, CC, SOG and WCVI stocks, respectively. During parameter estimation, the model also generates predicted values of commercial catch, spawning biomass, and age composition. A comprehensive description of parameter estimation and model equations is provided in Appendix B.

For the purposes of gauging model fit and precision of the parameter estimation procedure, the results section includes a number of comparisons between observed and predicted indices, as well as distributions of parameter estimates (and priors where applicable).

## 4.3. Priors

Model priors are an integral component of the Bayesian estimation procedure and are based on existing knowledge of parameter values and/or herring biology, derived either from previous studies or expert opinion. In the 2009 implementation of the HCAMv2, we include priors for estimating average or total mortality, deviations in natural mortality, deviations in recruitment and steepness. The prior for steepness also includes upper and lower bounds, as defined by the Beverton-Holt stock recruitment relationship. Prior distributions are described in Table 2.

*Table 2. Prior distributions for model parameters for all major and minor stock areas.*

| Parameter | Prior density | Range[2] | Mean | Median | SD |
|---|---|---|---|---|---|
| Average natural mortality rate | normal | - | 0.45 | - | 0.2 |
| Residual deviations in average natural mortality rate | normal | - | 0.0 | - | 0.1 |
| Recruitment deviations | normal | - | 0.0 | - | 0.8 |
| Steepness[1] | lognormal | (0.2 -0.99) | 0.67 | - | 0.17 |
| Initial fishing mortality | lognormal | - | 0.3945 | 0.3166 | - |

[1] Hilborn, pers. comm. with Schweigert, comparable to Myers *et al.* (1999) estimate of 0.74 for Atlantic herring. Note this prior should be changed to a beta distribution to naturally bound steepness between 0.2 and 1.0.
[2] Steepness is the only parameter with a bounded prior. Upper and lower bounds are used during the estimation procedure for other parameters but they are not related to model priors, thus are not included in Table 2.

Remaining "free" parameters, $R_0$, $q_1$, $\psi$, are assumed to be uniformly distributed, although the range of some of these uniform distributions may be restricted using upper and lower bounds (e.g. $q_2 \sim U[0.3,1.2]$).

## 4.4. Retrospective analysis

A retrospective analysis is used to examine the sensitivity of estimates of pre-fishery biomass to the addition or removal of new data (for the major stock areas). Our retrospective analysis includes the successive removal of 10-years of data. Warning signs include persistent over- or under-estimation of pre-fishery biomass, with the latter being less of a concern to DFO Science (with respect to conservation) than the former.

## 4.5. Abundance forecasts

The assessment model includes a component for forecasting herring abundance for the upcoming fishing year. The forecast of pre-fishery biomass, referred to as 'forecast run', is calculated as:

Forecast run = predicted spawning biomass of fish age 4 and older in year t=T+1
+ predicted recruitment of age 3 fish in year t=T+1

For each stock, the forecast is calculated under each assumption of poor, average and good recruitment (Section 4.6). Equations describing these calculations appear in Appendix B.

## 4.6. Recruitment forecast rules

Independent estimates of recruitment for the WCVI and SOG stocks are based on offshore survey data collected during the summer prior to the recruitment of age 3 fish to the spawning population. Recruitment forecasting methods were first applied in 1999/2000 for the WCVI stock (Tanasichuk 2000) and in 2005/06 for the SOG stock (Tanasichuk 2002). Comparable methods for the QCI, CC and PRD stocks are not available, thus recruitment is based on the following precautionary rules:

1. If the pre-fishery biomass was below cutoff in the previous year, then assume POOR recruitment for the forecast.

2. If the pre-fishery biomass was above cutoff in the previous year and recruitment has been GOOD in the previous two years, then assume GOOD recruitment for the forecast.
3. If Rule 1 or Rule 2 DO NOT APPLY then assume AVERAGE recruitment for the forecast.

The calculation of area-specific cutoffs is described in Section 4.7.1. For all assumptions of recruitment, recommended harvest rates follow the rules outlined in Section 4.7.2.

## 4.7. Harvest control rule

A formal harvest control rule (HCR) has been used to provide advice for the management of major B.C. herring stocks since 1986 (Stocker 1993). The herring HCR has three components:

1. Reference point
2. Harvest rates
3. Decision rules

These are the same three components identified within the DFO Harvest Strategy Compliant with the Precautionary Approach (DFO 2006), a key component of the Sustainable Fisheries Framework (SFF 2009).

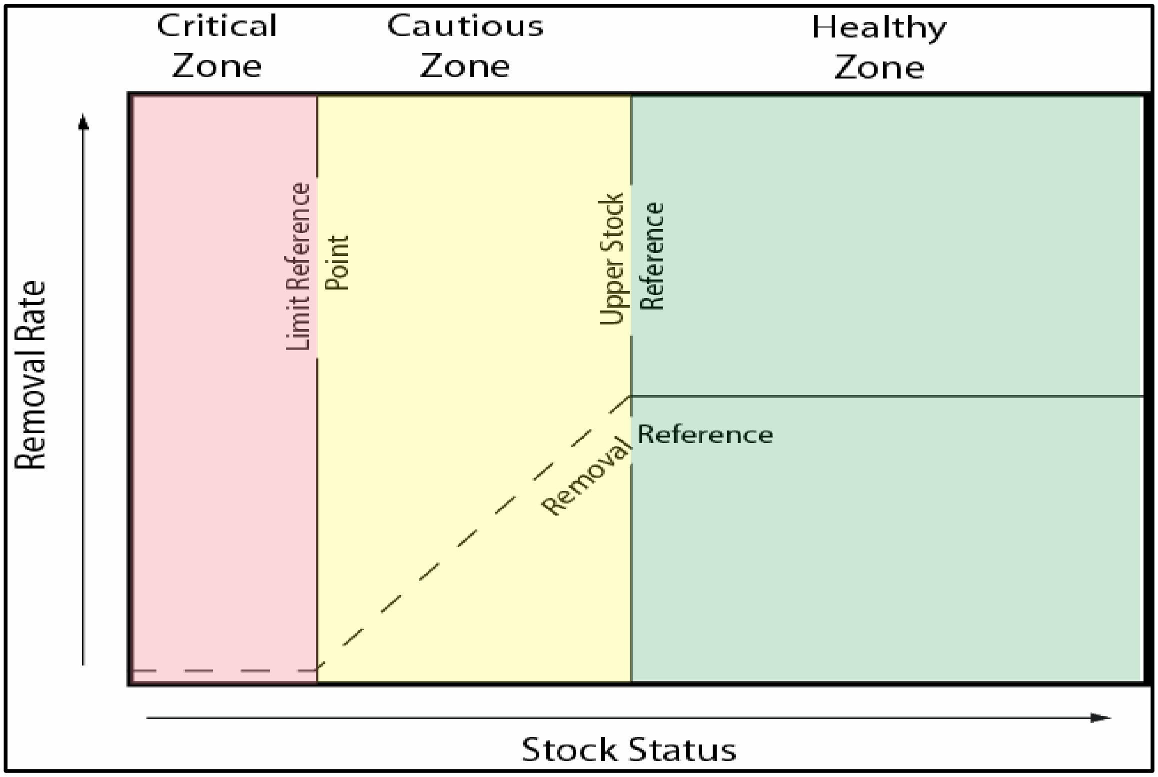



*Figure 9. The DFO Harvest Strategy compliant with the Precautionary Approach.*

In Figure 9, the limit reference point, defined as $0.4B_{MSY}$, separates the critical and cautious stock zones while the upper stock reference point, defined as $0.8B_{MSY}$, separates the cautious and healthy stock zones. The removal reference defines the maximum acceptable removal rate which is constant in the healthy zone, reduced in the cautious zone and negligible (little or no targeted catch) in the critical zone. This harvest strategy is intended to keep the removal rate moderate when stock status is healthy, promote rebuilding when stock status is low and ensure a low risk of serious or irreversible harm.

Figure 10 shows the harvest control rule for B.C. herring stocks. The main differences between these figures are the "width" of the cautious zone and the existence of only a lower reference point, the cutoff, for the herring HCR.

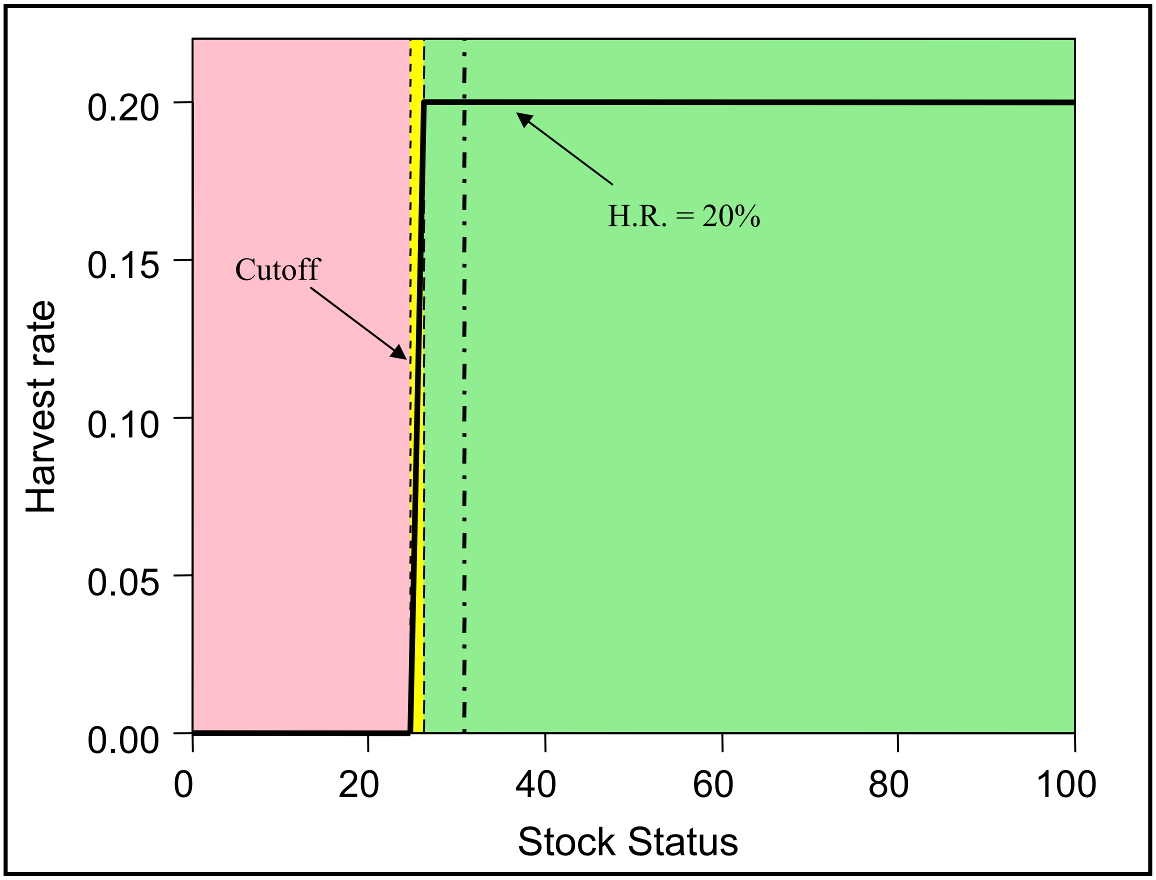



*Figure 10. Harvest control rule for B.C. herring stocks, where stock status is defined as a percentage of the estimated virgin biomass. The left-hand dashed line represents the cutoff value for a given stock, i.e., the stock level below which the harvest rate, H.R., is zero. The right-hand dashed line represents the stock level below which the H.R. is reduced below 20%. The dash-dot line is the biological reference point $B_{MSY}$ (biomass at maximum sustainable yield). Note this figure was produced using a generic operating model.*

We recognize that evaluating compliance of the current herring HCR with the DFO harvest strategy is a necessary next step. We intend to carry out this comparison using a simulation framework in the context of a management strategy evaluation (MSE).

### 4.7.1. Reference points

The reference point or cutoff for the herring HCR is $0.25B_0$. For each major stock area, the cutoff is intended to ensure a minimum spawning biomass of 25% of the estimated unfished biomass ($B_0$). Past simulation studies indicate this minimum spawning stock biomass is adequate to sustain each population during natural reductions in stock productivity (e.g. Haist et al. 1986, Hall et al. 1988). A similar reference point criterion is also used in managing the Pacific sardine fishery (PFMC 1998).

Because of the way they are defined, herring cutoffs are considered commercial fishing thresholds and not conservation thresholds and are thus thought to be more conservative than the default Limit Reference Point of $0.4B_{MSY}$ included in the DFO harvest control rule (DFO 2006). However, as previously mentioned, to ensure compliance of the herring HCR with the DFO Harvest Strategy and the Precautionary Approach, an evaluation of these and alternate reference points in a simulation framework is planned for the near future.

Estimates of unfished biomass used in the calculation of current cutoff levels were calculated using simulation methods, either using a stock recruitment relationship or by bootstrap sampling of the historic recruitment time series.

*Table 3. Current and historic cutoff levels incorporated into the B.C. herring harvest control rule for the major stock areas.*

| | Cutoff levels | | | |
|---|---|---|---|---|
| | 1992/93[a] | 1994/95[b] | 1996/97[c] | **Current** |
| QCI | 11,700 | 10,700 | 10,700 | **10,700** |
| PRD | 12,100 | 12,100 | 12,100 | **12,100** |
| CC | 10,600 | 18,800 | 17,600 | **17,600** |
| SoG | 22,100 | 21,200 | 21,200 | **21,200** |
| WCVI | 20,300 | 18,800 | 18,800 | **18,800** |

[a] Cutoff levels based on simulation model with stock recruitment relationship and two assessment areas on the WCVI (Schweigert and Fort 1994).
[b] Cutoff levels revised (Schweigert et al 1995).
[c] Cutoff levels revised (Schweigert et al 1997).

### 4.7.2. Harvest rates

The Pacific Science Advice Review Committee (PSARC) has reviewed the biological basis for target exploitation rate, considering both the priority of assuring conservation of the resource and allowing sustainable harvesting opportunities (Schweigert and Ware 1995). The review concluded that 20% is an appropriate exploitation rate for those major stock areas that are well above cutoff levels of 25% of the estimated unfished biomass.. The recommended 20% harvest rate is based on an analysis of stock dynamics which indicates this level will stabilize both catch and spawning biomass while foregoing minimum yield over the long term (Hall et al. 1988, Zheng et al. 1993).

In the case of minor stock areas, data-limitations present a challenge in providing reliable estimates of unfished biomass, required for the calculation of stock-specific cutoffs. Consequently, the PSARC recommended harvest rate of 10% is applied to the currently estimated biomass for the following year for these areas.

### 4.7.3. Decision rules

The herring harvest control rule (HCR) was first implemented for the major stock areas in 1983 as a fixed harvest rate of 20% and was augmented with a fishing threshold or cutoff in 1986 (Stocker 1993). Since inception, the rule has remained unchanged, however modifications have been made to model estimates of unfished biomass and consequently to stock-specific cutoff levels (Table 3).

For the major stock areas, the harvest control rule combines both constant exploitation rate and constant escapement policies (Figure 10), allowing for smaller fisheries in areas where the 20% harvest rate would bring the escapement down to levels below the cutoff. The rule operates as follows:

If the forecast run is less than the cutoff:
The area is closed to all commercial harvest (allowable harvest = 0)
*Analogous to the critical zone in Figure 9*

If the forecast run is greater than the cutoff
A commercial harvest is permitted and the H.R. is based on the following rules:

If the forecast run – 0.20 x forecast run is greater than the cutoff

A 20% H.R. is applied
*Analogous to the healthy zone in Figure 9*

If the forecast run – 0.20 x forecast run is less than the cutoff
A reduced H.R. equivalent to: forecast run – cutoff is applied
This represents the constant escapement portion of the rule.
*Analogous to the cautious zone in Figure 9 but is operationally narrow as is shown in Figure 10.*

In the case of the minor stock areas, the decision to allow for a commercial harvest has been at the discretion of Fisheries Management. In years where a commercial harvest is permitted, a harvest rate of 10% is applied to the estimated biomass for the area.

# 5 Results

The results section contains two subsections: Model estimates (5.1) and Catch advice (5.2); where the former includes figures and descriptions of leading (model-estimated) parameters and the latter includes decision tables for catch advice, with pre-fishery biomass and available harvest presented under three recruitment scenarios: poor, average and good.

## 5.1. Model estimates

### 5.1.1. Catch: observed vs. predicted

In the herring assessment, we assume commercial catch to be known with a high degree of certainty. This assumption is confirmed by plotting observed and predicted catch (Figure 11) and by examining the residuals (not shown).

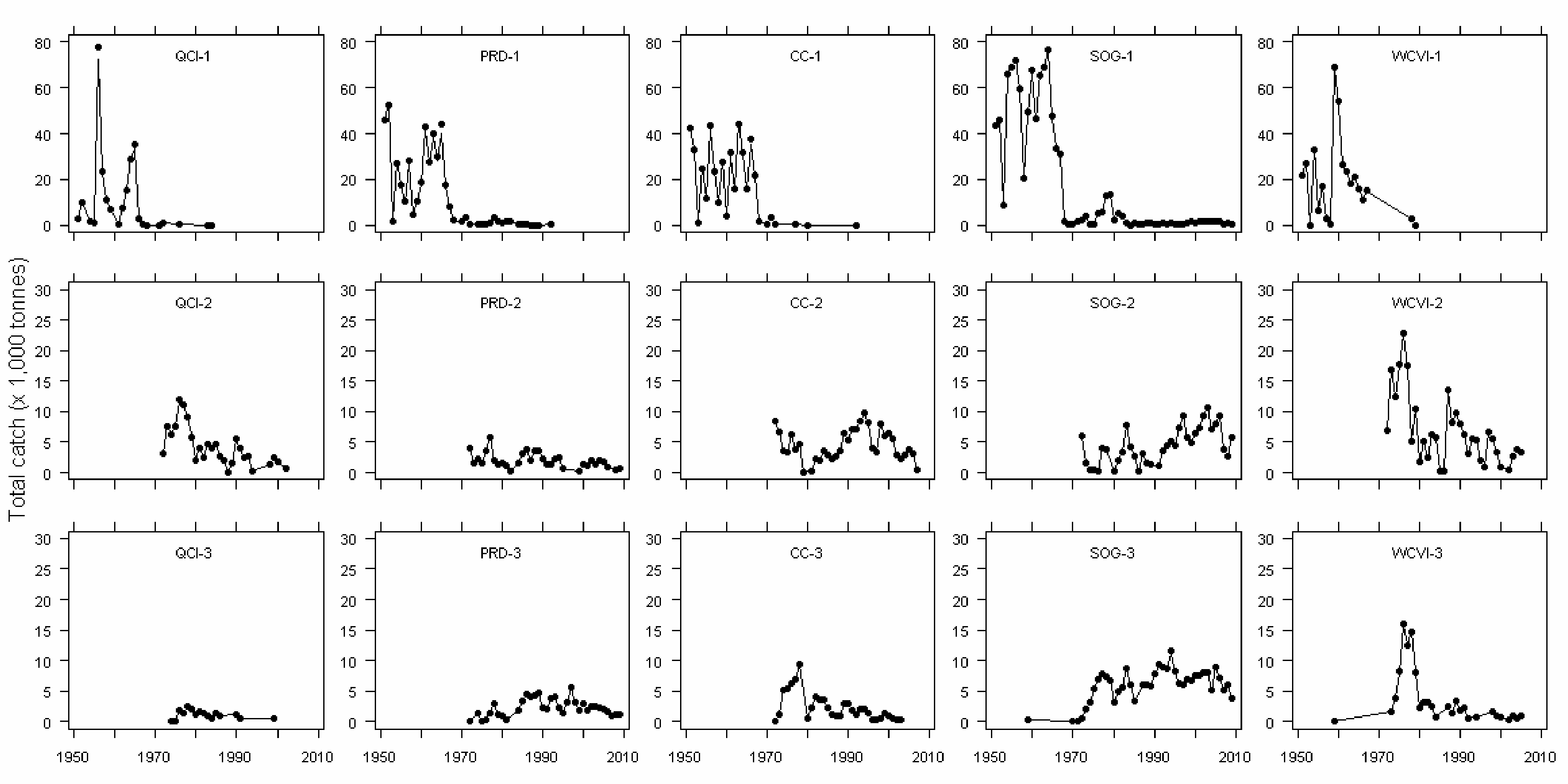



*Figure 11. Observed (circles) and model predicted catch (lines) by fishing period from 1951-2009. Upper row- Fishing period 1 – primarily seine and reduction fisheries, except recent years in SOG which represent food and bait/ special use fisheries; Middle row- Fishing period 2 (seine roe fishery); Bottom row- Fishing period 3 (gillnet roe fishery). Note range in y-axis differs for fishing period 1*

.

### 5.1.2. Spawn index: observed vs. predicted

Time series of estimated spawning stock biomass (SSB) fitted to observed spawn index for all major stock areas are shown in Figure 12. An examination of the residuals provides the basis for assessing the fit of the model to the available data. We compare model estimates of population egg production (estimated spawning stock biomass, SSB) to the observed egg deposition (observed spawn index) and calculate the by-year differences, the residuals, as log (observed) – log (predicted), adjusted for differences in q (spawn index proportionality coefficient) for the five major stocks. For all stocks, residuals range from -1 to +1, with a few exceptions in the earlier years, e.g., PRD for 1960s-1970s. In recent years, model estimated spawning biomass is closely fitted to the spawn index, although there are a higher proportion of negative residuals in years preceding the surface surveys (pre-1988). In particular, SOG and PRD stocks show a run of negative residuals from the late 1980s through mid 2000s. Currently we are unsure of the reason for this switch.

The spawn index proportionality coefficient, $q$, is used to relate spawn observed during the survey to the total amount of spawn in each area (i.e., $q$ is the proportion of the total spawn estimated to have been identified). In years prior to 1988, when surface survey was the primary survey method, $q$ is estimated as a parameter in the model (see Appendix B) and from 1988-present we make the precautionary assumption that $q$=1.

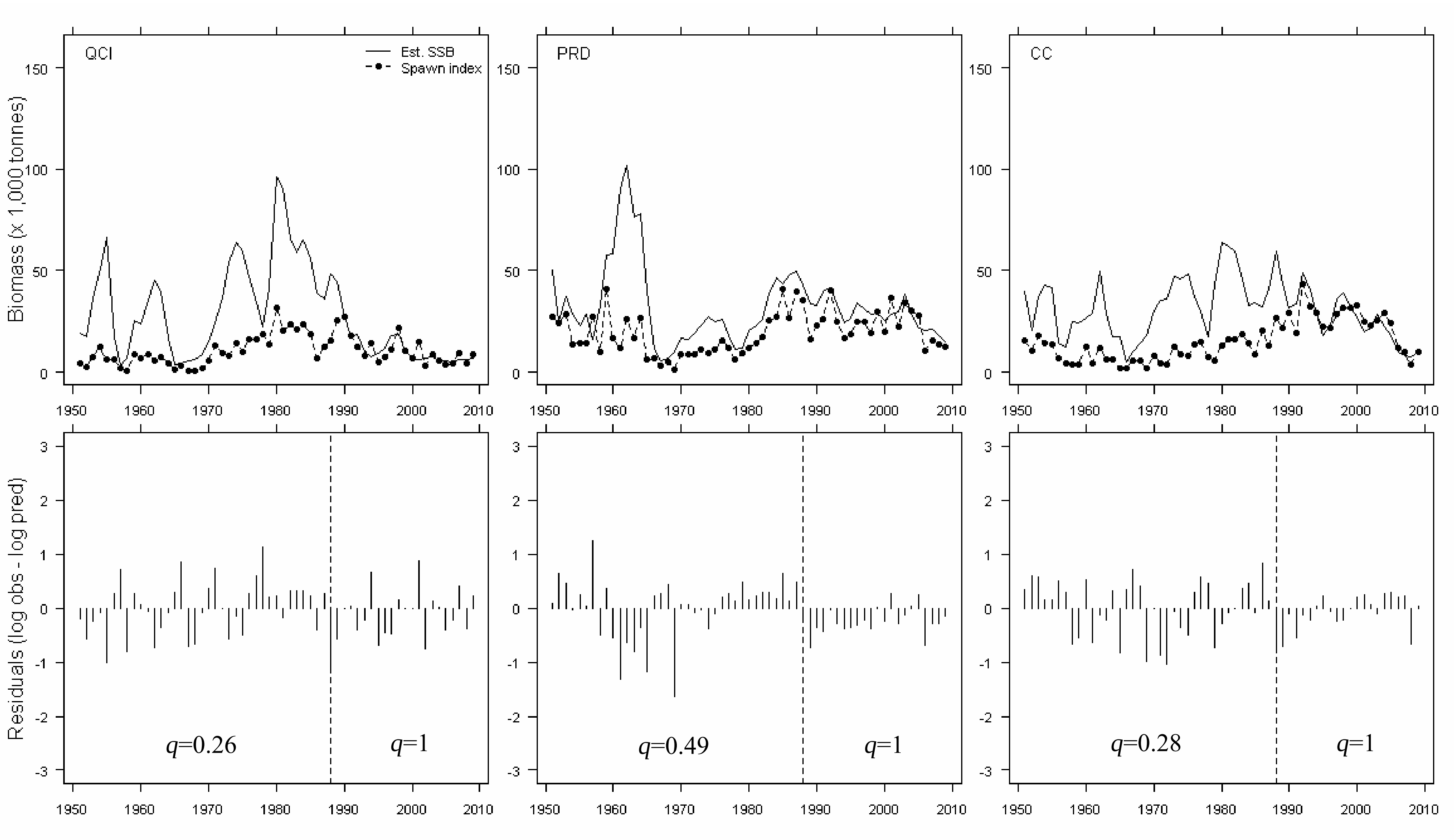



*Fig 12. QCI, PRD and CC*

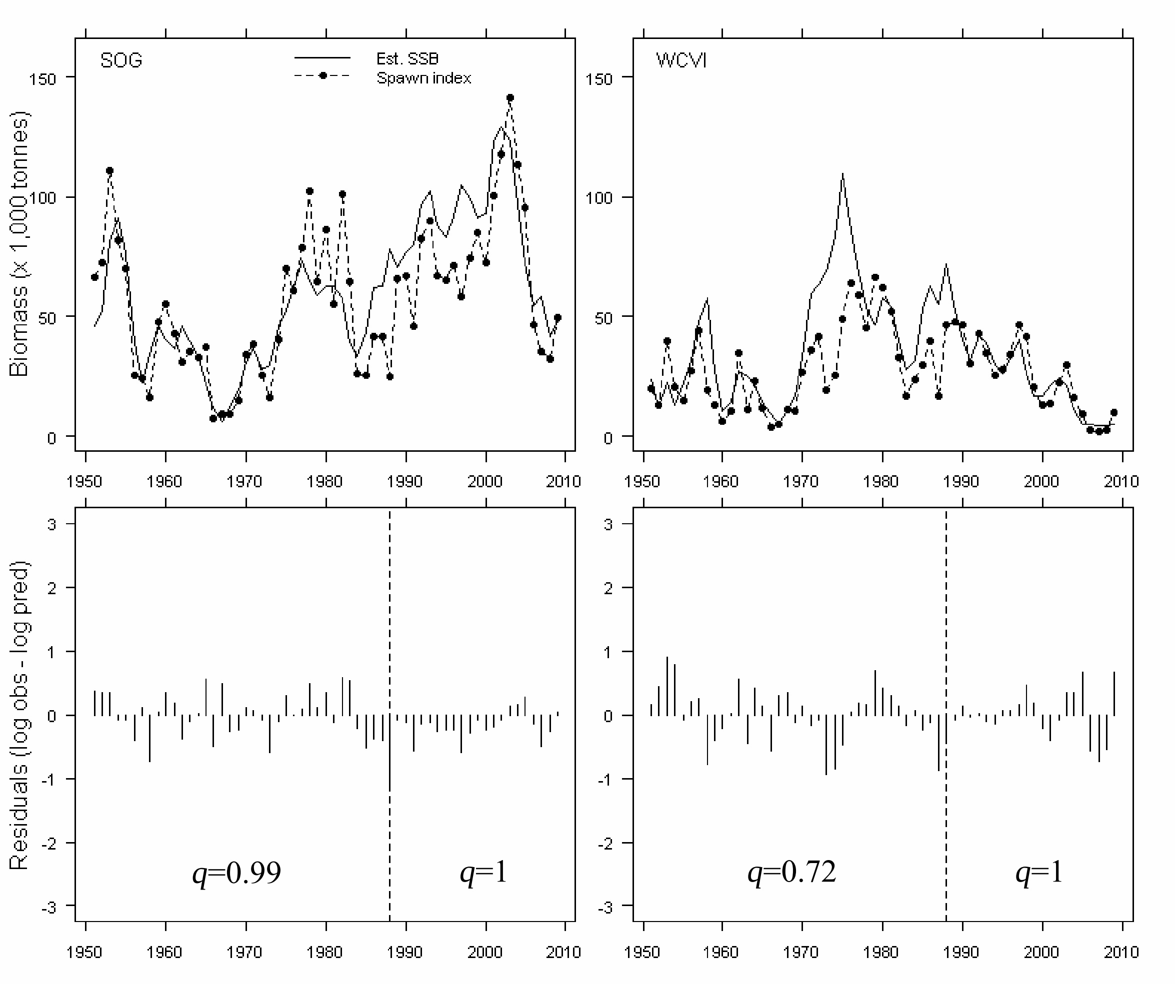



*Fig 12. SOG and WCVI*

*Figure 12. Time series of estimated spawning stock biomass (SSB) fitted to observed spawn index for all major stock areas. Residuals of this relationship appear in the bottom plots. Note that residuals are calculated as log (observed) – log (predicted), with values adjusted for differences in q (spawn index proportionality coefficient). Vertical dashed line in residual plots indicates 1988, the year the spawn survey switched from surface to dive survey. In years prior to 1988, q is estimated, whereas from 1988-present q is assumed to be 1. Values of q appear at the bottom of each residual plot.*

### 5.1.3. Age composition: observed vs. predicted

We used standardized Pearson's residuals to summarize the fit of the age-structured model to the observed proportion-at-age data. Residuals are presented in

Figure 13 for each of the five major stocks over time (broken down by fishing period). Positive residuals (blue) indicate the model is under-estimating age proportions for a given year/period, negative residuals (green) indicate an overestimation. There is no evidence of persistent over or underestimation of age composition in any area for any of the three fishing periods indicating reasonable agreement between the observed data and model predictions of age composition. A few larger positive (blue) residuals remain in each area and require further investigation.

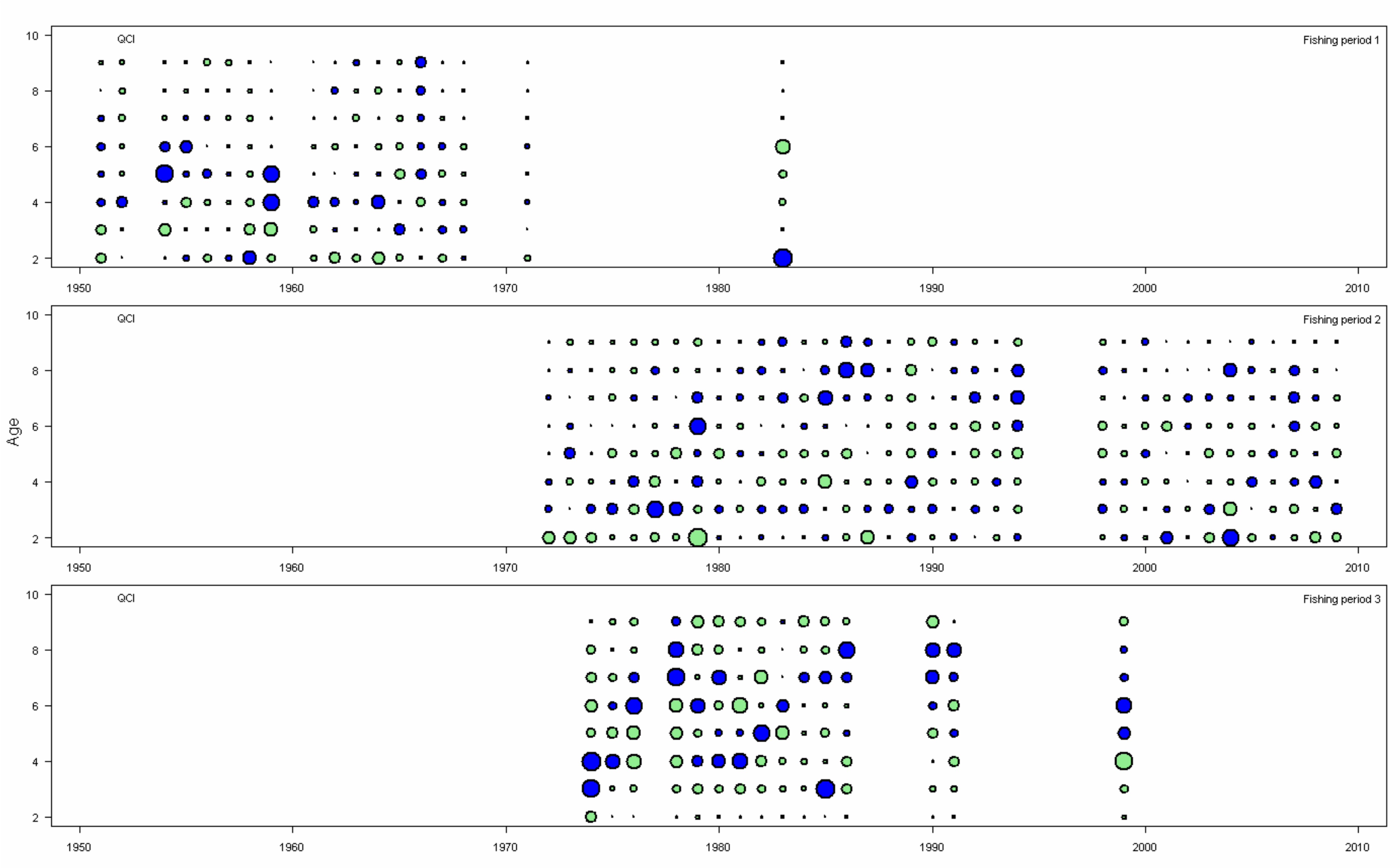

QCI
Fishing period 1
QCI
Fishing period 2
QCI
Fishing period 3
Age
1950
1960
1970
1980
1990
2000
2010

*Fig 13. QCI*

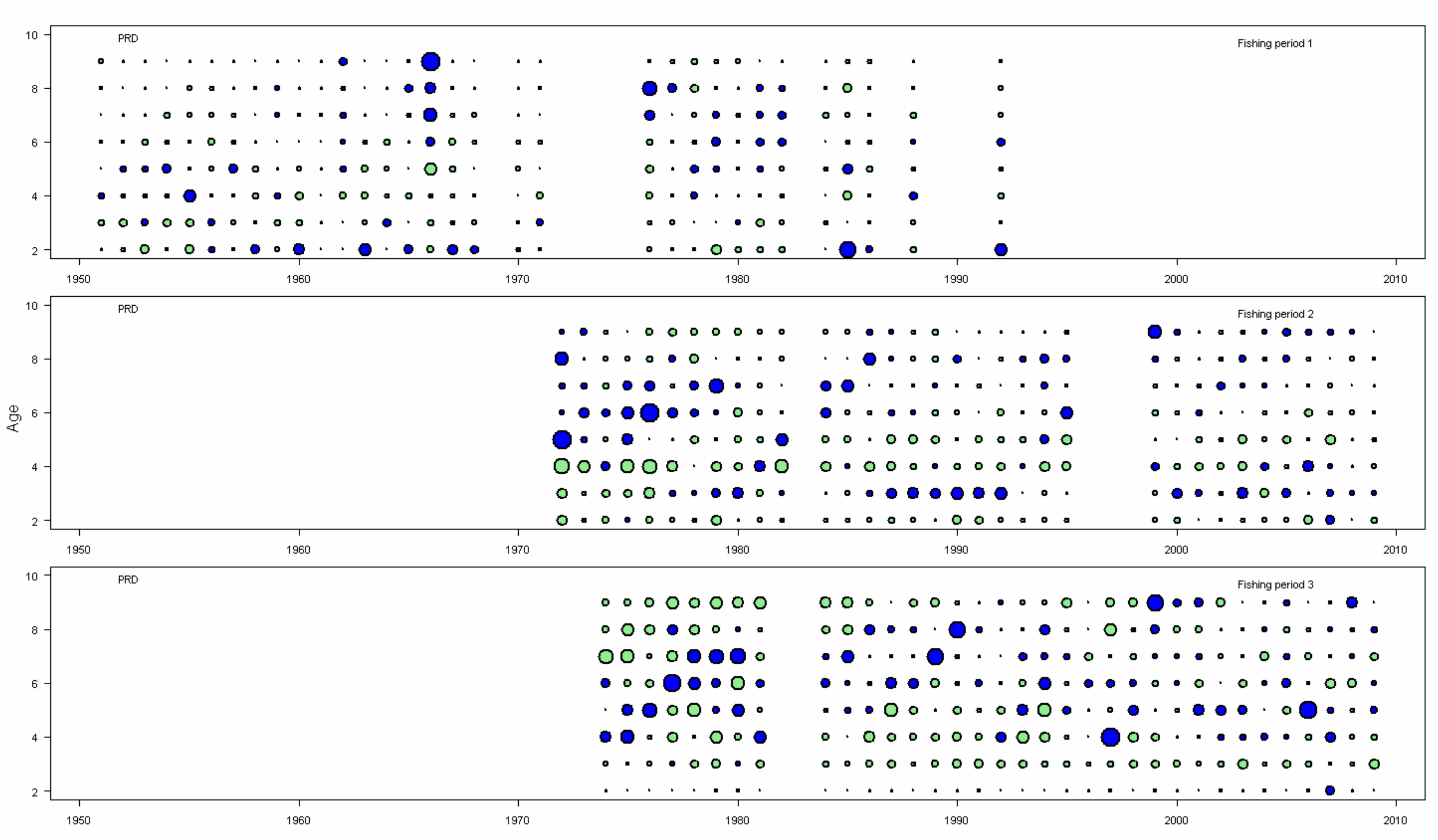

PRD
Fishing period 1
PRD
Fishing period 2
PRD
Fishing period 3
Age
10
8
6
4
2
1950
1960
1970
1980
1990
2000
2010

*Fig 13. PRD*

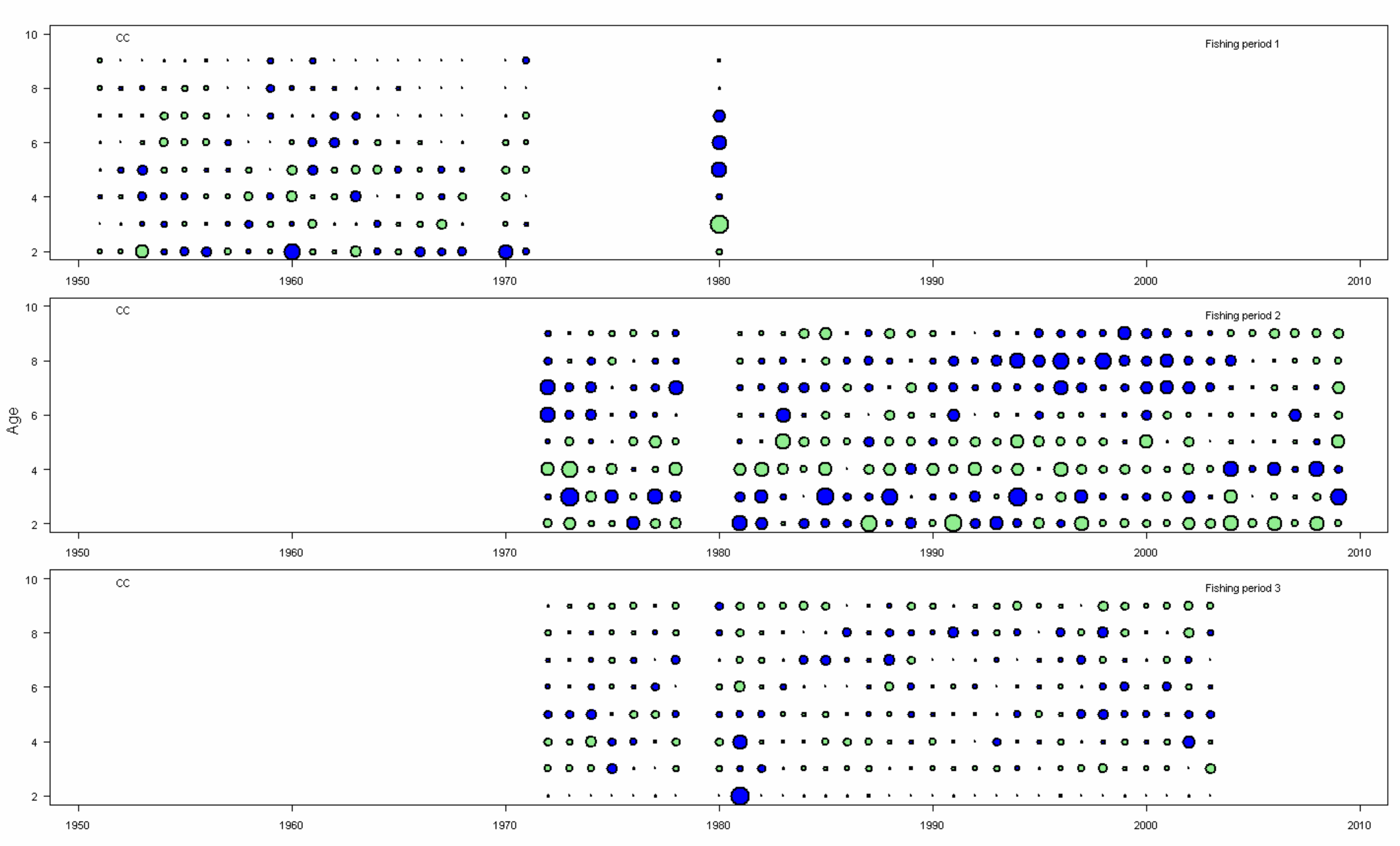
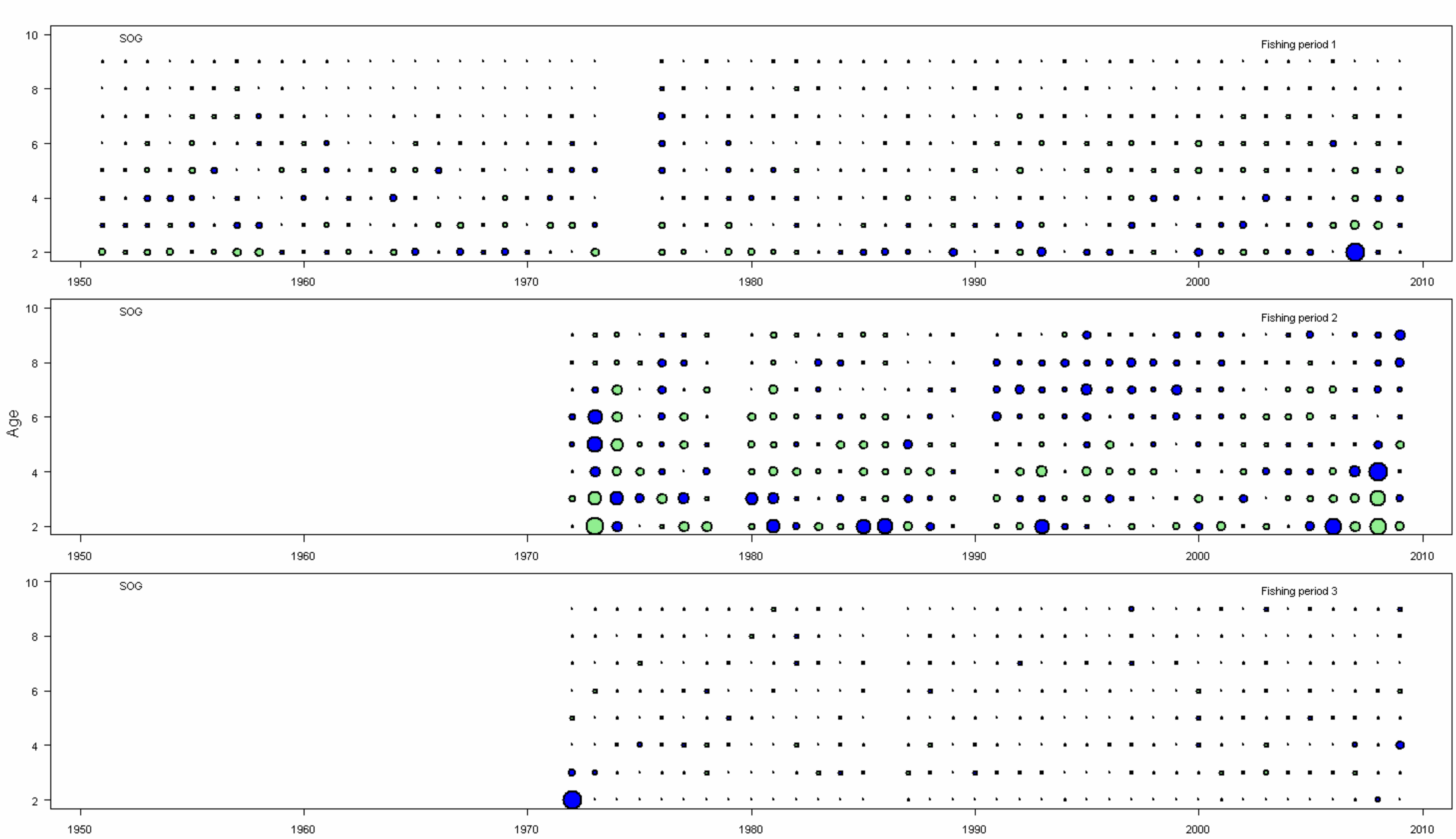

CC
Fishing period 1
CC
Fishing period 2
CC
Fishing period 3
Age
10
8
6
4
2
1950
1960
1970
1980
1990
2000
2010

*Fig 13. CC*



SOG
Fishing period 1
Fishing period 2
Fishing period 3
Age
1950
1960
1970
1980
1990
2000
2010


*Fig 13. SOG*

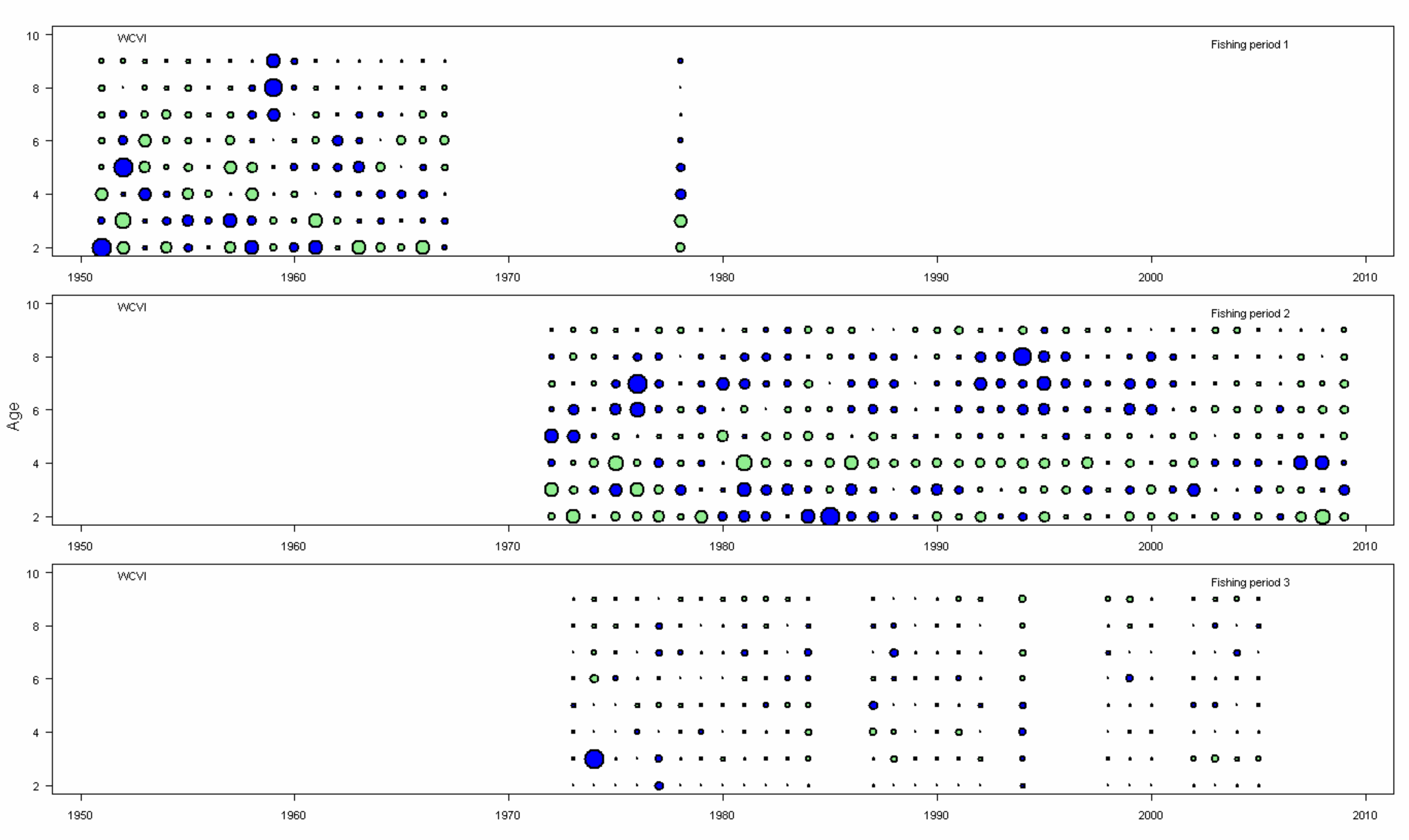



*Fig 13. WCVI*

*Figure 13. Bubble plots of Pearson residuals for the proportions-at-age calculated between observed and model-predicted proportions-at-age for each fishing period from 1951-2009. Positive residuals appear in blue, negative residuals in green.*

### 5.1.4. Recruitment

Recruitment of age 3 fish is estimated as the number of age 3 fish recruited to the stock at the beginning of year t. Recruitment is categorized as poor, average or good, and model estimates of recruitment are calculated as the lower 33%, middle 33% and upper 33% of the number of age 3 fish over the entire time series. Numbers of recruits and the poor-average and average-good recruitment category divisions (0.33 and 0.66 quantiles) are presented for each major stock area in Figure 14. With the addition of each year of data, these category divisions change slightly to reflect our updated view of poor, average and good recruitment. Based on this year's information, the QCI stock area appears to be alternating between poor and average recruitment (over the past 10-years), with average recruitment occurring in 2009. The 2008 assessment assumed poor recruitment for the QCI 2009 forecast (DFO 2008), although this difference can likely be explained by the inclusion of additional ageing data. Figure 14 shows average recruitment for the CC stock (2008 assessment assumed poor) whereas the PRD stock appears at the divide between poor and average (2008 assessment assumed average). The SOG stock shows a strong assumption of good recruitment while the WCVI stock maintains a trend of poor recruitment. Recruitment assumptions for both the SOG and WCVI stocks reflect predictions provided by the 2008 off-shore recruitment forecast survey (DFO 2008).

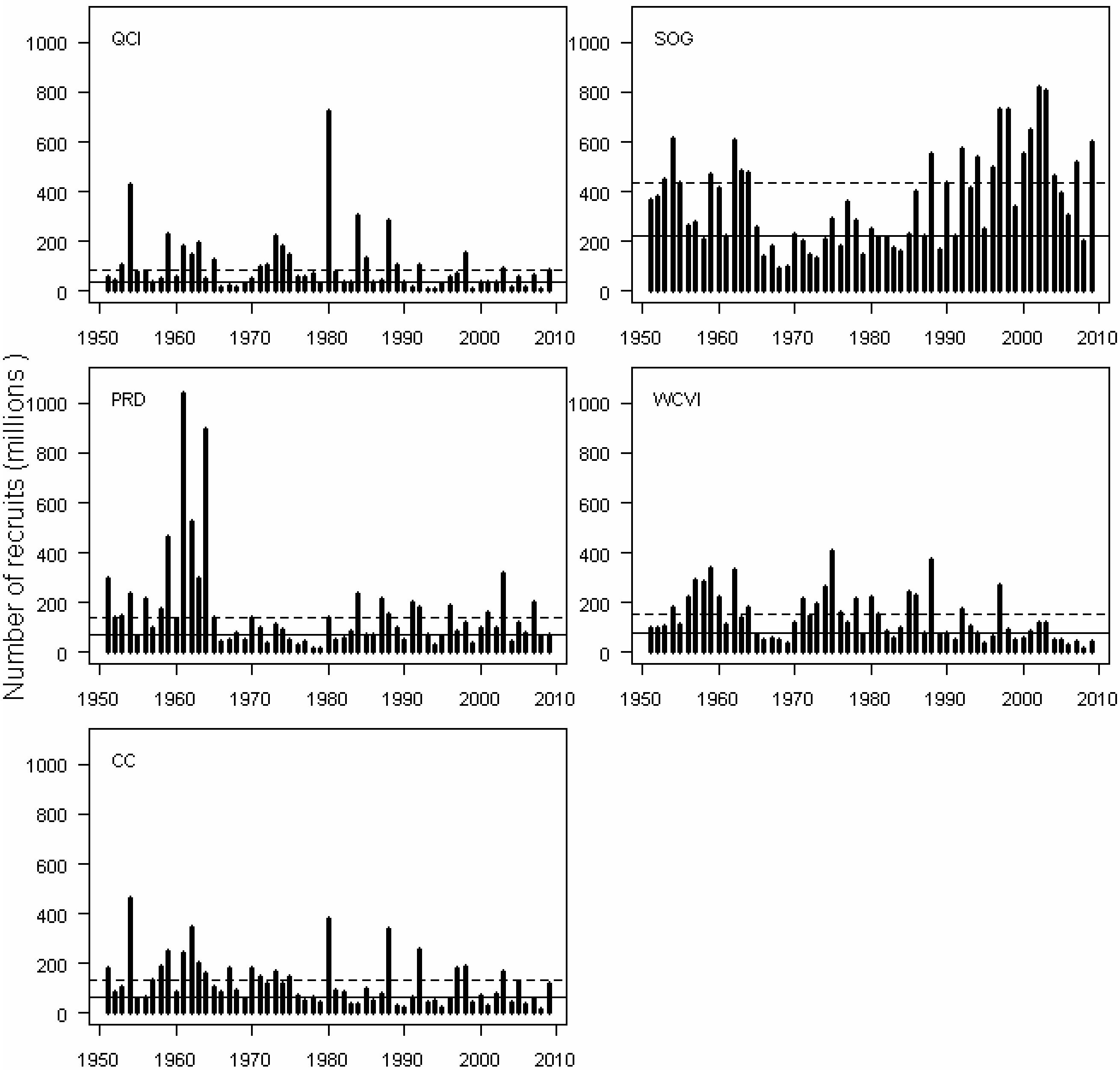



*Figure 14. Estimated number of age 3 fish recruiting to the stock in each of the major stock assessment areas. Upper dashed lines represent division between good and average categories of recruitment, lower solid lines represent division between average and poor recruitment. Divisions were calculated as the 0.33 and 0.66 quantiles of the historic numbers of age 3 fish across all years. Recruitment categories for 2009 are as follows: QCI-average; PRD- poor-average; CC- average; SOG- good; WCVI- poor.*

### 5.1.5. Gillnet selectivity

Fishery selectivity is estimated separately for all three fishing periods using three different logistic equations (see Appendix B, Model description and documentation). Figure 15 shows the selectivity function for the roe gillnet fishery, estimated using a weight-based logistic function. The average selectivity curves (thick lines) imply that on average herring are not fully-selected to the gillnet fishery until age 8-9. Based on the way the fishery operates, we would expect herring to be fully selected at a younger age, i.e., 6-years, thus future work should examine adjusting parameters of the selectivity function to more closely reflect operations of the gillnet fishery. For the SOG stock, the observed declines in selectivity at older ages are the result of lower observed fish weight for ages 9-10 than for ages 7-8. Future work should also include comparisons of gillnet and seine selectivity functions to determine whether differences between these functions is reasonable and accurately reflects fishery operations.

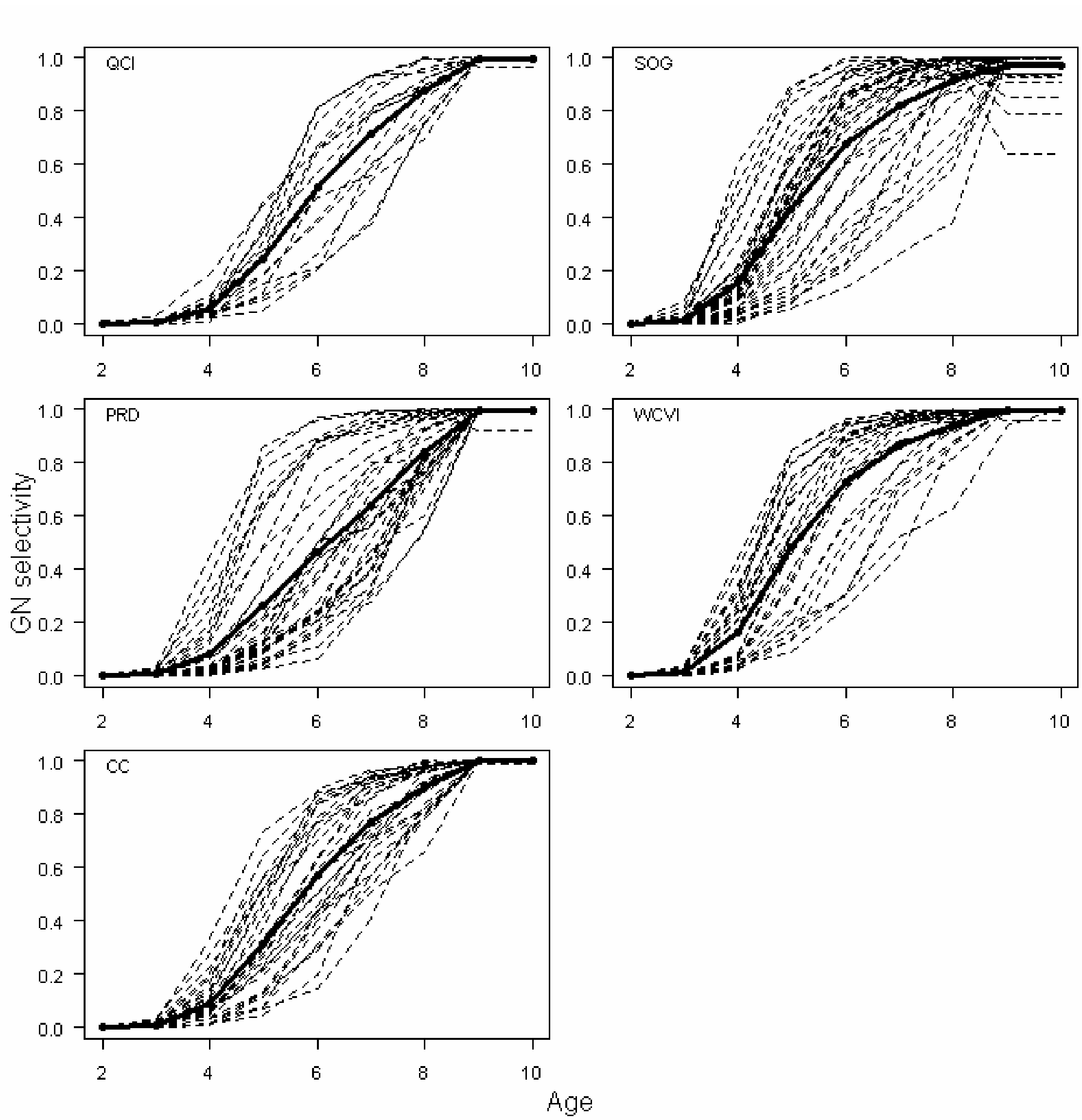



*Figure 15. Fishery selectivity for the roe gillnet fishery, estimated using a weight-based logistic function. Each line represents one-year in the time series with average selectivity over all years indicated by the thick black line.*

### 5.1.6. Fishing mortality

From the observed catch, the model estimates the rate of fishing that produced the observed catch, also known as the instantaneous fishing mortality rate. These rates are presented in Figure 16. Historical trends in F reflect the intensive fishing of the reduction period, while later F values reflect the comparatively low catch rates of recent years.

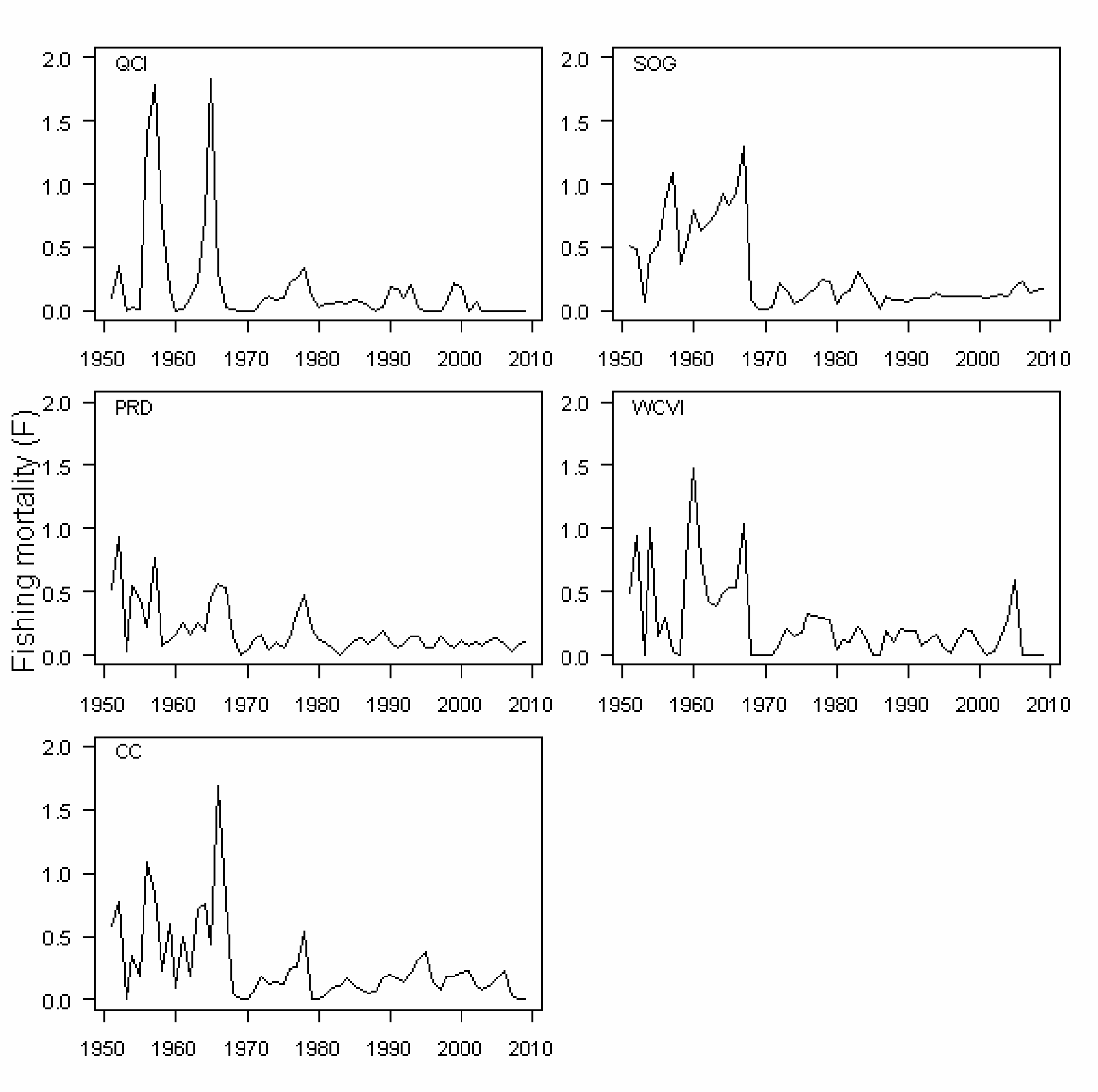



*Figure 16. Estimates of annual instantaneous fishing mortality (F) for major B.C. herring stocks from 1951-2009.*

### 5.1.7. Natural mortality

Over the years, a number of different methods have been explored for estimating natural mortality for herring stocks, including: fixed and estimated values for constant M, age-dependent M, and most recently, annual estimates of M using a ‘random walk’ in the estimation procedure (see Appendix B, Model description and documentation). Using this method, natural mortality is shown to be increasing in all major stocks (Figure 17), with the highest observed rates in areas closed to fishing: QCI, CC and WCVI. This implies that despite conservation efforts in the areas (i.e., area closures), recovery potential for these stocks is largely driven by environmental factors and not the impacts of fishing.

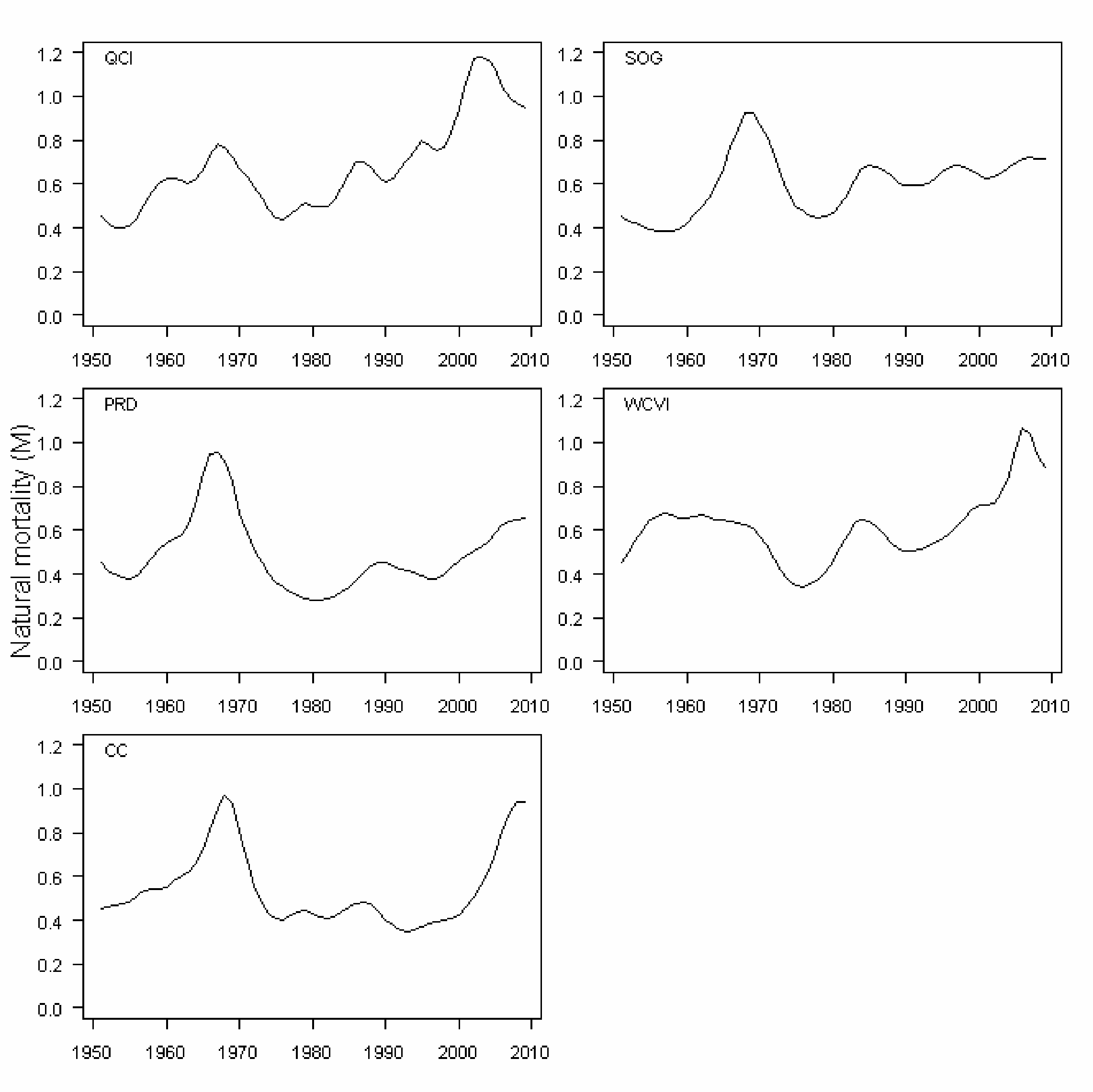



*Figure 17. Estimate of the annual instantaneous natural mortality rate (M) for the B.C. herring stocks from 1951-2009, calculated using a random walk approach. Natural mortality rates for 2009 are as follows: QCI- 0.95; PRD-0.68; CC- 0.94; SOG- 0.71; WCVI- 0.89.*

It is difficult to determine whether these high *M* values are an accurate reflection of herring biology in this current 'low productivity' regime, or whether these estimates of natural mortality are capturing noise from other parameters. Due to the way the model equations are defined, parameters such as *F* and *h* (steepness) can be confounded with natural mortality, meaning that when we make a change to one of these parameters this change can be detected in the others. We ran a number of simulations to test the response of changes in *M*, *F* and *h*, and found, as expected, a high degree of response in *h* when changes were made to *M*, and vice versa. However, we found little effects on *F*. The lack of trade-off between *M* and *F* is likely the result of model assumptions about catch and biomass, specifically that we have absolute estimates of both (commercial catch is known with high certainty and *q*=1 from 1988 to present).

Our tests confirmed a degree of confounding amongst these three parameters, although they do not allow us to confirm whether high *M* values accurately reflect the current productivity regime. An example of parameter response between *h* and *M* for the CC stock is presented in Figure 18. We will continue this work by exploring the effects of: (1) estimating time-invariant *M*, (2) constraining the year-to-year rate of change in *M* (reducing the variance), (3) fixing *h* at 0.74 (as per Myers et al. 1999) and (4) estimating *h* across all stocks. Further results of these tests will help us with future development of a herring operating model for use in a management strategy evaluation.

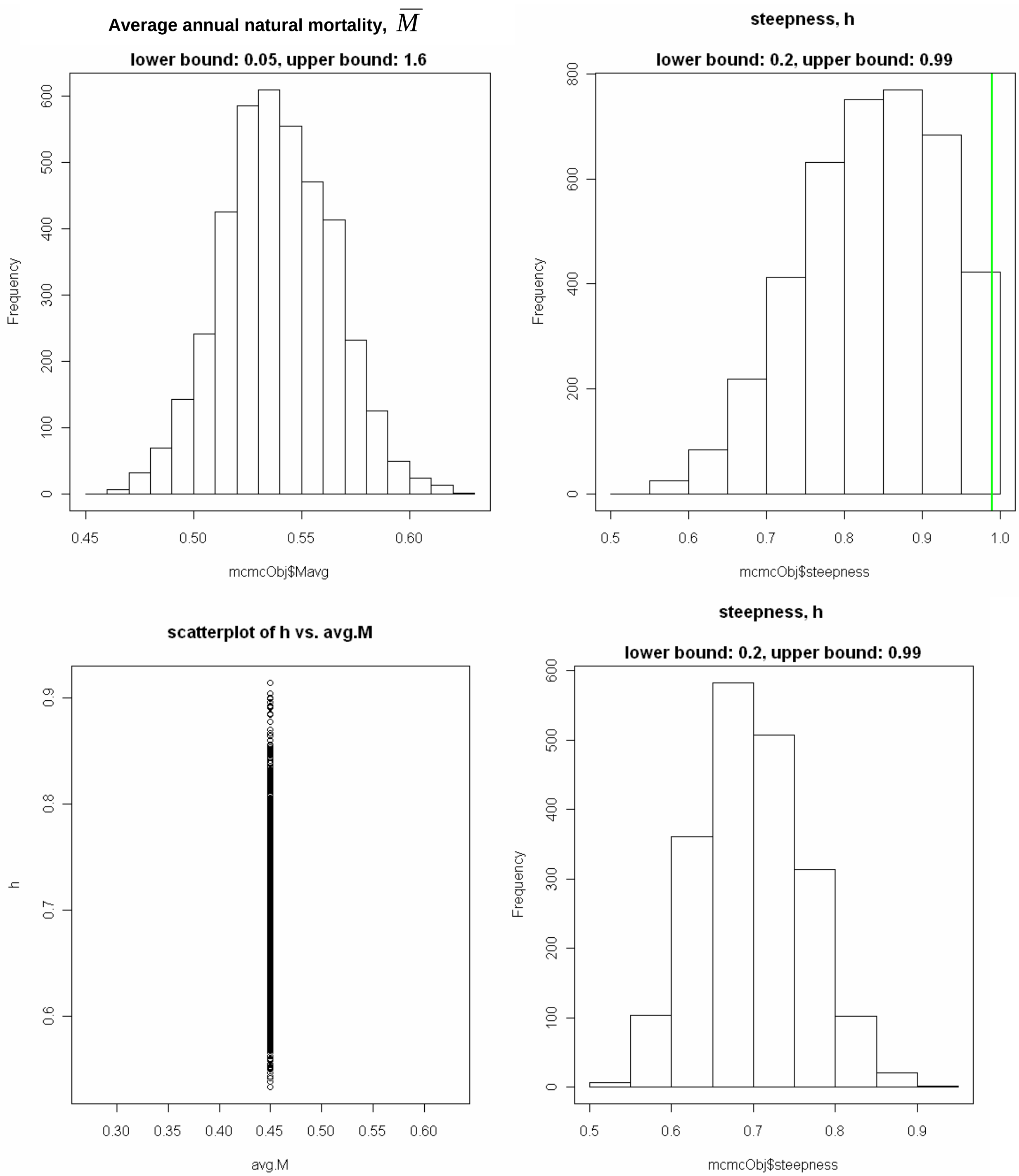



*Figure 18. Distribution of steepness, h, under time-varying (top left) and fixed estimates of average annual natural mortality (bottom left,* $\overline{M}$ *, where M is N ~ (0.45, 0.2).*

### 5.1.8. Parameter estimation

Marginal posterior distributions are available for all parameters estimated using MCMC routines. We have included posterior distributions (Figure 19) and trace lines (Figure 20) for key model parameters and derived variables which are used for providing science advice on each stock. Median values of the marginal posterior distributions (vertical black dashed lines) are used in calculating pre-fishery forecast biomass and available catch, presented in Table 4.

Ideally, we like to see smooth posterior distributions, such as the posterior distributions for average recruitment and steepness for the WCVI stock. These posterior samples follow a normal distribution and it is clear that there is no interference of the parameter bounds during the parameter estimation procedure. In most cases, the MPD and median of the marginal posterior distributions are similar, as indicated by the high degree of overlap between the solid green and black dashed lines. The main exception to this statement is the CC stock. The posterior distribution for steepness for the CC stock indicates that the estimation procedure is constrained by the upper bound (i.e., 1.0). This problem is resolved if we fix $M$ at 0.45, rather than include a time-varying natural mortality rate.

Model estimates of steepness (median of the posterior distribution) for all stocks are: QCI=0.74, PRD=0.64, CC=0.84, SOG=0.73 and WCVI=0.72. High steepness values infer high stock productivity and that recruitment is relatively invulnerable to the effects of fishing. At this point we are unable to determine whether h=0.84 is biologically reasonable for the CC herring stock, or whether it is the result of parameter confounding mentioned in Section 5.1.7. However, one must also recognize that steepness bounds (0.2-1.0) are the natural bounds of the Beverton-Holt stock recruitment relationship, thus high density at the upper bound may not be an issue.

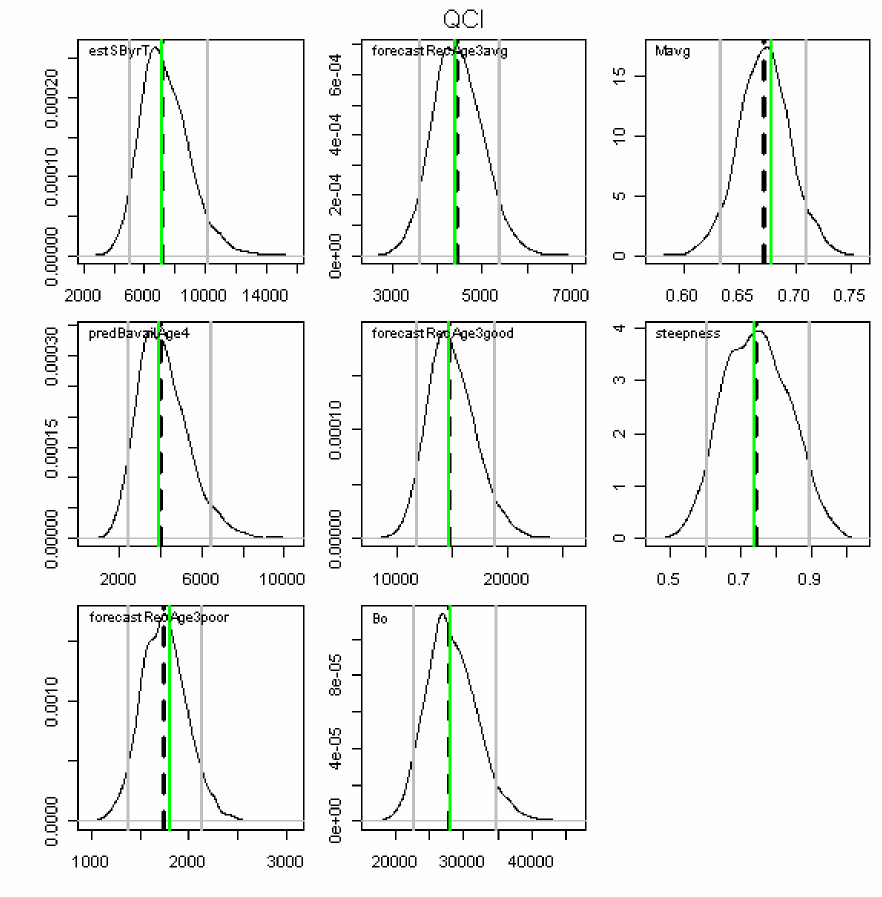



*Fig 19. QCI*

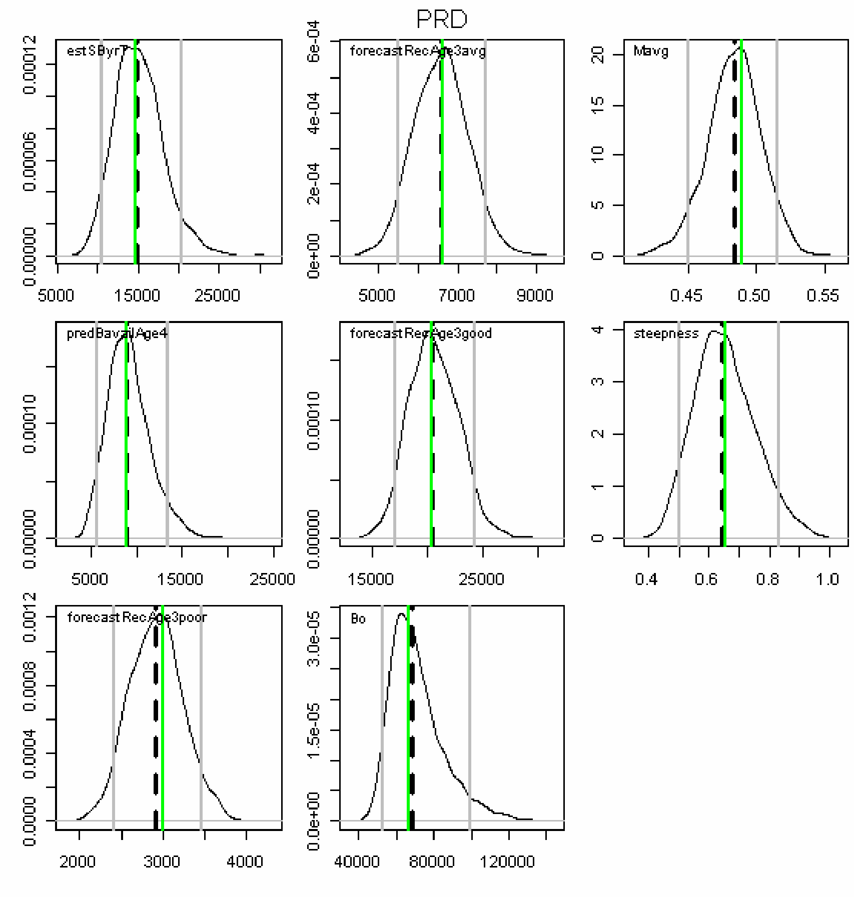



*Fig 19. PRD*

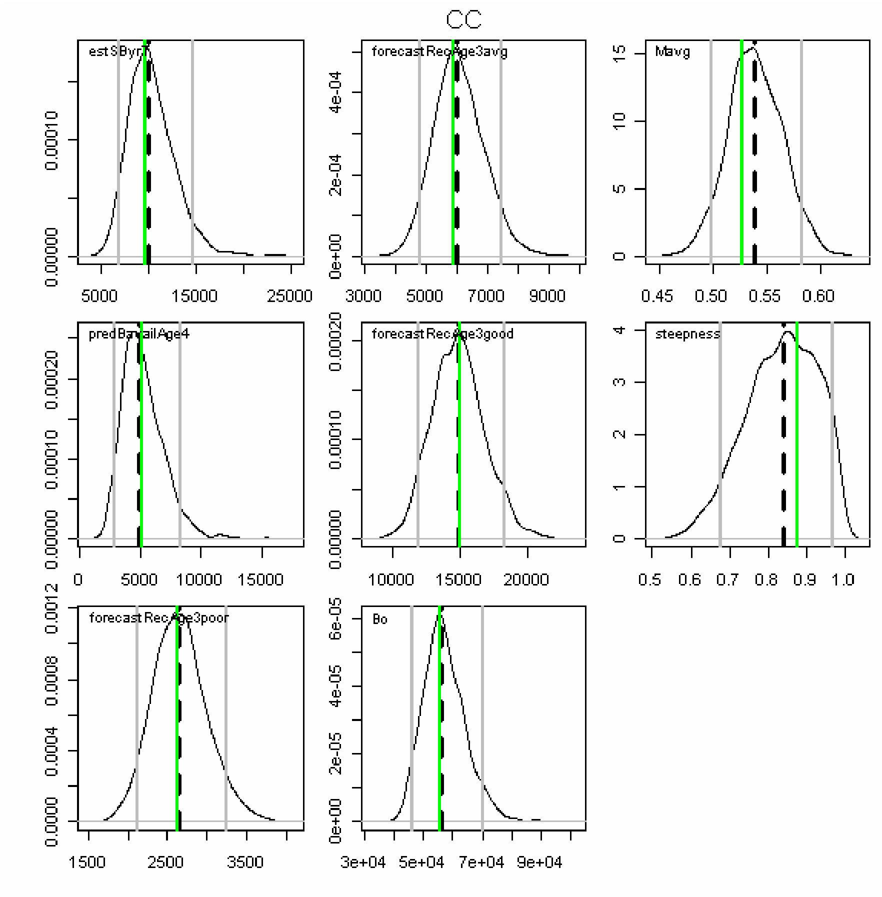



*Fig 19. CC*

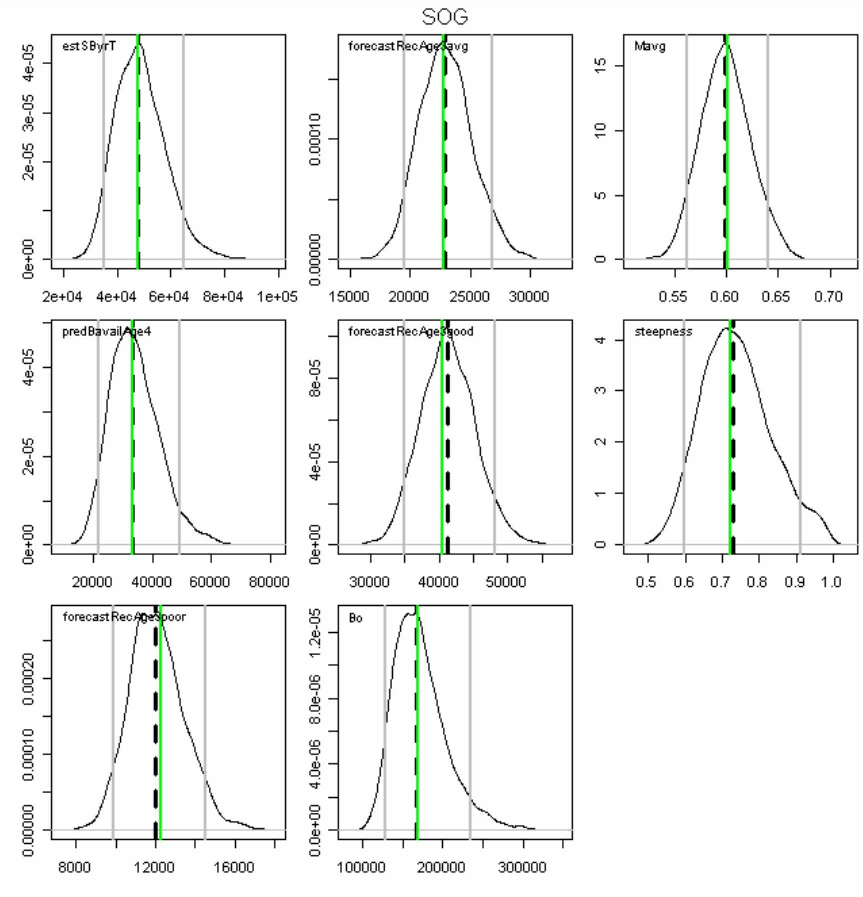



*Fig 19. SOG*

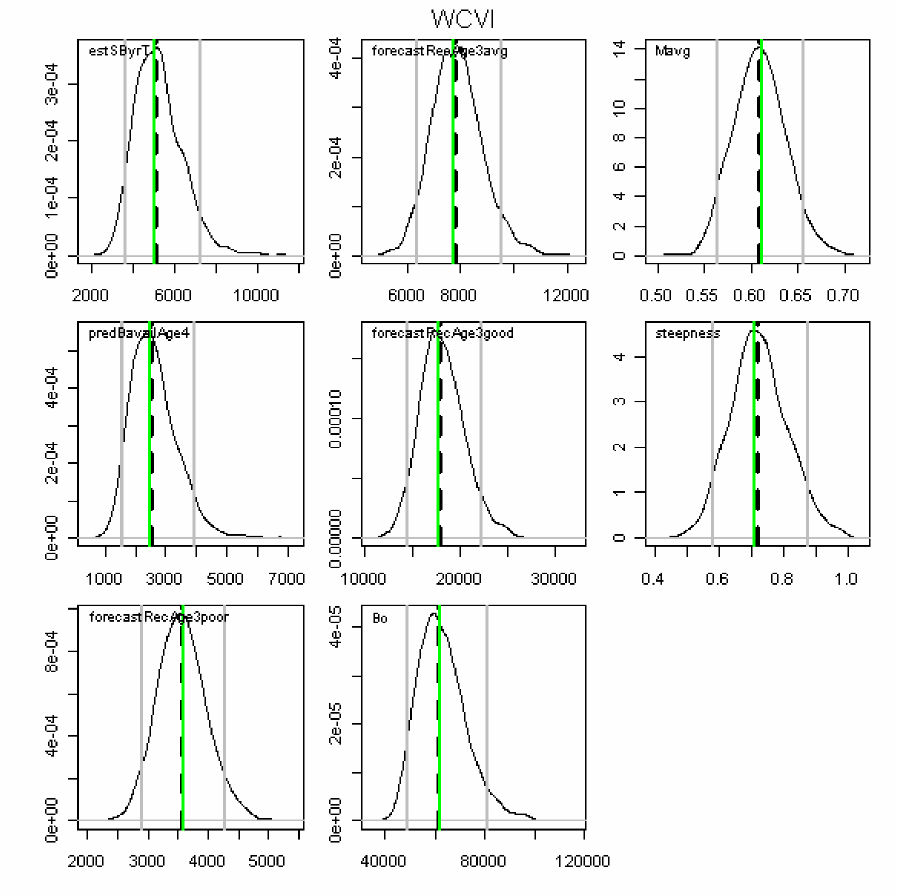



*Fig 19. WCVI*

Figure 19. Marginal posterior distributions for key parameters of the 2009 assessment, shown for the five major stock areas. Black trend lines outlines the marginal posterior distribution for each parameter, vertical black dashed lines represents median posterior values while solid green lines represent MPD estimates. Gray vertical lines denote the 5% and 95% quantiles of the posterior distribution. Estimated parameters include: unfished biomass (*Bo*), average natural morality (*Mavg*), and steepness. The other five distributions are key derived variables used for providing science advice to management. These include: estimated spawning biomass in the final year (*estSByrT*), predicted availability of age 4 and older fish (in biomass, *predBavailAge4*), and forecast recruitment of age 3 fish under estimates of poor, average and good recruitment (*forecastRecAge3poor*, *forecastRecAge3avg* and *forecastRecAge3good*).

Model runs were examined for convergence through visual inspection of MCMC trace plots (Figure 20). For the QCI, CC and WCVI stocks, convergence was apparent for all parameters with a chain length of 2 million. For PRD and SOG stocks we found evidence of non-convergence in the estimation of steepness (*h*) and unfished biomass ($B_0$). In attempts to resolve these issues, we ran additional chains up to 20 million iterations. These extra long chains did improve the appearance of the trace plots, and it is likely that additional iterations, up to 50 million, would lead to convergence in all parameters. However, time did not permit these additional simulations.

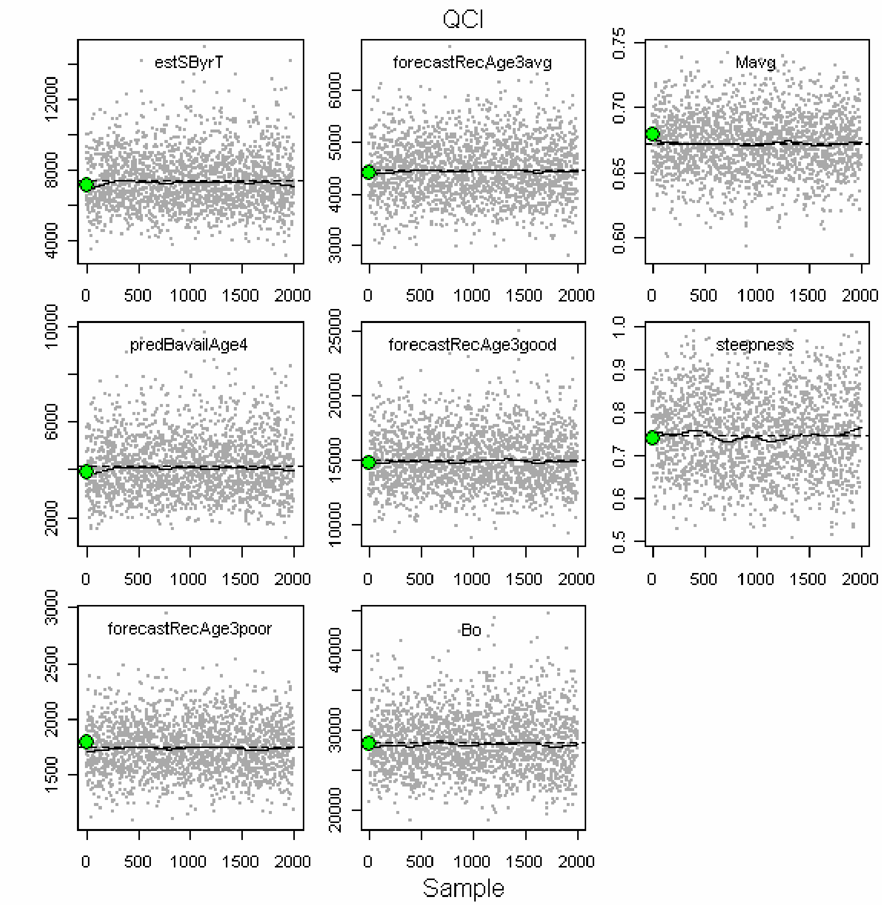



*Fig 20. QCI*

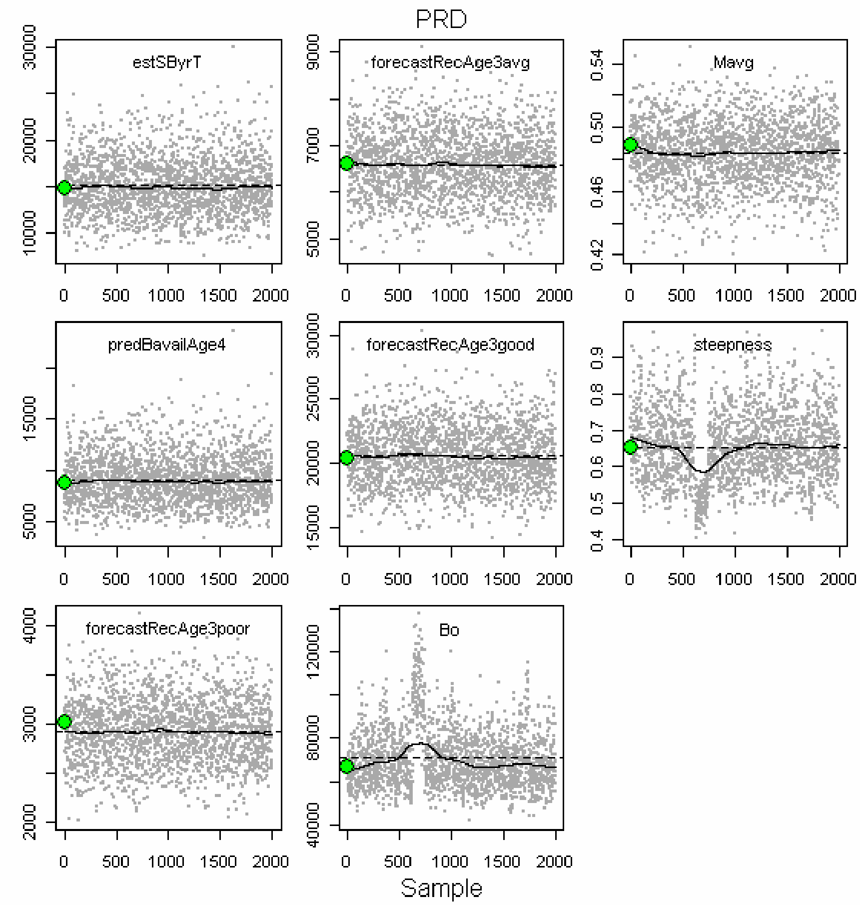



*Fig 20. PRD*

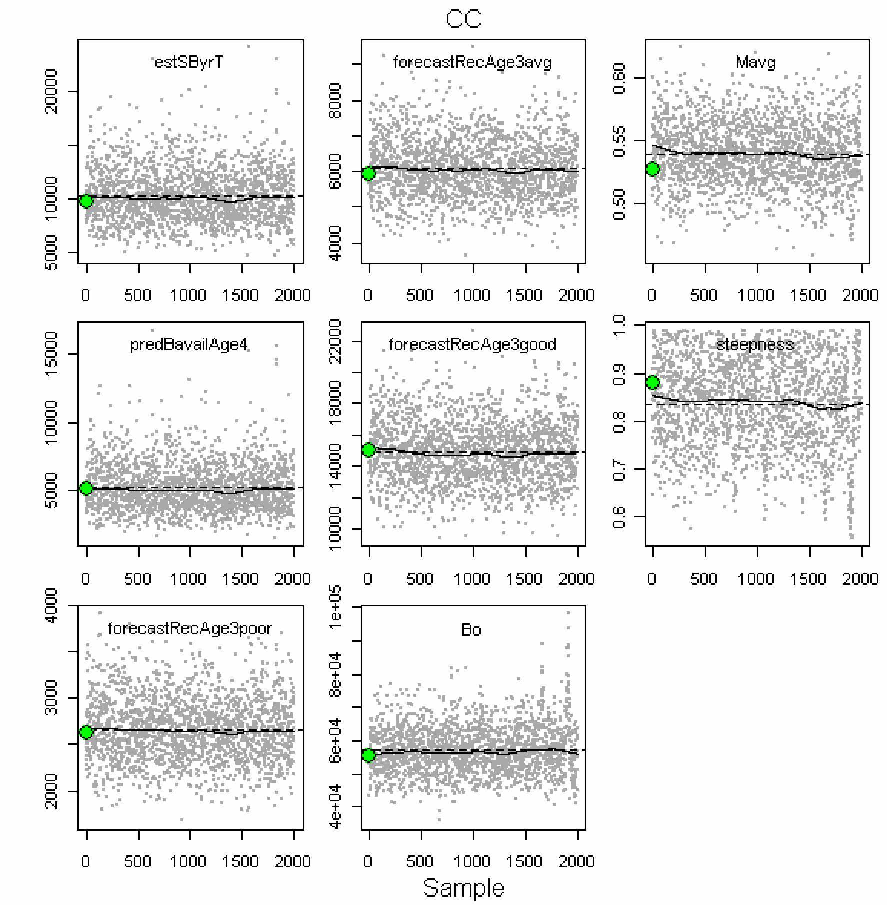



*Fig 20. CC*

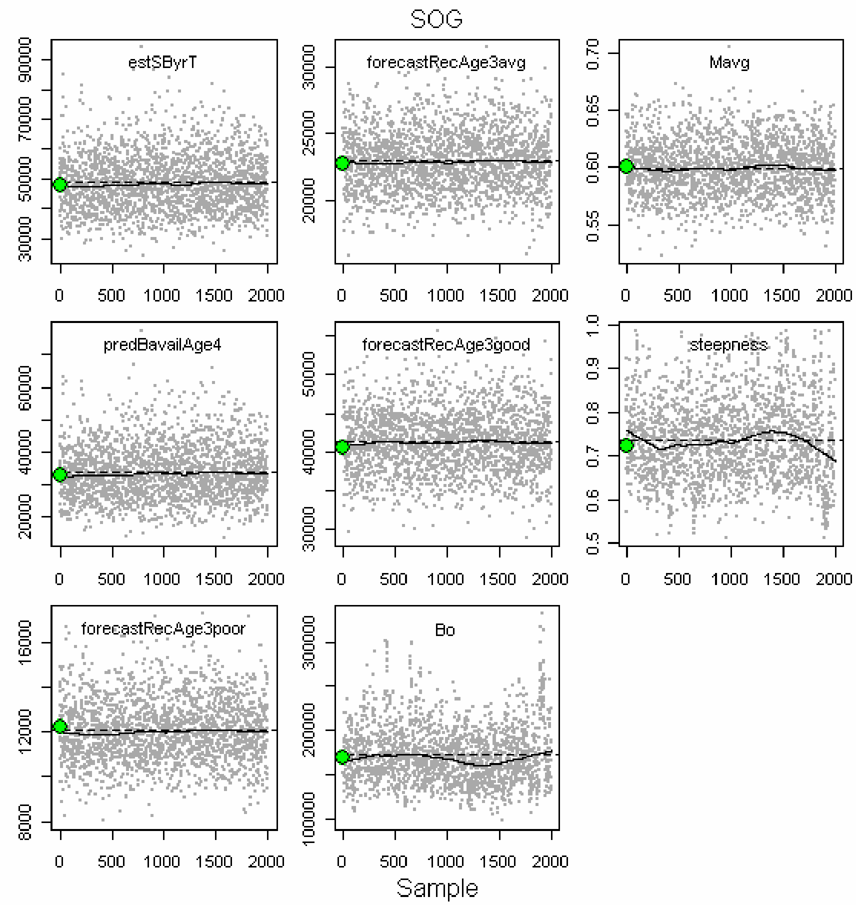



*Fig 20. SOG*

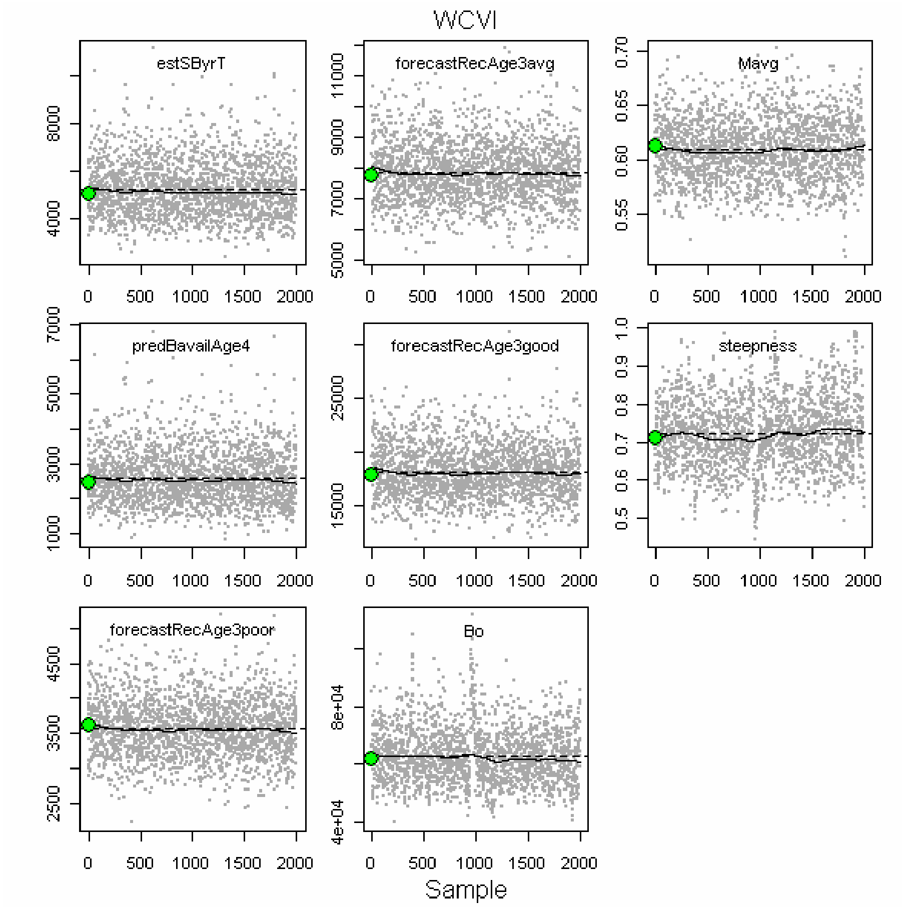



*Fig 20.  WCVI*

Figure 20.  MCMC trace plots for key parameters of the 2009 assessment, shown for the five major stock areas.  Black trend lines were generated using a locally-weighted polynomial regression (lowess smoother) and reflect average behaviour across posterior samples.  Green points represent MPD estimates, which also correspond to the MLE for each parameter.  See Figure 19 caption for parameter and variable descriptions.

### 5.1.9.  Retrospective analysis

A retrospective analysis was conducted for each of the major herring stocks to examine the sensitivity of pre-fishery biomass to the addition of new data (Figure 21). Only MPDs were estimated for these analyses.  These figures show the pre-fishery biomass for each year since 1999, demonstrating the effect of additional data on model performance relative to the estimates from the stock trajectory in the final year.  For QCI and WCVI stocks, incidences of over- and under-estimation of pre-fishery biomass occur with the same frequency, and thus appear to be unbiased.  The PRD and CC stocks show a positive retrospective bias for most years of the analysis, while the SOG stock demonstrates a negative bias for years 1999-2002.  In terms of precautionary fisheries management, a persistent positive bias warrants further investigation as it can lead to the stock being subject to a higher harvest rate than is recommended under the herring harvest control rule. Although the cause of these biases is currently unknown, it should be noted that the magnitude of these retrospective biases is much smaller than has been previously observed, prior to the implementation of the HCAMv2 model (Haist and Schweigert 2006, Schweigert et al. 2009).

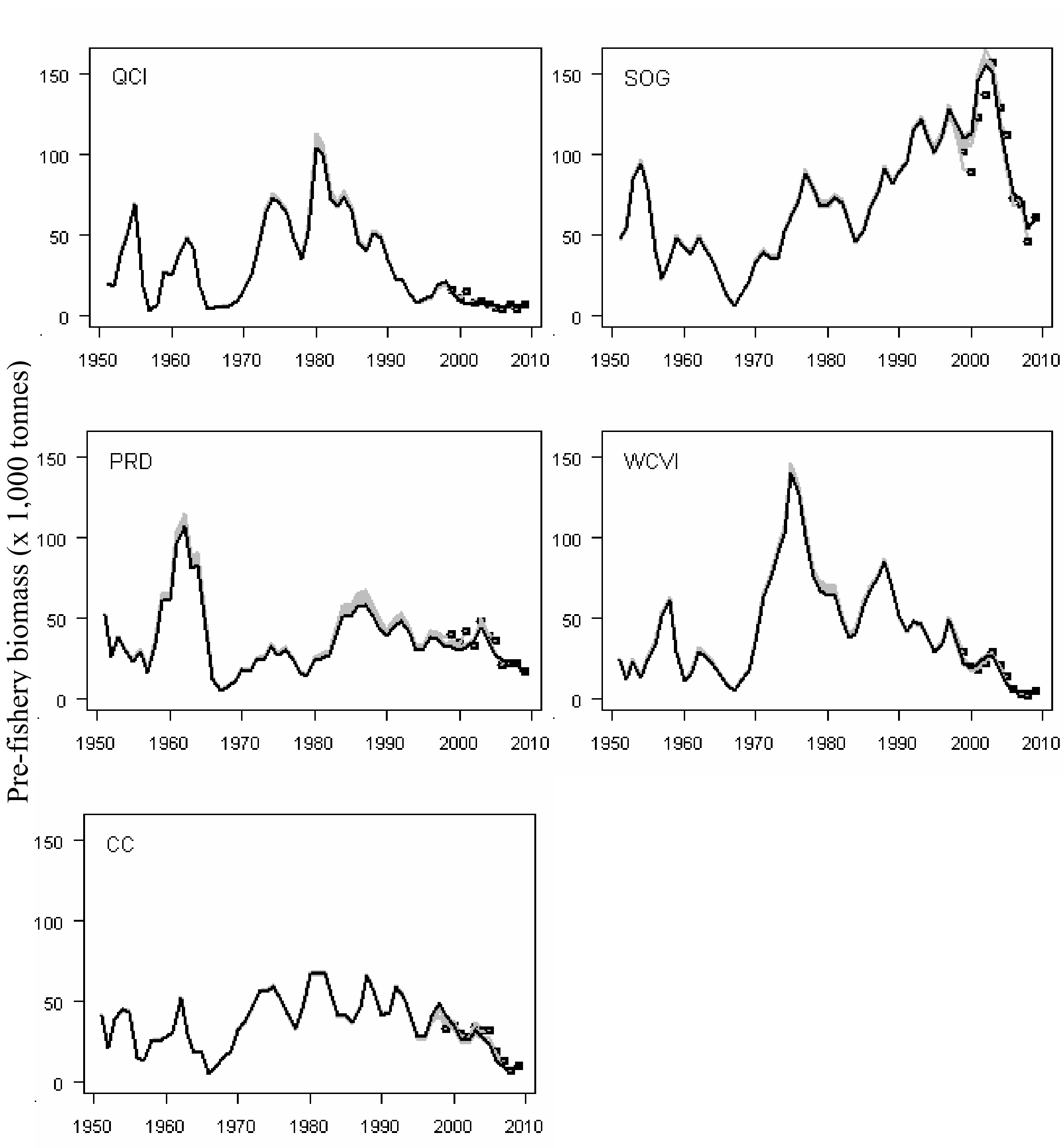



*Figure 21. Retrospective maximum likelihood estimates of pre-fishery biomass for the five major stock areas (1999-2009). Black line and solid black circle represent the complete time series. Gray lines and gray filled circles denote terminal year estimates for the reconstruction.*

## 5.2. Catch advice

Catch advice is provided in the form of a decision table, with pre-fishery biomass and available harvest presented for three recruitment scenarios: poor, average and good. Similar results were obtained using both estimation procedures, however, Table 4 includes only those calculated using median values of the marginal posterior distributions.

*Table 4. Estimated spawning stock biomass (SSB), pre-fishery forecasts and available harvest calculated using median values from the marginal posterior distributions for the major stock areas.*

| | | | Pre-fishery Forecast Biomass | | | | Available Harvest | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2009 SSB | 2010 age 4 | Poor | Average | Good | Cutoff | Poor | Average | Good |
| QCI | 7,172 | 4,013 | 5,750 | 8,447 | 18,810 | 10,700 | 0 | 0 | 3,762 |
| PRD | 14,866 | 8,909 | 11,829 | 15,499 | 29,366 | 12,100 | 0 | 3,100 | 5,873 |
| CC | 9,991 | 4,934 | 7,577 | 10,961 | 19,772 | 17,600 | 0 | 0 | 2,172 |
| SOG | 47,966 | 33,020 | 45,001 | 55,857 | 74,216 | 21,200 | 9,000 | 11,171 | 14,843 |
| WCVI | 5,112 | 2,506 | 6,063 | 10,333 | 20,490 | 18,800 | 0 | 0 | 1,690 |

Time series of model estimates of pre-fishery biomass are presented in Figure 22, and include comparisons of spawning biomass, spawn index and cutoff levels.

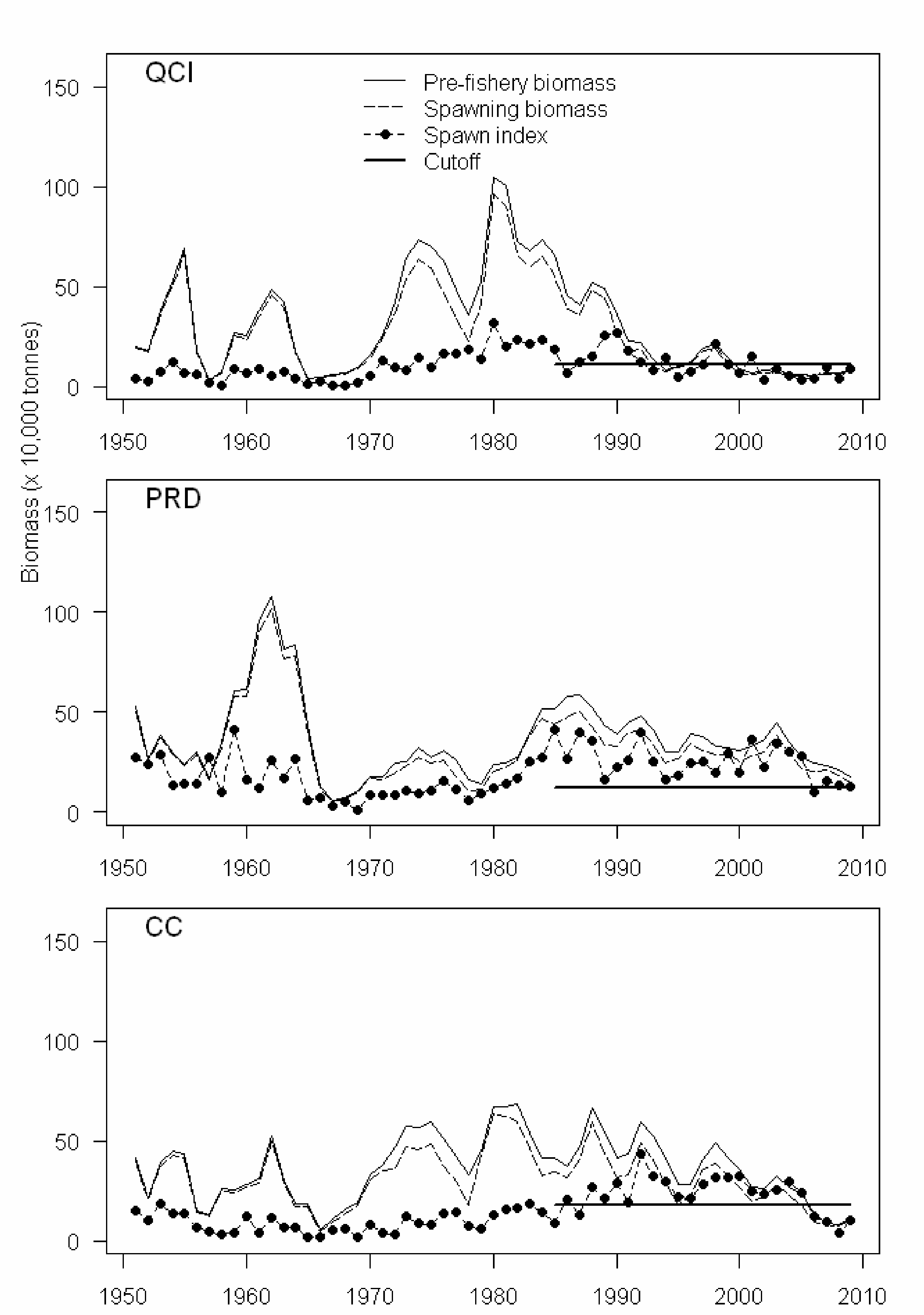

QCI
Pre-fishery biomass
Spawning biomass
Spawn index
Cutoff
150
100
50
0
1950
1960
1970
1980
1990
2000
2010
Biomass (x 10,000 tonnes)
PRD
CC

*Fig 22.*

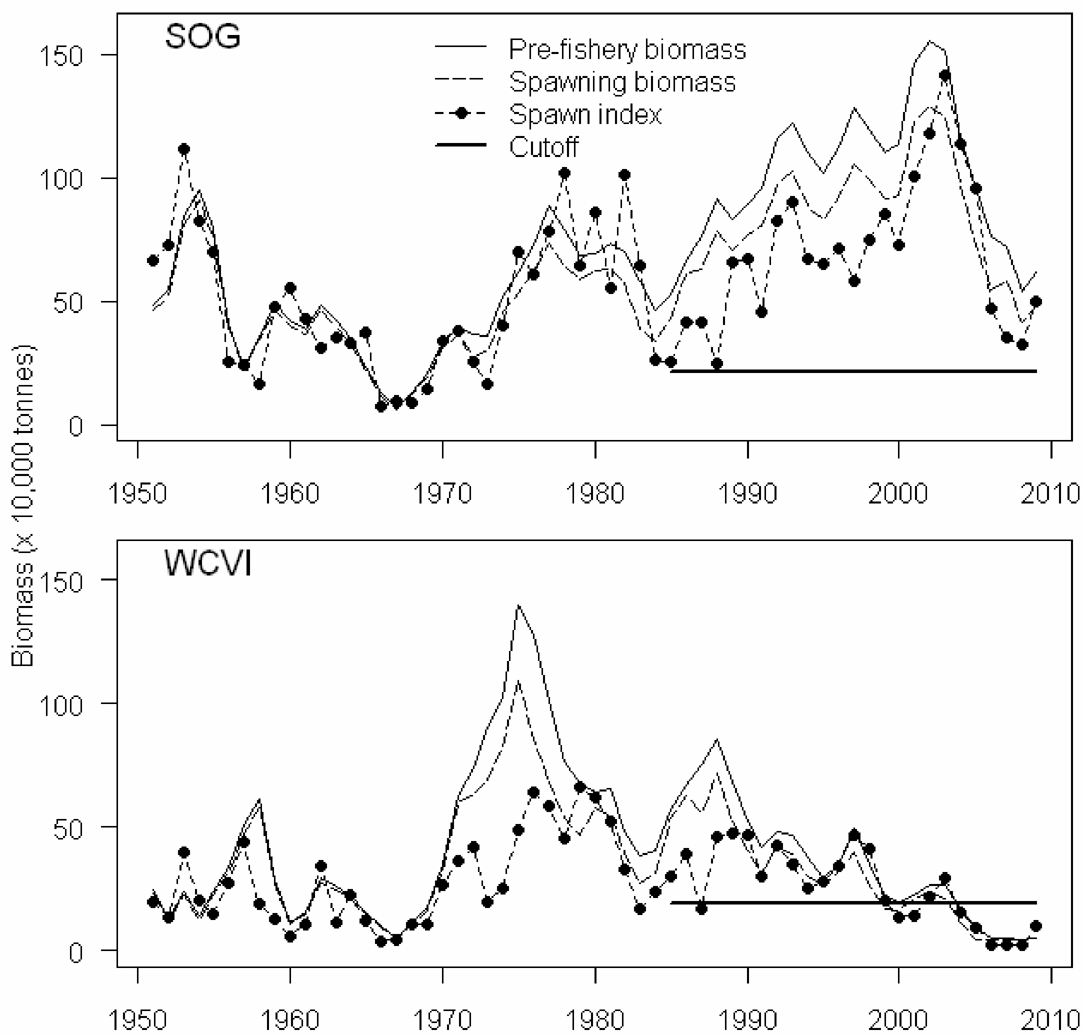



*Figure 22. Estimates of pre-fishery stock biomass with comparisons to estimated spawning biomass, spawn index and harvest cutoff levels for all major stock areas.*

# 6 Stock assessment for minor stock areas

## 6.1. Model estimates

Abundance estimates for the minor stock areas, Area 27 and Area 2W, were obtained using the HCAMv2 assessment model. Because of data limitations for these minor stocks, the time series of analysis was restricted to the period of 1978-2009. For the most part, the model is parameterized in the same way as was used for the major stock areas. However, there are a few minor differences which are described in Appendix B.

Model estimates of pre-fishery spawning biomass were determined assuming two spawn index proportionality coefficients (*q*) for Area 27 and one *q* for Area 2W (same as the 2008 assessment). For Area 27, $q_1$= 1.0699 and $q_2$= 1.0 and for Area 2W-B, *q*= 0.6181 (0.6589 for A2W-A). At first glance, Figure 23 indicates what appears to be an overestimation of pre-fishery biomass and spawning biomass for Area 2W (A2W-B, bottom panel), however we do not feel these are unrealistic as they appear to be the result of including additional ageing data in this year's assessment. For the purposes of comparison, we have included Area 2W results produced using the 2008 configuration of the HCAMv2 model (A2W-A).

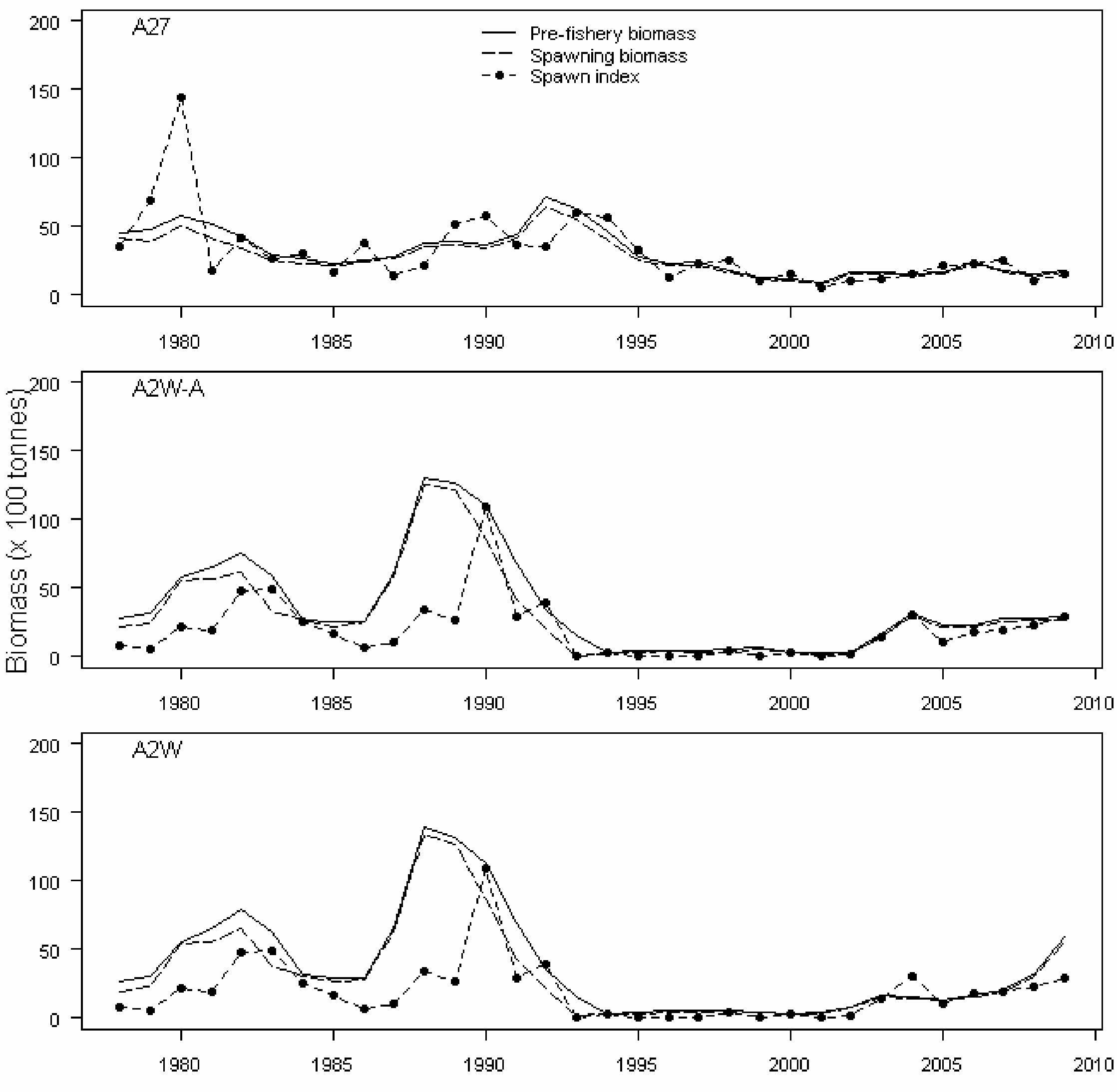



*Figure 23. Estimates of pre-fishery spawning stock biomass, estimated spawning biomass and spawn index for the minor stock areas. The middle panel, A2W-A, was produced using the 2008 configuration of the HCAMv2 model (fewer ageing samples), while the bottom panel, A2W-B, was produced using the 2009 assessment model (includes all ageing samples).*

### 6.1.1. Recruitment

Following the same approach used with the major stock areas, recruitment of age 3 fish is estimated as the number of age 3 fish recruited to the stock at the beginning of year *t*. Recruitment is categorized as poor, average or good, and model estimates of recruitment are calculated as the lower 33%, middle 33% and upper 33% of the number of age 3 fish over the entire time series. Numbers of recruits and the poor-average and average-good recruitment category divisions (0.33 and 0.66 quantiles) are presented for the minor stock areas in Figure 24. With the addition of each year of data, these category divisions change slightly to reflect our updated view of poor, average and good recruitment. Based on this year's information, Area 27 and Area 2W show good recruitment in 2009.

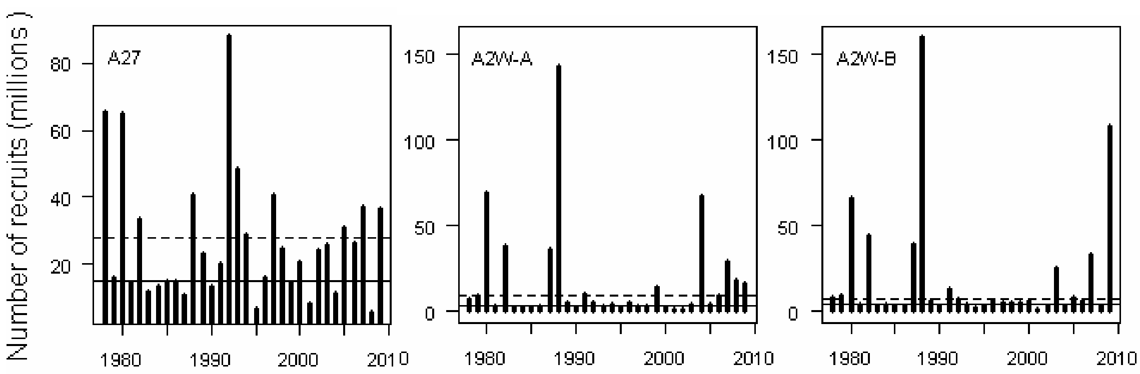



*Figure 24. Estimated number of age 3 fish recruiting to the stock in the minor stock assessment areas. Model A (A2W-A, middle panel) and Model B (A2W-B, right-hand panel) estimates are presented for Area 2W. Upper dashed lines represent division between good and average categories of recruitment, lower solid lines represent division between average and poor recruitment. Divisions were calculated as the 0.33 and 0.66 quantiles of the historic numbers of age 3 fish across all years. Note range in y-axis differs between A27 and A2W.*

## 6.2. Catch advice

Catch advice is provided in the form of a decision table, with pre-fishery biomass and available harvest presented for three recruitment scenarios: poor, average and good. Results presented in Table 5 are calculated using median values of the marginal posterior distributions. Cutoff values are not available for the minor stock areas and instead available harvest represents a 10% harvest rate. Results are presented for Area 27 and for Area 2W.

*Table 5. Estimated spawning stock biomass (SSB), pre-fishery forecasts and available harvest calculated using median values from the posterior distributions for the minor stock areas.*

| | | | Pre-fishery Forecast Biomass | | | | Available Harvest | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2009 SSB | 2010 age 4 | Poor | Average | Good | Cutoff | Poor | **Average**[1] | Good |
| A27 | 1,627 | 723 | 1,000 | 1,347 | 2,108 | NA | 100 | **135** | 211 |
| A2W-A | 2,871 | 1,920 | 2,013 | 2,163 | 3,888 | NA | 201 | **216** | 389 |
| A2W-B | 5,695 | 3,885 | 4,000 | 4,125 | 5,938 | NA | 400 | **413** | 594 |

[1] Current decision rule: Assume average recruitment for all minor stock areas.

# 7 Outstanding issues

After completing this year's herring stock assessment, we feel there are a number of areas which require further investigations. Future research will:

1. Improve our understanding of the relationship between natural mortality and steepness in order to determine whether high observed values of *M* and *h* are biologically reasonable for the B.C. herring stock.
2. Explore additional methods of defining natural mortality, including: (1) estimating time-invariant *M*, (2) constraining the year-to-year rate of change in *M* (reducing the variance) and (3) fixing *h* at 0.74 (as per Myers et al. 1999).
3. Explore the impacts of estimating steepness across all stocks.
4. Compare gillnet and seine selectivity functions. Constrain logistic functions to remain at 1 once fully-selected age is reached. For example, assume all ages greater than age-8 are fully selected.

We feel these areas of research are important and will help us with future development of a herring operating model for use in a management strategy evaluation.

## Acknowledgements

The authors would like to thank Charles Fort and Kristen Daniel for their continued efforts in error checking, reviewing and updating the catch, spawn survey and biological sampling databases. We would also like to acknowledge Howard Stiff for providing programming support for the MS Access database used to summarize the assessment data series. This WP benefitted greatly from Kristen Daniel's mapping expertise and responses to our numerous data requests, as well as feedback and suggestions from Linnea Flostrand on an earlier draft. We are also very grateful to Rob Kronlund, R guru, for his assistance in developing the HCAM graphics viewer software.

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# Appendices

# A Input data

Table 1.1. Age composition and catch by season, fishery and gear type for the Queen Charlotte Islands stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | | | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Mean Weight | Number Aged | (tonnes) | (millions) |
| 19501 | Seine | Jan-Apr | 0.00 | 0.07 | 15.31 | 52.91 | 15.31 | 11.52 | 4.20 | 0.61 | 0.07 | 0.00 | 89.7 | 1,476 | 2,847 | 31.744 |
| 19512 | Seine | Jan-Apr | 1.92 | 24.77 | 20.96 | 29.67 | 17.98 | 3.71 | 0.93 | 0.07 | 0.00 | 0.00 | 78.4 | 2,251 | 10,147 | 122.347 |
| 19534 | Seine | Jan-Apr | 0.06 | 2.90 | 29.02 | 21.28 | 33.66 | 10.19 | 1.93 | 0.71 | 0.19 | 0.06 | 77.1 | 0 * | 1,786 | 23.168 |
| 19545 | Seine | Jan-Apr | 0.00 | 8.74 | 14.08 | 39.42 | 18.06 | 14.85 | 4.37 | 0.29 | 0.10 | 0.10 | 94.1 | 0 * | 498 | 5.294 |
| 19556 | Seine | Jan-Apr | 0.00 | 0.15 | 16.02 | 9.64 | 62.17 | 8.38 | 2.74 | 0.74 | 0.00 | 0.15 | 118.2 | 1,348 | 77,461 | 655.182 |
| 19567 | Seine | Jan-Apr | 0.07 | 20.74 | 24.63 | 15.96 | 9.38 | 26.31 | 2.36 | 0.44 | 0.11 | 0.00 | 102.9 | 4,423 | 21,803 | 209.492 |
| 19578 | Seine | Oct-Dec | 0.00 | 81.58 | 16.68 | 1.26 | 0.18 | 0.14 | 0.14 | 0.00 | 0.00 | 0.00 | 52.1 | 2,769 + | 721 | 13.844 |
| | Seine | Jan-Apr | 0.00 | 81.98 | 16.24 | 1.29 | 0.20 | 0.16 | 0.12 | 0.00 | 0.00 | 0.00 | 51.8 | 2,475 | 10,426 | 201.343 |
| 19589 | Seine | Jan-Apr | 0.00 | 1.05 | 63.16 | 28.42 | 7.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 92.8 | 95 + | 6,828 | 73.560 |
| 19601 | Seine | Jan-Apr | 0.00 | 4.21 | 32.63 | 36.00 | 24.84 | 1.26 | 0.42 | 0.21 | 0.42 | 0.00 | 97.7 | 0 * | 576 | 5.901 |
| 19612 | Seine | Jan-Apr | 0.00 | 2.57 | 38.97 | 44.12 | 5.88 | 7.35 | 0.74 | 0.37 | 0.00 | 0.00 | 114.0 | 272 + | 7,632 | 66.952 |
| 19623 | Seine | Jan-Apr | 0.00 | 0.37 | 50.00 | 27.11 | 18.16 | 2.11 | 1.99 | 0.00 | 0.12 | 0.12 | 109.5 | 804 | 14,705 | 134.232 |
| 19634 | Seine | Jan-Apr | 0.00 | 1.02 | 15.92 | 60.00 | 16.53 | 5.31 | 1.22 | 0.00 | 0.00 | 0.00 | 113.9 | 490 | 28,600 | 251.046 |
| | Seine | May- | 0.00 | 1.02 | 15.92 | 60.00 | 16.53 | 5.31 | 1.22 | 0.00 | 0.00 | 0.00 | 113.9 | 490 + | 127 | 1.113 |
| | Trawl | Jan-Apr | 0.00 | 1.02 | 15.92 | 60.00 | 16.53 | 5.31 | 1.22 | 0.00 | 0.00 | 0.00 | 113.9 | 490 + | 46 | 0.401 |
| 19645 | Seine | Jan-Apr | 0.00 | 1.71 | 82.31 | 10.25 | 3.63 | 1.34 | 0.55 | 0.20 | 0.00 | 0.00 | 101.5 | 1,019 | 35,304 | 348.556 |
| | Seine | May- | 0.00 | 1.67 | 81.75 | 10.30 | 4.02 | 1.47 | 0.59 | 0.20 | 0.00 | 0.00 | 102.0 | 1,019 + | 145 | 1.419 |
| 19656 | Seine | Jan-Apr | 0.00 | 18.36 | 32.77 | 16.38 | 10.40 | 7.45 | 5.89 | 4.92 | 2.07 | 1.75 | 130.7 | 0 * | 2,746 | 21.016 |
| 19667 | Seine | Jan-Apr | 0.00 | 0.88 | 67.25 | 26.49 | 2.65 | 2.72 | 0.00 | 0.00 | 0.00 | 0.00 | 113.0 | 0 * | 213 | 1.883 |
| 19678 | Seine | Jan-Apr | 0.00 | 29.95 | 50.57 | 17.23 | 2.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 94.9 | 0 * | 80 | 0.843 |
| 19701 | Seine | Jan-Apr | 0.00 | 6.50 | 50.40 | 29.30 | 8.00 | 4.30 | 0.80 | 0.50 | 0.20 | 0.00 | 118.1 | 0 * | 102 | 0.861 |
| 19712 | Seine | Jan-Apr | 0.00 | 3.59 | 34.24 | 40.98 | 12.30 | 5.57 | 2.14 | 0.77 | 0.35 | 0.06 | 142.1 | 1,184 | 3,972 | 27.954 |
| 19723 | Seine | Jan-Apr | 0.00 | 0.20 | 32.91 | 18.91 | 32.99 | 11.77 | 2.10 | 1.13 | 0.00 | 0.00 | 140.7 | 1,726 | 7,520 | 49.735 |
| 19734 | Seine | Jan-Apr | 0.00 | 0.12 | 27.40 | 41.39 | 17.67 | 10.64 | 2.32 | 0.40 | 0.06 | 0.00 | 126.8 | 1,215 | 6,191 | 47.881 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 5.73 | 48.41 | 25.48 | 16.56 | 3.18 | 0.00 | 0.00 | 0.64 | 153.8 | 157 + | 127 | 0.824 |
| 19745 | Seine | Jan-Apr | 0.00 | 0.62 | 27.82 | 36.04 | 24.53 | 8.53 | 1.94 | 0.40 | 0.12 | 0.00 | 132.8 | 6,010 | 7,602 | 60.181 |
| | Seine | May- | 0.00 | 0.13 | 33.28 | 45.41 | 13.55 | 5.29 | 1.72 | 0.46 | 0.17 | 0.00 | 116.3 | 3,026 + | 17 | 0.147 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 22.50 | 40.00 | 30.00 | 5.00 | 2.50 | 0.00 | 0.00 | 169.3 | 40 + | 105 | 0.619 |
| 19756 | Seine | Jan-Apr | 0.00 | 0.30 | 2.98 | 44.51 | 31.53 | 15.24 | 4.61 | 0.76 | 0.06 | 0.00 | 155.4 | 4,055 | 11,939 | 82.499 |
| | Seine | May- | 0.00 | 0.44 | 2.81 | 36.87 | 29.25 | 23.18 | 6.41 | 0.96 | 0.07 | 0.00 | 151.8 | 4,055 + | 374 | 2.466 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 0.75 | 21.80 | 60.90 | 14.29 | 2.26 | 0.00 | 0.00 | 196.2 | 133 + | 1,802 | 9.186 |
| 19767 | Seine | Jan-Apr | 0.00 | 0.05 | 18.42 | 9.26 | 36.66 | 22.74 | 9.92 | 2.64 | 0.31 | 0.00 | 159.1 | 3,178 | 11,125 | 73.628 |
| | Seine | May- | 0.00 | 0.09 | 19.67 | 8.12 | 29.70 | 22.91 | 14.66 | 4.44 | 0.41 | 0.00 | 157.1 | 3,178 + | 21 | 0.132 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 2.53 | 16.61 | 39.71 | 27.08 | 11.55 | 2.17 | 0.36 | 196.6 | 277 + | 1,489 | 7.575 |
| 19778 | Seine | Jan-Apr | 0.00 | 0.16 | 22.75 | 17.10 | 11.34 | 33.12 | 13.29 | 2.03 | 0.17 | 0.05 | 146.4 | 1,172 | 9,172 | 62.947 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 4.17 | 11.81 | 20.14 | 38.89 | 20.14 | 4.17 | 0.69 | 196.9 | 144 + | 2,553 | 12.967 |
| 19789 | Seine | Oct-Dec | 0.00 | 6.22 | 4.91 | 32.53 | 18.23 | 20.31 | 14.19 | 3.06 | 0.44 | 0.11 | 149.9 | 916 + | 50 | 0.336 |
| | Seine | Jan-Apr | 0.00 | 7.06 | 5.39 | 32.35 | 18.23 | 20.80 | 12.45 | 3.08 | 0.51 | 0.13 | 148.9 | 779 | 5,817 | 39.078 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 28.24 | 25.88 | 27.06 | 15.29 | 3.53 | 0.00 | 0.00 | 160.1 | 170 + | 2,086 | 13.028 |
| 19790 | Seine | Jan-Apr | 0.00 | 0.69 | 83.10 | 4.49 | 5.44 | 2.58 | 1.79 | 1.22 | 0.60 | 0.09 | 97.1 | 2,986 | 2,106 | 22.050 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 6.50 | 4.56 | 44.47 | 19.36 | 19.58 | 4.20 | 1.34 | 0.00 | 157.6 | 518 | 1,210 | 7.739 |
| 19801 | Seine | Jan-Apr | 0.00 | 0.42 | 3.05 | 85.37 | 5.13 | 3.08 | 1.92 | 0.68 | 0.21 | 0.14 | 116.3 | 5,551 | 3,888 | 32.912 |
| | Seine | May- | 0.00 | 1.33 | 3.92 | 88.65 | 2.94 | 1.73 | 0.69 | 0.35 | 0.23 | 0.17 | 112.7 | 1,735 + | 39 | 0.342 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.30 | 72.00 | 8.55 | 9.84 | 5.88 | 2.84 | 0.60 | 0.00 | 141.9 | 790 | 1,705 | 11.930 |
| 19812 | Seine | Jan-Apr | 0.00 | 0.45 | 3.26 | 3.50 | 87.61 | 2.19 | 1.34 | 0.95 | 0.57 | 0.12 | 127.2 | 3,526 | 2,353 | 18.420 |
| | Seine | May- | 0.00 | 0.85 | 4.68 | 4.48 | 84.32 | 2.47 | 1.53 | 0.99 | 0.54 | 0.14 | 128.0 | 3,526 + | 18 | 0.138 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.21 | 3.35 | 89.10 | 3.35 | 2.31 | 1.05 | 0.42 | 0.21 | 141.9 | 477 | 1,407 | 9.918 |
| 19823 | Seine | Jan-Apr | 0.00 | 4.14 | 4.21 | 3.02 | 5.75 | 77.05 | 3.65 | 1.33 | 0.70 | 0.14 | 148.7 | 1,425 | 4,601 | 30.942 |
| | Seine | May- | 0.00 | 4.88 | 5.23 | 3.51 | 6.86 | 72.87 | 3.91 | 1.58 | 0.91 | 0.25 | 146.9 | 1,968 + | 67 | 0.457 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 1.19 | 2.38 | 90.32 | 2.72 | 2.38 | 0.51 | 0.51 | 158.5 | 589 | 929 | 5.860 |
| 19834 | Seine | Jan-Apr | 0.00 | 2.09 | 36.57 | 4.17 | 2.64 | 9.56 | 43.33 | 1.11 | 0.35 | 0.17 | 126.1 | 3,484 | 4,054 | 31.997 |
| | Seine | May- | 0.00 | 2.70 | 36.39 | 4.54 | 2.87 | 10.10 | 41.76 | 1.12 | 0.34 | 0.17 | 125.5 | 3,484 + | 58 | 0.459 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 2.81 | 1.28 | 4.60 | 8.95 | 80.05 | 1.79 | 0.26 | 0.26 | 154.6 | 391 + | 535 | 3.459 |
| 19845 | Seine | Jan-Apr | 0.00 | 0.12 | 8.63 | 25.14 | 3.52 | 3.93 | 12.79 | 45.24 | 0.53 | 0.10 | 146.4 | 3,099 | 4,581 | 27.888 |
| | Seine | May- | 0.00 | 0.10 | 8.15 | 24.49 | 3.51 | 3.95 | 12.94 | 46.22 | 0.54 | 0.10 | 165.5 | 2,025 + | 35 | 0.209 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 8.30 | 24.48 | 2.90 | 4.56 | 12.45 | 46.89 | 0.41 | 0.00 | 155.0 | 241 + | 1,493 | 9.632 |
| 19856 | Seine | Jan-Apr | 0.00 | 0.16 | 2.00 | 21.05 | 37.46 | 3.69 | 3.28 | 8.88 | 23.03 | 0.43 | 165.5 | 4,462 | 2,613 | 15.278 |
| | Trawl | Jan-Apr | 0.00 | 0.31 | 2.80 | 10.56 | 37.58 | 8.70 | 9.63 | 11.18 | 17.70 | 1.55 | 163.5 | 322 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 12.73 | 53.42 | 4.04 | 5.28 | 9.01 | 15.22 | 0.31 | 159.7 | 322 + | 890 | 5.576 |
| 19867 | Seine | Jan-Apr | 0.00 | 1.78 | 9.60 | 4.90 | 24.93 | 38.44 | 3.88 | 4.36 | 5.86 | 6.24 | 158.6 | 2,916 | 2,028 | 12.787 |
| | Seine | May- | 0.00 | 1.74 | 10.42 | 5.85 | 24.35 | 37.76 | 3.84 | 4.33 | 5.79 | 5.91 | 157.2 | 3,281 + | 33 | 0.210 |
| 19878 | Seine | Jan-Apr | 0.00 | 3.64 | 51.01 | 7.52 | 4.77 | 11.75 | 14.86 | 1.37 | 1.67 | 3.40 | 123.6 | 1,676 | 0 | 0.000 ~ |
| | Seine | May- | 0.00 | 1.34 | 41.98 | 5.34 | 3.24 | 14.50 | 22.71 | 1.91 | 1.72 | 7.25 | 136.5 | 524 + | 32 | 0.232 |
| | Trawl | Jan-Apr | 0.00 | 1.33 | 68.11 | 11.63 | 1.66 | 6.98 | 6.64 | 1.33 | 1.66 | 0.66 | 105.4 | 301 | 0 | 0.000 ~ |
| 19889 | Seine | Jan-Apr | 0.00 | 3.43 | 5.12 | 85.99 | 3.74 | 0.18 | 0.77 | 0.47 | 0.08 | 0.22 | 119.2 | 2,996 | 1,449 | 11.972 |
| | Seine | May- | 0.00 | 1.27 | 31.75 | 45.90 | 4.03 | 2.55 | 7.00 | 4.81 | 1.06 | 1.63 | 117.4 | 1,414 + | 13 | 0.108 |
| 19890 | Seine | Jan-Apr | 0.00 | 0.14 | 10.61 | 6.53 | 78.55 | 2.43 | 0.33 | 0.85 | 0.34 | 0.23 | 133.9 | 4,769 | 5,542 | 39.649 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.51 | 8.18 | 44.50 | 9.97 | 8.44 | 17.39 | 8.44 | 2.56 | 149.6 | 391 + | 1,170 | 7.821 |
| 19901 | Seine | Jan-Apr | 0.00 | 5.60 | 4.25 | 10.74 | 33.21 | 33.99 | 3.68 | 2.00 | 4.70 | 1.84 | 127.8 | 2,448 | 3,899 | 30.506 |
| | Trawl | Jan-Apr | 0.00 | 1.06 | 4.26 | 8.51 | 21.28 | 46.81 | 4.26 | 6.38 | 4.26 | 3.19 | 143.0 | 94 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 2.27 | 22.44 | 43.47 | 9.66 | 7.10 | 10.23 | 4.83 | 151.9 | 352 + | 543 | 3.576 |
| 19912 | Seine | Jan-Apr | 0.00 | 1.05 | 30.50 | 4.25 | 8.27 | 4.46 | 48.40 | 2.42 | 0.14 | 0.52 | 143.2 | 3,228 | 2,524 | 16.695 |
| | Trawl | Jan-Apr | 0.00 | 1.08 | 54.84 | 9.68 | 2.15 | 15.05 | 11.83 | 3.23 | 2.15 | 0.00 | 115.6 | 93 | 0 | 0.000 ~ |
| 19923 | Seine | Jan-Apr | 0.00 | 0.04 | 2.79 | 67.33 | 4.25 | 4.68 | 9.73 | 9.95 | 0.87 | 0.36 | 124.2 | 2,755 | 2,699 | 21.742 |
| | Trawl | Jan-Apr | 0.00 | 1.75 | 4.68 | 59.65 | 5.85 | 6.43 | 11.70 | 7.02 | 2.34 | 0.58 | 125.9 | 171 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 2.27 | 22.44 | 43.47 | 9.66 | 7.10 | 10.23 | 4.83 | 151.9 | 352 + | 0 | 0.002 |
| 19934 | Seine | Jan-Apr | 0.00 | 5.50 | 5.50 | 5.63 | 40.75 | 12.87 | 14.48 | 11.13 | 3.49 | 0.67 | 130.5 | 746 | 299 | 2.291 |
| | Trawl | Jan-Apr | 0.00 | 7.08 | 2.36 | 5.42 | 53.30 | 8.49 | 6.60 | 8.49 | 7.31 | 0.94 | 133.0 | 424 | 0 | 0.000 ~ |
| 19945 | Seine | Jan-Apr | 0.00 | 14.35 | 15.82 | 2.32 | 4.43 | 37.55 | 9.70 | 8.02 | 5.27 | 2.53 | 134.8 | 474 | 0 | 0.000 ~ |
| 19956 | Seine | Jan-Apr | 0.10 | 10.76 | 53.81 | 9.30 | 3.24 | 3.34 | 15.57 | 2.40 | 1.15 | 0.31 | 102.8 | 957 | 0 | 0.000 ~ |

Table 1.1. Age composition and catch by season, fishery and gear type for the Queen Charlotte Islands stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | Mean | Number | CATCH | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Weight | Aged | (tonnes) | (millions) | |
| 19967 | Seine | Jan-Apr | 0.00 | 22.64 | 26.17 | 33.41 | 5.23 | 1.52 | 4.44 | 5.36 | 0.85 | 0.37 | 97.5 | 1,643 | 0 | 0.000 | ~ |
| 19978 | Seine | Jan-Apr | 0.00 | 0.23 | 55.83 | 27.55 | 10.64 | 2.70 | 0.51 | 1.11 | 1.04 | 0.39 | 86.8 | 2,327 | 2,093 | 24.012 | |
| 19989 | Seine | Jan-Apr | 0.00 | 3.71 | 2.16 | 65.00 | 16.83 | 8.03 | 2.78 | 0.67 | 0.41 | 0.41 | 105.9 | 1,943 | 2,500 | 23.604 | |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.67 | 30.78 | 22.80 | 29.12 | 9.98 | 2.66 | 1.33 | 2.66 | 131.4 | 601 | 1,000 | 7.609 | |
| 19990 | Seine | Jan-Apr | 0.00 | 3.71 | 17.36 | 3.72 | 60.60 | 8.26 | 5.19 | 0.39 | 0.61 | 0.16 | 108.4 | 2,057 | 1,765 | 16.491 | |
| 20001 | Seine | Jan-Apr | 0.00 | 15.26 | 31.65 | 22.32 | 5.06 | 20.92 | 3.05 | 1.39 | 0.26 | 0.09 | 97.0 | 1,147 | 0 | 0.000 | ~ |
| 20012 | Seine | Jan-Apr | 0.00 | 20.84 | 22.90 | 25.47 | 12.99 | 3.11 | 12.83 | 1.36 | 0.43 | 0.08 | 93.6 | 2,572 | 706 | 7.544 | |
| 20023 | Seine | Jan-Apr | 0.00 | 0.08 | 68.16 | 18.33 | 6.43 | 3.24 | 1.13 | 2.10 | 0.40 | 0.12 | 96.7 | 2,472 | 0 | 0.000 | ~ |
| 20034 | Seine | Jan-Apr | 0.00 | 29.35 | 2.37 | 50.65 | 8.76 | 4.02 | 2.60 | 1.42 | 0.59 | 0.24 | 91.5 | 845 | 0 | 0.000 | ~ |
| 20045 | Seine | Jan-Apr | 0.00 | 1.30 | 46.29 | 15.66 | 28.57 | 3.90 | 2.37 | 1.22 | 0.46 | 0.23 | 93.9 | 1,309 | 0 | 0.000 | ~ |
| 20056 | Seine | Jan-Apr | 0.00 | 19.07 | 10.10 | 42.78 | 9.40 | 15.15 | 2.81 | 0.42 | 0.00 | 0.28 | 83.3 | 713 | 0 | 0.000 | ~ |
| 20067 | Seine | Jan-Apr | 0.00 | 1.10 | 45.24 | 14.29 | 20.88 | 5.86 | 10.26 | 2.20 | 0.18 | 0.00 | 93.5 | 546 | 0 | 0.000 | ~ |
| 20078 | Seine | Jan-Apr | 0.00 | 9.35 | 7.39 | 63.37 | 7.61 | 8.59 | 1.85 | 1.63 | 0.00 | 0.22 | 87.5 | 920 | 0 | 0.000 | ~ |
| 20089 | Seine | Jan-Apr | 0.00 | 0.10 | 64.31 | 7.58 | 22.13 | 1.99 | 2.89 | 0.40 | 0.50 | 0.10 | 79.0 | 1,003 | 0 | 0.000 | ~ |

NOTE: * No biosample data available. Age composition and mean weight assigned from published reports.
+ Age composition calculated from biosample data aggregated from adjacent sections and/or fishery periods, by gear type.
~ No fishery openings this season. Age composition and mean weight obtained from pre-fishery charter

Table 1.2. Age composition and catch by season, fishery and gear type for the Prince Rupert District stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| Season | Gear | Fishery | PERCENT AT AGE 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Mean Weight | Number Aged | CATCH (tonnes) | CATCH (millions) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19501 | Seine | Oct-Dec | 0.03 | 5.19 | 18.96 | 57.83 | 10.05 | 5.42 | 2.27 | 0.20 | 0.06 | 0.00 | 91.5 | 3,524 | 27,192 | 297.109 |
| | Seine | Jan-Apr | 0.09 | 1.72 | 15.86 | 60.43 | 11.38 | 6.21 | 3.79 | 0.43 | 0.00 | 0.09 | 95.8 | 1,160 | 18,674 | 195.022 |
| 19512 | Seine | Oct-Dec | 0.09 | 5.32 | 9.32 | 33.19 | 45.08 | 5.66 | 0.91 | 0.40 | 0.03 | 0.00 | 121.7 | 3,498 | 42,613 | 350.112 |
| | Seine | Jan-Apr | 0.00 | 3.96 | 8.08 | 34.32 | 45.41 | 6.84 | 1.19 | 0.16 | 0.04 | 0.00 | 115.7 | 2,427 | 9,650 | 83.415 |
| | Seine | May- | 0.05 | 4.76 | 8.81 | 33.65 | 45.22 | 6.14 | 1.03 | 0.30 | 0.03 | 0.00 | 119.2 | 5,925 + | 116 | 0.976 |
| 19523 | Seine | Oct-Dec | 0.00 | 1.46 | 38.05 | 28.90 | 26.40 | 4.99 | 0.21 | 0.00 | 0.00 | 0.00 | 114.7 | 481 | 401 | 3.491 |
| | Seine | Jan-Apr | 0.00 | 1.07 | 38.17 | 20.04 | 24.95 | 14.29 | 1.39 | 0.11 | 0.00 | 0.00 | 107.7 | 938 | 1,465 | 13.601 |
| 19534 | Seine | Oct-Dec | 0.00 | 0.38 | 22.98 | 31.95 | 27.13 | 14.48 | 2.52 | 0.56 | 0.01 | 0.00 | 114.3 | 2,138 | 26,692 | 232.215 |
| | Seine | Jan-Apr | 0.00 | 8.88 | 47.88 | 19.11 | 13.51 | 6.76 | 3.28 | 0.58 | 0.00 | 0.00 | 83.9 | 518 | 584 | 6.969 |
| 19545 | Seine | Jan-Apr | 0.00 | 2.25 | 4.08 | 70.30 | 15.80 | 6.01 | 1.34 | 0.22 | 0.00 | 0.00 | 105.2 | 1,131 | 17,806 | 167.544 |
| 19556 | Seine | Oct-Dec | 0.00 | 10.04 | 58.11 | 9.51 | 18.95 | 2.55 | 0.53 | 0.18 | 0.12 | 0.00 | 83.6 | 1,683 + | 1,602 | 19.164 |
| | Seine | Jan-Apr | 0.00 | 8.99 | 59.62 | 9.14 | 18.79 | 2.65 | 0.66 | 0.07 | 0.07 | 0.00 | 84.6 | 1,357 | 8,580 | 101.455 |
| 19567 | Seine | Oct-Dec | 0.00 | 18.02 | 19.80 | 35.57 | 12.24 | 13.25 | 0.90 | 0.22 | 0.00 | 0.00 | 93.8 | 3,172 + | 820 | 9.056 |
| | Seine | Jan-Apr | 0.00 | 3.83 | 19.26 | 42.33 | 13.46 | 19.05 | 1.61 | 0.41 | 0.05 | 0.00 | 104.8 | 2,784 | 19,753 | 182.450 |
| | Seine | May- | 0.00 | 0.00 | 7.11 | 44.95 | 37.16 | 9.17 | 1.38 | 0.23 | 0.00 | 0.00 | 106.7 | 436 | 7,461 | 69.921 |
| | Trawl | Jan-Apr | 0.00 | 4.08 | 21.43 | 52.04 | 12.24 | 10.20 | 0.00 | 0.00 | 0.00 | 0.00 | 88.3 | 98 | 0 | 0.000 ~ |
| 19578 | Seine | Oct-Dec | 0.00 | 58.55 | 24.14 | 6.24 | 7.24 | 0.80 | 3.02 | 0.00 | 0.00 | 0.00 | 62.7 | 497 + | 1,270 | 20.260 |
| | Seine | Jan-Apr | 0.00 | 58.55 | 24.14 | 6.24 | 7.24 | 0.80 | 3.02 | 0.00 | 0.00 | 0.00 | 62.7 | 497 + | 667 | 10.640 |
| | Seine | May- | 0.00 | 58.55 | 24.14 | 6.24 | 7.24 | 0.80 | 3.02 | 0.00 | 0.00 | 0.00 | 62.7 | 497 + | 2,586 | 41.259 |
| 19589 | Seine | Oct-Dec | 0.00 | 1.64 | 62.11 | 19.52 | 5.96 | 7.16 | 2.05 | 1.54 | 0.01 | 0.00 | 98.0 | 1,592 + | 1,629 | 16.406 |
| | Seine | Jan-Apr | 0.00 | 2.88 | 61.03 | 19.34 | 5.06 | 7.96 | 1.81 | 1.85 | 0.06 | 0.00 | 97.5 | 1,454 | 5,629 | 57.722 |
| | Seine | May- | 0.00 | 1.17 | 62.96 | 19.29 | 6.19 | 6.74 | 2.21 | 1.44 | 0.56 | 0.00 | 98.7 | 1,592 + | 2,899 | 29.047 |
| | Trawl | Jan-Apr | 0.00 | 3.39 | 58.98 | 20.35 | 5.15 | 8.73 | 1.44 | 1.88 | 0.06 | 0.00 | 97.5 | 1,592 + | 66 | 0.674 |
| 19590 | Seine | Oct-Dec | 0.00 | 62.74 | 8.21 | 20.55 | 5.57 | 1.63 | 1.10 | 0.08 | 0.12 | 0.00 | 64.7 | 1,549 | 3,125 | 49.715 |
| | Seine | Jan-Apr | 0.00 | 66.74 | 7.43 | 18.52 | 4.46 | 1.48 | 0.94 | 0.22 | 0.22 | 0.00 | 61.5 | 1,617 | 12,513 | 218.740 |
| | Seine | May- | 0.00 | 5.00 | 3.26 | 51.30 | 20.22 | 10.65 | 7.39 | 1.96 | 0.22 | 0.00 | 115.5 | 460 | 2,297 | 19.897 |
| | Trawl | Oct-Dec | 0.00 | 59.38 | 7.49 | 23.25 | 6.10 | 2.21 | 1.17 | 0.22 | 0.19 | 0.00 | 64.7 | 3,166 + | 72 | 1.110 |
| | Trawl | Jan-Apr | 0.00 | 59.38 | 7.49 | 23.25 | 6.10 | 2.21 | 1.17 | 0.22 | 0.19 | 0.00 | 64.7 | 3,166 + | 468 | 7.238 |
| 19601 | Seine | Oct-Dec | 0.00 | 13.33 | 69.22 | 4.76 | 9.50 | 2.44 | 0.44 | 0.25 | 0.06 | 0.00 | 80.6 | 1,729 | 14,879 | 183.842 |
| | Seine | Jan-Apr | 0.00 | 8.10 | 60.17 | 6.91 | 18.06 | 4.38 | 1.74 | 0.43 | 0.20 | 0.00 | 93.8 | 2,174 | 24,244 | 278.906 |
| | Seine | May- | 0.00 | 10.08 | 59.51 | 7.23 | 17.13 | 4.07 | 1.43 | 0.42 | 0.13 | 0.00 | 93.9 | 3,903 + | 350 | 4.012 |
| | Trawl | Jan-Apr | 0.00 | 10.25 | 60.16 | 7.07 | 16.63 | 3.97 | 1.38 | 0.41 | 0.13 | 0.00 | 86.7 | 3,903 + | 3,273 | 37.756 |
| 19612 | Seine | Oct-Dec | 0.00 | 6.70 | 32.01 | 38.46 | 7.44 | 11.41 | 2.23 | 0.74 | 0.74 | 0.25 | 106.6 | 403 + | 633 | 5.938 |
| | Seine | Jan-Apr | 0.00 | 6.70 | 32.01 | 38.46 | 7.44 | 11.41 | 2.23 | 0.74 | 0.74 | 0.25 | 106.6 | 403 + | 25,352 | 237.877 |
| | Seine | May- | 0.00 | 6.70 | 32.01 | 38.46 | 7.44 | 11.41 | 2.23 | 0.74 | 0.74 | 0.25 | 106.6 | 403 + | 346 | 3.243 |
| | Trawl | Oct-Dec | 0.00 | 6.05 | 30.85 | 38.31 | 7.66 | 11.69 | 3.43 | 0.60 | 1.01 | 0.40 | 109.0 | 496 + | 296 | 2.714 |
| | Trawl | Jan-Apr | 0.00 | 6.05 | 30.85 | 38.31 | 7.66 | 11.69 | 3.43 | 0.60 | 1.01 | 0.40 | 109.0 | 496 + | 1,033 | 9.474 |
| 19623 | Seine | Oct-Dec | 0.00 | 76.33 | 15.42 | 4.46 | 3.10 | 0.28 | 0.35 | 0.06 | 0.00 | 0.00 | 55.5 | 1,267 | 9,769 | 199.178 |
| | Seine | Jan-Apr | 0.00 | 38.55 | 15.20 | 21.58 | 17.43 | 3.27 | 3.61 | 0.21 | 0.06 | 0.10 | 96.9 | 1,921 | 29,142 | 350.900 |
| | Seine | May- | 0.00 | 60.74 | 16.33 | 12.62 | 7.12 | 1.42 | 1.69 | 0.01 | 0.00 | 0.07 | 74.6 | 3,188 + | 736 | 11.819 |
| | Trawl | Oct-Dec | 0.00 | 41.59 | 13.61 | 17.25 | 21.11 | 3.14 | 2.79 | 0.41 | 0.06 | 0.03 | 80.9 | 3,188 + | 123 | 1.526 |
| | Trawl | Jan-Apr | 0.00 | 41.59 | 13.61 | 17.25 | 21.11 | 3.14 | 2.79 | 0.41 | 0.06 | 0.03 | 80.9 | 3,188 + | 457 | 5.653 |
| 19634 | Seine | Oct-Dec | 0.00 | 2.51 | 71.43 | 11.94 | 7.88 | 5.04 | 0.85 | 0.35 | 0.00 | 0.00 | 84.2 | 1,644 | 14,887 | 170.573 |
| | Seine | Jan-Apr | 0.00 | 1.29 | 48.47 | 10.21 | 19.65 | 17.00 | 1.48 | 1.38 | 0.40 | 0.11 | 89.9 | 1,697 | 13,180 | 135.777 |
| | Seine | May- | 0.00 | 2.89 | 67.52 | 11.86 | 10.20 | 6.38 | 0.60 | 0.43 | 0.11 | 0.02 | 80.8 | 3,341 + | 1,282 | 14.960 |
| | Trawl | Oct-Dec | 0.00 | 3.26 | 65.07 | 10.15 | 11.10 | 8.98 | 0.69 | 0.60 | 0.12 | 0.03 | 85.8 | 3,341 + | 44 | 0.519 |
| | Trawl | Jan-Apr | 0.00 | 3.26 | 65.07 | 10.15 | 11.10 | 8.98 | 0.69 | 0.60 | 0.12 | 0.03 | 85.8 | 3,341 + | 537 | 6.254 |
| 19645 | Seine | Oct-Dec | 0.00 | 9.22 | 19.05 | 45.55 | 10.13 | 10.34 | 4.75 | 0.71 | 0.22 | 0.03 | 127.7 | 805 | 5,435 | 40.840 |
| | Seine | Jan-Apr | 0.00 | 4.99 | 13.41 | 53.55 | 9.70 | 9.66 | 7.23 | 1.03 | 0.37 | 0.06 | 118.0 | 2,088 | 12,851 | 99.593 |
| | Seine | May- | 0.00 | 6.54 | 15.87 | 50.81 | 10.48 | 9.83 | 5.18 | 0.95 | 0.34 | 0.77 | 124.0 | 2,893 + | 25,924 | 191.386 |
| 19656 | Seine | Oct-Dec | 0.00 | 0.00 | 5.29 | 21.38 | 23.45 | 16.32 | 19.08 | 9.66 | 3.22 | 1.61 | 137.3 | 0 * | 3,312 | 24.120 |
| | Seine | Jan-Apr | 0.00 | 0.00 | 5.29 | 21.38 | 23.45 | 16.32 | 19.08 | 9.66 | 3.22 | 1.61 | 137.3 | 0 * | 9,151 | 66.643 |
| | Seine | May- | 0.00 | 0.00 | 5.29 | 21.38 | 23.45 | 16.32 | 19.08 | 9.66 | 3.22 | 1.61 | 137.3 | 0 * | 4,831 | 35.181 |
| | Trawl | Jan-Apr | 0.00 | 0.00 | 5.29 | 21.38 | 23.45 | 16.32 | 19.08 | 9.66 | 3.22 | 1.61 | 137.3 | 0 * | 1 | 0.007 |
| 19667 | Seine | Oct-Dec | 0.00 | 57.22 | 32.31 | 5.37 | 1.88 | 2.70 | 0.41 | 0.20 | 0.00 | 0.00 | 65.7 | 0 * | 4,379 | 66.650 |
| | Seine | Jan-Apr | 0.00 | 57.22 | 32.31 | 5.37 | 1.88 | 2.70 | 0.41 | 0.20 | 0.00 | 0.00 | 65.7 | 0 * | 2,338 | 35.588 |
| | Seine | May- | 0.00 | 57.22 | 32.31 | 5.37 | 1.88 | 2.70 | 0.41 | 0.20 | 0.00 | 0.00 | 65.7 | 0 * | 1,280 | 19.484 |
| 19678 | Seine | Oct-Dec | 0.00 | 34.87 | 39.74 | 19.40 | 4.59 | 0.73 | 0.26 | 0.14 | 0.27 | 0.00 | 77.9 | 0 * | 53 | 0.678 |
| | Seine | Jan-Apr | 0.00 | 34.87 | 39.74 | 19.40 | 4.59 | 0.73 | 0.26 | 0.14 | 0.27 | 0.00 | 77.9 | 0 * | 1,084 | 13.902 |
| 19678 | Seine | May- | 0.00 | 34.87 | 39.74 | 19.40 | 4.59 | 0.73 | 0.26 | 0.14 | 0.27 | 0.00 | 77.9 | 0 * | 932 | 11.953 |
| 19690 | Seine | Jan-Apr | 0.00 | 18.67 | 62.91 | 15.11 | 3.12 | 0.03 | 0.08 | 0.08 | 0.00 | 0.00 | 81.6 | 0 * | 1,330 | 16.304 |
| 19701 | Seine | Jan-Apr | 0.00 | 5.79 | 45.91 | 31.35 | 9.51 | 5.05 | 1.63 | 0.59 | 0.15 | 0.00 | 92.2 | 673 | 3,418 | 37.076 |
| | Seine | May- | 0.00 | 5.79 | 45.91 | 31.35 | 9.51 | 5.05 | 1.63 | 0.59 | 0.15 | 0.00 | 92.2 | 673 + | 82 | 0.894 |
| 19712 | Seine | Jan-Apr | 0.00 | 0.00 | 5.32 | 17.93 | 64.43 | 5.88 | 3.78 | 2.38 | 0.14 | 0.14 | 161.3 | 714 | 4,490 | 27.842 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.96 | 39.42 | 21.15 | 34.62 | 2.88 | 0.96 | 0.00 | 0.00 | 168.2 | 104 + | 4 | 0.023 |
| 19723 | Seine | Oct-Dec | 0.00 | 3.89 | 35.37 | 4.95 | 27.58 | 23.05 | 3.26 | 1.26 | 0.63 | 0.00 | 133.3 | 950 + | 16 | 0.123 |
| | Seine | Jan-Apr | 0.00 | 0.61 | 33.23 | 4.45 | 30.09 | 26.25 | 3.38 | 1.26 | 0.74 | 0.00 | 137.9 | 950 | 1,524 | 10.454 |
| | Seine | May- | 0.00 | 3.89 | 35.37 | 4.95 | 27.58 | 23.05 | 3.26 | 1.26 | 0.63 | 0.00 | 133.3 | 950 + | 67 | 0.499 |
| 19734 | Seine | Jan-Apr | 0.00 | 0.16 | 17.88 | 53.16 | 7.44 | 16.46 | 4.43 | 0.32 | 0.16 | 0.00 | 132.2 | 632 | 2,300 | 17.401 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.96 | 39.42 | 21.15 | 34.62 | 2.88 | 0.96 | 0.00 | 0.00 | 168.2 | 104 + | 1,519 | 9.034 |
| 19745 | Seine | Jan-Apr | 0.20 | 0.35 | 4.42 | 26.83 | 51.39 | 9.06 | 6.31 | 1.26 | 0.18 | 0.00 | 124.1 | 1,704 | 1,691 | 12.357 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 31.91 | 59.57 | 8.51 | 0.00 | 0.00 | 0.00 | 0.00 | 140.9 | 47 + | 11 | 0.076 |
| 19756 | Seine | Oct-Dec | 0.00 | 0.00 | 1.60 | 6.86 | 27.66 | 43.89 | 9.26 | 8.46 | 2.29 | 0.00 | 172.2 | 875 + | 564 | 3.278 |
| | Seine | Jan-Apr | 0.00 | 0.00 | 0.90 | 7.22 | 32.25 | 49.73 | 7.47 | 1.74 | 0.70 | 0.00 | 169.6 | 713 | 3,466 | 20.451 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 15.79 | 57.89 | 22.81 | 3.51 | 0.00 | 0.00 | 0.00 | 154.0 | 57 + | 276 | 1.793 |
| 19767 | Seine | Oct-Dec | 0.00 | 0.08 | 13.52 | 6.40 | 24.30 | 35.92 | 14.53 | 4.01 | 0.80 | 0.43 | 154.2 | 1,821 + | 296 | 1.895 |
| | Seine | Jan-Apr | 0.00 | 0.13 | 21.43 | 3.97 | 20.78 | 34.28 | 14.49 | 3.18 | 1.29 | 0.45 | 151.9 | 1,765 | 6,309 | 41.462 |
| | Seine | May- | 0.00 | 0.16 | 18.12 | 7.08 | 22.73 | 31.85 | 13.84 | 4.45 | 1.32 | 0.44 | 149.8 | 1,821 + | 31 | 0.204 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.07 | 2.14 | 19.93 | 54.09 | 14.59 | 6.76 | 1.42 | 0.00 | 166.9 | 281 + | 1,494 | 8.948 |
| | Gillnet | May- | 0.00 | 0.00 | 1.07 | 2.14 | 19.93 | 54.09 | 14.59 | 6.76 | 1.42 | 0.00 | 166.9 | 281 + | 12 | 0.072 |

Table 1.2. Age composition and catch by season, fishery and gear type for the Prince Rupert District stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | | | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Mean Weight | Number Aged | (tonnes) | (millions) |
| 19778 | Seine | Oct-Dec | 0.00 | 1.66 | 7.66 | 32.30 | 17.60 | 16.98 | 13.46 | 6.21 | 2.48 | 1.66 | 151.1 | 483 | 2,263 | 14.977 |
| | Seine | Jan-Apr | 0.00 | 1.35 | 12.58 | 34.86 | 9.09 | 19.63 | 18.84 | 2.66 | 0.67 | 0.32 | 147.2 | 812 | 2,202 | 14.957 |
| | Seine | May- | 0.00 | 1.73 | 12.50 | 38.39 | 9.35 | 18.12 | 15.88 | 2.73 | 0.92 | 0.38 | 147.1 | 1,295 + | 68 | 0.469 |
| | Trawl | Oct-Dec | 0.00 | 1.36 | 10.03 | 31.95 | 13.18 | 19.41 | 17.48 | 4.37 | 1.43 | 0.79 | 150.3 | 1,396 + | 1,024 | 6.814 |
| | Trawl | Jan-Apr | 0.00 | 0.99 | 2.97 | 20.79 | 19.80 | 25.74 | 20.79 | 7.92 | 0.99 | 0.00 | 167.6 | 101 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 20.53 | 5.96 | 32.45 | 33.11 | 6.62 | 1.32 | 0.00 | 167.1 | 151 + | 3,031 | 18.142 |
| 19789 | Seine | Oct-Dec | 0.00 | 1.42 | 9.81 | 10.85 | 25.36 | 19.39 | 17.10 | 8.63 | 4.73 | 2.71 | 152.3 | 777 | 971 | 6.314 |
| | Seine | Jan-Apr | 0.00 | 2.91 | 9.88 | 12.21 | 32.17 | 13.57 | 21.32 | 5.81 | 1.74 | 0.39 | 158.5 | 516 | 1,411 | 8.905 |
| | Seine | May- | 0.00 | 2.19 | 14.84 | 11.37 | 28.12 | 14.72 | 17.26 | 6.93 | 2.94 | 1.62 | 151.3 | 1,732 + | 10 | 0.063 |
| | Trawl | Oct-Dec | 0.00 | 2.04 | 9.07 | 10.37 | 27.96 | 15.37 | 15.37 | 8.52 | 7.04 | 4.26 | 147.9 | 540 | 690 | 4.664 |
| | Trawl | Jan-Apr | 0.00 | 2.04 | 9.07 | 10.37 | 27.96 | 15.37 | 15.37 | 8.52 | 7.04 | 4.26 | 147.9 | 540 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 8.25 | 41.24 | 18.56 | 22.68 | 7.56 | 1.72 | 0.00 | 168.4 | 291 + | 1,236 | 7.338 |
| 19790 | Seine | Oct-Dec | 0.00 | 1.82 | 62.62 | 6.88 | 6.93 | 7.57 | 5.81 | 5.21 | 2.12 | 1.04 | 108.2 | 1,049 | 460 | 4.238 |
| | Seine | Jan-Apr | 0.00 | 1.69 | 85.42 | 4.98 | 2.89 | 2.29 | 1.69 | 0.70 | 0.30 | 0.05 | 90.0 | 2,010 | 1,641 | 18.223 |
| | Trawl | Oct-Dec | 0.00 | 1.59 | 73.25 | 7.18 | 5.79 | 4.99 | 3.78 | 2.12 | 0.91 | 0.39 | 99.0 | 4,389 + | 278 | 2.806 |
| | Trawl | Jan-Apr | 0.00 | 0.00 | 47.95 | 12.33 | 10.96 | 16.44 | 1.37 | 5.48 | 4.11 | 1.37 | 123.9 | 73 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 4.98 | 7.66 | 35.25 | 19.92 | 19.54 | 8.43 | 3.45 | 0.77 | 162.2 | 261 + | 1,046 | 6.449 |
| 19801 | Seine | Oct-Dec | 0.00 | 1.13 | 7.37 | 53.52 | 10.15 | 10.64 | 8.82 | 4.51 | 2.45 | 1.40 | 124.7 | 3,068 | 733 | 5.870 |
| | Seine | Jan-Apr | 0.03 | 0.57 | 10.08 | 82.32 | 3.36 | 1.46 | 1.55 | 0.32 | 0.19 | 0.13 | 98.7 | 3,156 | 1,051 | 10.652 |
| | Trawl | Oct-Dec | 0.00 | 1.07 | 7.67 | 56.82 | 8.62 | 9.09 | 9.02 | 3.68 | 2.37 | 1.66 | 119.0 | 3,095 | 949 | 7.928 |
| | Trawl | Jan-Apr | 0.00 | 1.07 | 7.21 | 55.35 | 8.89 | 9.56 | 9.66 | 4.17 | 2.36 | 1.74 | 121.0 | 3,095 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.37 | 39.18 | 16.42 | 23.13 | 14.55 | 4.48 | 1.87 | 0.00 | 149.7 | 268 + | 356 | 2.378 |
| 19812 | Seine | Oct-Dec | 0.00 | 0.83 | 14.25 | 24.70 | 45.73 | 6.01 | 3.80 | 3.07 | 1.13 | 0.49 | 128.5 | 1,143 | 794 | 6.481 |
| | Seine | Jan-Apr | 0.00 | 4.57 | 11.84 | 7.15 | 71.51 | 2.93 | 1.41 | 0.35 | 0.23 | 0.00 | 106.5 | 853 | 170 | 1.593 |
| | Trawl | Oct-Dec | 0.00 | 2.34 | 11.99 | 19.03 | 39.60 | 10.11 | 6.80 | 6.60 | 2.13 | 1.39 | 132.6 | 1,283 | 1,021 | 7.686 |
| | Trawl | Jan-Apr | 0.00 | 2.34 | 11.85 | 18.08 | 40.14 | 10.37 | 6.94 | 6.24 | 2.42 | 1.64 | 132.6 | 1,283 | 0 | 0.000 ~ |
| 19823 | Seine | Jan-Apr | 0.00 | 1.35 | 20.82 | 17.74 | 5.26 | 49.16 | 3.73 | 1.13 | 0.59 | 0.22 | 117.7 | 4,583 | 0 | 0.000 ~ |
| 19834 | Seine | Oct-Dec | 0.00 | 1.83 | 34.08 | 15.42 | 15.21 | 10.14 | 19.68 | 3.04 | 0.20 | 0.41 | 97.1 | 493 | 87 | 0.900 |
| | Seine | Jan-Apr | 0.00 | 0.43 | 32.79 | 11.18 | 9.48 | 17.31 | 27.38 | 0.95 | 0.33 | 0.14 | 106.6 | 3,118 | 1,679 | 15.337 |
| | Seine | May- | 0.00 | 0.72 | 36.17 | 14.18 | 10.77 | 13.79 | 22.65 | 1.27 | 0.28 | 0.17 | 102.7 | 3,611 + | 6 | 0.055 |
| | Trawl | Oct-Dec | 0.00 | 0.93 | 36.45 | 14.29 | 10.74 | 13.57 | 21.95 | 1.30 | 0.42 | 0.34 | 102.3 | 3,772 + | 54 | 0.529 |
| | Trawl | Jan-Apr | 0.00 | 5.59 | 42.86 | 16.77 | 9.94 | 8.70 | 6.21 | 1.86 | 3.73 | 4.35 | 93.4 | 161 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.99 | 1.98 | 12.87 | 21.39 | 57.43 | 3.37 | 1.19 | 0.79 | 147.7 | 505 | 1,880 | 12.731 |
| 19845 | Seine | Oct-Dec | 0.00 | 17.10 | 8.92 | 20.45 | 30.67 | 12.83 | 4.46 | 4.28 | 0.93 | 0.37 | 86.0 | 538 | 48 | 0.556 |
| | Seine | Jan-Apr | 0.00 | 0.33 | 7.91 | 50.78 | 11.15 | 6.74 | 12.95 | 9.81 | 0.19 | 0.16 | 108.4 | 4,214 | 3,070 | 27.724 |
| | Seine | May- | 0.00 | 2.15 | 7.95 | 50.48 | 14.31 | 7.07 | 10.01 | 7.61 | 0.27 | 0.17 | 108.3 | 4,752 + | 70 | 0.662 |
| | Trawl | Oct-Dec | 0.00 | 2.31 | 7.95 | 50.46 | 14.58 | 7.09 | 9.74 | 7.41 | 0.27 | 0.17 | 105.8 | 4,752 + | 83 | 0.787 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.36 | 16.36 | 14.91 | 15.82 | 21.82 | 29.82 | 0.36 | 0.55 | 147.9 | 550 | 3,476 | 23.500 |
| 19856 | Seine | Oct-Dec | 0.00 | 1.77 | 12.72 | 10.13 | 44.29 | 9.00 | 5.23 | 8.78 | 7.96 | 0.11 | 139.2 | 3,554 + | 130 | 0.937 |
| | Seine | Jan-Apr | 0.00 | 1.75 | 12.79 | 10.09 | 44.41 | 9.10 | 5.23 | 8.69 | 7.83 | 0.11 | 133.1 | 5,655 | 3,823 | 27.523 |
| | Seine | May- | 0.00 | 1.69 | 13.34 | 9.55 | 46.09 | 10.53 | 5.26 | 7.46 | 5.98 | 0.10 | 137.1 | 5,655 + | 105 | 0.778 |
| | Trawl | Oct-Dec | 0.00 | 12.11 | 11.13 | 9.48 | 27.58 | 16.27 | 9.30 | 5.81 | 5.02 | 3.30 | 137.9 | 1,635 | 47 | 0.343 |
| | Trawl | Jan-Apr | 0.00 | 12.11 | 11.13 | 9.48 | 27.58 | 16.27 | 9.30 | 5.81 | 5.02 | 3.30 | 137.9 | 1,635 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.38 | 4.09 | 54.02 | 18.86 | 8.71 | 7.65 | 6.06 | 0.23 | 147.0 | 1,320 | 4,573 | 31.100 |
| 19867 | Seine | Oct-Dec | 0.00 | 0.60 | 38.78 | 9.59 | 7.26 | 29.94 | 5.84 | 3.59 | 3.09 | 1.33 | 117.1 | 2,977 + | 47 | 0.398 |
| | Seine | Jan-Apr | 0.00 | 0.45 | 39.37 | 9.51 | 7.32 | 29.04 | 5.78 | 3.72 | 3.34 | 1.47 | 117.1 | 4,049 | 2,100 | 17.695 |
| | Seine | May- | 0.00 | 1.06 | 36.99 | 9.81 | 7.06 | 32.66 | 6.01 | 3.21 | 2.31 | 0.89 | 117.1 | 2,977 + | 52 | 0.448 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.50 | 2.67 | 6.37 | 55.23 | 16.65 | 9.37 | 6.07 | 3.14 | 150.4 | 1,855 | 4,071 | 27.067 |
| 19878 | Seine | Oct-Dec | 0.00 | 0.52 | 35.53 | 36.87 | 5.23 | 7.15 | 11.18 | 1.59 | 1.43 | 0.49 | 100.3 | 3,076 + | 23 | 0.229 |
| | Seine | Jan-Apr | 0.00 | 0.52 | 35.53 | 36.87 | 5.23 | 7.15 | 11.18 | 1.59 | 1.43 | 0.49 | 100.3 | 3,076 | 3,550 | 35.399 |
| | Seine | May- | 0.00 | 0.45 | 30.98 | 38.94 | 5.97 | 8.35 | 11.53 | 1.95 | 1.45 | 0.38 | 102.6 | 4,206 + | 56 | 0.542 |
| | Trawl | Jan-Apr | 0.00 | 0.26 | 13.73 | 41.19 | 11.92 | 11.14 | 11.92 | 4.40 | 4.15 | 1.30 | 109.5 | 386 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.24 | 4.97 | 4.59 | 20.02 | 48.56 | 13.52 | 5.31 | 2.78 | 157.2 | 710 | 4,340 | 27.459 |
| 19889 | Seine | Oct-Dec | 0.00 | 0.21 | 25.24 | 29.11 | 30.29 | 4.94 | 4.83 | 4.40 | 0.64 | 0.32 | 105.0 | 931 + | 42 | 0.403 |
| | Seine | Jan-Apr | 0.00 | 0.70 | 19.15 | 41.92 | 25.84 | 4.00 | 4.19 | 3.39 | 0.46 | 0.36 | 104.1 | 2,893 | 3,686 | 35.672 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 5.11 | 30.02 | 13.98 | 22.91 | 21.87 | 3.66 | 2.46 | 149.3 | 476 | 4,745 | 31.739 |
| 19890 | Seine | Jan-Apr | 0.00 | 0.63 | 20.05 | 21.02 | 29.59 | 18.95 | 3.90 | 3.41 | 2.08 | 0.37 | 120.7 | 4,215 | 2,295 | 19.231 |
| | Seine | May- | 0.00 | 0.14 | 14.00 | 25.59 | 26.19 | 24.51 | 3.85 | 3.58 | 1.99 | 0.14 | 120.9 | 5,068 + | 32 | 0.263 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 6.25 | 21.32 | 42.46 | 10.29 | 11.58 | 6.07 | 2.02 | 146.7 | 544 | 2,361 | 16.100 |
| 19901 | Seine | Jan-Apr | 0.00 | 1.07 | 51.92 | 9.89 | 11.11 | 15.82 | 7.04 | 1.23 | 0.91 | 1.03 | 98.8 | 2,529 | 1,348 | 13.642 |
| | Seine | May- | 0.00 | 0.55 | 40.80 | 10.75 | 16.94 | 17.49 | 11.29 | 1.82 | 0.00 | 0.36 | 108.1 | 549 + | 19 | 0.172 |
| | Trawl | Jan-Apr | 0.00 | 17.05 | 28.41 | 5.68 | 22.73 | 6.82 | 6.82 | 0.00 | 2.27 | 10.23 | 110.2 | 88 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 4.26 | 18.67 | 31.44 | 31.33 | 6.66 | 4.37 | 3.28 | 144.5 | 916 | 2,143 | 14.832 |
| 19912 | Seine | Jan-Apr | 0.00 | 0.19 | 45.84 | 29.44 | 6.36 | 5.42 | 7.73 | 3.60 | 0.74 | 0.67 | 96.6 | 4,265 | 1,377 | 14.161 |
| | Seine | May- | 0.00 | 0.70 | 24.97 | 53.31 | 5.57 | 5.34 | 5.23 | 3.95 | 0.46 | 0.46 | 96.2 | 861 + | 3 | 0.027 |
| | Trawl | Jan-Apr | 0.00 | 14.10 | 21.79 | 20.94 | 8.97 | 18.80 | 6.41 | 4.70 | 1.28 | 2.99 | 108.5 | 234 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.32 | 13.21 | 9.13 | 23.52 | 25.35 | 19.66 | 3.97 | 4.83 | 145.5 | 931 | 3,797 | 26.100 |
| 19923 | Seine | Jan-Apr | 0.00 | 0.04 | 6.28 | 56.22 | 21.93 | 4.18 | 4.46 | 4.86 | 1.59 | 0.44 | 103.4 | 3,262 | 2,204 | 20.895 |
| | Seine | May- | 0.00 | 0.40 | 21.17 | 25.83 | 39.41 | 4.26 | 3.73 | 3.20 | 1.73 | 0.27 | 101.3 | 751 + | 5 | 0.046 |
| | Trawl | Jan-Apr | 0.00 | 6.59 | 31.87 | 31.32 | 22.53 | 2.75 | 3.85 | 1.10 | 0.00 | 0.00 | 91.4 | 182 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 8.32 | 40.54 | 9.53 | 18.52 | 13.29 | 8.19 | 1.61 | 134.1 | 745 | 4,112 | 30.661 |
| 19934 | Seine | Jan-Apr | 0.00 | 0.47 | 3.34 | 10.44 | 54.82 | 20.19 | 4.55 | 4.05 | 1.50 | 0.64 | 108.9 | 6,643 | 2,364 | 21.475 |
| | Trawl | Jan-Apr | 0.00 | 3.61 | 4.64 | 27.84 | 38.66 | 20.10 | 2.58 | 1.55 | 1.03 | 0.00 | 106.1 | 194 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 3.15 | 18.85 | 48.99 | 11.78 | 11.14 | 4.86 | 1.24 | 132.6 | 899 | 2,324 | 17.614 |
| 19945 | Seine | Jan-Apr | 0.08 | 3.82 | 12.91 | 5.38 | 9.57 | 49.66 | 13.84 | 2.46 | 1.44 | 0.82 | 113.1 | 3,532 | 706 | 6.242 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.12 | 1.18 | 16.98 | 34.79 | 39.39 | 4.13 | 1.89 | 1.53 | 131.4 | 848 | 1,355 | 10.311 |
| 19956 | Seine | Jan-Apr | 0.00 | 1.08 | 65.37 | 8.94 | 2.82 | 4.26 | 11.72 | 5.19 | 0.37 | 0.26 | 89.0 | 2,697 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.78 | 4.11 | 5.68 | 25.83 | 32.68 | 26.42 | 3.13 | 1.37 | 133.8 | 511 | 3,086 | 23.053 |
| 19967 | Seine | Jan-Apr | 0.00 | 1.30 | 22.79 | 53.63 | 8.01 | 2.52 | 4.93 | 4.74 | 1.85 | 0.22 | 88.5 | 2,698 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.16 | 19.49 | 11.57 | 13.95 | 20.29 | 20.60 | 11.09 | 2.85 | 133.4 | 631 | 5,541 | 41.550 |

Table 1.2. Age composition and catch by season, fishery and gear type for the Prince Rupert District stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | Mean | Number | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Weight | Aged | (tonnes) | (millions) |
| 19978 | Seine | Jan-Apr | 0.00 | 0.19 | 33.18 | 21.98 | 36.29 | 4.44 | 1.42 | 1.09 | 1.28 | 0.14 | 83.2 | 2,116 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.65 | 3.05 | 43.07 | 20.52 | 9.89 | 11.28 | 7.02 | 4.53 | 127.9 | 1,082 | 3,945 | 30.856 |
| 19989 | Seine | Jan-Apr | 0.00 | 0.93 | 3.39 | 51.17 | 20.68 | 17.76 | 2.92 | 0.47 | 1.17 | 1.52 | 105.5 | 856 | 256 | 2.426 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 11.17 | 16.23 | 48.99 | 13.24 | 4.72 | 2.20 | 3.46 | 126.1 | 721 | 1,895 | 15.011 |
| 19990 | Seine | Jan-Apr | 0.00 | 1.70 | 24.62 | 8.21 | 36.56 | 14.42 | 11.61 | 1.98 | 0.40 | 0.50 | 98.8 | 3,972 | 1,239 | 12.203 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.12 | 2.10 | 23.06 | 20.47 | 42.17 | 9.37 | 1.11 | 1.60 | 133.7 | 811 | 3,076 | 23.002 |
| 20001 | Seine | Jan-Apr | 0.00 | 0.53 | 28.84 | 25.30 | 5.65 | 23.85 | 9.15 | 5.34 | 1.14 | 0.22 | 103.9 | 2,285 | 1,012 | 9.740 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.29 | 5.58 | 9.33 | 32.40 | 20.67 | 25.58 | 5.29 | 0.87 | 134.3 | 1,040 | 1,906 | 14.186 |
| 20012 | Seine | Oct-Dec | 0.00 | 5.18 | 19.99 | 36.74 | 18.99 | 3.93 | 9.56 | 3.51 | 1.79 | 0.30 | 90.3 | 5,577 + | 1 | 0.009 |
| | Seine | Jan-Apr | 0.00 | 7.21 | 19.39 | 32.03 | 20.34 | 4.16 | 11.12 | 3.83 | 1.60 | 0.33 | 93.0 | 3,678 | 2,061 | 22.159 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.11 | 7.11 | 20.37 | 11.69 | 27.39 | 15.79 | 15.28 | 2.26 | 142.0 | 1,059 | 2,432 | 16.995 |
| 20023 | Seine | Oct-Dec | 0.00 | 0.79 | 67.83 | 13.49 | 11.10 | 3.13 | 1.52 | 1.15 | 0.48 | 0.51 | 85.1 | 659 + | 5 | 0.068 |
| | Seine | Jan-Apr | 0.00 | 0.07 | 53.06 | 13.44 | 14.53 | 9.54 | 2.97 | 4.24 | 1.47 | 0.68 | 95.3 | 2,925 | 1,446 | 15.169 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.34 | 4.60 | 37.13 | 25.98 | 10.57 | 12.30 | 5.29 | 3.79 | 136.6 | 870 | 2,562 | 18.758 |
| 20034 | Seine | Oct-Dec | 0.00 | 0.91 | 1.98 | 69.32 | 11.20 | 10.06 | 4.20 | 0.91 | 1.27 | 0.16 | 93.7 | 2,526 + | 11 | 0.116 |
| | Seine | Jan-Apr | 0.00 | 0.88 | 1.76 | 69.88 | 10.58 | 9.88 | 4.45 | 0.97 | 1.39 | 0.19 | 96.0 | 2,155 | 1,909 | 19.886 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.09 | 21.84 | 13.52 | 36.88 | 15.40 | 4.92 | 4.74 | 2.60 | 134.5 | 1,117 | 2,192 | 16.3 |
| 20045 | Seine | Jan-Apr | 0.00 | 0.75 | 26.86 | 8.94 | 45.29 | 9.23 | 6.00 | 2.02 | 0.51 | 0.42 | 91.1 | 2,972 | 1,750 | 18.938 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 0.80 | 46.42 | 18.04 | 25.86 | 5.84 | 1.33 | 1.72 | 134.5 | 754 | 2,050 | 15.237 |
| 20056 | Seine | Jan-Apr | 0.00 | 1.45 | 16.34 | 44.33 | 8.80 | 22.99 | 3.90 | 1.60 | 0.45 | 0.15 | 87.1 | 2,001 | 957 | 10.981 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 2.77 | 7.19 | 59.82 | 15.23 | 13.61 | 1.38 | 0.00 | 128.7 | 577 | 1,661 | 12.941 |
| 20067 | Seine | Jan-Apr | 0.00 | 3.69 | 48.50 | 21.99 | 10.66 | 3.01 | 9.84 | 1.23 | 0.96 | 0.14 | 71.6 | 732 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.08 | 0.90 | 3.26 | 16.94 | 8.79 | 51.30 | 12.21 | 5.29 | 1.22 | 127.5 | 1,228 | 969 | 7.606 |
| 20078 | Seine | Jan-Apr | 0.00 | 1.50 | 9.82 | 56.89 | 13.82 | 10.45 | 2.18 | 4.24 | 0.75 | 0.36 | 93.3 | 2,526 | 513 | 5.498 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.08 | 10.53 | 8.52 | 18.71 | 9.02 | 43.36 | 6.43 | 3.34 | 128.3 | 1,197 | 1,148 | 8.951 |
| 20089 | Seine | Jan-Apr | 0.00 | 0.08 | 23.78 | 14.00 | 45.78 | 7.70 | 5.72 | 1.28 | 1.59 | 0.08 | 100.8 | 2,586 | 713 | 7.077 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.11 | 2.19 | 44.42 | 20.46 | 15.75 | 5.80 | 10.07 | 1.20 | 126.1 | 914 | 1,286 | 10.196 |

NOTE: * No biosample data available. Age composition and mean weight assigned from published reports.
+ Age composition calculated from biosample data aggregated from adjacent sections and/or fishery periods, by gear type.
~ No fishery openings this season. Age composition and mean weight obtained from pre-fishery charter

Table 1.3. Age composition and catch by season, fishery and gear type for the Central Coast stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | Mean | Number | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Weight | Aged | (tonnes) | (millions) |
| 19501 | Seine | Oct-Dec | 0.00 | 2.68 | 28.09 | 50.52 | 12.28 | 5.17 | 1.20 | 0.06 | 0.00 | 0.00 | 109.2 | 3,175 | 15,508 | 141.986 |
| | Seine | Jan-Apr | 0.06 | 2.25 | 31.20 | 49.36 | 11.23 | 4.84 | 1.06 | 0.01 | 0.00 | 0.00 | 107.9 | 2,143 | 26,950 | 250.936 |
| 19512 | Seine | Jan-Apr | 0.25 | 4.61 | 20.10 | 29.98 | 38.50 | 4.56 | 1.55 | 0.40 | 0.04 | 0.02 | 112.7 | 5,214 | 33,072 | 290.690 |
| | Seine | May- | 1.11 | 5.12 | 19.85 | 29.75 | 37.71 | 4.45 | 1.52 | 0.44 | 0.04 | 0.02 | 112.3 | 5,214 + | 123 | 1.091 |
| 19523 | Seine | Jan-Apr | 0.43 | 7.65 | 28.02 | 24.49 | 27.28 | 10.25 | 1.40 | 0.48 | 0.00 | 0.00 | 104.9 | 2,939 | 768 | 7.304 |
| 19534 | Seine | Oct-Dec | 0.15 | 7.31 | 69.86 | 17.41 | 3.99 | 1.06 | 0.15 | 0.00 | 0.08 | 0.00 | 63.6 | 1,327 | 6,389 | 100.473 |
| | Seine | Jan-Apr | 0.00 | 1.72 | 72.02 | 21.04 | 3.91 | 1.10 | 0.15 | 0.00 | 0.06 | 0.00 | 76.2 | 1,739 | 18,119 | 243.703 |
| | Seine | May- | 0.07 | 4.04 | 69.18 | 20.52 | 4.63 | 1.34 | 0.16 | 0.00 | 0.07 | 0.00 | 71.1 | 3,066 + | 109 | 1.531 |
| 19545 | Seine | Oct-Dec | 0.29 | 9.94 | 6.32 | 77.40 | 5.10 | 0.48 | 0.48 | 0.00 | 0.00 | 0.00 | 85.4 | 826 | 2,559 | 28.033 |
| | Seine | Jan-Apr | 0.00 | 1.31 | 5.42 | 80.39 | 11.08 | 1.56 | 0.25 | 0.00 | 0.00 | 0.00 | 99.8 | 1,524 | 9,035 | 90.856 |
| 19556 | Seine | Oct-Dec | 0.10 | 13.79 | 13.63 | 11.05 | 58.24 | 2.85 | 0.25 | 0.10 | 0.00 | 0.00 | 91.4 | 2,408 | 22,335 | 208.767 |
| | Seine | Jan-Apr | 0.00 | 7.39 | 12.21 | 8.70 | 67.86 | 3.36 | 0.43 | 0.00 | 0.00 | 0.04 | 114.2 | 2,614 | 21,018 | 178.311 |
| | Seine | May- | 0.04 | 16.97 | 13.60 | 9.12 | 56.99 | 2.89 | 0.34 | 0.04 | 0.00 | 0.02 | 105.4 | 5,022 + | 275 | 2.606 |
| 19567 | Seine | Oct-Dec | 0.00 | 52.32 | 42.90 | 3.83 | 0.55 | 0.27 | 0.14 | 0.00 | 0.00 | 0.00 | 60.1 | 732 | 1,788 | 29.756 |
| | Seine | Jan-Apr | 0.00 | 3.59 | 52.30 | 13.98 | 8.33 | 20.79 | 0.98 | 0.03 | 0.00 | 0.00 | 93.9 | 3,890 | 21,002 | 211.756 |
| | Seine | May- | 0.00 | 23.13 | 49.84 | 9.53 | 5.03 | 11.85 | 0.59 | 0.02 | 0.00 | 0.00 | 79.6 | 4,622 + | 470 | 5.669 |
| 19578 | Seine | Oct-Dec | 0.00 | 40.38 | 49.69 | 8.01 | 1.33 | 0.17 | 0.42 | 0.00 | 0.00 | 0.00 | 61.5 | 2,106 | 4,928 | 79.258 |
| | Seine | Jan-Apr | 0.00 | 5.67 | 73.61 | 17.35 | 1.50 | 1.22 | 0.65 | 0.00 | 0.00 | 0.00 | 73.8 | 1,472 | 4,454 | 60.180 |
| | Seine | May- | 0.00 | 47.57 | 42.11 | 7.27 | 2.01 | 0.42 | 0.62 | 0.00 | 0.00 | 0.00 | 64.8 | 3,578 + | 467 | 8.141 |
| 19589 | Seine | Oct-Dec | 0.17 | 5.25 | 49.47 | 35.94 | 7.43 | 0.61 | 0.57 | 0.55 | 0.01 | 0.00 | 83.4 | 2,169 | 10,774 | 125.789 |
| | Seine | Jan-Apr | 0.00 | 0.74 | 47.39 | 40.66 | 9.62 | 0.72 | 0.52 | 0.35 | 0.00 | 0.00 | 88.2 | 2,594 | 17,096 | 192.788 |
| 19590 | Seine | Oct-Dec | 0.00 | 42.87 | 24.11 | 26.16 | 5.59 | 1.10 | 0.08 | 0.08 | 0.00 | 0.00 | 62.1 | 1,269 | 3,397 | 54.675 |
| | Seine | Jan-Apr | 0.00 | 41.51 | 23.53 | 27.72 | 5.86 | 1.22 | 0.08 | 0.08 | 0.00 | 0.00 | 63.7 | 1,313 + | 640 | 10.054 |
| 19601 | Seine | Oct-Dec | 0.00 | 64.30 | 28.81 | 3.34 | 2.30 | 1.25 | 0.00 | 0.00 | 0.00 | 0.00 | 51.4 | 479 | 956 | 18.581 |
| | Seine | Jan-Apr | 0.00 | 4.30 | 32.64 | 12.80 | 36.63 | 12.48 | 0.94 | 0.16 | 0.05 | 0.00 | 100.6 | 2,302 | 30,641 | 302.709 |
| | Seine | May- | 0.00 | 16.18 | 32.43 | 10.82 | 29.70 | 9.92 | 0.79 | 0.11 | 0.04 | 0.00 | 91.1 | 2,781 + | 104 | 1.136 |
| | Trawl | May- | 0.00 | 16.18 | 32.43 | 10.82 | 29.70 | 9.92 | 0.79 | 0.11 | 0.04 | 0.00 | 91.1 | 2,781 + | 4 | 0.042 |
| 19612 | Seine | Oct-Dec | 0.00 | 7.65 | 54.80 | 20.82 | 2.85 | 11.39 | 2.31 | 0.18 | 0.00 | 0.00 | 94.1 | 562 + | 677 | 7.197 |
| | Seine | Jan-Apr | 0.00 | 3.73 | 51.28 | 25.17 | 2.80 | 13.99 | 2.80 | 0.23 | 0.00 | 0.00 | 99.6 | 429 | 14,942 | 150.045 |
| | Seine | May- | 0.00 | 7.65 | 54.80 | 20.82 | 2.85 | 11.39 | 2.31 | 0.18 | 0.00 | 0.00 | 94.1 | 562 + | 90 | 0.954 |
| 19623 | Seine | Oct-Dec | 0.00 | 0.36 | 30.27 | 58.03 | 5.25 | 2.86 | 3.02 | 0.21 | 0.00 | 0.00 | 100.6 | 1,052 + | 124 | 1.232 |
| | Seine | Jan-Apr | 0.00 | 0.35 | 30.14 | 58.19 | 5.18 | 2.86 | 3.07 | 0.21 | 0.00 | 0.00 | 100.6 | 1,052 | 43,930 | 436.570 |
| 19634 | Seine | Oct-Dec | 0.00 | 14.03 | 46.96 | 27.37 | 10.09 | 1.45 | 0.09 | 0.00 | 0.00 | 0.00 | 91.1 | 1,169 + | 3,214 | 35.288 |
| | Seine | Jan-Apr | 0.00 | 4.88 | 43.06 | 35.48 | 14.65 | 1.80 | 0.13 | 0.00 | 0.00 | 0.00 | 103.4 | 778 | 28,288 | 273.620 |
| | Seine | May- | 0.00 | 14.03 | 46.96 | 27.37 | 10.09 | 1.45 | 0.09 | 0.00 | 0.00 | 0.00 | 91.1 | 1,169 + | 165 | 1.808 |
| | Trawl | Jan-Apr | 0.00 | 14.03 | 46.96 | 27.37 | 10.09 | 1.45 | 0.09 | 0.00 | 0.00 | 0.00 | 91.1 | 1,169 + | 228 | 2.507 |
| 19645 | Seine | Oct-Dec | 0.00 | 14.07 | 37.58 | 31.01 | 12.10 | 5.03 | 0.18 | 0.03 | 0.00 | 0.00 | 114.4 | 1,750 + | 1,562 | 14.266 |
| | Seine | Jan-Apr | 0.00 | 3.62 | 35.16 | 37.44 | 17.59 | 5.77 | 0.39 | 0.03 | 0.00 | 0.00 | 122.3 | 1,652 | 12,630 | 101.310 |
| | Seine | May- | 0.00 | 8.49 | 36.46 | 33.62 | 15.63 | 5.41 | 0.33 | 0.06 | 0.00 | 0.00 | 111.9 | 1,750 + | 1,477 | 12.553 |
| 19656 | Seine | Oct-Dec | 0.00 | 67.32 | 20.43 | 7.33 | 3.60 | 1.13 | 0.19 | 0.00 | 0.00 | 0.00 | 71.9 | 0 * | 16,217 | 225.703 |
| | Seine | Jan-Apr | 0.00 | 67.32 | 20.43 | 7.33 | 3.60 | 1.13 | 0.19 | 0.00 | 0.00 | 0.00 | 71.9 | 0 * | 19,101 | 265.835 |
| | Seine | May- | 0.00 | 67.32 | 20.43 | 7.33 | 3.60 | 1.13 | 0.19 | 0.00 | 0.00 | 0.00 | 71.9 | 0 * | 2,163 | 30.107 |
| 19667 | Seine | Oct-Dec | 0.00 | 37.40 | 46.19 | 13.10 | 2.04 | 1.02 | 0.17 | 0.07 | 0.01 | 0.00 | 87.0 | 0 * | 2,910 | 33.432 |
| | Seine | Jan-Apr | 0.00 | 37.40 | 46.19 | 13.10 | 2.04 | 1.02 | 0.17 | 0.07 | 0.01 | 0.00 | 87.0 | 0 * | 17,206 | 197.668 |
| | Seine | May- | 0.00 | 37.40 | 46.19 | 13.10 | 2.04 | 1.02 | 0.17 | 0.07 | 0.01 | 0.00 | 87.0 | 0 * | 1,774 | 20.378 |
| 19678 | Seine | Oct-Dec | 0.00 | 32.53 | 48.02 | 17.02 | 2.11 | 0.25 | 0.00 | 0.06 | 0.00 | 0.00 | 89.8 | 0 * | 497 | 5.535 |
| | Seine | Jan-Apr | 0.00 | 32.53 | 48.02 | 17.02 | 2.11 | 0.25 | 0.00 | 0.06 | 0.00 | 0.00 | 89.8 | 0 * | 309 | 3.439 |
| | Seine | May- | 0.00 | 32.53 | 48.02 | 17.02 | 2.11 | 0.25 | 0.00 | 0.06 | 0.00 | 0.00 | 89.8 | 0 * | 722 | 8.043 |
| 19690 | Seine | Jan-Apr | 0.00 | 54.02 | 44.42 | 1.16 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 73.9 | 0 * | 209 | 2.832 |
| 19701 | Seine | Jan-Apr | 0.06 | 12.04 | 39.34 | 39.20 | 4.11 | 4.33 | 0.72 | 0.06 | 0.13 | 0.00 | 108.2 | 953 | 3,614 | 32.684 |
| 19712 | Seine | Jan-Apr | 0.00 | 3.54 | 28.25 | 27.13 | 27.01 | 7.57 | 5.17 | 1.26 | 0.08 | 0.00 | 120.5 | 1,763 | 9,143 | 74.425 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 2.27 | 18.18 | 61.36 | 11.36 | 6.82 | 0.00 | 0.00 | 0.00 | 159.6 | 44 + | 137 | 0.855 |
| 19723 | Seine | Jan-Apr | 0.00 | 0.97 | 48.51 | 18.90 | 16.23 | 12.72 | 2.02 | 0.47 | 0.19 | 0.00 | 125.2 | 1,239 | 6,664 | 52.842 |
| | Seine | May- | 0.00 | 1.21 | 49.64 | 18.40 | 15.98 | 12.11 | 2.02 | 0.48 | 0.16 | 0.00 | 124.7 | 1,239 + | 22 | 0.178 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 4.04 | 28.28 | 43.43 | 21.21 | 2.02 | 1.01 | 0.00 | 0.00 | 152.8 | 99 + | 1,113 | 7.288 |
| 19734 | Seine | Jan-Apr | 0.00 | 2.94 | 20.26 | 42.18 | 18.05 | 10.26 | 5.42 | 0.71 | 0.18 | 0.00 | 129.5 | 1,515 | 3,621 | 28.835 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.42 | 22.36 | 38.82 | 24.47 | 12.24 | 1.69 | 0.00 | 0.00 | 158.5 | 474 | 5,267 | 33.230 |
| 19745 | Seine | Jan-Apr | 0.18 | 0.99 | 48.84 | 22.87 | 19.00 | 5.33 | 2.25 | 0.48 | 0.04 | 0.02 | 119.5 | 8,923 | 3,343 | 31.457 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 4.27 | 26.40 | 45.60 | 15.73 | 5.60 | 2.40 | 0.00 | 0.00 | 152.8 | 375 + | 5,395 | 35.308 |
| 19756 | Seine | Jan-Apr | 0.00 | 2.18 | 11.33 | 41.86 | 21.86 | 16.69 | 4.31 | 1.52 | 0.24 | 0.02 | 124.4 | 5,418 | 6,198 | 50.662 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.86 | 18.72 | 30.18 | 35.12 | 11.56 | 3.02 | 0.44 | 0.09 | 162.0 | 1,222 | 6,213 | 38.357 |
| 19767 | Seine | Jan-Apr | 0.00 | 0.70 | 17.01 | 23.32 | 31.11 | 17.06 | 8.70 | 1.72 | 0.34 | 0.05 | 136.6 | 2,606 | 4,201 | 30.702 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.10 | 13.02 | 35.54 | 31.57 | 13.47 | 3.97 | 1.32 | 0.00 | 167.7 | 453 | 6,904 | 41.171 |
| 19778 | Seine | Jan-Apr | 0.00 | 0.19 | 28.64 | 16.47 | 21.54 | 21.13 | 8.68 | 2.56 | 0.59 | 0.20 | 129.6 | 1,391 | 4,723 | 37.629 |
| | Seine | May- | 0.00 | 0.18 | 29.21 | 16.70 | 21.83 | 20.76 | 8.28 | 2.38 | 0.50 | 0.17 | 124.6 | 1,391 + | 46 | 0.369 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.83 | 8.45 | 32.10 | 38.26 | 16.57 | 3.21 | 0.44 | 0.15 | 162.1 | 886 | 9,277 | 56.466 |
| 19789 | Seine | Oct-Dec | 0.00 | 5.70 | 4.40 | 31.50 | 18.70 | 21.30 | 15.10 | 2.80 | 0.40 | 0.10 | 151.8 | 0 * | 0 | 0.001 |
| | Seine | May- | 0.00 | 5.70 | 4.40 | 31.50 | 18.70 | 21.30 | 15.10 | 2.80 | 0.40 | 0.10 | 151.8 | 0 * | 5 | 0.031 |
| 19790 | Seine | Oct-Dec | 0.06 | 5.59 | 69.33 | 6.94 | 9.48 | 4.51 | 2.87 | 0.72 | 0.42 | 0.09 | 91.4 | 3,345 + | 10 | 0.111 |
| | Seine | Jan-Apr | 0.06 | 5.59 | 69.33 | 6.94 | 9.48 | 4.51 | 2.87 | 0.72 | 0.42 | 0.09 | 91.4 | 3,345 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 5.36 | 0.89 | 34.82 | 21.43 | 18.75 | 11.61 | 6.25 | 0.89 | 157.9 | 112 + | 528 | 3.347 |
| 19801 | Seine | Jan-Apr | 0.00 | 1.88 | 14.92 | 68.45 | 7.06 | 4.98 | 1.95 | 0.44 | 0.29 | 0.04 | 101.3 | 5,210 | 263 | 2.570 |
| | Seine | May- | 0.00 | 3.78 | 14.57 | 63.82 | 7.83 | 6.03 | 2.80 | 0.67 | 0.36 | 0.13 | 99.2 | 5,210 + | 6 | 0.063 |
| | Gillnet | Jan-Apr | 0.00 | 0.28 | 1.47 | 47.46 | 12.43 | 15.35 | 12.78 | 6.94 | 2.48 | 0.82 | 142.5 | 1,418 | 2,304 | 15.892 |
| 19812 | Seine | Jan-Apr | 0.00 | 0.61 | 11.52 | 10.17 | 66.35 | 5.52 | 4.26 | 1.26 | 0.30 | 0.00 | 131.9 | 2,300 | 2,258 | 17.116 |
| | Seine | May- | 0.00 | 0.61 | 11.52 | 10.17 | 66.35 | 5.52 | 4.26 | 1.26 | 0.30 | 0.00 | 131.9 | 2,300 + | 0 | 0.003 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 2.88 | 6.96 | 76.07 | 7.38 | 5.17 | 1.20 | 0.33 | 0.01 | 141.3 | 1,242 | 4,112 | 29.155 |
| 19823 | Seine | Jan-Apr | 0.00 | 0.58 | 7.06 | 13.65 | 11.15 | 58.16 | 5.32 | 3.13 | 0.64 | 0.31 | 134.7 | 5,445 | 2,061 | 15.154 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.56 | 7.56 | 13.82 | 68.06 | 5.22 | 3.93 | 0.62 | 0.23 | 146.7 | 1,703 | 3,579 | 24.422 |

Table 1.3. Age composition and catch by season, fishery and gear type for the Central Coast stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | | | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Mean Weight | Number Aged | (tonnes) | (millions) |
| 19834 | Seine | Jan-Apr | 0.00 | 2.29 | 5.47 | 7.67 | 17.73 | 17.04 | 47.03 | 1.93 | 0.69 | 0.14 | 128.0 | 6,294 | 3,589 | 28.383 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.27 | 2.69 | 12.49 | 16.84 | 61.49 | 4.63 | 1.07 | 0.53 | 145.1 | 1,092 | 3,582 | 24.536 |
| 19845 | Seine | Jan-Apr | 0.00 | 0.61 | 28.72 | 8.11 | 9.89 | 17.28 | 14.48 | 20.15 | 0.49 | 0.26 | 136.5 | 3,690 | 2,915 | 20.337 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 3.78 | 6.27 | 9.37 | 20.63 | 23.57 | 35.09 | 0.85 | 0.44 | 161.3 | 1,507 | 2,294 | 14.082 |
| 19856 | Seine | Oct-Dec | 0.00 | 4.00 | 16.21 | 39.67 | 8.61 | 6.41 | 6.74 | 6.12 | 11.63 | 0.62 | 135.0 | 5,995 + | 30 | 0.224 |
| | Seine | Jan-Apr | 0.00 | 0.94 | 14.64 | 41.12 | 10.95 | 5.12 | 6.40 | 6.55 | 13.85 | 0.43 | 138.7 | 3,983 | 2,173 | 16.047 |
| | Trawl | Jan-Apr | 0.00 | 4.00 | 16.21 | 39.67 | 8.61 | 6.41 | 6.74 | 6.12 | 11.63 | 0.62 | 135.0 | 5,995 + | 7 | 0.054 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 2.01 | 21.83 | 14.45 | 7.98 | 14.53 | 14.47 | 24.18 | 0.56 | 155.5 | 1,020 | 1,176 | 7.676 |
| 19867 | Seine | Jan-Apr | 0.00 | 4.13 | 20.03 | 13.26 | 32.77 | 5.60 | 5.06 | 6.71 | 5.11 | 7.33 | 143.9 | 3,614 | 2,695 | 18.225 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.82 | 7.75 | 44.85 | 11.72 | 7.85 | 9.89 | 8.15 | 8.97 | 165.2 | 981 | 920 | 5.571 |
| 19878 | Seine | Jan-Apr | 0.00 | 0.82 | 65.84 | 12.35 | 6.16 | 8.30 | 1.73 | 1.71 | 1.68 | 1.40 | 107.5 | 4,159 | 3,539 | 31.909 |
| | Seine | May- | 0.00 | 0.81 | 65.96 | 12.42 | 6.14 | 8.29 | 1.66 | 1.73 | 1.66 | 1.34 | 110.9 | 2,835 + | 18 | 0.162 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 4.39 | 10.69 | 15.27 | 27.48 | 13.74 | 7.06 | 9.73 | 11.64 | 162.2 | 524 | 970 | 5.978 |
| 19889 | Seine | Jan-Apr | 0.00 | 0.84 | 3.72 | 79.59 | 8.59 | 2.79 | 2.28 | 0.60 | 0.87 | 0.71 | 112.1 | 4,321 | 6,531 | 61.253 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.32 | 29.13 | 25.73 | 17.31 | 14.72 | 5.34 | 3.72 | 3.72 | 147.9 | 618 | 2,911 | 19.680 |
| 19890 | Seine | Jan-Apr | 0.00 | 0.81 | 3.55 | 5.07 | 74.01 | 7.47 | 3.93 | 3.48 | 0.81 | 0.85 | 131.1 | 6,843 | 5,305 | 39.561 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 1.03 | 68.15 | 16.46 | 5.46 | 6.48 | 1.10 | 1.32 | 144.7 | 806 | 3,046 | 20.978 |
| 19901 | Seine | Jan-Apr | 0.00 | 1.76 | 16.48 | 7.41 | 6.52 | 56.72 | 6.70 | 2.34 | 1.70 | 0.36 | 133.9 | 7,107 | 7,097 | 52.412 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.56 | 2.41 | 6.30 | 69.81 | 9.44 | 7.04 | 3.52 | 0.93 | 154.7 | 540 | 1,806 | 11.673 |
| 19912 | Seine | Jan-Apr | 0.00 | 0.94 | 60.91 | 10.17 | 2.47 | 2.95 | 19.02 | 2.03 | 0.79 | 0.72 | 107.2 | 7,264 | 7,251 | 66.620 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 6.87 | 6.96 | 4.42 | 6.98 | 60.93 | 9.67 | 2.99 | 1.19 | 155.5 | 1,119 | 1,111 | 6.991 |
| 19923 | Seine | Jan-Apr | 0.00 | 3.37 | 7.06 | 63.75 | 9.66 | 1.85 | 2.41 | 10.22 | 1.24 | 0.43 | 112.3 | 6,939 | 8,478 | 75.838 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.20 | 45.74 | 14.12 | 5.43 | 5.88 | 25.47 | 2.48 | 0.67 | 138.9 | 781 | 2,038 | 14.682 |
| 19934 | Seine | Jan-Apr | 0.00 | 0.87 | 18.91 | 7.17 | 56.09 | 7.93 | 2.09 | 3.02 | 3.51 | 0.42 | 118.7 | 6,174 | 9,757 | 81.704 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.73 | 5.09 | 66.34 | 12.30 | 3.27 | 4.00 | 6.51 | 0.77 | 133.8 | 1,951 | 2,122 | 15.809 |
| 19945 | Seine | Jan-Apr | 0.00 | 0.58 | 5.12 | 22.95 | 9.25 | 49.46 | 6.30 | 2.18 | 2.34 | 1.81 | 127.0 | 8,932 | 8,131 | 64.167 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.23 | 8.93 | 8.00 | 64.84 | 10.67 | 1.79 | 2.23 | 3.31 | 137.4 | 1,267 | 1,451 | 10.565 |
| 19956 | Seine | Jan-Apr | 0.00 | 12.82 | 18.28 | 5.03 | 16.68 | 7.26 | 31.17 | 5.89 | 1.57 | 1.31 | 124.2 | 4,087 | 3,897 | 32.478 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.39 | 1.55 | 18.33 | 11.88 | 53.07 | 10.48 | 1.97 | 2.33 | 146.4 | 566 | 402 | 2.743 |
| 19967 | Seine | Jan-Apr | 0.00 | 2.20 | 56.77 | 15.70 | 3.46 | 6.65 | 4.27 | 8.66 | 1.70 | 0.58 | 94.3 | 5,235 | 3,276 | 34.713 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.36 | 2.92 | 6.23 | 22.76 | 19.26 | 38.33 | 7.20 | 1.95 | 143.5 | 514 | 344 | 2.401 |
| 19978 | Seine | Jan-Apr | 0.00 | 0.57 | 31.97 | 41.69 | 8.77 | 2.55 | 5.02 | 4.40 | 4.08 | 0.96 | 90.0 | 4,825 | 12,670 | 134.718 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.50 | 14.82 | 14.10 | 8.79 | 17.60 | 15.74 | 20.76 | 7.69 | 140.4 | 1,031 | 800 | 5.675 |
| 19989 | Seine | Jan-Apr | 0.00 | 0.38 | 8.40 | 39.78 | 34.47 | 7.66 | 2.20 | 2.87 | 2.70 | 1.55 | 100.2 | 3,861 | 6,311 | 61.746 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.13 | 15.27 | 45.02 | 17.80 | 6.24 | 5.31 | 5.44 | 4.78 | 128.8 | 753 | 1,524 | 11.833 |
| 19990 | Seine | Jan-Apr | 0.00 | 0.20 | 17.33 | 10.45 | 32.95 | 28.80 | 6.40 | 1.45 | 1.17 | 1.26 | 112.6 | 4,527 | 6,394 | 55.294 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.44 | 2.04 | 40.44 | 41.61 | 10.36 | 1.61 | 0.88 | 2.63 | 133.0 | 685 | 972 | 7.304 |
| 20001 | Seine | Jan-Apr | 0.01 | 2.12 | 7.10 | 24.85 | 12.46 | 25.25 | 21.35 | 5.12 | 1.17 | 0.57 | 117.5 | 3,070 | 5,613 | 47.004 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 4.87 | 5.75 | 52.75 | 28.13 | 7.12 | 1.13 | 0.25 | 135.3 | 800 | 517 | 3.823 |
| 20012 | Seine | Jan-Apr | 0.00 | 4.14 | 33.85 | 10.20 | 16.51 | 5.90 | 19.75 | 8.00 | 1.35 | 0.29 | 96.5 | 5,894 | 2,894 | 29.510 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.60 | 5.95 | 20.83 | 7.54 | 47.02 | 16.47 | 1.39 | 0.20 | 128.6 | 504 | 399 | 3.099 |
| 20023 | Seine | Jan-Apr | 0.00 | 0.09 | 30.97 | 24.46 | 9.95 | 12.93 | 5.79 | 11.12 | 3.98 | 0.72 | 104.9 | 2,212 | 2,299 | 21.910 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.43 | 3.57 | 11.14 | 25.73 | 11.24 | 33.08 | 12.32 | 2.49 | 143.2 | 925 | 289 | 2.020 |
| 20034 | Seine | Jan-Apr | 0.00 | 1.27 | 6.44 | 65.95 | 16.06 | 2.98 | 3.46 | 1.74 | 1.67 | 0.43 | 96.1 | 2,094 | 2,988 | 30.990 |
| 20045 | Seine | Jan-Apr | 0.00 | 0.50 | 33.48 | 16.62 | 34.91 | 9.13 | 1.96 | 1.74 | 1.09 | 0.58 | 88.5 | 5,728 | 3,778 | 41.595 |
| 20056 | Seine | Jan-Apr | 0.00 | 0.84 | 10.82 | 56.17 | 10.59 | 16.51 | 3.51 | 0.77 | 0.60 | 0.19 | 86.7 | 5,835 | 3,072 | 35.945 |
| 20067 | Seine | Jan-Apr | 0.29 | 1.32 | 29.35 | 20.47 | 29.70 | 9.33 | 7.73 | 1.35 | 0.38 | 0.08 | 86.3 | 2,343 | 398 | 4.586 |
| 20078 | Seine | Jan-Apr | 0.00 | 10.12 | 10.20 | 44.83 | 12.51 | 15.91 | 2.82 | 2.89 | 0.58 | 0.14 | 79.3 | 1,383 | 0 | 0.000 ~ |
| 20089 | Seine | Jan-Apr | 0.00 | 2.13 | 73.14 | 10.94 | 8.45 | 2.38 | 2.24 | 0.28 | 0.36 | 0.07 | 71.3 | 2,815 | 0 | 0.000 ~ |

NOTE: * No biosample data available. Age composition and mean weight assigned from published reports.
+ Age composition calculated from biosample data aggregated from adjacent sections and/or fishery periods, by gear type.
~ No fishery openings this season. Age composition and mean weight obtained from pre-fishery charter

Table 1.4. Age composition and catch by season, fishery and gear type for the Strait of Georgia stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | Mean | Number | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Weight | Aged | (tonnes) | (millions) |
| 19501 | Seine | Oct-Dec | 0.03 | 4.32 | 58.19 | 28.93 | 6.71 | 1.40 | 0.30 | 0.10 | 0.02 | 0.00 | 99.6 | 7,816 | 42,180 | 424.795 |
| | Seine | Jan-Apr | 0.06 | 4.40 | 32.64 | 48.59 | 10.65 | 2.76 | 0.62 | 0.23 | 0.06 | 0.00 | 103.6 | 1,774 + | 1,226 | 11.828 |
| | Seine | May- | 0.04 | 3.46 | 61.00 | 26.57 | 7.12 | 1.25 | 0.43 | 0.12 | 0.00 | 0.00 | 99.5 | 7,816 + | 393 | 3.923 |
| 19512 | Seine | Oct-Dec | 0.11 | 14.85 | 55.11 | 21.73 | 6.50 | 1.32 | 0.28 | 0.08 | 0.01 | 0.00 | 93.0 | 8,839 | 44,896 | 492.871 |
| | Seine | Jan-Apr | 0.16 | 21.00 | 49.73 | 21.23 | 6.21 | 1.51 | 0.11 | 0.05 | 0.00 | 0.00 | 92.5 | 8,839 + | 438 | 5.011 |
| | Seine | May- | 0.03 | 5.99 | 55.50 | 29.71 | 7.17 | 1.34 | 0.20 | 0.05 | 0.00 | 0.00 | 96.6 | 8,839 + | 551 | 5.472 |
| | Trawl | Jan-Apr | 0.00 | 0.00 | 50.26 | 36.79 | 9.84 | 2.59 | 0.52 | 0.00 | 0.00 | 0.00 | 115.6 | 193 | 0 | 0.000 ~ |
| 19523 | Seine | Oct-Dec | 0.11 | 1.74 | 54.75 | 38.76 | 3.97 | 0.52 | 0.07 | 0.10 | 0.00 | 0.00 | 85.9 | 3,810 | 3,757 | 41.534 |
| | Seine | Jan-Apr | 0.14 | 3.79 | 65.35 | 27.05 | 2.97 | 0.62 | 0.07 | 0.00 | 0.00 | 0.00 | 81.0 | 5,220 | 3,966 | 48.795 |
| | Seine | May- | 0.17 | 2.67 | 55.64 | 37.01 | 3.71 | 0.63 | 0.09 | 0.07 | 0.00 | 0.00 | 84.1 | 9,030 + | 447 | 5.124 |
| | Trawl | Oct-Dec | 0.00 | 1.58 | 63.29 | 30.79 | 3.68 | 0.66 | 0.00 | 0.00 | 0.00 | 0.00 | 88.4 | 760 | 29 | 0.326 |
| | Trawl | Jan-Apr | 0.00 | 5.91 | 67.27 | 23.62 | 2.60 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 78.0 | 999 | 225 | 2.888 |
| 19534 | Seine | Oct-Dec | 0.00 | 1.12 | 53.97 | 36.36 | 6.83 | 1.38 | 0.27 | 0.06 | 0.01 | 0.00 | 96.0 | 9,693 | 57,443 | 595.913 |
| | Seine | Jan-Apr | 0.00 | 2.17 | 43.19 | 41.52 | 8.91 | 3.32 | 0.70 | 0.18 | 0.01 | 0.00 | 94.5 | 3,618 + | 619 | 6.600 |
| | Seine | May- | 0.00 | 1.78 | 22.05 | 37.29 | 26.45 | 8.79 | 2.98 | 0.60 | 0.07 | 0.00 | 119.9 | 3,374 | 7,692 | 62.447 |
| | Trawl | Jan-Apr | 0.00 | 1.36 | 52.67 | 36.83 | 7.07 | 1.66 | 0.33 | 0.08 | 0.01 | 0.00 | 95.7 | 9,788 + | 14 | 0.142 |
| 19545 | Seine | Oct-Dec | 0.00 | 3.92 | 56.38 | 33.92 | 5.18 | 0.52 | 0.09 | 0.00 | 0.00 | 0.00 | 98.5 | 4,028 | 50,604 | 503.361 |
| | Seine | Jan-Apr | 0.00 | 3.50 | 22.26 | 60.88 | 11.00 | 2.22 | 0.15 | 0.00 | 0.00 | 0.00 | 85.6 | 896 | 13,825 | 161.566 |
| | Seine | May- | 0.00 | 4.65 | 49.87 | 38.62 | 5.95 | 0.82 | 0.10 | 0.00 | 0.00 | 0.00 | 94.5 | 4,924 + | 4,207 | 43.919 |
| | Trawl | Oct-Dec | 0.00 | 4.65 | 50.12 | 38.35 | 5.99 | 0.80 | 0.10 | 0.00 | 0.00 | 0.00 | 95.8 | 4,994 + | 5 | 0.054 |
| | Trawl | Jan-Apr | 0.00 | 8.57 | 57.14 | 25.71 | 8.57 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 84.7 | 70 | 0 | 0.000 ~ |
| 19556 | Seine | Oct-Dec | 0.00 | 4.07 | 52.03 | 30.65 | 11.30 | 1.65 | 0.29 | 0.00 | 0.00 | 0.00 | 97.4 | 3,783 | 44,043 | 451.810 |
| | Seine | Jan-Apr | 0.00 | 4.10 | 14.20 | 29.99 | 41.94 | 7.87 | 1.37 | 0.43 | 0.09 | 0.02 | 109.1 | 4,816 | 26,375 | 243.982 |
| | Seine | May- | 0.00 | 0.13 | 9.76 | 43.52 | 26.32 | 17.07 | 2.44 | 0.64 | 0.00 | 0.13 | 125.5 | 779 | 1,462 | 11.648 |
| | Trawl | Oct-Dec | 0.00 | 5.52 | 58.00 | 26.95 | 8.19 | 1.05 | 0.29 | 0.00 | 0.00 | 0.00 | 93.7 | 1,050 | 182 | 1.944 |
| | Trawl | Jan-Apr | 0.00 | 18.62 | 44.38 | 24.62 | 10.24 | 1.91 | 0.23 | 0.00 | 0.00 | 0.00 | 85.7 | 2,197 | 0 | 0.000 ~ |
| 19567 | Seine | Oct-Dec | 0.00 | 0.73 | 64.78 | 20.31 | 9.37 | 4.25 | 0.51 | 0.04 | 0.00 | 0.00 | 96.2 | 4,691 | 44,241 | 460.767 |
| | Seine | Jan-Apr | 0.00 | 1.42 | 64.96 | 21.83 | 7.50 | 3.97 | 0.31 | 0.00 | 0.00 | 0.00 | 95.7 | 826 | 8,202 | 84.577 |
| | Seine | May- | 0.00 | 3.46 | 18.92 | 40.97 | 25.30 | 9.95 | 1.08 | 0.11 | 0.11 | 0.11 | 129.9 | 925 | 7,165 | 55.146 |
| | Trawl | Jan-Apr | 0.12 | 2.24 | 71.93 | 14.15 | 4.60 | 5.66 | 0.94 | 0.24 | 0.00 | 0.12 | 91.7 | 848 | 0 | 0.000 ~ |
| 19578 | Seine | Oct-Dec | 0.00 | 10.67 | 60.24 | 20.45 | 3.60 | 3.20 | 1.64 | 0.15 | 0.04 | 0.00 | 88.8 | 3,085 | 11,745 | 133.517 |
| | Seine | Jan-Apr | 0.00 | 9.97 | 61.67 | 16.52 | 4.36 | 3.66 | 3.24 | 0.49 | 0.09 | 0.00 | 90.1 | 1,850 | 6,982 | 84.814 |
| | Seine | May- | 0.00 | 9.00 | 60.10 | 21.06 | 3.99 | 3.20 | 2.30 | 0.30 | 0.05 | 0.00 | 88.9 | 4,935 + | 1,206 | 13.597 |
| | Trawl | Jan-Apr | 0.00 | 12.72 | 73.29 | 11.64 | 1.88 | 0.45 | 0.01 | 0.01 | 0.00 | 0.00 | 74.8 | 527 | 695 | 9.491 |
| | Gillnet | Jan-Apr | 0.00 | 24.49 | 53.06 | 18.37 | 0.00 | 2.04 | 0.00 | 2.04 | 0.00 | 0.00 | 76.1 | 49 | 0 | 0.000 ~ |
| 19589 | Seine | Oct-Dec | 0.74 | 13.95 | 66.31 | 15.95 | 2.34 | 0.39 | 0.21 | 0.10 | 0.01 | 0.00 | 83.5 | 7,169 | 47,601 | 575.751 |
| | Seine | Jan-Apr | 0.86 | 14.21 | 65.57 | 16.41 | 2.29 | 0.39 | 0.21 | 0.06 | 0.01 | 0.00 | 82.4 | 7,215 + | 146 | 1.770 |
| | Seine | May- | 0.00 | 25.55 | 57.59 | 10.98 | 3.72 | 1.52 | 0.27 | 0.29 | 0.09 | 0.00 | 79.4 | 1,506 | 1,897 | 23.636 |
| | Trawl | Jan-Apr | 1.52 | 19.81 | 59.43 | 18.10 | 1.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 70.9 | 525 | 0 | 0.000 ~ |
| | Gillnet | Oct-Dec | 0.00 | 24.49 | 53.06 | 18.37 | 0.00 | 2.04 | 0.00 | 2.04 | 0.00 | 0.00 | 76.1 | 49 + | 381 | 5.002 |
| 19590 | Seine | Oct-Dec | 0.00 | 6.80 | 54.12 | 35.60 | 2.93 | 0.36 | 0.09 | 0.07 | 0.00 | 0.02 | 98.1 | 3,323 | 67,866 | 685.617 |
| | Seine | Jan-Apr | 0.00 | 23.34 | 50.24 | 24.15 | 2.11 | 0.00 | 0.16 | 0.00 | 0.00 | 0.00 | 79.8 | 617 | 149 | 1.863 |
| | Trawl | Oct-Dec | 0.00 | 10.10 | 51.47 | 34.80 | 3.07 | 0.36 | 0.10 | 0.08 | 0.00 | 0.03 | 95.7 | 3,940 + | 23 | 0.237 |
| 19601 | Seine | Oct-Dec | 0.00 | 40.17 | 30.91 | 22.59 | 5.84 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 88.0 | 2,248 | 25,847 | 303.907 |
| | Seine | Jan-Apr | 0.00 | 31.84 | 24.60 | 25.78 | 15.85 | 1.83 | 0.11 | 0.00 | 0.00 | 0.00 | 80.0 | 1,188 | 9,335 | 115.878 |
| | Seine | May- | 0.00 | 0.16 | 28.79 | 22.54 | 26.29 | 19.56 | 2.35 | 0.31 | 0.00 | 0.00 | 114.2 | 639 | 9,119 | 79.855 |
| | Trawl | Oct-Dec | 0.00 | 38.75 | 35.27 | 19.59 | 6.24 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 85.8 | 689 | 1,328 | 15.472 |
| | Trawl | Jan-Apr | 0.00 | 38.75 | 35.27 | 19.59 | 6.24 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 85.8 | 689 + | 586 | 6.822 |
| 19612 | Seine | Oct-Dec | 0.00 | 9.92 | 71.21 | 12.79 | 4.02 | 1.72 | 0.33 | 0.00 | 0.00 | 0.00 | 88.8 | 2,824 | 53,725 | 602.612 |
| | Seine | Jan-Apr | 0.00 | 13.01 | 67.90 | 10.71 | 5.23 | 2.56 | 0.60 | 0.00 | 0.00 | 0.00 | 87.8 | 2,824 + | 36 | 0.412 |
| | Seine | May- | 0.00 | 9.42 | 71.71 | 13.00 | 3.96 | 1.57 | 0.32 | 0.02 | 0.00 | 0.00 | 88.8 | 2,824 + | 10,747 | 120.280 |
| | Trawl | Oct-Dec | 0.00 | 9.56 | 71.49 | 12.85 | 4.11 | 1.59 | 0.35 | 0.04 | 0.00 | 0.00 | 89.0 | 2,824 + | 785 | 8.818 |
| | Trawl | Jan-Apr | 0.00 | 9.56 | 71.49 | 12.85 | 4.11 | 1.59 | 0.35 | 0.04 | 0.00 | 0.00 | 89.0 | 2,824 + | 9 | 0.106 |
| 19623 | Seine | Oct-Dec | 0.00 | 13.94 | 52.76 | 29.55 | 3.49 | 0.19 | 0.04 | 0.04 | 0.00 | 0.00 | 86.6 | 1,596 | 56,900 | 651.147 |
| | Seine | Jan-Apr | 0.00 | 31.58 | 47.43 | 15.38 | 2.89 | 1.77 | 0.71 | 0.35 | 0.00 | 0.00 | 81.8 | 1,968 + | 5,014 | 71.025 |
| | Seine | May- | 0.00 | 16.95 | 51.64 | 26.95 | 3.50 | 1.26 | 0.48 | 0.10 | 0.00 | 0.00 | 82.8 | 1,968 + | 6,685 | 79.351 |
| | Trawl | Oct-Dec | 0.00 | 17.03 | 52.56 | 26.28 | 3.13 | 0.66 | 0.24 | 0.09 | 0.00 | 0.00 | 83.8 | 2,108 + | 200 | 2.392 |
| | Trawl | Jan-Apr | 0.00 | 17.03 | 52.56 | 26.28 | 3.13 | 0.66 | 0.24 | 0.09 | 0.00 | 0.00 | 83.8 | 2,108 + | 47 | 0.567 |
| 19634 | Seine | Oct-Dec | 0.00 | 4.30 | 63.37 | 29.55 | 2.20 | 0.47 | 0.05 | 0.07 | 0.00 | 0.00 | 103.4 | 3,255 | 65,538 | 626.573 |
| 19678 | Seine | Oct-Dec | 0.00 | 30.37 | 50.62 | 14.68 | 3.04 | 0.88 | 0.18 | 0.23 | 0.00 | 0.00 | 94.8 | 0 * | 1,034 | 10.909 |
| | Seine | Jan-Apr | 0.00 | 30.37 | 50.62 | 14.68 | 3.04 | 0.88 | 0.18 | 0.23 | 0.00 | 0.00 | 94.8 | 0 * | 58 | 0.616 |
| | Seine | May- | 0.00 | 30.37 | 50.62 | 14.68 | 3.04 | 0.88 | 0.18 | 0.23 | 0.00 | 0.00 | 94.8 | 0 * | 700 | 7.390 |
| | Trawl | Jan-Apr | 0.00 | 30.37 | 50.62 | 14.68 | 3.04 | 0.88 | 0.18 | 0.23 | 0.00 | 0.00 | 94.8 | 0 * | 101 | 1.061 |
| 19690 | Seine | Oct-Dec | 0.00 | 25.64 | 60.32 | 9.49 | 3.27 | 0.72 | 0.56 | 0.00 | 0.00 | 0.00 | 95.5 | 0 * | 1 | 0.007 |
| | Seine | Jan-Apr | 0.00 | 25.64 | 60.32 | 9.49 | 3.27 | 0.72 | 0.56 | 0.00 | 0.00 | 0.00 | 95.5 | 0 * | 220 | 2.299 |
| | Trawl | Jan-Apr | 0.00 | 25.64 | 60.32 | 9.49 | 3.27 | 0.72 | 0.56 | 0.00 | 0.00 | 0.00 | 95.5 | 0 * | 0 | 0.004 |
| | Gillnet | Jan-Apr | 0.00 | 25.64 | 60.32 | 9.49 | 3.27 | 0.72 | 0.56 | 0.00 | 0.00 | 0.00 | 95.5 | 0 * | 23 | 0.243 |
| 19701 | Seine | Oct-Dec | 0.35 | 12.33 | 40.03 | 36.36 | 7.12 | 2.82 | 0.92 | 0.07 | 0.00 | 0.00 | 114.8 | 1,419 | 588 | 5.118 |
| | Seine | Jan-Apr | 0.43 | 13.36 | 41.17 | 34.74 | 7.01 | 2.58 | 0.67 | 0.04 | 0.00 | 0.00 | 113.9 | 1,419 + | 857 | 7.672 |
| | Seine | May- | 0.35 | 12.33 | 40.03 | 36.36 | 7.12 | 2.82 | 0.92 | 0.07 | 0.00 | 0.00 | 114.8 | 1,419 + | 66 | 0.577 |
| | Trawl | Oct-Dec | 0.35 | 12.33 | 40.03 | 36.36 | 7.12 | 2.82 | 0.92 | 0.07 | 0.00 | 0.00 | 114.8 | 1,419 + | 95 | 0.828 |
| | Trawl | Jan-Apr | 0.35 | 12.33 | 40.03 | 36.36 | 7.12 | 2.82 | 0.92 | 0.07 | 0.00 | 0.00 | 114.8 | 1,419 + | 4 | 0.032 |
| | Gillnet | Oct-Dec | 0.00 | 4.58 | 11.75 | 46.61 | 28.49 | 6.77 | 1.49 | 0.20 | 0.10 | 0.00 | 140.1 | 1,004 + | 42 | 0.303 |
| | Gillnet | Jan-Apr | 0.00 | 4.58 | 11.75 | 46.61 | 28.49 | 6.77 | 1.49 | 0.20 | 0.10 | 0.00 | 140.1 | 1,004 + | 44 | 0.315 |
| | Gillnet | May- | 0.00 | 4.58 | 11.75 | 46.61 | 28.49 | 6.77 | 1.49 | 0.20 | 0.10 | 0.00 | 140.1 | 1,004 + | 3 | 0.023 |
| 19712 | Seine | Oct-Dec | 0.06 | 12.78 | 32.57 | 33.30 | 16.53 | 3.36 | 1.21 | 0.12 | 0.06 | 0.00 | 126.0 | 2,340 | 1,017 | 8.277 |
| | Seine | Jan-Apr | 0.00 | 5.69 | 32.75 | 36.27 | 19.69 | 4.21 | 1.29 | 0.09 | 0.01 | 0.00 | 113.1 | 7,062 | 7,240 | 63.276 |
| | Seine | May- | 0.01 | 4.41 | 29.73 | 34.98 | 23.32 | 6.08 | 1.39 | 0.09 | 0.01 | 0.00 | 117.3 | 9,402 + | 98 | 0.815 |
| | Trawl | Jan-Apr | 0.01 | 8.60 | 34.61 | 33.23 | 18.40 | 3.79 | 1.17 | 0.17 | 0.02 | 0.00 | 114.9 | 9,402 + | 0 | 0.002 |
| | Gillnet | Jan-Apr | 0.00 | 5.92 | 11.45 | 45.25 | 28.69 | 6.90 | 1.65 | 0.14 | 0.00 | 0.00 | 139.8 | 1,004 | 456 | 3.275 |

Table 1.4. Age composition and catch by season, fishery and gear type for the Strait of Georgia stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | | | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Mean Weight | Number Aged | (tonnes) | (millions) |
| 19723 | Seine | Oct-Dec | 0.00 | 3.37 | 50.48 | 20.94 | 18.35 | 5.39 | 0.91 | 0.45 | 0.11 | 0.00 | 120.6 | 1,071 | 256 | 2.082 |
| | Seine | Jan-Apr | 0.08 | 1.98 | 36.48 | 29.31 | 20.75 | 10.01 | 1.24 | 0.14 | 0.01 | 0.00 | 130.3 | 4,643 | 5,161 | 41.003 |
| | Seine | May- | 0.09 | 3.35 | 39.83 | 27.62 | 19.68 | 7.90 | 1.15 | 0.33 | 0.05 | 0.00 | 124.1 | 5,714 + | 167 | 1.351 |
| | Trawl | Oct-Dec | 0.10 | 1.89 | 31.61 | 30.52 | 23.07 | 11.01 | 1.51 | 0.26 | 0.03 | 0.00 | 130.6 | 5,777 + | 1 | 0.008 |
| | Trawl | Jan-Apr | 0.10 | 1.89 | 31.61 | 30.52 | 23.07 | 11.01 | 1.51 | 0.26 | 0.03 | 0.00 | 130.6 | 5,777 + | 0 | 0.000 |
| | Gillnet | Oct-Dec | 0.00 | 0.00 | 17.41 | 30.36 | 37.50 | 11.16 | 3.13 | 0.45 | 0.00 | 0.00 | 133.4 | 224 + | 6 | 0.048 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 17.41 | 30.36 | 37.50 | 11.16 | 3.13 | 0.45 | 0.00 | 0.00 | 133.4 | 224 + | 2,057 | 15.421 |
| 19734 | Seine | Jan-Apr | 0.00 | 16.29 | 60.29 | 17.53 | 4.19 | 1.47 | 0.11 | 0.11 | 0.00 | 0.00 | 77.8 | 884 + | 856 | 11.013 |
| | Seine | May- | 0.00 | 16.29 | 60.29 | 17.53 | 4.19 | 1.47 | 0.11 | 0.11 | 0.00 | 0.00 | 77.8 | 884 + | 62 | 0.795 |
| | Trawl | Jan-Apr | 0.00 | 16.83 | 61.15 | 17.24 | 3.42 | 1.23 | 0.14 | 0.00 | 0.00 | 0.00 | 72.2 | 731 | 5 | 0.064 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 3.74 | 43.04 | 32.01 | 17.56 | 3.21 | 0.43 | 0.00 | 0.00 | 157.1 | 924 | 3,095 | 19.692 |
| 19745 | Seine | Oct-Dec | 1.00 | 5.07 | 54.83 | 26.49 | 7.34 | 3.17 | 1.50 | 0.44 | 0.18 | 0.00 | 97.1 | 5,685 + | 218 | 2.243 |
| | Seine | Jan-Apr | 0.36 | 3.87 | 57.31 | 27.80 | 7.04 | 2.49 | 0.77 | 0.23 | 0.13 | 0.00 | 98.1 | 5,685 | 575 | 5.995 |
| | Seine | May- | 1.00 | 5.07 | 54.83 | 26.49 | 7.34 | 3.17 | 1.50 | 0.44 | 0.18 | 0.00 | 97.1 | 5,685 + | 55 | 0.564 |
| | Trawl | Oct-Dec | 1.00 | 5.07 | 54.83 | 26.49 | 7.34 | 3.17 | 1.50 | 0.44 | 0.18 | 0.00 | 97.1 | 5,685 + | 1 | 0.006 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 4.88 | 46.34 | 32.32 | 12.80 | 3.05 | 0.61 | 0.00 | 0.00 | 150.1 | 164 + | 5,331 | 35.526 |
| 19756 | Seine | Oct-Dec | 0.06 | 7.34 | 23.01 | 40.08 | 20.31 | 5.57 | 2.38 | 0.79 | 0.43 | 0.04 | 122.7 | 3,494 | 4,313 | 35.358 |
| | Seine | Jan-Apr | 0.00 | 5.95 | 20.35 | 46.41 | 19.28 | 5.46 | 1.60 | 0.71 | 0.20 | 0.04 | 109.9 | 2,254 | 834 | 7.166 |
| | Seine | May- | 0.03 | 7.45 | 21.69 | 41.20 | 20.01 | 5.53 | 2.57 | 1.04 | 0.40 | 0.07 | 119.8 | 5,748 + | 28 | 0.238 |
| 19756 | Trawl | Oct-Dec | 0.03 | 7.28 | 21.54 | 41.65 | 19.99 | 5.44 | 2.59 | 1.01 | 0.39 | 0.07 | 120.3 | 5,918 + | 3 | 0.021 |
| | Trawl | Jan-Apr | 0.03 | 7.28 | 21.54 | 41.65 | 19.99 | 5.44 | 2.59 | 1.01 | 0.39 | 0.07 | 120.3 | 5,918 + | 86 | 0.711 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.54 | 42.00 | 43.88 | 10.28 | 2.70 | 0.40 | 0.20 | 0.00 | 148.8 | 786 | 6,975 | 46.818 |
| 19767 | Seine | Oct-Dec | 0.62 | 6.52 | 56.39 | 19.55 | 12.05 | 3.06 | 0.95 | 0.66 | 0.19 | 0.01 | 107.2 | 1,828 | 616 | 5.836 |
| | Seine | Jan-Apr | 0.06 | 3.39 | 52.68 | 22.31 | 16.46 | 3.70 | 0.86 | 0.42 | 0.03 | 0.09 | 105.5 | 3,200 | 8,257 | 78.397 |
| | Seine | May- | 0.36 | 3.76 | 52.98 | 21.04 | 15.51 | 4.16 | 1.25 | 0.62 | 0.20 | 0.12 | 106.5 | 5,028 + | 25 | 0.236 |
| | Trawl | Oct-Dec | 0.36 | 3.76 | 52.98 | 21.04 | 15.51 | 4.16 | 1.25 | 0.62 | 0.20 | 0.12 | 106.5 | 5,028 + | 73 | 0.683 |
| | Trawl | Jan-Apr | 0.36 | 3.76 | 52.98 | 21.04 | 15.51 | 4.16 | 1.25 | 0.62 | 0.20 | 0.12 | 106.5 | 5,028 + | 802 | 7.534 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 3.50 | 27.75 | 47.32 | 16.68 | 4.08 | 0.54 | 0.15 | 0.00 | 150.3 | 1,658 | 7,736 | 51.507 |
| 19778 | Seine | Oct-Dec | 0.06 | 2.53 | 36.75 | 40.07 | 9.39 | 7.18 | 3.08 | 0.56 | 0.35 | 0.03 | 110.2 | 1,984 | 10,648 | 96.197 |
| | Seine | Jan-Apr | 0.00 | 0.42 | 34.65 | 42.60 | 13.62 | 7.09 | 1.22 | 0.32 | 0.00 | 0.08 | 105.6 | 3,516 | 3,919 | 36.641 |
| | Seine | May- | 0.06 | 2.25 | 36.56 | 39.10 | 10.46 | 7.84 | 2.83 | 0.57 | 0.27 | 0.06 | 106.3 | 5,500 + | 30 | 0.287 |
| | Trawl | Oct-Dec | 0.03 | 1.31 | 35.05 | 42.37 | 11.19 | 7.52 | 1.95 | 0.34 | 0.15 | 0.08 | 107.9 | 5,891 + | 1,792 | 16.618 |
| | Trawl | Jan-Apr | 0.03 | 1.31 | 35.05 | 42.37 | 11.19 | 7.52 | 1.95 | 0.34 | 0.15 | 0.08 | 107.9 | 5,891 + | 296 | 2.746 |
| | Gillnet | Oct-Dec | 0.00 | 0.00 | 0.37 | 20.33 | 30.50 | 36.04 | 10.91 | 1.48 | 0.37 | 0.00 | 148.9 | 541 + | 63 | 0.425 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.37 | 20.33 | 30.50 | 36.04 | 10.91 | 1.48 | 0.37 | 0.00 | 148.9 | 541 | 7,253 | 48.694 |
| 19789 | Seine | Oct-Dec | 0.00 | 1.62 | 17.91 | 38.42 | 27.23 | 8.82 | 4.77 | 1.01 | 0.15 | 0.08 | 126.5 | 2,433 | 10,046 | 79.075 |
| | Seine | Jan-Apr | 0.00 | 3.01 | 23.91 | 33.51 | 25.54 | 7.92 | 3.91 | 1.48 | 0.43 | 0.29 | 117.7 | 2,095 | 54 | 0.461 |
| | Seine | May- | 0.00 | 2.25 | 20.19 | 36.76 | 25.68 | 8.39 | 4.95 | 1.27 | 0.31 | 0.20 | 120.8 | 4,528 + | 71 | 0.587 |
| | Trawl | Oct-Dec | 0.00 | 1.04 | 17.08 | 39.67 | 29.98 | 8.28 | 2.76 | 1.04 | 0.07 | 0.07 | 125.5 | 1,341 | 2,734 | 21.790 |
| | Trawl | Jan-Apr | 0.00 | 2.34 | 21.31 | 33.82 | 29.30 | 8.39 | 3.55 | 0.56 | 0.48 | 0.24 | 121.0 | 1,239 | 607 | 5.018 |
| | Gillnet | Oct-Dec | 0.00 | 0.00 | 1.15 | 23.14 | 54.68 | 13.77 | 5.54 | 1.53 | 0.00 | 0.19 | 153.5 | 523 + | 7 | 0.048 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.25 | 22.00 | 55.02 | 14.11 | 5.74 | 1.66 | 0.00 | 0.21 | 153.8 | 523 | 6,818 | 44.171 |
| 19790 | Seine | Oct-Dec | 0.30 | 2.02 | 42.12 | 22.71 | 18.78 | 9.35 | 2.56 | 1.54 | 0.47 | 0.15 | 114.6 | 3,063 | 1,188 | 10.051 |
| | Seine | Jan-Apr | 0.00 | 4.56 | 41.61 | 20.44 | 20.26 | 8.99 | 2.55 | 1.29 | 0.25 | 0.05 | 100.1 | 7,741 | 903 | 9.227 |
| | Seine | May- | 0.16 | 4.11 | 43.38 | 19.92 | 19.27 | 8.70 | 2.58 | 1.41 | 0.37 | 0.11 | 102.1 | 10,804 + | 52 | 0.515 |
| | Trawl | Oct-Dec | 0.00 | 3.30 | 46.70 | 22.21 | 15.90 | 8.60 | 2.01 | 1.29 | 0.00 | 0.00 | 108.4 | 698 | 242 | 2.234 |
| | Trawl | Jan-Apr | 0.00 | 3.31 | 49.04 | 22.17 | 14.65 | 7.90 | 1.78 | 1.15 | 0.00 | 0.00 | 107.1 | 785 + | 254 | 2.373 |
| | Gillnet | Oct-Dec | 0.00 | 0.00 | 1.52 | 9.89 | 44.49 | 34.22 | 8.75 | 0.76 | 0.38 | 0.00 | 148.7 | 263 + | 0 | 0.001 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.52 | 9.89 | 44.49 | 34.22 | 8.75 | 0.76 | 0.38 | 0.00 | 148.7 | 263 + | 3,177 | 21.367 |
| | Gillnet | May- | 0.00 | 0.00 | 1.52 | 9.89 | 44.49 | 34.22 | 8.75 | 0.76 | 0.38 | 0.00 | 148.7 | 263 + | 2 | 0.017 |
| 19801 | Seine | Oct-Dec | 0.00 | 4.38 | 33.94 | 34.26 | 14.82 | 8.57 | 3.14 | 0.66 | 0.21 | 0.02 | 116.5 | 6,355 | 4,152 | 34.800 |
| | Seine | Jan-Apr | 0.00 | 6.17 | 34.93 | 30.73 | 11.93 | 10.58 | 4.58 | 0.67 | 0.37 | 0.04 | 99.9 | 12,461 | 2,133 | 19.819 |
| | Seine | May- | 0.00 | 4.85 | 38.20 | 36.20 | 10.08 | 7.78 | 2.24 | 0.47 | 0.15 | 0.03 | 98.7 | 18,816 + | 80 | 0.826 |
| | Trawl | Oct-Dec | 0.26 | 4.36 | 39.15 | 29.90 | 13.16 | 7.76 | 3.57 | 1.13 | 0.61 | 0.09 | 111.0 | 1,147 | 501 | 4.510 |
| | Trawl | Jan-Apr | 0.26 | 4.36 | 39.15 | 29.90 | 13.16 | 7.76 | 3.57 | 1.13 | 0.61 | 0.09 | 111.0 | 1,147 + | 121 | 1.087 |
| | Gillnet | Jan-Apr | 0.00 | 0.09 | 2.19 | 18.16 | 22.98 | 37.37 | 16.05 | 2.81 | 0.26 | 0.09 | 152.1 | 1,140 | 5,067 | 33.319 |
| 19812 | Seine | Oct-Dec | 0.00 | 5.36 | 39.98 | 31.38 | 14.07 | 4.96 | 3.31 | 0.83 | 0.06 | 0.06 | 121.1 | 3,876 | 3,337 | 27.503 |
| | Seine | Jan-Apr | 0.00 | 7.65 | 37.90 | 23.33 | 19.46 | 4.51 | 4.57 | 2.11 | 0.40 | 0.06 | 104.8 | 5,332 | 3,324 | 30.103 |
| | Seine | May- | 0.00 | 3.86 | 35.45 | 28.47 | 21.36 | 4.56 | 4.30 | 1.74 | 0.22 | 0.04 | 106.8 | 9,208 + | 74 | 0.690 |
| | Trawl | Oct-Dec | 0.00 | 2.19 | 46.35 | 30.29 | 15.51 | 2.74 | 1.64 | 0.91 | 0.00 | 0.36 | 119.5 | 548 | 414 | 3.464 |
| | Trawl | Jan-Apr | 0.00 | 2.19 | 46.35 | 30.29 | 15.51 | 2.74 | 1.64 | 0.91 | 0.00 | 0.36 | 119.5 | 548 + | 101 | 0.843 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 4.60 | 15.77 | 30.37 | 15.82 | 20.42 | 11.58 | 1.03 | 0.41 | 150.9 | 589 | 5,583 | 37.004 |
| | Gillnet | May- | 0.00 | 0.00 | 4.58 | 15.96 | 30.56 | 15.11 | 20.88 | 11.71 | 0.85 | 0.34 | 151.6 | 589 + | 0 | 0.001 |
| 19823 | Seine | Oct-Dec | 0.00 | 3.37 | 34.06 | 30.39 | 16.43 | 8.12 | 2.93 | 3.00 | 1.43 | 0.26 | 116.0 | 5,296 | 632 | 4.809 |
| | Seine | Jan-Apr | 0.00 | 3.36 | 31.41 | 28.72 | 17.68 | 11.49 | 3.16 | 2.78 | 1.16 | 0.24 | 113.5 | 13,007 | 7,798 | 69.556 |
| | Seine | May- | 0.00 | 10.91 | 42.05 | 22.39 | 12.44 | 7.63 | 1.95 | 1.76 | 0.72 | 0.14 | 109.6 | 18,303 + | 57 | 0.568 |
| | Trawl | Oct-Dec | 0.00 | 1.59 | 19.36 | 35.99 | 17.54 | 12.07 | 3.87 | 5.01 | 3.87 | 0.68 | 144.1 | 439 | 115 | 0.797 |
| | Trawl | Jan-Apr | 0.00 | 1.59 | 19.36 | 35.99 | 17.54 | 12.07 | 3.87 | 5.01 | 3.87 | 0.68 | 144.1 | 439 | 0 | 0.000 ~ |
| | Trawl | May- | 0.00 | 1.59 | 19.36 | 35.99 | 17.54 | 12.07 | 3.87 | 5.01 | 3.87 | 0.68 | 144.1 | 439 + | 2 | 0.017 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.49 | 27.76 | 29.48 | 23.59 | 9.34 | 7.37 | 1.72 | 0.25 | 152.8 | 407 | 8,613 | 56.381 |
| 19834 | Seine | Oct-Dec | 0.21 | 19.24 | 36.34 | 21.19 | 13.02 | 6.01 | 2.80 | 0.64 | 0.34 | 0.22 | 108.4 | 3,634 | 444 | 3.882 |
| | Seine | Jan-Apr | 0.00 | 4.70 | 40.35 | 31.85 | 11.86 | 6.31 | 3.10 | 1.27 | 0.44 | 0.11 | 103.8 | 7,318 | 4,137 | 41.098 |
| | Seine | May- | 0.15 | 10.57 | 39.21 | 27.00 | 12.16 | 6.30 | 3.13 | 0.95 | 0.39 | 0.14 | 105.9 | 10,952 + | 88 | 0.843 |
| | Trawl | Oct-Dec | 0.12 | 11.35 | 38.18 | 26.45 | 12.59 | 6.62 | 3.17 | 0.95 | 0.41 | 0.16 | 106.6 | 10,952 + | 113 | 1.056 |
| | Trawl | Jan-Apr | 0.12 | 11.35 | 38.18 | 26.45 | 12.59 | 6.62 | 3.17 | 0.95 | 0.41 | 0.16 | 106.6 | 10,952 + | 214 | 2.011 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 7.14 | 30.29 | 30.95 | 19.05 | 9.39 | 1.59 | 0.66 | 0.93 | 142.9 | 756 | 6,039 | 42.246 |
| 19845 | Seine | Oct-Dec | 0.00 | 32.93 | 37.34 | 18.72 | 6.75 | 2.89 | 0.91 | 0.34 | 0.11 | 0.00 | 101.9 | 2,528 | 409 | 3.904 |
| | Seine | Jan-Apr | 0.00 | 23.09 | 43.51 | 19.33 | 8.62 | 3.55 | 1.27 | 0.55 | 0.07 | 0.00 | 90.8 | 8,187 | 2,770 | 29.011 |

Table 1.4. Age composition and catch by season, fishery and gear type for the Strait of Georgia stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | Mean | Number | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Weight | Aged | (tonnes) | (millions) |
| 19845 | Seine | May- | 0.00 | 24.05 | 45.04 | 18.72 | 7.69 | 2.83 | 1.19 | 0.42 | 0.05 | 0.01 | 90.3 | 10,715 + | 88 | 0.975 |
| | Trawl | Oct-Dec | 0.00 | 25.68 | 43.11 | 18.61 | 7.60 | 3.21 | 1.20 | 0.51 | 0.06 | 0.01 | 93.7 | 10,799 + | 20 | 0.218 |
| | Trawl | Jan-Apr | 0.00 | 25.68 | 43.11 | 18.61 | 7.60 | 3.21 | 1.20 | 0.51 | 0.06 | 0.01 | 93.7 | 10,799 + | 246 | 2.630 |
| | Gillnet | Oct-Dec | 0.00 | 0.09 | 3.10 | 26.09 | 32.48 | 23.63 | 9.22 | 3.74 | 0.82 | 0.82 | 147.4 | 1,096 + | 0 | 0.002 |
| | Gillnet | Jan-Apr | 0.00 | 0.09 | 3.10 | 26.09 | 32.48 | 23.63 | 9.22 | 3.74 | 0.82 | 0.82 | 147.4 | 1,096 | 3,495 | 23.718 |
| 19856 | Seine | Oct-Dec | 0.00 | 14.33 | 62.24 | 17.57 | 4.40 | 1.27 | 0.17 | 0.02 | 0.00 | 0.00 | 103.3 | 1,390 | 209 | 2.004 |
| | Seine | Jan-Apr | 0.01 | 9.76 | 55.76 | 24.98 | 6.45 | 2.06 | 0.80 | 0.12 | 0.08 | 0.00 | 94.7 | 6,773 | 178 | 1.844 |
| | Seine | May- | 0.05 | 13.71 | 56.73 | 21.10 | 5.75 | 1.79 | 0.70 | 0.12 | 0.06 | 0.00 | 95.2 | 8,163 + | 40 | 0.426 |
| | Trawl | Oct-Dec | 0.05 | 13.71 | 56.73 | 21.10 | 5.75 | 1.79 | 0.70 | 0.12 | 0.06 | 0.00 | 95.2 | 8,163 + | 46 | 0.481 |
| | Trawl | Jan-Apr | 0.05 | 13.71 | 56.73 | 21.10 | 5.75 | 1.79 | 0.70 | 0.12 | 0.06 | 0.00 | 95.2 | 8,163 + | 120 | 1.257 |
| | Gillnet | Oct-Dec | 0.00 | 0.00 | 2.50 | 35.62 | 33.44 | 16.51 | 8.49 | 2.60 | 0.57 | 0.26 | 145.1 | 1,920 + | 0 | 0.000 |
| 19867 | Seine | Oct-Dec | 0.10 | 23.34 | 34.77 | 30.50 | 8.84 | 1.75 | 0.46 | 0.23 | 0.00 | 0.00 | 104.8 | 1,148 | 104 | 0.984 |
| | Seine | Jan-Apr | 0.03 | 2.73 | 32.98 | 38.23 | 19.76 | 4.32 | 1.22 | 0.45 | 0.19 | 0.10 | 97.6 | 7,957 | 3,133 | 32.258 |
| | Seine | May- | 0.03 | 11.92 | 35.91 | 34.11 | 13.52 | 3.16 | 0.96 | 0.27 | 0.08 | 0.05 | 94.2 | 9,105 + | 41 | 0.431 |
| | Trawl | Jan-Apr | 0.03 | 11.82 | 33.27 | 35.95 | 14.21 | 3.23 | 0.99 | 0.34 | 0.11 | 0.05 | 98.6 | 9,105 + | 76 | 0.768 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 3.01 | 38.33 | 32.48 | 15.47 | 7.35 | 2.55 | 0.60 | 0.21 | 145.3 | 1,920 | 5,998 | 41.166 |
| 19878 | Seine | Oct-Dec | 0.41 | 6.52 | 64.47 | 14.59 | 11.38 | 1.81 | 0.55 | 0.15 | 0.11 | 0.00 | 106.4 | 1,632 | 357 | 3.386 |
| | Seine | Jan-Apr | 0.00 | 2.35 | 52.89 | 17.58 | 20.29 | 5.27 | 1.31 | 0.21 | 0.10 | 0.00 | 104.0 | 6,338 | 1,475 | 13.516 |
| | Seine | May- | 0.07 | 4.82 | 61.90 | 14.59 | 13.99 | 3.51 | 0.87 | 0.18 | 0.06 | 0.00 | 99.7 | 7,970 + | 33 | 0.333 |
| | Trawl | Oct-Dec | 0.06 | 4.74 | 61.47 | 14.71 | 14.27 | 3.60 | 0.90 | 0.19 | 0.06 | 0.00 | 100.5 | 7,970 + | 83 | 0.826 |
| | Trawl | Jan-Apr | 0.06 | 4.74 | 61.47 | 14.71 | 14.27 | 3.60 | 0.90 | 0.19 | 0.06 | 0.00 | 100.5 | 7,970 + | 279 | 2.773 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 9.20 | 14.81 | 47.81 | 20.09 | 5.27 | 2.24 | 0.34 | 0.22 | 144.4 | 891 | 5,988 | 41.461 |
| 19889 | Seine | Oct-Dec | 0.00 | 26.15 | 17.44 | 42.75 | 6.77 | 5.90 | 0.82 | 0.16 | 0.00 | 0.00 | 109.1 | 1,252 | 728 | 6.660 |
| | Seine | Jan-Apr | 0.00 | 12.31 | 15.17 | 51.91 | 10.87 | 7.93 | 1.48 | 0.27 | 0.04 | 0.03 | 104.6 | 6,517 | 1,446 | 13.339 |
| | Seine | May- | 0.01 | 12.64 | 17.97 | 51.78 | 8.95 | 6.86 | 1.47 | 0.28 | 0.03 | 0.01 | 102.2 | 7,769 + | 56 | 0.547 |
| | Trawl | Oct-Dec | 0.01 | 12.64 | 17.97 | 51.78 | 8.95 | 6.86 | 1.47 | 0.28 | 0.03 | 0.01 | 102.2 | 7,769 + | 134 | 1.308 |
| | Trawl | Jan-Apr | 0.01 | 12.64 | 17.97 | 51.78 | 8.95 | 6.86 | 1.47 | 0.28 | 0.03 | 0.01 | 102.2 | 7,769 + | 86 | 0.844 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.60 | 40.43 | 21.42 | 26.02 | 7.99 | 2.26 | 0.28 | 0.00 | 140.3 | 823 | 5,919 | 42.236 |
| 19890 | Seine | Oct-Dec | 0.00 | 6.68 | 58.62 | 12.72 | 17.67 | 2.26 | 2.05 | 0.00 | 0.00 | 0.00 | 101.3 | 928 | 75 | 0.736 |
| | Seine | Jan-Apr | 0.00 | 10.09 | 57.87 | 8.23 | 17.43 | 3.59 | 2.27 | 0.40 | 0.07 | 0.06 | 100.2 | 5,915 | 96 | 0.936 |
| | Seine | May- | 0.00 | 7.51 | 56.71 | 11.25 | 19.33 | 2.97 | 1.81 | 0.34 | 0.06 | 0.01 | 97.4 | 6,843 + | 62 | 0.632 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 8.93 | 11.71 | 56.04 | 12.10 | 9.44 | 1.41 | 0.30 | 0.06 | 141.6 | 1,371 | 7,886 | 55.630 |
| 19901 | Seine | Oct-Dec | 0.00 | 13.89 | 31.24 | 38.58 | 7.67 | 7.42 | 1.04 | 0.16 | 0.00 | 0.00 | 107.5 | 698 | 371 | 3.440 |
| | Seine | Jan-Apr | 0.00 | 3.82 | 21.09 | 44.52 | 10.27 | 16.08 | 2.48 | 1.47 | 0.24 | 0.03 | 109.4 | 5,291 | 1,141 | 10.217 |
| | Seine | May- | 0.00 | 10.74 | 23.31 | 39.87 | 8.80 | 13.78 | 2.05 | 1.27 | 0.17 | 0.02 | 108.1 | 5,989 + | 58 | 0.541 |
| | Trawl | Oct-Dec | 0.00 | 10.74 | 23.31 | 39.87 | 8.80 | 13.78 | 2.05 | 1.27 | 0.17 | 0.02 | 108.1 | 5,989 + | 122 | 1.133 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.29 | 28.15 | 17.20 | 40.11 | 7.27 | 4.69 | 1.20 | 0.09 | 146.0 | 1,087 | 9,410 | 64.461 |
| 19912 | Seine | Oct-Dec | 0.00 | 4.17 | 70.00 | 15.26 | 8.56 | 1.12 | 0.45 | 0.45 | 0.00 | 0.00 | 102.5 | 890 | 916 | 8.886 |
| | Seine | Jan-Apr | 0.00 | 3.62 | 53.63 | 14.96 | 17.44 | 4.04 | 5.34 | 0.59 | 0.38 | 0.00 | 105.6 | 5,036 | 3,725 | 34.318 |
| | Seine | May- | 0.00 | 4.96 | 57.49 | 13.77 | 15.39 | 3.10 | 4.44 | 0.56 | 0.27 | 0.02 | 103.9 | 5,926 + | 57 | 0.551 |
| | Trawl | Oct-Dec | 0.00 | 4.96 | 57.49 | 13.77 | 15.39 | 3.10 | 4.44 | 0.56 | 0.27 | 0.02 | 103.9 | 5,926 + | 128 | 1.231 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 6.33 | 14.88 | 43.63 | 11.72 | 18.91 | 2.65 | 1.45 | 0.43 | 147.6 | 1,169 | 8,870 | 60.081 |
| 19923 | Seine | Oct-Dec | 0.00 | 26.95 | 31.11 | 31.47 | 6.97 | 2.56 | 0.26 | 0.58 | 0.11 | 0.00 | 98.6 | 973 | 516 | 5.272 |
| | Seine | Jan-Apr | 0.00 | 11.22 | 39.18 | 33.15 | 7.57 | 5.77 | 1.37 | 1.63 | 0.06 | 0.06 | 101.3 | 5,540 | 4,396 | 42.070 |
| | Seine | May- | 0.00 | 16.64 | 36.82 | 31.52 | 6.85 | 5.40 | 1.21 | 1.38 | 0.14 | 0.03 | 99.5 | 6,513 + | 96 | 0.969 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 11.47 | 40.02 | 16.98 | 21.61 | 4.08 | 5.40 | 0.22 | 0.22 | 137.9 | 907 | 8,733 | 63.326 |
| 19934 | Seine | Oct-Dec | 0.00 | 7.53 | 51.43 | 24.01 | 14.52 | 1.61 | 0.90 | 0.00 | 0.00 | 0.00 | 99.0 | 558 | 957 | 9.662 |
| | Seine | Jan-Apr | 0.02 | 3.72 | 42.96 | 26.98 | 19.34 | 3.70 | 2.65 | 0.53 | 0.13 | 0.00 | 97.2 | 5,969 | 5,138 | 52.868 |
| | Seine | May- | 0.02 | 4.92 | 42.98 | 26.47 | 18.40 | 3.78 | 2.65 | 0.64 | 0.14 | 0.00 | 97.3 | 6,527 + | 71 | 0.732 |
| | Gillnet | Jan-Apr | 0.00 | 0.07 | 3.65 | 25.26 | 44.78 | 15.21 | 7.83 | 2.42 | 0.62 | 0.16 | 133.7 | 1,201 | 11,572 | 86.661 |
| 19945 | Seine | Oct-Dec | 0.00 | 20.87 | 27.81 | 36.05 | 10.01 | 4.44 | 0.68 | 0.11 | 0.00 | 0.02 | 102.9 | 1,130 | 604 | 5.865 |
| | Seine | Jan-Apr | 0.00 | 7.09 | 21.21 | 37.04 | 18.67 | 11.51 | 2.92 | 1.13 | 0.35 | 0.08 | 109.9 | 5,754 | 4,362 | 38.991 |
| | Seine | May- | 0.00 | 11.65 | 22.69 | 35.69 | 16.39 | 9.89 | 2.37 | 0.93 | 0.29 | 0.10 | 107.9 | 6,884 + | 35 | 0.328 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 2.10 | 27.82 | 38.15 | 24.14 | 5.10 | 2.10 | 0.30 | 0.30 | 139.6 | 927 | 8,190 | 58.655 |
| 19956 | Seine | Oct-Dec | 0.49 | 29.31 | 46.92 | 11.70 | 8.84 | 1.78 | 0.87 | 0.08 | 0.00 | 0.00 | 85.9 | 1,662 | 397 | 4.650 |
| | Seine | Jan-Apr | 0.06 | 9.29 | 47.72 | 15.20 | 15.88 | 6.74 | 3.87 | 0.86 | 0.27 | 0.11 | 98.2 | 8,243 | 7,434 | 73.620 |
| | Seine | May- | 0.08 | 14.92 | 48.51 | 13.72 | 13.62 | 5.27 | 3.01 | 0.61 | 0.19 | 0.07 | 95.1 | 9,905 + | 10 | 0.106 |
| | Trawl | Oct-Dec | 0.08 | 14.92 | 48.51 | 13.72 | 13.62 | 5.27 | 3.01 | 0.61 | 0.19 | 0.07 | 95.1 | 9,905 + | 39 | 0.406 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 4.05 | 15.87 | 44.53 | 22.08 | 10.30 | 2.11 | 0.84 | 0.21 | 138.2 | 544 | 6,233 | 45.214 |
| 19967 | Seine | Oct-Dec | 3.29 | 9.71 | 54.01 | 21.40 | 5.31 | 5.27 | 2.24 | 1.24 | 0.14 | 0.16 | 88.1 | 7,667 + | 279 | 3.120 |
| | Seine | Jan-Apr | 0.00 | 5.52 | 51.35 | 24.45 | 6.54 | 7.43 | 2.84 | 1.70 | 0.12 | 0.04 | 88.8 | 7,297 | 9,390 | 96.287 |
| | Seine | May- | 0.65 | 8.74 | 52.26 | 22.45 | 5.78 | 6.09 | 2.41 | 1.42 | 0.13 | 0.07 | 91.7 | 7,667 + | 7 | 0.071 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 4.74 | 17.85 | 16.43 | 31.91 | 17.06 | 8.53 | 2.53 | 0.95 | 136.7 | 633 | 6,148 | 44.974 |
| 19978 | Seine | Oct-Dec | 0.00 | 3.96 | 48.07 | 40.23 | 6.40 | 0.91 | 0.34 | 0.08 | 0.00 | 0.00 | 86.1 | 1,288 | 954 | 11.072 |
| | Seine | Jan-Apr | 0.02 | 2.93 | 47.03 | 31.80 | 12.25 | 2.90 | 2.14 | 0.70 | 0.21 | 0.03 | 86.8 | 5,837 | 5,755 | 66.260 |
| | Trawl | Jan-Apr | 0.00 | 7.01 | 45.19 | 37.03 | 8.16 | 1.14 | 0.98 | 0.16 | 0.33 | 0.00 | 74.3 | 613 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 2.10 | 28.16 | 29.30 | 14.83 | 17.07 | 6.12 | 1.64 | 0.79 | 125.7 | 1,398 | 9,785 | 75.940 |
| 19989 | Seine | Oct-Dec | 0.17 | 12.30 | 27.77 | 43.17 | 13.35 | 2.74 | 0.37 | 0.13 | 0.00 | 0.00 | 91.3 | 1,297 | 1,471 | 16.123 |
| | Seine | Jan-Apr | 0.00 | 4.23 | 22.78 | 45.02 | 18.55 | 6.58 | 1.88 | 0.78 | 0.13 | 0.06 | 100.0 | 3,192 | 4,976 | 49.748 |
| | Trawl | Jan-Apr | 0.00 | 5.49 | 31.87 | 30.77 | 21.98 | 7.69 | 1.10 | 0.00 | 1.10 | 0.00 | 92.3 | 91 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 2.15 | 29.31 | 36.72 | 21.05 | 6.70 | 3.35 | 0.60 | 0.12 | 130.8 | 836 | 6,863 | 52.450 |
| 19990 | Seine | Oct-Dec | 0.00 | 21.12 | 50.16 | 16.69 | 8.74 | 2.39 | 0.89 | 0.00 | 0.00 | 0.00 | 75.0 | 1,077 | 1,156 | 15.363 |
| | Seine | Jan-Apr | 0.10 | 9.62 | 35.44 | 19.34 | 23.92 | 8.81 | 2.12 | 0.36 | 0.28 | 0.02 | 92.2 | 5,042 | 6,454 | 69.961 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.08 | 14.00 | 44.71 | 28.42 | 9.40 | 1.99 | 0.39 | 0.00 | 134.4 | 1,179 | 7,594 | 56.373 |
| 20001 | Seine | Oct-Dec | 0.00 | 9.66 | 51.94 | 27.98 | 5.52 | 3.51 | 1.25 | 0.00 | 0.13 | 0.00 | 95.6 | 797 | 1,423 | 14.897 |
| | Seine | Jan-Apr | 0.00 | 4.80 | 42.65 | 30.65 | 9.52 | 9.19 | 2.52 | 0.55 | 0.09 | 0.02 | 97.3 | 4,558 | 7,276 | 74.777 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 3.32 | 18.08 | 25.60 | 34.42 | 15.05 | 2.78 | 0.46 | 0.29 | 133.4 | 1,027 | 7,683 | 57.592 |
| 20012 | Seine | Oct-Dec | 0.00 | 4.96 | 61.42 | 26.19 | 5.93 | 0.97 | 0.32 | 0.11 | 0.00 | 0.11 | 87.0 | 928 | 1,328 | 15.265 |
| | Seine | Jan-Apr | 0.00 | 6.59 | 49.18 | 27.04 | 12.45 | 2.35 | 1.99 | 0.40 | 0.00 | 0.00 | 87.7 | 4,475 | 9,299 | 106.016 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 5.58 | 21.25 | 30.62 | 17.31 | 20.59 | 3.92 | 0.50 | 0.23 | 131.8 | 915 | 7,986 | 60.707 |

Table 1.4. Age composition and catch by season, fishery and gear type for the Strait of Georgia stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | Mean | Number | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Weight | Aged | (tonnes) | (millions) |
| 20023 | Seine | Oct-Dec | 0.00 | 2.80 | 44.16 | 42.29 | 8.41 | 2.10 | 0.23 | 0.00 | 0.00 | 0.00 | 91.9 | 428 | 1,696 | 18.466 |
| | Seine | Jan-Apr | 0.01 | 2.67 | 42.62 | 36.58 | 12.64 | 4.03 | 0.93 | 0.41 | 0.10 | 0.00 | 87.2 | 7,293 | 10,600 | 121.507 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 2.29 | 22.23 | 31.51 | 23.72 | 9.98 | 7.15 | 2.55 | 0.57 | 131.1 | 1,311 | 8,083 | 61.493 |
| 20034 | Seine | Oct-Dec | 0.00 | 11.24 | 30.77 | 40.04 | 14.00 | 3.55 | 0.39 | 0.00 | 0.00 | 0.00 | 83.1 | 507 | 1,356 | 16.316 |
| | Seine | Jan-Apr | 0.00 | 2.90 | 25.39 | 41.55 | 22.29 | 5.65 | 1.54 | 0.43 | 0.25 | 0.00 | 83.1 | 1,707 | 7,019 | 79.434 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.73 | 21.37 | 37.01 | 23.99 | 11.75 | 2.51 | 1.49 | 0.14 | 124.0 | 1,185 | 5,226 | 41.623 |
| 20045 | Seine | Oct-Dec | 0.05 | 9.02 | 31.32 | 28.33 | 20.85 | 7.92 | 1.94 | 0.44 | 0.10 | 0.03 | 87.7 | 5,135 + | 1,332 | 15.157 |
| | Seine | Jan-Apr | 0.00 | 4.00 | 23.82 | 31.66 | 28.26 | 8.73 | 2.30 | 0.85 | 0.28 | 0.09 | 95.6 | 3,174 | 7,929 | 82.945 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.79 | 12.47 | 46.19 | 25.12 | 10.31 | 3.68 | 1.26 | 0.18 | 131.1 | 773 | 8,954 | 68.338 |
| 20056 | Seine | Oct-Dec | 0.33 | 23.95 | 30.75 | 23.55 | 11.93 | 7.30 | 1.88 | 0.83 | 0.31 | 0.01 | 79.5 | 4,891 + | 1,371 | 17.913 |
| | Seine | Jan-Apr | 0.07 | 17.00 | 24.96 | 24.50 | 18.89 | 11.01 | 2.44 | 0.88 | 0.21 | 0.03 | 80.8 | 4,195 | 9,308 | 110.245 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.69 | 12.90 | 33.91 | 33.26 | 15.08 | 3.24 | 0.85 | 0.08 | 129.8 | 810 | 7,277 | 56.068 |
| 20067 | Seine | Oct-Dec | 0.00 | 2.66 | 48.04 | 26.57 | 12.82 | 5.96 | 3.01 | 0.68 | 0.23 | 0.03 | 84.9 | 6,122 + | 672 | 7.770 |
| | Seine | Jan-Apr | 0.00 | 1.71 | 48.41 | 27.05 | 12.84 | 5.93 | 3.12 | 0.71 | 0.20 | 0.02 | 83.9 | 5,809 | 3,865 | 45.134 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 4.80 | 13.95 | 28.09 | 27.34 | 19.06 | 5.14 | 1.36 | 0.26 | 125.2 | 2,645 | 5,286 | 42.169 |
| 20078 | Seine | Oct-Dec | 0.12 | 15.45 | 10.56 | 55.62 | 14.50 | 2.89 | 0.61 | 0.12 | 0.12 | 0.00 | 74.8 | 933 | 1,136 | 14.517 |
| | Seine | Jan-Apr | 0.00 | 0.25 | 7.14 | 65.12 | 16.73 | 6.27 | 3.01 | 1.20 | 0.25 | 0.04 | 88.0 | 2,761 | 6,046 | 68.731 |
| | Gillnet | Jan-Apr | 0.00 | 0.01 | 1.24 | 41.78 | 23.94 | 17.99 | 10.43 | 3.29 | 1.28 | 0.05 | 111.0 | 1,866 | 2,752 | 24.624 |
| 20089 | Seine | Oct-Dec | 0.00 | 0.69 | 73.58 | 15.82 | 7.88 | 1.64 | 0.29 | 0.09 | 0.01 | 0.00 | 65.0 | 4,964 + | 547 | 8.708 |
| | Seine | Jan-Apr | 0.00 | 0.47 | 66.60 | 14.39 | 12.67 | 4.08 | 1.15 | 0.40 | 0.24 | 0.00 | 74.8 | 2,967 | 5,685 | 76.005 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 4.79 | 7.18 | 53.14 | 18.93 | 11.29 | 3.31 | 1.25 | 0.11 | 122.7 | 877 | 3,937 | 32.095 |

NOTE: * No biosample data available. Age composition and mean weight assigned from published reports.
+ Age composition calculated from biosample data aggregated from adjacent sections and/or fishery periods, by gear type.
~ No fishery openings this season. Age composition and mean weight obtained from pre-fishery charter

Table 1.5. Age composition and catch by season, fishery and gear type for the West Coast Vancouver Island stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | Mean | Number | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Weight | Aged | (tonnes) | (millions) |
| 19501 | Seine | Oct-Dec | 0.10 | 15.78 | 39.08 | 37.78 | 5.35 | 1.56 | 0.26 | 0.05 | 0.05 | 0.00 | 96.8 | 1,927 | 7,670 | 79.266 |
| | Seine | Jan-Apr | 0.00 | 10.19 | 36.69 | 43.89 | 7.69 | 1.25 | 0.30 | 0.00 | 0.00 | 0.00 | 99.3 | 2,112 | 14,151 | 143.353 |
| 19512 | Seine | Oct-Dec | 0.11 | 6.62 | 61.99 | 20.85 | 9.27 | 0.89 | 0.27 | 0.00 | 0.00 | 0.00 | 98.9 | 996 | 8,251 | 83.215 |
| | Seine | Jan-Apr | 0.00 | 0.33 | 12.08 | 27.32 | 50.77 | 6.88 | 2.08 | 0.48 | 0.06 | 0.00 | 123.8 | 3,897 | 18,757 | 146.019 |
| 19523 | Seine | Jan-Apr | 0.16 | 11.77 | 57.76 | 28.08 | 1.67 | 0.50 | 0.05 | 0.00 | 0.00 | 0.00 | 82.4 | 3,764 | 20 | 0.242 |
| 19534 | Seine | Oct-Dec | 0.05 | 1.61 | 61.40 | 29.42 | 6.70 | 0.59 | 0.12 | 0.12 | 0.00 | 0.00 | 95.6 | 3,655 | 23,534 | 245.938 |
| | Seine | Jan-Apr | 0.00 | 4.43 | 65.53 | 24.81 | 4.06 | 0.83 | 0.21 | 0.04 | 0.04 | 0.04 | 87.2 | 2,439 | 9,675 | 109.814 |
| 19545 | Seine | Oct-Dec | 0.06 | 19.64 | 57.81 | 18.59 | 3.27 | 0.64 | 0.00 | 0.00 | 0.00 | 0.00 | 87.6 | 1,723 | 4,650 | 53.117 |
| | Seine | Jan-Apr | 0.00 | 10.86 | 65.09 | 20.01 | 3.47 | 0.52 | 0.05 | 0.00 | 0.00 | 0.00 | 80.9 | 754 | 1,473 | 18.369 |
| 19556 | Seine | Oct-Dec | 0.00 | 13.43 | 67.98 | 14.82 | 3.09 | 0.50 | 0.16 | 0.02 | 0.00 | 0.00 | 87.4 | 3,730 | 15,310 | 175.972 |
| | Seine | Jan-Apr | 0.00 | 9.21 | 49.51 | 19.28 | 17.88 | 3.68 | 0.11 | 0.11 | 0.22 | 0.00 | 87.2 | 923 | 1,787 | 20.496 |
| 19567 | Seine | Oct-Dec | 0.00 | 2.86 | 71.84 | 24.69 | 0.41 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 86.4 | 490 + | 1,690 | 19.549 |
| | Seine | Jan-Apr | 0.00 | 2.74 | 71.92 | 24.81 | 0.35 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 | 86.4 | 588 + | 915 | 10.586 |
| | Seine | May- | 0.00 | 2.72 | 71.94 | 24.83 | 0.34 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 86.4 | 588 + | 8 | 0.088 |
| 19578 | Seine | Jan-Apr | 0.00 | 15.18 | 54.28 | 25.87 | 3.98 | 0.47 | 0.17 | 0.04 | 0.01 | 0.00 | 76.8 | 1,480 | 513 | 6.766 |
| | Seine | May- | 0.00 | 13.04 | 52.03 | 25.41 | 5.47 | 2.30 | 1.35 | 0.34 | 0.07 | 0.00 | 78.3 | 1,480 + | 43 | 0.551 |
| 19589 | Seine | Oct-Dec | 0.00 | 3.26 | 45.21 | 29.96 | 14.51 | 3.46 | 1.82 | 1.45 | 0.33 | 0.00 | 92.2 | 2,843 | 55,196 | 588.911 |
| | Seine | Jan-Apr | 0.00 | 3.28 | 19.68 | 23.88 | 26.94 | 9.15 | 7.94 | 6.52 | 1.99 | 0.62 | 99.6 | 751 | 13,845 | 136.204 |
| | Gillnet | Jan-Apr | 0.00 | 10.00 | 58.10 | 9.50 | 19.00 | 2.60 | 0.50 | 0.20 | 0.10 | 0.00 | 97.6 | 0 * | 182 | 1.868 |
| 19590 | Seine | Oct-Dec | 0.00 | 8.92 | 54.85 | 23.26 | 8.64 | 2.81 | 0.95 | 0.35 | 0.14 | 0.07 | 95.7 | 2,846 | 53,911 | 563.328 |
| | Seine | Jan-Apr | 0.00 | 8.92 | 54.85 | 23.26 | 8.64 | 2.81 | 0.95 | 0.35 | 0.14 | 0.07 | 95.7 | 2,846 | 0 | 0.000 ~ |
| 19601 | Seine | Oct-Dec | 0.00 | 38.31 | 37.97 | 19.15 | 4.41 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 85.5 | 590 + | 16,711 | 195.384 |
| | Seine | Jan-Apr | 0.00 | 38.31 | 37.97 | 19.15 | 4.41 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 85.5 | 590 + | 9,679 | 113.162 |
| | Seine | May- | 0.00 | 38.31 | 37.97 | 19.15 | 4.41 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 85.5 | 590 + | 44 | 0.520 |
| 19612 | Seine | Oct-Dec | 0.00 | 4.82 | 82.29 | 9.63 | 2.41 | 0.86 | 0.00 | 0.00 | 0.00 | 0.00 | 93.2 | 1,163 + | 5,951 | 63.821 |
| | Seine | Jan-Apr | 0.00 | 5.32 | 80.46 | 10.07 | 3.10 | 1.05 | 0.00 | 0.00 | 0.00 | 0.00 | 92.8 | 1,117 | 17,710 | 190.890 |
| | Trawl | Jan-Apr | 0.00 | 4.82 | 82.29 | 9.63 | 2.41 | 0.86 | 0.00 | 0.00 | 0.00 | 0.00 | 93.2 | 1,163 + | 24 | 0.253 |
| 19623 | Seine | Oct-Dec | 0.00 | 1.99 | 43.18 | 48.71 | 5.16 | 0.75 | 0.21 | 0.00 | 0.00 | 0.00 | 101.3 | 1,862 + | 3,184 | 31.449 |
| | Seine | Jan-Apr | 0.00 | 2.47 | 41.39 | 49.75 | 5.41 | 0.71 | 0.27 | 0.00 | 0.00 | 0.00 | 101.0 | 1,633 | 15,022 | 148.723 |
| 19634 | Seine | Oct-Dec | 0.00 | 1.64 | 60.61 | 25.86 | 10.83 | 0.77 | 0.29 | 0.00 | 0.00 | 0.00 | 103.4 | 1,107 + | 2,952 | 28.550 |
| | Seine | Jan-Apr | 0.00 | 0.95 | 65.05 | 22.91 | 10.00 | 0.85 | 0.25 | 0.00 | 0.00 | 0.00 | 101.0 | 769 | 18,313 | 182.208 |
| 19645 | Seine | Oct-Dec | 0.00 | 2.78 | 34.38 | 48.44 | 10.07 | 3.99 | 0.35 | 0.00 | 0.00 | 0.00 | 122.5 | 576 + | 68 | 0.553 |
| | Seine | Jan-Apr | 0.00 | 2.78 | 34.37 | 48.44 | 10.07 | 3.99 | 0.35 | 0.00 | 0.00 | 0.00 | 122.5 | 576 | 10,397 | 84.858 |
| | Seine | May- | 0.00 | 2.78 | 34.37 | 48.44 | 10.07 | 3.99 | 0.35 | 0.00 | 0.00 | 0.00 | 122.5 | 576 + | 5,582 | 45.559 |
| 19656 | Seine | Oct-Dec | 0.00 | 13.59 | 26.83 | 26.12 | 23.17 | 9.07 | 1.23 | 0.00 | 0.00 | 0.00 | 137.0 | 0 * | 4,299 | 31.377 |
| | Seine | Jan-Apr | 0.00 | 13.59 | 26.83 | 26.12 | 23.17 | 9.07 | 1.23 | 0.00 | 0.00 | 0.00 | 137.0 | 0 * | 6,471 | 47.228 |
| | Seine | May- | 0.00 | 13.59 | 26.83 | 26.12 | 23.17 | 9.07 | 1.23 | 0.00 | 0.00 | 0.00 | 137.0 | 0 * | 73 | 0.535 |
| 19667 | Seine | Oct-Dec | 0.00 | 12.86 | 60.28 | 20.52 | 4.84 | 1.15 | 0.18 | 0.01 | 0.02 | 0.00 | 114.9 | 0 * | 2,965 | 25.811 |
| | Seine | Jan-Apr | 0.00 | 12.86 | 60.28 | 20.52 | 4.84 | 1.15 | 0.18 | 0.01 | 0.02 | 0.00 | 114.9 | 0 * | 9,794 | 85.253 |
| | Seine | May- | 0.00 | 12.86 | 60.28 | 20.52 | 4.84 | 1.15 | 0.18 | 0.01 | 0.02 | 0.00 | 114.9 | 0 * | 2,385 | 20.760 |
| 19701 | Seine | Jan-Apr | 0.00 | 5.77 | 44.57 | 36.95 | 7.85 | 2.77 | 1.62 | 0.46 | 0.00 | 0.00 | 132.8 | 433 | 0 | 0.000 ~ |
| 19712 | Seine | Jan-Apr | 0.00 | 3.66 | 19.01 | 50.10 | 21.81 | 3.39 | 1.23 | 0.79 | 0.03 | 0.00 | 135.3 | 1,482 | 6,894 | 51.001 |
| 19723 | Seine | Jan-Apr | 0.00 | 0.21 | 25.15 | 23.05 | 35.64 | 13.81 | 1.89 | 0.17 | 0.08 | 0.00 | 139.1 | 2,556 | 16,766 | 117.326 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 8.81 | 23.56 | 51.44 | 12.23 | 3.06 | 0.72 | 0.18 | 0.00 | 159.4 | 556 | 1,537 | 9.642 |
| 19734 | Seine | Jan-Apr | 0.00 | 5.71 | 43.66 | 22.09 | 15.14 | 10.96 | 2.32 | 0.12 | 0.00 | 0.00 | 114.9 | 5,221 | 12,394 | 109.083 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 29.87 | 27.92 | 27.92 | 10.39 | 3.90 | 0.00 | 0.00 | 0.00 | 133.5 | 154 + | 3,940 | 29.517 |
| 19745 | Seine | Jan-Apr | 0.02 | 0.44 | 51.61 | 19.95 | 12.00 | 8.70 | 5.71 | 1.38 | 0.18 | 0.00 | 124.6 | 10,038 | 17,798 | 142.327 |
| | Trawl | Jan-Apr | 0.02 | 0.60 | 53.85 | 19.75 | 11.36 | 8.01 | 4.96 | 1.28 | 0.17 | 0.01 | 122.5 | 10,038 + | 0 | 0.004 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 2.90 | 32.37 | 36.51 | 19.92 | 7.88 | 0.41 | 0.00 | 0.00 | 169.0 | 241 + | 8,310 | 49.159 |
| 19756 | Seine | Jan-Apr | 0.00 | 0.20 | 8.31 | 48.06 | 19.79 | 12.97 | 7.65 | 2.57 | 0.43 | 0.00 | 140.0 | 9,230 | 22,820 | 162.893 |
| | Trawl | Jan-Apr | 0.00 | 0.47 | 14.55 | 54.46 | 18.78 | 6.10 | 5.16 | 0.47 | 0.00 | 0.00 | 131.6 | 213 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.68 | 41.72 | 34.00 | 14.77 | 5.92 | 2.50 | 0.33 | 0.08 | 150.2 | 1,199 | 16,005 | 106.418 |
| 19767 | Seine | Jan-Apr | 0.00 | 0.39 | 11.51 | 32.16 | 38.00 | 12.43 | 3.89 | 1.42 | 0.16 | 0.03 | 136.7 | 6,684 | 17,463 | 126.700 |
| | Gillnet | Jan-Apr | 0.00 | 0.60 | 3.61 | 17.47 | 43.37 | 16.87 | 11.14 | 5.12 | 1.51 | 0.30 | 154.2 | 332 + | 12,556 | 81.452 |
| | Gillnet | May- | 0.00 | 0.60 | 3.61 | 17.47 | 43.37 | 16.87 | 11.14 | 5.12 | 1.51 | 0.30 | 154.2 | 332 + | 24 | 0.154 |
| 19778 | Seine | Oct-Dec | 0.00 | 0.00 | 31.00 | 23.75 | 15.00 | 22.50 | 4.25 | 1.50 | 1.00 | 1.00 | 127.3 | 400 | 303 | 2.379 |
| | Seine | Jan-Apr | 0.00 | 0.77 | 39.43 | 18.78 | 16.78 | 18.80 | 4.14 | 1.10 | 0.17 | 0.04 | 109.2 | 7,454 | 7,615 | 67.761 |
| | Seine | May- | 0.00 | 0.80 | 41.49 | 19.07 | 15.66 | 17.60 | 3.85 | 1.18 | 0.23 | 0.11 | 111.9 | 7,854 + | 7 | 0.066 |
| | Trawl | Oct-Dec | 0.00 | 0.80 | 41.63 | 19.02 | 15.66 | 17.52 | 3.85 | 1.18 | 0.23 | 0.11 | 111.8 | 7,898 + | 51 | 0.456 |
| 19778 | Trawl | Jan-Apr | 0.00 | 0.80 | 41.63 | 19.02 | 15.66 | 17.52 | 3.85 | 1.18 | 0.23 | 0.11 | 111.8 | 7,898 + | 3 | 0.023 |
| | Trawl | May- | 0.00 | 0.80 | 41.63 | 19.02 | 15.66 | 17.52 | 3.85 | 1.18 | 0.23 | 0.11 | 111.8 | 7,898 + | 11 | 0.101 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.42 | 5.45 | 21.33 | 49.05 | 17.54 | 4.74 | 0.24 | 0.24 | 157.6 | 422 | 14,755 | 93.615 |
| 19789 | Seine | Oct-Dec | 0.00 | 0.81 | 13.91 | 50.09 | 14.23 | 10.79 | 7.94 | 1.60 | 0.52 | 0.11 | 124.5 | 3,689 + | 70 | 0.563 |
| | Seine | Jan-Apr | 0.00 | 1.07 | 14.94 | 51.51 | 13.82 | 9.87 | 7.04 | 1.43 | 0.26 | 0.06 | 123.1 | 3,689 | 10,473 | 86.211 |
| | Seine | May- | 0.00 | 0.81 | 13.91 | 50.09 | 14.23 | 10.79 | 7.94 | 1.60 | 0.52 | 0.11 | 124.5 | 3,689 + | 4 | 0.032 |
| | Trawl | Oct-Dec | 0.00 | 0.81 | 13.91 | 50.09 | 14.23 | 10.79 | 7.94 | 1.60 | 0.52 | 0.11 | 124.5 | 3,689 + | 9 | 0.073 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.05 | 24.79 | 28.57 | 23.74 | 18.07 | 3.15 | 0.42 | 0.21 | 161.5 | 476 | 8,138 | 50.388 |
| 19790 | Seine | Jan-Apr | 0.00 | 7.13 | 37.93 | 13.75 | 20.24 | 8.99 | 8.11 | 3.14 | 0.48 | 0.23 | 110.8 | 3,735 | 1,682 | 14.641 |
| | Seine | May- | 0.00 | 6.21 | 43.91 | 15.58 | 20.00 | 6.37 | 5.30 | 2.20 | 0.35 | 0.08 | 108.2 | 3,735 + | 0 | 0.000 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 5.31 | 52.51 | 22.35 | 12.01 | 7.26 | 0.28 | 0.28 | 163.6 | 358 + | 2,300 | 14.061 |
| 19801 | Seine | Jan-Apr | 0.00 | 3.89 | 32.52 | 33.31 | 10.62 | 13.65 | 4.07 | 1.51 | 0.37 | 0.05 | 116.1 | 5,026 | 5,008 | 44.277 |
| | Seine | May- | 0.00 | 2.83 | 27.39 | 22.26 | 14.13 | 17.84 | 8.83 | 4.77 | 1.41 | 0.53 | 133.6 | 566 | 2 | 0.015 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.78 | 21.00 | 14.95 | 36.30 | 18.86 | 7.12 | 0.00 | 0.00 | 148.6 | 281 + | 3,079 | 20.725 |
| 19812 | Seine | Jan-Apr | 0.00 | 4.32 | 24.84 | 28.55 | 22.53 | 5.50 | 7.92 | 3.73 | 2.04 | 0.58 | 120.4 | 4,775 | 2,370 | 19.713 |
| | Seine | May- | 0.00 | 3.27 | 23.96 | 27.41 | 26.05 | 5.45 | 9.51 | 2.72 | 1.36 | 0.27 | 115.9 | 4,775 + | 2 | 0.013 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.70 | 12.02 | 44.25 | 11.67 | 27.53 | 3.31 | 0.35 | 0.17 | 137.0 | 574 | 3,115 | 22.741 |
| 19823 | Seine | Jan-Apr | 0.00 | 3.83 | 19.37 | 23.62 | 23.39 | 16.69 | 4.60 | 5.45 | 1.50 | 1.55 | 131.3 | 3,188 | 6,141 | 45.840 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.35 | 14.19 | 23.82 | 44.83 | 6.48 | 9.81 | 0.35 | 0.18 | 137.8 | 571 | 2,434 | 17.662 |
| 19834 | Seine | Jan-Apr | 0.00 | 23.09 | 37.97 | 13.00 | 8.86 | 9.48 | 5.52 | 0.88 | 1.00 | 0.19 | 114.9 | 3,079 | 5,718 | 49.965 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.68 | 6.72 | 17.98 | 32.61 | 31.93 | 5.38 | 3.36 | 0.34 | 154.9 | 595 | 858 | 5.540 |

Table 1.5. Age composition and catch by season, fishery and gear type for the West Coast Vancouver Island stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | Mean | Number | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Weight | Aged | (tonnes) | (millions) |
| 19845 | Seine | Jan-Apr | 0.00 | 6.28 | 48.74 | 22.86 | 6.40 | 5.12 | 6.21 | 3.47 | 0.37 | 0.55 | 120.1 | 2,995 | 177 | 1.352 |
| | Seine | May- | 0.00 | 20.47 | 53.62 | 14.22 | 3.71 | 2.74 | 3.17 | 1.70 | 0.13 | 0.23 | 109.0 | 2,995 + | 1 | 0.008 |
| 19856 | Seine | Oct-Dec | 0.00 | 3.78 | 50.45 | 29.70 | 8.29 | 3.13 | 2.24 | 1.76 | 0.58 | 0.07 | 121.5 | 4,151 + | 1 | 0.005 |
| | Seine | Jan-Apr | 0.00 | 3.86 | 48.16 | 27.50 | 10.68 | 3.83 | 2.92 | 2.21 | 0.74 | 0.11 | 124.3 | 2,847 | 203 | 1.633 |
| 19867 | Seine | Jan-Apr | 0.00 | 16.21 | 16.21 | 36.29 | 18.16 | 7.70 | 2.56 | 1.38 | 1.15 | 0.34 | 130.8 | 3,480 | 13,463 | 102.956 |
| | Trawl | Jan-Apr | 0.00 | 26.98 | 26.03 | 28.57 | 13.65 | 1.59 | 0.95 | 1.90 | 0.32 | 0.00 | 93.9 | 315 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.82 | 24.55 | 61.82 | 5.45 | 2.18 | 2.91 | 0.91 | 0.36 | 171.3 | 550 | 2,471 | 14.431 |
| 19878 | Seine | Jan-Apr | 0.00 | 1.60 | 63.80 | 7.41 | 14.70 | 8.38 | 2.75 | 0.65 | 0.48 | 0.23 | 127.5 | 4,883 | 8,276 | 67.129 |
| | Trawl | Jan-Apr | 0.00 | 3.03 | 59.09 | 19.70 | 15.15 | 3.03 | 0.00 | 0.00 | 0.00 | 0.00 | 92.9 | 66 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 5.38 | 7.10 | 41.29 | 28.60 | 12.90 | 3.01 | 1.29 | 0.43 | 166.9 | 465 | 1,448 | 8.674 |
| 19889 | Seine | Jan-Apr | 0.00 | 3.06 | 14.96 | 61.92 | 7.11 | 8.47 | 3.45 | 0.79 | 0.17 | 0.07 | 126.4 | 4,178 | 9,774 | 77.304 |
| | Trawl | Jan-Apr | 0.00 | 0.00 | 14.29 | 63.10 | 10.71 | 9.52 | 2.38 | 0.00 | 0.00 | 0.00 | 127.4 | 84 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.20 | 54.50 | 11.00 | 22.30 | 9.40 | 1.60 | 1.00 | 0.00 | 151.0 | 382 + | 3,515 | 23.274 |
| 19890 | Seine | Jan-Apr | 0.00 | 0.46 | 26.32 | 11.72 | 48.79 | 4.89 | 5.99 | 1.53 | 0.27 | 0.03 | 139.4 | 3,720 | 7,890 | 56.611 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.35 | 7.87 | 68.99 | 8.31 | 10.34 | 2.47 | 0.67 | 0.00 | 155.6 | 445 | 1,959 | 12.593 |
| 19901 | Seine | Jan-Apr | 0.00 | 6.15 | 19.13 | 22.02 | 10.60 | 35.06 | 2.99 | 3.39 | 0.64 | 0.02 | 130.8 | 5,715 | 6,299 | 47.096 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 3.26 | 6.84 | 12.70 | 64.50 | 6.84 | 8.14 | 6.52 | 0.00 | 175.5 | 307 + | 2,336 | 13.308 |
| 19912 | Seine | Jan-Apr | 0.00 | 1.47 | 43.29 | 10.77 | 14.97 | 6.62 | 18.95 | 2.42 | 1.26 | 0.26 | 132.2 | 4,290 | 3,086 | 23.337 |
| | Trawl | Jan-Apr | 0.00 | 3.45 | 31.03 | 20.69 | 26.44 | 2.30 | 10.34 | 2.30 | 2.30 | 1.15 | 105.6 | 87 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 6.29 | 13.49 | 30.76 | 13.85 | 29.86 | 2.88 | 2.52 | 0.36 | 154.2 | 556 | 627 | 4.066 |
| 19923 | Seine | Jan-Apr | 0.00 | 3.46 | 26.25 | 39.83 | 7.14 | 8.29 | 4.57 | 8.71 | 1.08 | 0.66 | 126.9 | 4,705 | 5,612 | 44.244 |
| 19934 | Seine | Jan-Apr | 0.00 | 3.85 | 18.47 | 22.30 | 31.82 | 8.69 | 6.19 | 6.58 | 1.84 | 0.27 | 125.3 | 6,196 | 5,332 | 42.481 |
| | Trawl | Oct-Dec | 0.00 | 3.00 | 22.74 | 24.13 | 30.04 | 8.00 | 5.00 | 5.26 | 1.58 | 0.24 | 124.7 | 6,274 + | 0 | 0.001 |
| | Trawl | Jan-Apr | 0.00 | 6.41 | 25.64 | 37.18 | 12.82 | 12.82 | 3.85 | 0.00 | 1.28 | 0.00 | 92.4 | 78 | 0 | 0.000 ~ |
| | Trawl | May- | 0.00 | 0.79 | 26.11 | 29.11 | 26.58 | 7.91 | 5.38 | 2.85 | 1.11 | 0.16 | 97.1 | 632 | 1 | 0.008 |
| | Gillnet | Jan-Apr | 0.00 | 0.16 | 5.65 | 32.10 | 54.84 | 5.32 | 1.13 | 0.65 | 0.16 | 0.00 | 131.1 | 620 | 706 | 5.381 |
| 19945 | Seine | Jan-Apr | 0.00 | 1.02 | 13.98 | 21.55 | 19.83 | 27.32 | 7.46 | 4.66 | 3.26 | 0.93 | 139.0 | 5,392 | 1,947 | 14.006 |
| | Trawl | Oct-Dec | 0.00 | 1.17 | 13.32 | 25.60 | 20.52 | 25.29 | 6.44 | 4.02 | 2.89 | 0.75 | 135.6 | 7,086 + | 1 | 0.005 |
| | Trawl | May- | 0.00 | 2.57 | 34.57 | 29.07 | 10.02 | 13.75 | 4.52 | 3.93 | 1.57 | 0.00 | 105.9 | 574 | 3 | 0.029 |
| 19956 | Seine | Jan-Apr | 0.00 | 17.06 | 22.43 | 12.83 | 15.22 | 12.76 | 14.03 | 3.39 | 1.42 | 0.86 | 119.3 | 5,394 | 790 | 6.607 |
| | Trawl | Oct-Dec | 0.00 | 14.66 | 22.14 | 12.66 | 19.38 | 12.53 | 13.75 | 2.82 | 1.25 | 0.81 | 119.5 | 8,255 + | 1 | 0.006 |
| | Trawl | May- | 0.00 | 14.66 | 22.14 | 12.66 | 19.38 | 12.53 | 13.75 | 2.82 | 1.25 | 0.81 | 119.5 | 8,255 + | 0 | 0.000 |
| 19967 | Seine | Jan-Apr | 0.00 | 3.65 | 70.44 | 8.47 | 4.17 | 5.11 | 4.02 | 3.18 | 0.63 | 0.32 | 98.6 | 6,539 | 6,656 | 67.506 |
| 19978 | Seine | Jan-Apr | 0.00 | 2.40 | 21.91 | 61.07 | 6.56 | 2.75 | 2.40 | 1.65 | 0.98 | 0.29 | 99.1 | 6,098 | 5,449 | 55.784 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.73 | 40.09 | 10.72 | 10.19 | 16.92 | 12.39 | 6.06 | 2.90 | 138.6 | 899 | 2,633 | 18.989 |
| 19989 | Seine | Jan-Apr | 0.00 | 1.39 | 21.95 | 23.61 | 39.60 | 8.41 | 2.67 | 1.29 | 0.73 | 0.33 | 110.5 | 4,341 | 3,407 | 31.759 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.82 | 9.98 | 60.36 | 18.46 | 5.32 | 3.35 | 1.48 | 0.24 | 135.7 | 1,043 | 963 | 7.098 |
| 19990 | Seine | Jan-Apr | 0.00 | 6.91 | 26.22 | 20.46 | 17.47 | 23.66 | 3.24 | 1.09 | 0.72 | 0.21 | 111.0 | 5,592 | 926 | 8.409 |
| 19990 | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.28 | 7.52 | 27.04 | 52.80 | 6.24 | 2.56 | 2.24 | 0.32 | 145.2 | 625 | 700 | 4.822 |
| 20001 | Seine | Jan-Apr | 0.00 | 7.02 | 45.66 | 20.20 | 8.38 | 7.57 | 9.44 | 1.32 | 0.21 | 0.21 | 105.3 | 2,352 | 0 | 0.000 ~ |
| 20012 | Seine | Jan-Apr | 0.00 | 4.14 | 51.73 | 22.77 | 9.91 | 3.00 | 4.36 | 3.73 | 0.36 | 0.00 | 103.0 | 2,200 | 433 | 4.204 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 10.28 | 28.79 | 15.33 | 20.56 | 22.43 | 2.24 | 0.37 | 152.3 | 535 | 388 | 2.550 |
| 20023 | Seine | Jan-Apr | 0.00 | 1.13 | 38.66 | 39.14 | 14.95 | 2.87 | 1.45 | 0.88 | 0.79 | 0.11 | 105.7 | 4,309 | 2,571 | 24.342 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 2.61 | 17.43 | 31.86 | 19.84 | 9.82 | 12.83 | 5.01 | 0.60 | 146.7 | 499 | 945 | 6.443 |
| 20034 | Seine | Jan-Apr | 0.00 | 1.32 | 13.73 | 52.30 | 22.60 | 7.34 | 1.89 | 0.51 | 0.27 | 0.03 | 104.1 | 2,956 | 3,861 | 37.108 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.79 | 28.37 | 24.41 | 25.04 | 14.58 | 3.80 | 2.22 | 0.79 | 137.2 | 631 | 593 | 4.324 |
| 20045 | Seine | Jan-Apr | 0.00 | 1.09 | 33.21 | 23.84 | 27.65 | 9.92 | 3.45 | 0.60 | 0.12 | 0.12 | 100.5 | 1,653 | 3,373 | 33.572 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.80 | 10.80 | 49.80 | 23.80 | 10.60 | 3.80 | 0.20 | 0.20 | 127.5 | 500 | 896 | 7.030 |
| 20056 | Seine | Jan-Apr | 0.00 | 15.08 | 37.26 | 33.54 | 7.89 | 5.37 | 0.78 | 0.09 | 0.00 | 0.00 | 78.8 | 1,154 | 0 | 0.000 ~ |
| 20067 | Seine | Jan-Apr | 0.00 | 1.16 | 50.33 | 35.05 | 10.96 | 1.83 | 0.66 | 0.00 | 0.00 | 0.00 | 78.3 | 602 | 0 | 0.000 ~ |
| 20078 | Seine | Jan-Apr | 0.00 | 5.22 | 24.64 | 54.01 | 11.50 | 3.09 | 0.77 | 0.58 | 0.10 | 0.10 | 82.8 | 1,035 | 0 | 0.000 ~ |
| 20089 | Seine | Jan-Apr | 0.00 | 2.43 | 66.41 | 15.64 | 12.71 | 2.27 | 0.55 | 0.00 | 0.00 | 0.00 | 79.6 | 1,810 | 0 | 0.000 ~ |

NOTE: * No biosample data available. Age composition and mean weight assigned from published reports.
+ Age composition calculated from biosample data aggregated from adjacent sections and/or fishery periods, by gear type.
~ No fishery openings this season. Age composition and mean weight obtained from pre-fishery charter

Table 1.6. Age composition and catch by season, fishery and gear type for the Area 27 stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | P E R C E N T | A T | A G E | | | | | | | | Mean | Number | C A T C H | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Weight | Aged | (tonnes) | (millions) |
| 19534 | Seine | Jan-Apr | 0.03 | 2.56 | 62.55 | 28.12 | 5.74 | 0.69 | 0.19 | 0.08 | 0.02 | 0.02 | 92.9 | 6,361 + | 1,920 | 20.667 |
| 19545 | Seine | Oct-Dec | 0.00 | 2.77 | 35.29 | 52.50 | 7.55 | 1.48 | 0.33 | 0.08 | 0.00 | 0.00 | 99.0 | 1,412 | 5,939 | 58.757 |
| | Seine | Jan-Apr | 0.00 | 6.80 | 34.77 | 49.72 | 6.94 | 1.42 | 0.28 | 0.07 | 0.00 | 0.00 | 96.7 | 1,412 | 0 | 0.000 ~ |
| 19589 | Seine | Jan-Apr | 0.00 | 4.12 | 44.71 | 27.63 | 14.44 | 3.90 | 2.45 | 2.06 | 0.58 | 0.11 | 93.3 | 3,594 + | 407 | 4.366 |
| 19601 | Seine | Jan-Apr | 0.00 | 38.31 | 37.97 | 19.15 | 4.41 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 85.5 | 590 + | 1,149 | 13.434 |
| 19612 | Seine | Jan-Apr | 0.00 | 4.82 | 82.29 | 9.63 | 2.41 | 0.86 | 0.00 | 0.00 | 0.00 | 0.00 | 93.2 | 1,163 + | 173 | 1.856 |
| 19623 | Seine | Jan-Apr | 0.00 | 1.99 | 43.18 | 48.71 | 5.16 | 0.75 | 0.21 | 0.00 | 0.00 | 0.00 | 101.3 | 1,862 + | 31 | 0.304 |
| 19634 | Seine | Jan-Apr | 0.00 | 1.33 | 59.98 | 26.04 | 11.56 | 0.83 | 0.25 | 0.00 | 0.00 | 0.00 | 103.7 | 1,202 + | 323 | 3.110 |
| 19645 | Seine | Jan-Apr | 0.00 | 2.51 | 31.20 | 46.10 | 14.62 | 4.60 | 0.42 | 0.28 | 0.28 | 0.00 | 125.8 | 718 + | 769 | 6.113 |
| 19656 | Seine | Oct-Dec | 0.00 | 13.59 | 26.83 | 26.12 | 23.17 | 9.07 | 1.23 | 0.00 | 0.00 | 0.00 | 137.0 | 0 * | 125 | 0.913 |
| | Seine | Jan-Apr | 0.00 | 13.59 | 26.83 | 26.12 | 23.17 | 9.07 | 1.23 | 0.00 | 0.00 | 0.00 | 137.0 | 0 * | 826 | 6.032 |
| 19667 | Seine | Jan-Apr | 2.43 | 20.71 | 55.46 | 16.68 | 3.43 | 0.80 | 0.26 | 0.19 | 0.04 | 0.00 | 106.7 | 0 * | 51 | 0.482 |
| 19701 | Seine | Jan-Apr | 0.00 | 19.86 | 30.14 | 40.41 | 4.79 | 2.05 | 1.37 | 0.68 | 0.68 | 0.00 | 131.8 | 146 | 0 | 0.000 ~ |
| 19734 | Seine | Jan-Apr | 0.00 | 8.03 | 43.12 | 23.94 | 13.56 | 8.83 | 2.23 | 0.22 | 0.04 | 0.02 | 111.3 | 5,389 + | 508 | 4.562 |
| | Gillnet | Jan-Apr | 0.00 | 8.03 | 43.12 | 23.94 | 13.56 | 8.83 | 2.23 | 0.22 | 0.04 | 0.02 | 111.3 | 5,389 + | 18 | 0.165 |
| 19756 | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.03 | 41.48 | 32.92 | 15.35 | 6.05 | 2.80 | 0.30 | 0.07 | 149.7 | 1,355 + | 79 | 0.525 |
| 19778 | Seine | Jan-Apr | 0.00 | 0.81 | 41.60 | 18.95 | 15.70 | 17.59 | 3.84 | 1.17 | 0.23 | 0.11 | 111.8 | 7,925 + | 75 | 0.670 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.42 | 5.45 | 21.33 | 49.05 | 17.54 | 4.74 | 0.24 | 0.24 | 157.6 | 422 + | 75 | 0.477 |
| 19789 | Seine | Jan-Apr | 0.00 | 0.82 | 13.88 | 50.49 | 14.19 | 10.61 | 7.80 | 1.59 | 0.50 | 0.11 | 124.1 | 3,769 + | 422 | 3.401 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.93 | 27.43 | 27.61 | 23.32 | 17.35 | 2.80 | 0.37 | 0.19 | 159.6 | 536 + | 270 | 1.695 |
| 19790 | Seine | Jan-Apr | 0.00 | 7.17 | 82.08 | 8.96 | 1.43 | 0.00 | 0.00 | 0.36 | 0.00 | 0.00 | 84.3 | 279 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 6.28 | 46.56 | 15.12 | 18.71 | 5.93 | 4.93 | 2.07 | 0.32 | 0.07 | 106.6 | 4,014 + | 519 | 4.873 |
| 19801 | Seine | Jan-Apr | 0.00 | 2.08 | 13.73 | 60.33 | 8.74 | 13.59 | 1.53 | 0.00 | 0.00 | 0.00 | 113.6 | 721 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 4.30 | 34.23 | 32.33 | 9.78 | 12.20 | 4.73 | 1.79 | 0.50 | 0.14 | 114.0 | 5,747 + | 671 | 5.884 |
| 19812 | Seine | Jan-Apr | 0.00 | 0.60 | 30.57 | 8.73 | 47.59 | 4.07 | 7.53 | 0.75 | 0.15 | 0.00 | 118.6 | 664 | 238 | 2.011 |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.63 | 11.62 | 44.58 | 11.77 | 27.63 | 3.30 | 0.31 | 0.16 | 137.7 | 637 + | 332 | 2.411 |
| 19823 | Seine | Jan-Apr | 0.00 | 3.96 | 20.79 | 31.68 | 10.89 | 28.71 | 0.00 | 3.96 | 0.00 | 0.00 | 108.4 | 101 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.31 | 13.52 | 22.73 | 47.00 | 5.99 | 9.98 | 0.31 | 0.15 | 138.0 | 651 + | 163 | 1.181 |
| 19834 | Gillnet | Jan-Apr | 0.00 | 0.00 | 0.00 | 4.17 | 42.13 | 16.67 | 33.33 | 2.55 | 1.16 | 0.00 | 154.2 | 432 | 171 | 1.107 |
| 19856 | Seine | Jan-Apr | 0.00 | 2.21 | 23.62 | 63.47 | 2.58 | 1.48 | 1.85 | 2.58 | 2.21 | 0.00 | 136.5 | 271 | 0 | 0.000 ~ |
| 19867 | Seine | Jan-Apr | 0.00 | 17.02 | 27.66 | 15.96 | 35.46 | 1.06 | 0.00 | 1.06 | 0.35 | 1.42 | 131.2 | 282 | 0 | 0.000 ~ |
| 19878 | Seine | Jan-Apr | 0.00 | 2.16 | 62.53 | 11.05 | 6.20 | 15.36 | 1.62 | 0.81 | 0.00 | 0.27 | 121.3 | 371 | 0 | 0.000 ~ |
| 19889 | Seine | Jan-Apr | 0.00 | 0.21 | 12.66 | 57.51 | 8.15 | 8.37 | 11.37 | 1.29 | 0.43 | 0.00 | 151.3 | 466 | 0 | 0.000 ~ |
| 19890 | Seine | Jan-Apr | 0.00 | 1.84 | 22.68 | 14.25 | 39.63 | 5.83 | 7.13 | 7.78 | 0.65 | 0.22 | 158.0 | 926 | 0 | 0.000 ~ |
| 19901 | Seine | Oct-Dec | 0.01 | 6.71 | 22.27 | 20.52 | 10.65 | 32.59 | 2.99 | 3.50 | 0.73 | 0.03 | 131.8 | 7,680 + | 0 | 0.001 |
| | Seine | Jan-Apr | 0.27 | 8.94 | 39.30 | 8.94 | 10.30 | 22.49 | 2.71 | 4.88 | 2.17 | 0.00 | 128.4 | 369 | 0 | 0.000 ~ |
| 19912 | Seine | Jan-Apr | 0.00 | 1.30 | 66.59 | 13.39 | 4.27 | 3.20 | 7.11 | 1.42 | 1.90 | 0.83 | 130.0 | 844 | 335 | 2.580 |
| 19923 | Seine | Jan-Apr | 0.00 | 11.30 | 35.79 | 38.93 | 5.02 | 1.57 | 1.41 | 5.02 | 0.31 | 0.63 | 108.5 | 637 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 3.28 | 53.28 | 14.09 | 7.92 | 7.53 | 11.58 | 0.97 | 1.35 | 146.6 | 518 | 367 | 2.502 |
| 19934 | Seine | Jan-Apr | 0.00 | 1.48 | 31.75 | 24.55 | 30.90 | 5.50 | 2.12 | 2.86 | 0.53 | 0.32 | 119.5 | 945 | 0 | 0.000 ~ |
| | Gillnet | Jan-Apr | 0.00 | 0.00 | 1.28 | 19.40 | 61.19 | 9.81 | 3.41 | 3.84 | 0.43 | 0.64 | 140.4 | 469 | 345 | 2.455 |
| 19945 | Seine | Jan-Apr | 0.00 | 1.29 | 6.83 | 30.93 | 27.19 | 25.26 | 5.28 | 1.55 | 1.29 | 0.39 | 130.6 | 776 | 88 | 0.670 |
| | Trawl | May- | 0.00 | 1.68 | 6.37 | 35.29 | 24.37 | 24.65 | 4.13 | 1.33 | 1.61 | 0.56 | 131.3 | 1,428 + | 0 | 0.000 |
| 19956 | Seine | Jan-Apr | 0.00 | 10.19 | 24.60 | 7.91 | 20.91 | 17.75 | 14.76 | 3.16 | 0.35 | 0.35 | 120.9 | 569 | 0 | 0.000 ~ |
| | Trawl | May- | 0.00 | 10.19 | 24.60 | 7.91 | 20.91 | 17.75 | 14.76 | 3.16 | 0.35 | 0.35 | 120.9 | 569 + | 0 | 0.000 |
| 19967 | Seine | Jan-Apr | 0.00 | 4.01 | 76.83 | 7.32 | 1.57 | 4.01 | 4.70 | 1.57 | 0.00 | 0.00 | 89.9 | 574 | 0 | 0.000 ~ |
| 19978 | Seine | Jan-Apr | 0.00 | 1.39 | 38.89 | 48.61 | 4.86 | 0.35 | 2.78 | 2.43 | 0.69 | 0.00 | 90.8 | 288 | 0 | 0.000 ~ |
| 19989 | Seine | Jan-Apr | 0.00 | 7.76 | 28.03 | 33.82 | 24.87 | 4.08 | 0.53 | 0.53 | 0.26 | 0.13 | 86.9 | 760 | 0 | 0.000 ~ |
| 19990 | Seine | Jan-Apr | 0.00 | 2.30 | 54.36 | 24.20 | 9.65 | 7.50 | 1.23 | 0.15 | 0.46 | 0.15 | 89.9 | 653 | 0 | 0.000 ~ |
| 20001 | Seine | Jan-Apr | 0.00 | 6.63 | 20.92 | 35.71 | 12.76 | 12.24 | 9.69 | 1.02 | 0.51 | 0.51 | 91.7 | 196 | 0 | 0.000 ~ |
| 20012 | Seine | Jan-Apr | 0.00 | 7.49 | 62.74 | 15.63 | 10.06 | 0.64 | 2.36 | 0.86 | 0.21 | 0.00 | 96.7 | 467 | 0 | 0.000 ~ |
| 20023 | Seine | Jan-Apr | 0.00 | 0.52 | 51.13 | 37.09 | 6.24 | 3.99 | 0.17 | 0.69 | 0.17 | 0.00 | 104.9 | 577 | 0 | 0.000 ~ |
| 20034 | Seine | Jan-Apr | 0.00 | 1.30 | 21.50 | 54.15 | 19.69 | 1.04 | 1.55 | 0.78 | 0.00 | 0.00 | 98.1 | 386 | 0 | 0.000 ~ |
| 20045 | Seine | Jan-Apr | 0.00 | 0.56 | 54.19 | 24.02 | 12.85 | 7.26 | 0.56 | 0.56 | 0.00 | 0.00 | 81.1 | 179 | 0 | 0.000 ~ |
| 20067 | Seine | Jan-Apr | 0.00 | 1.10 | 46.14 | 30.91 | 15.89 | 3.53 | 2.21 | 0.22 | 0.00 | 0.00 | 75.5 | 453 | 0 | 0.000 ~ |
| 20078 | Seine | Jan-Apr | 0.00 | 1.64 | 3.28 | 59.56 | 21.86 | 12.02 | 1.37 | 0.27 | 0.00 | 0.00 | 82.7 | 366 | 0 | 0.000 ~ |
| 20089 | Seine | Jan-Apr | 0.00 | 1.26 | 62.66 | 10.21 | 20.00 | 3.22 | 2.52 | 0.00 | 0.14 | 0.00 | 80.9 | 715 | 0 | 0.000 ~ |

NOTE: * No biosample data available. Age composition and mean weight assigned from published reports.
+ Age composition calculated from biosample data aggregated from adjacent sections and/or fishery periods, by gear type.
~ No fishery openings this season. Age composition and mean weight obtained from pre-fishery charter

Table 1.7. Age composition and catch by season, fishery and gear type for the Area 2W stock assessment region. Percentages represent a combination of samples taken from commercial fisheries and pre-fishery charters. Age-9++ represents the plus group of ages.

| | | | PERCENT AT AGE | | | | | | | | | | Mean | Number | CATCH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Gear | Fishery | 0+ | 1+ | 2+ | 3+ | 4+ | 5+ | 6+ | 7+ | 8+ | 9++ | Weight | Aged | (tonnes) | (millions) |
| 19567 | Seine | Jan-Apr | 0.07 | 20.00 | 25.34 | 16.22 | 9.41 | 25.92 | 2.46 | 0.47 | 0.11 | 0.00 | 104.2 | 4,506 + | 106 | 1.016 |
| 19634 | Seine | Jan-Apr | 0.00 | 1.02 | 15.92 | 60.00 | 16.53 | 5.31 | 1.22 | 0.00 | 0.00 | 0.00 | 113.9 | 490 + | 312 | 2.743 |
| 19645 | Seine | Jan-Apr | 0.00 | 1.59 | 80.07 | 10.20 | 5.14 | 1.78 | 0.84 | 0.37 | 0.00 | 0.00 | 104.0 | 1,069 + | 1,251 | 12.030 |
| 19656 | Seine | Jan-Apr | 1.67 | 18.05 | 32.22 | 16.11 | 10.23 | 7.33 | 5.79 | 4.84 | 2.04 | 1.72 | 128.8 | 0 * | 172 | 1.338 |
| 19723 | Seine | Jan-Apr | 0.00 | 0.16 | 38.08 | 21.42 | 26.62 | 10.93 | 1.93 | 0.80 | 0.05 | 0.00 | 144.7 | 1,867 + | 706 | 4.878 |
| 19734 | Seine | Jan-Apr | 0.00 | 0.61 | 31.47 | 38.54 | 17.89 | 8.36 | 2.58 | 0.49 | 0.06 | 0.00 | 126.9 | 1,627 + | 403 | 3.178 |
| | Gillnet | Jan-Apr | 0.00 | 50.98 | 11.11 | 5.88 | 15.69 | 5.88 | 9.15 | 1.31 | 0.00 | 0.00 | 101.0 | 153 | 0 | 0.000 ~ |
| 19745 | Seine | Jan-Apr | 0.00 | 0.63 | 26.50 | 34.13 | 27.01 | 9.18 | 2.05 | 0.41 | 0.09 | 0.00 | 130.8 | 6,384 + | 449 | 3.436 |
| 19756 | Seine | Jan-Apr | 0.00 | 23.71 | 6.70 | 41.24 | 23.71 | 4.64 | 0.00 | 0.00 | 0.00 | 0.00 | 139.8 | 194 | 0 | 0.000 ~ |
| 19778 | Seine | Jan-Apr | 0.00 | 0.15 | 23.63 | 18.15 | 9.48 | 28.96 | 13.11 | 5.04 | 1.26 | 0.22 | 150.5 | 1,350 + | 575 | 3.819 |
| 19789 | Seine | Jan-Apr | 0.00 | 1.49 | 18.84 | 22.95 | 16.23 | 22.95 | 13.81 | 1.87 | 1.12 | 0.75 | 151.9 | 536 | 691 | 4.546 |
| 19790 | Seine | Jan-Apr | 0.00 | 0.37 | 76.03 | 13.11 | 4.49 | 3.37 | 1.87 | 0.00 | 0.75 | 0.00 | 108.8 | 267 | 0 | 0.000 ~ |
| 19801 | Seine | Jan-Apr | 0.00 | 4.98 | 1.87 | 66.92 | 11.97 | 6.35 | 5.02 | 1.79 | 0.84 | 0.26 | 132.9 | 1,232 | 770 | 5.808 |
| 19812 | Seine | Jan-Apr | 0.00 | 0.02 | 53.90 | 2.31 | 34.93 | 3.91 | 2.55 | 2.02 | 0.23 | 0.13 | 139.5 | 1,654 | 1,225 | 9.099 |
| 19823 | Seine | Jan-Apr | 0.00 | 0.50 | 1.52 | 68.64 | 3.59 | 20.49 | 2.37 | 1.43 | 0.83 | 0.64 | 151.9 | 3,356 | 2,518 | 16.808 |
| 19834 | Seine | Jan-Apr | 0.00 | 6.45 | 1.61 | 0.60 | 35.28 | 2.42 | 51.01 | 1.81 | 0.60 | 0.20 | 166.2 | 496 | 0 | 0.000 ~ |
| 19845 | Seine | Jan-Apr | 0.00 | 0.40 | 0.67 | 5.80 | 2.56 | 13.75 | 1.62 | 74.39 | 0.67 | 0.13 | 212.3 | 742 | 199 | 0.940 |
| 19856 | Seine | Jan-Apr | 0.00 | 0.82 | 0.27 | 11.48 | 11.75 | 5.46 | 20.77 | 7.38 | 41.53 | 0.55 | 205.2 | 366 | 0 | 0.000 ~ |
| 19867 | Seine | Jan-Apr | 0.00 | 22.14 | 61.32 | 0.25 | 1.27 | 1.27 | 1.27 | 8.14 | 1.02 | 3.31 | 112.0 | 393 | 0 | 0.000 ~ |
| 19878 | Seine | Jan-Apr | 0.00 | 1.79 | 74.01 | 19.31 | 0.26 | 0.53 | 0.66 | 0.79 | 1.65 | 0.99 | 114.1 | 1,512 | 0 | 0.000 ~ |
| 19889 | Seine | Jan-Apr | 0.00 | 0.49 | 3.42 | 76.06 | 15.88 | 0.49 | 0.49 | 0.98 | 0.81 | 1.38 | 137.6 | 1,228 | 0 | 0.000 ~ |
| 19890 | Seine | Jan-Apr | 0.00 | 0.19 | 1.71 | 2.28 | 80.41 | 13.18 | 0.46 | 0.18 | 0.70 | 0.90 | 168.1 | 2,353 | 2,272 | 13.608 |
| 19901 | Seine | Jan-Apr | 0.00 | 0.50 | 6.46 | 0.89 | 1.84 | 68.91 | 19.83 | 0.72 | 0.45 | 0.39 | 173.3 | 1,795 | 2,558 | 14.762 |
| 19912 | Seine | Jan-Apr | 0.00 | 1.48 | 6.34 | 13.44 | 1.37 | 2.79 | 60.55 | 12.46 | 0.55 | 1.04 | 183.5 | 1,830 | 1,284 | 6.994 |
| 19923 | Seine | Jan-Apr | 0.00 | 0.76 | 11.71 | 16.46 | 13.53 | 1.91 | 4.57 | 44.54 | 5.67 | 0.84 | 156.7 | 2,574 | 1,306 | 7.985 |
| 19934 | Seine | Jan-Apr | 0.00 | 5.32 | 12.23 | 43.62 | 14.89 | 9.57 | 2.13 | 5.85 | 5.32 | 1.06 | 145.6 | 188 | 0 | 0.000 ~ |
| 19978 | Seine | Jan-Apr | 0.00 | 19.50 | 31.34 | 24.01 | 18.53 | 3.34 | 0.85 | 2.18 | 0.27 | 0.00 | 121.0 | 1,108 | 359 | 2.967 |
| 19989 | Seine | Jan-Apr | 0.00 | 15.60 | 32.38 | 28.09 | 14.30 | 7.28 | 1.56 | 0.52 | 0.26 | 0.00 | 116.8 | 769 | 0 | 0.000 ~ |
| 19990 | Seine | Jan-Apr | 0.00 | 14.77 | 63.64 | 18.18 | 0.00 | 2.27 | 0.00 | 1.14 | 0.00 | 0.00 | 85.0 | 88 | 0 | 0.000 ~ |
| 20001 | Seine | Jan-Apr | 0.00 | 4.37 | 8.48 | 40.62 | 24.42 | 12.08 | 6.94 | 2.06 | 0.51 | 0.51 | 153.2 | 389 | 0 | 0.000 ~ |
| 20012 | Seine | Jan-Apr | 0.00 | 28.69 | 23.83 | 4.77 | 21.64 | 9.72 | 6.86 | 2.67 | 1.53 | 0.29 | 130.5 | 1,049 | 0 | 0.000 ~ |
| 20023 | Seine | Jan-Apr | 0.00 | 1.03 | 73.49 | 15.31 | 3.39 | 3.69 | 1.15 | 1.33 | 0.36 | 0.24 | 111.3 | 1,652 | 0 | 0.000 ~ |
| 20034 | Seine | Jan-Apr | 0.00 | 7.24 | 9.74 | 71.71 | 7.50 | 1.71 | 1.58 | 0.26 | 0.00 | 0.26 | 124.5 | 760 | 0 | 0.000 ~ |
| 20045 | Seine | Jan-Apr | 0.00 | 0.36 | 26.68 | 8.63 | 58.76 | 4.04 | 0.54 | 0.81 | 0.00 | 0.18 | 122.7 | 1,113 | 0 | 0.000 ~ |
| 20056 | Seine | Jan-Apr | 0.00 | 10.75 | 13.98 | 17.63 | 6.88 | 44.95 | 3.44 | 1.72 | 0.65 | 0.00 | 132.4 | 465 | 0 | 0.000 ~ |
| 20067 | Seine | Jan-Apr | 0.00 | 0.31 | 57.89 | 11.30 | 6.50 | 3.25 | 18.58 | 1.55 | 0.46 | 0.15 | 102.9 | 646 | 0 | 0.000 ~ |
| 20078 | Seine | Jan-Apr | 0.00 | 34.08 | 1.68 | 41.90 | 8.38 | 2.79 | 2.23 | 8.38 | 0.00 | 0.56 | 99.6 | 179 | 0 | 0.000 ~ |
| 20089 | Seine | Jan-Apr | 0.00 | 2.58 | 72.48 | 2.46 | 12.16 | 2.21 | 2.46 | 2.21 | 2.95 | 0.49 | 102.7 | 814 | 0 | 0.000 ~ |

NOTE: * No biosample data available. Age composition and mean weight assigned from published reports.
+ Age composition calculated from biosample data aggregated from adjacent sections and/or fishery periods, by gear type.
~ No fishery openings this season. Age composition and mean weight obtained from pre-fishery charter

Table 2.1. Estimated numbers at age, spawning stock biomass (SB), spawn index (SI), residuals (RES), and other model estimated parameters for the Queen Charlotte Island stock assessment region. Age notation refers to age at beginning of fishery.

| | Estimated numbers at age (x 10,000 ) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | SB | SI | RES |
| 1950/51 | 1,907 | 1,445 | 1,636 | 406 | 246 | 82 | 22 | 10 | 10 | 19,384 | 4,213 | -0.2 |
| 1951/52 | 4,531 | 1,198 | 847 | 930 | 228 | 138 | 46 | 12 | 11 | 17,178 | 2,578 | -0.57 |
| 1952/53 | 16,769 | 2,827 | 587 | 371 | 394 | 96 | 58 | 19 | 10 | 36,190 | 7,555 | -0.24 |
| 1953/54 | 3,063 | 11,219 | 1,891 | 393 | 248 | 264 | 64 | 38 | 19 | 50,949 | 12,408 | -0.08 |
| 1954/55 | 3,161 | 2,051 | 7,372 | 1,233 | 255 | 161 | 171 | 42 | 38 | 66,552 | 6,437 | -1.01 |
| 1955/56 | 1,642 | 2,093 | 1,346 | 4,819 | 805 | 167 | 105 | 112 | 52 | 17,296 | 6,042 | 0.28 |
| 1956/57 | 2,565 | 916 | 522 | 215 | 687 | 110 | 23 | 14 | 22 | 2,923 | 1,592 | 0.72 |
| 1957/58 | 11,816 | 1,298 | 152 | 42 | 15 | 45 | 7 | 1 | 2 | 6,851 | 815 | -0.8 |
| 1958/59 | 2,835 | 5,976 | 339 | 28 | 7 | 2 | 7 | 1 | 1 | 25,627 | 8,981 | 0.28 |
| 1959/60 | 8,648 | 1,515 | 2,797 | 150 | 12 | 3 | 1 | 3 | 1 | 23,647 | 6,599 | 0.05 |
| 1960/61 | 7,105 | 4,645 | 813 | 1,502 | 80 | 7 | 2 | 1 | 2 | 35,532 | 8,981 | -0.05 |
| 1961/62 | 9,407 | 3,787 | 2,454 | 428 | 790 | 42 | 3 | 1 | 1 | 45,542 | 5,730 | -0.74 |
| 1962/63 | 2,429 | 4,989 | 1,862 | 1,167 | 202 | 370 | 20 | 2 | 1 | 39,454 | 7,297 | -0.36 |
| 1963/64 | 6,618 | 1,284 | 2,262 | 788 | 483 | 83 | 152 | 8 | 1 | 16,893 | 4,104 | -0.09 |
| 1964/65 | 1,089 | 3,264 | 384 | 528 | 172 | 103 | 18 | 32 | 2 | 3,902 | 1,378 | 0.29 |
| 1965/66 | 1,300 | 468 | 441 | 24 | 28 | 9 | 5 | 1 | 2 | 4,595 | 2,824 | 0.84 |
| 1966/67 | 1,071 | 598 | 172 | 146 | 8 | 9 | 3 | 2 | 1 | 5,397 | 710 | -0.7 |
| 1967/68 | 1,687 | 488 | 268 | 76 | 65 | 3 | 4 | 1 | 1 | 6,057 | 833 | -0.66 |
| 1968/69 | 2,875 | 782 | 225 | 123 | 35 | 30 | 2 | 2 | 1 | 8,602 | 2,075 | -0.09 |
| 1969/70 | 5,005 | 1,398 | 380 | 109 | 60 | 17 | 14 | 1 | 1 | 14,664 | 5,552 | 0.36 |
| 1970/71 | 5,273 | 2,552 | 713 | 194 | 56 | 30 | 9 | 7 | 1 | 24,140 | 13,291 | 0.73 |
| 1971/72 | 10,416 | 2,798 | 1,351 | 377 | 102 | 29 | 16 | 5 | 4 | 36,540 | 9,542 | -0.01 |
| 1972/73 | 8,194 | 5,733 | 1,467 | 659 | 169 | 43 | 12 | 6 | 4 | 53,779 | 7,960 | -0.58 |
| 1973/74 | 6,120 | 4,772 | 3,140 | 720 | 282 | 65 | 16 | 4 | 4 | 63,896 | 14,510 | -0.15 |
| 1974/75 | 2,498 | 3,777 | 2,837 | 1,744 | 366 | 133 | 30 | 7 | 4 | 59,607 | 9,686 | -0.49 |
| 1975/76 | 2,223 | 1,591 | 2,321 | 1,637 | 927 | 182 | 64 | 14 | 5 | 47,300 | 16,374 | 0.27 |
| 1976/77 | 2,877 | 1,421 | 963 | 1,272 | 771 | 375 | 69 | 24 | 7 | 33,855 | 16,408 | 0.6 |
| 1977/78 | 1,440 | 1,804 | 837 | 500 | 561 | 289 | 129 | 23 | 10 | 22,631 | 18,371 | 1.12 |
| 1978/79 | 31,654 | 875 | 1,013 | 393 | 175 | 154 | 67 | 28 | 7 | 41,679 | 13,649 | 0.21 |
| 1979/80 | 3,289 | 18,880 | 484 | 470 | 124 | 43 | 32 | 12 | 6 | 96,194 | 31,904 | 0.22 |
| 1980/81 | 1,585 | 1,993 | 11,285 | 281 | 235 | 50 | 16 | 11 | 6 | 90,362 | 20,294 | -0.17 |
| 1981/82 | 1,631 | 966 | 1,195 | 6,531 | 152 | 104 | 19 | 6 | 6 | 65,535 | 23,593 | 0.31 |
| 1982/83 | 13,467 | 989 | 580 | 702 | 3,735 | 83 | 52 | 9 | 5 | 59,182 | 21,391 | 0.31 |
| 1983/84 | 6,177 | 7,935 | 573 | 326 | 377 | 1,932 | 42 | 26 | 7 | 64,920 | 23,439 | 0.31 |
| 1984/85 | 1,787 | 3,450 | 4,350 | 304 | 164 | 184 | 917 | 19 | 15 | 55,644 | 18,625 | 0.23 |
| 1985/86 | 2,449 | 931 | 1,759 | 2,112 | 137 | 69 | 75 | 358 | 13 | 38,963 | 6,847 | -0.41 |
| 1986/87 | 15,089 | 1,212 | 453 | 825 | 944 | 59 | 29 | 31 | 153 | 35,812 | 12,289 | 0.26 |
| 1987/88 | 5,419 | 7,463 | 590 | 214 | 376 | 419 | 26 | 13 | 80 | 48,150 | 15,245 | -1.15 |
| 1988/89 | 1,890 | 2,755 | 3,793 | 299 | 109 | 191 | 212 | 13 | 47 | 44,389 | 25,201 | -0.57 |
| 1989/90 | 889 | 1,007 | 1,453 | 1,964 | 152 | 54 | 94 | 105 | 30 | 27,376 | 27,058 | -0.01 |
| 1990/91 | 5,139 | 482 | 522 | 696 | 826 | 56 | 18 | 29 | 41 | 17,367 | 17,998 | 0.04 |
| 1991/92 | 529 | 2,730 | 244 | 242 | 286 | 303 | 19 | 6 | 20 | 18,509 | 12,376 | -0.4 |
| 1992/93 | 623 | 269 | 1,337 | 112 | 101 | 112 | 115 | 7 | 10 | 10,183 | 8,152 | -0.22 |
| 1993/94 | 1,852 | 304 | 123 | 549 | 40 | 33 | 34 | 34 | 5 | 7,359 | 14,293 | 0.66 |
| 1994/95 | 3,399 | 869 | 141 | 56 | 245 | 17 | 14 | 15 | 17 | 9,239 | 4,701 | -0.68 |
| 1995/96 | 3,919 | 1,537 | 393 | 64 | 25 | 111 | 8 | 6 | 14 | 11,679 | 7,377 | -0.46 |
| 1996/97 | 8,617 | 1,802 | 706 | 181 | 29 | 12 | 51 | 4 | 10 | 17,998 | 11,215 | -0.47 |
| 1997/98 | 663 | 4,055 | 848 | 332 | 85 | 14 | 6 | 24 | 6 | 18,637 | 21,649 | 0.15 |
| 1998/99 | 2,201 | 307 | 1,819 | 359 | 131 | 32 | 5 | 2 | 11 | 10,618 | 10,610 | 0 |
| 1999/2000 | 2,670 | 952 | 124 | 642 | 107 | 30 | 6 | 1 | 1 | 6,704 | 6,698 | 0 |
| 2000/01 | 2,975 | 1,033 | 341 | 39 | 169 | 25 | 6 | 1 | 0 | 6,365 | 15,195 | 0.87 |
| 2001/02 | 7,728 | 1,035 | 359 | 119 | 13 | 59 | 9 | 2 | 1 | 6,876 | 3,257 | -0.75 |
| 2002/03 | 1,346 | 2,375 | 300 | 94 | 27 | 3 | 12 | 2 | 1 | 7,642 | 8,801 | 0.14 |
| 2003/04 | 4,945 | 414 | 730 | 92 | 29 | 8 | 1 | 4 | 1 | 5,600 | 5,668 | 0.01 |
| 2004/05 | 1,136 | 1,545 | 129 | 228 | 29 | 9 | 3 | 0 | 1 | 5,448 | 3,614 | -0.41 |
| 2005/06 | 5,009 | 369 | 502 | 42 | 74 | 9 | 3 | 1 | 1 | 5,049 | 4,097 | -0.21 |
| 2006/07 | 775 | 1,768 | 130 | 177 | 15 | 26 | 3 | 1 | 0 | 6,340 | 9,436 | 0.4 |
| 2007/08 | 5,881 | 288 | 656 | 48 | 66 | 6 | 10 | 1 | 1 | 6,139 | 4,213 | -0.38 |
| 2008/09 | 823 | 2,235 | 109 | 249 | 18 | 25 | 2 | 4 | 1 | 7,130 | 8,935 | 0.23 |

Estimated gillnet selectivity at age (averaged over all years):

| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.01 | 0.06 | 0.25 | 0.52 | 0.72 | 0.87 | 1.00 | 1.00 |

Spawn index proportionality coefficient (pre-1988): 0.26

Table 2.2. Estimated numbers at age, spawning stock biomass (SB), spawn index (SI), residuals (RES), and other model estimated parameters for the Prince Rupert District stock assessment region. Age notation refers to age at beginning of fishery.

| | Estimated numbers at age (x 10,000 ) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | SB | SI | RES |
| 1950/51 | 4,678 | 5,918 | 7,331 | 1,078 | 396 | 180 | 54 | 30 | 42 | 50,396 | 27,149 | 0.09 |
| 1951/52 | 4,767 | 2,835 | 2,774 | 2,724 | 306 | 79 | 24 | 5 | 3 | 25,702 | 24,047 | 0.64 |
| 1952/53 | 7,150 | 2,900 | 1,129 | 745 | 468 | 29 | 4 | 1 | 0 | 37,078 | 28,468 | 0.45 |
| 1953/54 | 1,940 | 4,787 | 1,907 | 731 | 473 | 289 | 18 | 2 | 0 | 28,459 | 13,535 | -0.03 |
| 1954/55 | 6,599 | 1,252 | 2,364 | 739 | 214 | 96 | 38 | 1 | 0 | 22,967 | 14,482 | 0.25 |
| 1955/56 | 2,978 | 4,309 | 650 | 999 | 245 | 52 | 16 | 4 | 0 | 28,703 | 14,533 | 0.03 |
| 1956/57 | 5,862 | 1,956 | 2,506 | 339 | 459 | 95 | 17 | 4 | 1 | 15,947 | 27,518 | 1.25 |
| 1957/58 | 15,014 | 3,544 | 798 | 710 | 63 | 50 | 5 | 0 | 0 | 33,170 | 9,882 | -0.5 |
| 1958/59 | 4,512 | 9,238 | 2,062 | 442 | 371 | 31 | 22 | 2 | 0 | 57,894 | 40,961 | 0.36 |
| 1959/60 | 36,589 | 2,671 | 5,094 | 1,068 | 212 | 162 | 12 | 8 | 1 | 58,147 | 16,545 | -0.55 |
| 1960/61 | 19,194 | 20,850 | 1,362 | 2,352 | 439 | 75 | 48 | 3 | 2 | 90,838 | 12,059 | -1.31 |
| 1961/62 | 10,821 | 10,591 | 9,728 | 547 | 792 | 118 | 15 | 7 | 0 | 101,562 | 26,329 | -0.64 |
| 1962/63 | 34,536 | 5,949 | 5,325 | 4,520 | 231 | 297 | 38 | 4 | 2 | 76,325 | 16,981 | -0.79 |
| 1963/64 | 5,756 | 17,955 | 2,691 | 2,129 | 1,562 | 66 | 68 | 7 | 1 | 77,943 | 26,919 | -0.35 |
| 1964/65 | 2,035 | 2,748 | 7,703 | 1,051 | 743 | 471 | 17 | 14 | 1 | 39,854 | 6,055 | -1.17 |
| 1965/66 | 2,840 | 829 | 918 | 2,155 | 239 | 129 | 59 | 2 | 1 | 11,432 | 7,105 | 0.23 |
| 1966/67 | 4,449 | 1,054 | 247 | 224 | 418 | 34 | 13 | 4 | 0 | 5,327 | 3,386 | 0.26 |
| 1967/68 | 2,598 | 1,616 | 290 | 53 | 36 | 45 | 2 | 1 | 0 | 6,856 | 5,197 | 0.43 |
| 1968/69 | 6,489 | 1,016 | 574 | 95 | 16 | 9 | 10 | 0 | 0 | 10,081 | 965 | -1.64 |
| 1969/70 | 3,985 | 2,853 | 447 | 252 | 42 | 7 | 4 | 4 | 0 | 16,738 | 8,814 | 0.07 |
| 1970/71 | 1,370 | 2,005 | 1,390 | 212 | 116 | 18 | 3 | 2 | 2 | 16,423 | 8,480 | 0.05 |
| 1971/72 | 3,680 | 753 | 1,027 | 670 | 95 | 47 | 7 | 1 | 1 | 19,439 | 8,774 | -0.09 |
| 1972/73 | 2,846 | 2,195 | 412 | 495 | 306 | 43 | 21 | 3 | 1 | 22,965 | 10,959 | -0.03 |
| 1973/74 | 1,631 | 1,812 | 1,354 | 242 | 286 | 176 | 24 | 12 | 2 | 27,543 | 9,244 | -0.38 |
| 1974/75 | 855 | 1,089 | 1,169 | 806 | 127 | 146 | 89 | 12 | 7 | 24,767 | 10,949 | -0.11 |
| 1975/76 | 1,166 | 593 | 737 | 763 | 519 | 81 | 93 | 57 | 12 | 25,966 | 15,587 | 0.2 |
| 1976/77 | 509 | 829 | 402 | 462 | 461 | 309 | 48 | 55 | 40 | 17,754 | 11,589 | 0.28 |
| 1977/78 | 460 | 368 | 539 | 219 | 219 | 208 | 136 | 21 | 40 | 10,995 | 6,164 | 0.13 |
| 1978/79 | 3,866 | 336 | 242 | 285 | 89 | 74 | 63 | 38 | 15 | 11,575 | 9,195 | 0.48 |
| 1979/80 | 1,319 | 2,860 | 227 | 135 | 135 | 37 | 29 | 23 | 18 | 20,660 | 11,937 | 0.16 |
| 1980/81 | 1,563 | 988 | 2,022 | 142 | 69 | 62 | 16 | 12 | 17 | 22,847 | 14,087 | 0.23 |
| 1981/82 | 2,380 | 1,172 | 708 | 1,369 | 88 | 39 | 33 | 8 | 14 | 26,246 | 17,186 | 0.29 |
| 1982/83 | 6,334 | 1,779 | 855 | 504 | 952 | 60 | 25 | 21 | 13 | 38,228 | 25,247 | 0.29 |
| 1983/84 | 2,050 | 4,707 | 1,322 | 635 | 375 | 707 | 44 | 19 | 25 | 46,570 | 27,041 | 0.17 |
| 1984/85 | 2,092 | 1,495 | 3,371 | 920 | 423 | 235 | 409 | 22 | 20 | 43,707 | 41,028 | 0.65 |
| 1985/86 | 6,210 | 1,490 | 1,035 | 2,212 | 572 | 240 | 117 | 168 | 15 | 47,541 | 26,638 | 0.13 |
| 1986/87 | 4,623 | 4,281 | 994 | 636 | 1,238 | 304 | 122 | 58 | 89 | 49,935 | 39,905 | 0.49 |
| 1987/88 | 3,003 | 3,082 | 2,798 | 619 | 361 | 644 | 148 | 58 | 67 | 42,561 | 35,444 | -0.18 |
| 1988/89 | 1,639 | 1,938 | 1,926 | 1,645 | 333 | 163 | 245 | 56 | 42 | 33,565 | 16,379 | -0.72 |
| 1989/90 | 6,479 | 1,038 | 1,182 | 1,091 | 830 | 128 | 53 | 65 | 26 | 32,625 | 22,679 | -0.36 |
| 1990/91 | 5,750 | 4,117 | 640 | 686 | 596 | 414 | 59 | 23 | 39 | 39,554 | 25,811 | -0.43 |
| 1991/92 | 2,237 | 3,707 | 2,609 | 387 | 389 | 320 | 203 | 27 | 26 | 41,347 | 40,145 | -0.03 |
| 1992/93 | 997 | 1,464 | 2,389 | 1,627 | 208 | 176 | 130 | 73 | 16 | 33,770 | 25,071 | -0.3 |
| 1993/94 | 2,007 | 657 | 940 | 1,440 | 896 | 88 | 58 | 38 | 21 | 24,489 | 16,589 | -0.39 |
| 1994/95 | 5,499 | 1,335 | 423 | 568 | 815 | 465 | 34 | 21 | 18 | 26,930 | 18,516 | -0.37 |
| 1995/96 | 2,575 | 3,718 | 892 | 277 | 357 | 494 | 265 | 17 | 19 | 34,322 | 24,854 | -0.32 |
| 1996/97 | 3,451 | 1,762 | 2,541 | 601 | 177 | 194 | 251 | 120 | 14 | 31,080 | 25,037 | -0.22 |
| 1997/98 | 1,199 | 2,360 | 1,202 | 1,706 | 356 | 75 | 50 | 46 | 16 | 28,610 | 19,420 | -0.39 |
| 1998/99 | 3,054 | 804 | 1,577 | 789 | 1,045 | 190 | 18 | 5 | 1 | 29,119 | 29,745 | 0.02 |
| 1999/2000 | 5,104 | 1,981 | 518 | 991 | 480 | 585 | 102 | 7 | 2 | 25,212 | 19,694 | -0.25 |
| 2000/01 | 3,264 | 3,214 | 1,220 | 305 | 523 | 235 | 240 | 29 | 2 | 28,354 | 36,684 | 0.26 |
| 2001/02 | 10,607 | 2,014 | 1,952 | 716 | 172 | 252 | 110 | 97 | 12 | 29,935 | 22,449 | -0.29 |
| 2002/03 | 1,503 | 6,407 | 1,178 | 1,079 | 359 | 73 | 83 | 32 | 20 | 38,632 | 34,007 | -0.13 |
| 2003/04 | 4,060 | 890 | 3,721 | 661 | 541 | 140 | 21 | 20 | 11 | 29,366 | 30,493 | 0.04 |
| 2004/05 | 2,728 | 2,334 | 499 | 1,981 | 328 | 223 | 36 | 3 | 4 | 21,961 | 27,956 | 0.24 |
| 2005/06 | 7,678 | 1,510 | 1,254 | 256 | 909 | 139 | 69 | 5 | 1 | 20,415 | 10,251 | -0.69 |
| 2006/07 | 2,390 | 4,116 | 793 | 633 | 125 | 374 | 44 | 15 | 1 | 20,935 | 15,562 | -0.3 |
| 2007/08 | 2,837 | 1,263 | 2,175 | 418 | 322 | 54 | 152 | 14 | 3 | 18,120 | 13,553 | -0.29 |
| 2008/09 | 1,566 | 1,480 | 652 | 1,093 | 202 | 140 | 20 | 36 | 3 | 14,758 | 12,684 | -0.15 |

Estimated gillnet selectivity at age (averaged over all years):

| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| | 0.00 | 0.01 | 0.08 | 0.27 | 0.47 | 0.64 | 0.84 | 1.00 | 1.00 |

Spawn index proportionality coefficient (pre-1988): 0.49

Table 2.3. Estimated numbers at age, spawning stock biomass (SB), spawn index (SI), residuals (RES), and other model estimated parameters for the Central Coast stock assessment region. Age notation refers to age at beginning of fishery.

| | Estimated numbers at age (x 10,000 ) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | SB | SI | RES |
| 1950/51 | 3,694 | 4,691 | 4,809 | 814 | 309 | 88 | 31 | 16 | 17 | 39,968 | 15,390 | 0.33 |
| 1951/52 | 4,583 | 2,240 | 2,153 | 1,644 | 191 | 43 | 7 | 1 | 1 | 20,564 | 10,295 | 0.59 |
| 1952/53 | 19,262 | 2,728 | 939 | 620 | 293 | 18 | 2 | 0 | 0 | 37,319 | 18,237 | 0.57 |
| 1953/54 | 2,589 | 12,085 | 1,698 | 579 | 378 | 176 | 10 | 1 | 0 | 42,912 | 13,967 | 0.16 |
| 1954/55 | 2,886 | 1,555 | 5,917 | 671 | 173 | 77 | 23 | 1 | 0 | 41,751 | 13,564 | 0.16 |
| 1955/56 | 6,296 | 1,750 | 870 | 3,043 | 309 | 69 | 26 | 6 | 0 | 14,542 | 6,626 | 0.5 |
| 1956/57 | 9,142 | 3,511 | 636 | 199 | 386 | 17 | 1 | 0 | 0 | 12,449 | 4,607 | 0.29 |
| 1957/58 | 11,494 | 4,906 | 1,104 | 111 | 17 | 12 | 0 | 0 | 0 | 24,825 | 3,549 | -0.66 |
| 1958/59 | 3,887 | 6,481 | 2,319 | 434 | 34 | 4 | 2 | 0 | 0 | 24,227 | 3,904 | -0.54 |
| 1959/60 | 10,959 | 2,124 | 2,466 | 599 | 68 | 3 | 0 | 0 | 0 | 26,800 | 12,615 | 0.53 |
| 1960/61 | 16,793 | 6,265 | 1,148 | 1,259 | 284 | 29 | 1 | 0 | 0 | 29,317 | 4,265 | -0.64 |
| 1961/62 | 9,605 | 8,896 | 2,431 | 320 | 230 | 29 | 1 | 0 | 0 | 49,452 | 11,948 | -0.13 |
| 1962/63 | 8,434 | 5,160 | 4,237 | 1,022 | 114 | 66 | 6 | 0 | 0 | 28,835 | 6,485 | -0.21 |
| 1963/64 | 5,742 | 4,252 | 1,760 | 949 | 134 | 7 | 2 | 0 | 0 | 17,222 | 6,464 | 0.31 |
| 1964/65 | 4,755 | 2,771 | 1,339 | 349 | 105 | 7 | 0 | 0 | 0 | 17,162 | 2,097 | -0.82 |
| 1965/66 | 12,383 | 2,196 | 989 | 364 | 67 | 12 | 0 | 0 | 0 | 4,861 | 1,863 | 0.33 |
| 1966/67 | 6,759 | 4,663 | 271 | 29 | 2 | 0 | 0 | 0 | 0 | 9,685 | 5,434 | 0.71 |
| 1967/68 | 4,085 | 2,459 | 913 | 26 | 1 | 0 | 0 | 0 | 0 | 14,038 | 5,790 | 0.4 |
| 1968/69 | 11,823 | 1,539 | 891 | 318 | 9 | 0 | 0 | 0 | 0 | 17,819 | 1,837 | -0.99 |
| 1969/70 | 8,493 | 4,656 | 606 | 351 | 125 | 3 | 0 | 0 | 0 | 30,285 | 8,230 | -0.02 |
| 1970/71 | 6,233 | 3,810 | 2,083 | 270 | 156 | 55 | 2 | 0 | 0 | 35,486 | 4,156 | -0.86 |
| 1971/72 | 7,628 | 3,158 | 1,865 | 984 | 122 | 66 | 22 | 1 | 0 | 36,097 | 3,572 | -1.03 |
| 1972/73 | 5,047 | 4,322 | 1,606 | 810 | 388 | 46 | 25 | 8 | 0 | 47,046 | 12,434 | -0.05 |
| 1973/74 | 5,913 | 3,116 | 2,498 | 825 | 381 | 177 | 21 | 11 | 4 | 45,722 | 8,852 | -0.36 |
| 1974/75 | 2,807 | 3,834 | 1,953 | 1,377 | 376 | 147 | 65 | 7 | 5 | 48,530 | 8,037 | -0.51 |
| 1975/76 | 1,937 | 1,866 | 2,481 | 1,148 | 674 | 164 | 61 | 27 | 5 | 37,135 | 13,849 | 0.3 |
| 1976/77 | 2,658 | 1,289 | 1,179 | 1,402 | 504 | 239 | 52 | 19 | 10 | 29,936 | 14,613 | 0.57 |
| 1977/78 | 1,854 | 1,740 | 807 | 650 | 618 | 174 | 77 | 16 | 9 | 17,631 | 7,747 | 0.46 |
| 1978/79 | 15,284 | 1,186 | 1,034 | 365 | 176 | 79 | 17 | 7 | 2 | 43,139 | 5,779 | -0.72 |
| 1979/80 | 3,686 | 9,810 | 761 | 663 | 234 | 113 | 51 | 11 | 6 | 63,638 | 13,012 | -0.3 |
| 1980/81 | 3,320 | 2,393 | 6,365 | 492 | 419 | 142 | 67 | 30 | 10 | 62,039 | 15,919 | -0.07 |
| 1981/82 | 1,482 | 2,186 | 1,571 | 4,110 | 302 | 226 | 67 | 27 | 16 | 59,781 | 16,333 | -0.01 |
| 1982/83 | 1,366 | 983 | 1,429 | 991 | 2,404 | 169 | 119 | 33 | 21 | 46,156 | 18,482 | 0.37 |
| 1983/84 | 4,035 | 900 | 638 | 896 | 587 | 1,349 | 92 | 64 | 28 | 32,679 | 14,185 | 0.45 |
| 1984/85 | 2,032 | 2,607 | 561 | 372 | 485 | 293 | 643 | 41 | 38 | 34,382 | 8,850 | -0.07 |
| 1985/86 | 3,135 | 1,282 | 1,591 | 317 | 196 | 246 | 144 | 312 | 38 | 32,089 | 20,342 | 0.83 |
| 1986/87 | 14,316 | 1,942 | 772 | 903 | 172 | 103 | 128 | 75 | 181 | 41,091 | 12,827 | 0.12 |
| 1987/88 | 1,275 | 8,781 | 1,153 | 432 | 477 | 88 | 53 | 65 | 130 | 59,283 | 26,916 | -0.79 |
| 1988/89 | 934 | 793 | 5,293 | 658 | 233 | 244 | 45 | 27 | 99 | 43,309 | 21,561 | -0.7 |
| 1989/90 | 2,401 | 601 | 485 | 2,966 | 316 | 98 | 90 | 16 | 45 | 31,884 | 28,980 | -0.1 |
| 1990/91 | 9,805 | 1,602 | 382 | 283 | 1,564 | 146 | 41 | 37 | 25 | 33,302 | 19,183 | -0.55 |
| 1991/92 | 1,516 | 6,699 | 1,008 | 212 | 140 | 716 | 63 | 17 | 26 | 49,110 | 43,274 | -0.13 |
| 1992/93 | 1,918 | 1,056 | 4,341 | 585 | 113 | 70 | 340 | 29 | 20 | 40,482 | 32,392 | -0.22 |
| 1993/94 | 751 | 1,343 | 688 | 2,504 | 303 | 53 | 31 | 136 | 18 | 28,474 | 29,432 | 0.03 |
| 1994/95 | 2,109 | 522 | 849 | 371 | 1,184 | 130 | 20 | 11 | 55 | 17,720 | 22,348 | 0.23 |
| 1995/96 | 6,985 | 1,442 | 316 | 424 | 159 | 462 | 48 | 7 | 23 | 22,732 | 21,646 | -0.05 |
| 1996/97 | 7,282 | 4,721 | 901 | 176 | 216 | 78 | 221 | 22 | 14 | 35,886 | 28,255 | -0.24 |
| 1997/98 | 1,608 | 4,897 | 3,015 | 534 | 99 | 116 | 40 | 113 | 18 | 38,917 | 31,503 | -0.21 |
| 1998/99 | 2,797 | 1,072 | 2,986 | 1,611 | 262 | 45 | 45 | 15 | 46 | 32,388 | 31,813 | -0.02 |
| 1999/2000 | 1,323 | 1,856 | 669 | 1,683 | 823 | 124 | 17 | 12 | 14 | 27,123 | 32,652 | 0.19 |
| 2000/01 | 3,255 | 860 | 1,119 | 361 | 831 | 379 | 53 | 7 | 10 | 19,825 | 25,109 | 0.24 |
| 2001/02 | 7,208 | 2,043 | 494 | 562 | 168 | 363 | 159 | 22 | 7 | 21,744 | 23,147 | 0.06 |
| 2002/03 | 2,109 | 4,333 | 1,157 | 256 | 273 | 78 | 163 | 69 | 12 | 28,294 | 25,679 | -0.1 |
| 2003/04 | 6,297 | 1,201 | 2,372 | 598 | 127 | 130 | 36 | 74 | 36 | 22,625 | 29,407 | 0.26 |
| 2004/05 | 1,875 | 3,357 | 606 | 1,106 | 266 | 56 | 57 | 16 | 48 | 17,942 | 24,158 | 0.3 |
| 2005/06 | 3,249 | 915 | 1,504 | 240 | 408 | 96 | 20 | 20 | 23 | 9,900 | 12,051 | 0.2 |
| 2006/07 | 1,181 | 1,439 | 362 | 507 | 74 | 122 | 29 | 6 | 13 | 7,831 | 9,857 | 0.23 |
| 2007/08 | 7,819 | 483 | 576 | 141 | 194 | 28 | 46 | 11 | 7 | 7,688 | 3,971 | -0.66 |
| 2008/09 | 1,799 | 3,045 | 188 | 224 | 55 | 75 | 11 | 18 | 7 | 9,918 | 10,183 | 0.03 |

Estimated gillnet selectivity at age (averaged over all years):

| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| | 0.00 | 0.01 | 0.09 | 0.32 | 0.57 | 0.77 | 0.90 | 1.00 | 1.00 |

Spawn index proportionality coefficient (pre-1988): 0.28

Table 2.4. Estimated numbers at age, spawning stock biomass (SB), spawn index (SI), residuals (RES), and other model estimated parameters for the Strait of Georgia stock assessment region. Age notation refers to age at beginning of fishery.

| | Estimated numbers at age (x 10,000 ) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | SB | SI | RES |
| 1950/51 | 13,316 | 7,710 | 3,113 | 711 | 177 | 64 | 23 | 8 | 5 | 46,215 | 66,143 | 0.37 |
| 1951/52 | 15,391 | 7,993 | 3,025 | 1,056 | 239 | 60 | 21 | 8 | 4 | 52,182 | 72,376 | 0.34 |
| 1952/53 | 20,002 | 9,422 | 3,261 | 1,075 | 372 | 84 | 21 | 8 | 4 | 81,028 | 111,307 | 0.33 |
| 1953/54 | 14,564 | 13,032 | 5,770 | 1,960 | 645 | 223 | 50 | 13 | 7 | 91,025 | 82,141 | -0.09 |
| 1954/55 | 8,645 | 9,235 | 5,860 | 2,314 | 780 | 257 | 89 | 20 | 8 | 76,242 | 69,854 | -0.07 |
| 1955/56 | 9,544 | 5,510 | 3,976 | 2,210 | 865 | 292 | 96 | 33 | 10 | 39,290 | 25,667 | -0.41 |
| 1956/57 | 7,269 | 5,935 | 1,791 | 1,013 | 555 | 217 | 73 | 24 | 11 | 22,057 | 24,126 | 0.1 |
| 1957/58 | 15,247 | 4,441 | 1,578 | 339 | 188 | 103 | 40 | 14 | 6 | 34,221 | 16,149 | -0.74 |
| 1958/59 | 13,946 | 9,896 | 2,071 | 660 | 141 | 78 | 43 | 17 | 8 | 46,530 | 47,864 | 0.04 |
| 1959/60 | 7,894 | 8,786 | 3,884 | 686 | 206 | 42 | 23 | 13 | 7 | 40,256 | 55,082 | 0.33 |
| 1960/61 | 22,037 | 4,753 | 2,876 | 1,015 | 177 | 53 | 11 | 6 | 5 | 36,802 | 42,864 | 0.17 |
| 1961/62 | 18,091 | 12,870 | 1,572 | 773 | 270 | 47 | 14 | 3 | 3 | 46,100 | 31,078 | -0.38 |
| 1962/63 | 18,790 | 10,178 | 4,045 | 399 | 194 | 68 | 12 | 4 | 1 | 39,684 | 35,135 | -0.11 |
| 1963/64 | 10,871 | 10,108 | 2,896 | 907 | 88 | 43 | 15 | 3 | 1 | 33,134 | 33,117 | 0.01 |
| 1964/65 | 6,282 | 5,469 | 2,459 | 531 | 164 | 16 | 8 | 3 | 1 | 21,995 | 37,116 | 0.54 |
| 1965/66 | 9,074 | 2,937 | 1,332 | 468 | 100 | 31 | 3 | 1 | 1 | 11,955 | 7,153 | -0.5 |
| 1966/67 | 5,288 | 3,795 | 559 | 185 | 64 | 14 | 4 | 0 | 0 | 6,018 | 9,619 | 0.48 |
| 1967/68 | 5,270 | 1,978 | 507 | 47 | 15 | 5 | 1 | 0 | 0 | 12,063 | 9,128 | -0.27 |
| 1968/69 | 12,079 | 2,069 | 721 | 181 | 17 | 5 | 2 | 0 | 0 | 19,058 | 14,644 | -0.25 |
| 1969/70 | 10,226 | 4,801 | 818 | 285 | 71 | 7 | 2 | 1 | 0 | 31,018 | 33,970 | 0.1 |
| 1970/71 | 6,950 | 4,262 | 1,993 | 339 | 118 | 29 | 3 | 1 | 0 | 36,360 | 38,180 | 0.06 |
| 1971/72 | 5,906 | 3,078 | 1,846 | 855 | 145 | 50 | 13 | 1 | 1 | 27,690 | 25,165 | -0.08 |
| 1972/73 | 8,425 | 2,787 | 1,232 | 660 | 296 | 50 | 17 | 4 | 1 | 29,876 | 16,191 | -0.6 |
| 1973/74 | 10,824 | 4,385 | 1,303 | 513 | 247 | 109 | 18 | 6 | 2 | 45,615 | 40,354 | -0.11 |
| 1974/75 | 6,282 | 6,215 | 2,480 | 643 | 237 | 112 | 49 | 8 | 4 | 52,953 | 70,211 | 0.3 |
| 1975/76 | 12,223 | 3,802 | 3,711 | 1,360 | 259 | 82 | 37 | 16 | 4 | 61,905 | 60,642 | -0.01 |
| 1976/77 | 9,643 | 7,565 | 2,245 | 1,929 | 609 | 106 | 33 | 15 | 8 | 73,109 | 78,562 | 0.09 |
| 1977/78 | 4,879 | 6,067 | 4,397 | 1,154 | 828 | 231 | 38 | 12 | 8 | 64,469 | 102,115 | 0.47 |
| 1978/79 | 8,384 | 3,063 | 3,348 | 2,164 | 461 | 277 | 72 | 12 | 6 | 58,671 | 64,266 | 0.1 |
| 1979/80 | 7,433 | 5,232 | 1,707 | 1,675 | 938 | 184 | 108 | 27 | 7 | 62,507 | 85,991 | 0.33 |
| 1980/81 | 7,720 | 4,628 | 3,182 | 1,012 | 923 | 489 | 95 | 55 | 17 | 62,700 | 55,121 | -0.12 |
| 1981/82 | 6,539 | 4,628 | 2,610 | 1,701 | 478 | 399 | 206 | 39 | 30 | 57,707 | 100,987 | 0.57 |
| 1982/83 | 6,279 | 3,728 | 2,449 | 1,264 | 754 | 184 | 150 | 76 | 26 | 38,964 | 64,575 | 0.52 |
| 1983/84 | 9,476 | 3,341 | 1,762 | 928 | 370 | 197 | 42 | 32 | 21 | 33,505 | 26,227 | -0.23 |
| 1984/85 | 16,984 | 4,806 | 1,562 | 692 | 259 | 85 | 45 | 9 | 11 | 43,169 | 25,247 | -0.52 |
| 1985/86 | 9,365 | 8,480 | 2,256 | 645 | 230 | 71 | 22 | 11 | 5 | 61,762 | 41,575 | -0.38 |
| 1986/87 | 22,618 | 4,736 | 4,264 | 1,132 | 323 | 115 | 36 | 11 | 8 | 62,954 | 41,737 | -0.4 |
| 1987/88 | 6,622 | 11,650 | 2,324 | 1,896 | 403 | 88 | 24 | 7 | 4 | 78,191 | 24,976 | -1.14 |
| 1988/89 | 16,826 | 3,478 | 5,961 | 1,082 | 756 | 142 | 28 | 8 | 3 | 70,796 | 66,052 | -0.07 |
| 1989/90 | 8,549 | 9,162 | 1,847 | 2,971 | 452 | 276 | 48 | 9 | 3 | 76,760 | 67,152 | -0.13 |
| 1990/91 | 21,875 | 4,728 | 5,031 | 968 | 1,299 | 164 | 94 | 16 | 4 | 80,127 | 45,830 | -0.56 |
| 1991/92 | 16,007 | 12,085 | 2,552 | 2,500 | 399 | 447 | 51 | 28 | 6 | 96,645 | 82,656 | -0.16 |
| 1992/93 | 20,897 | 8,823 | 6,410 | 1,239 | 1,005 | 136 | 144 | 16 | 10 | 102,245 | 90,198 | -0.13 |
| 1993/94 | 9,805 | 11,423 | 4,624 | 3,074 | 510 | 360 | 45 | 46 | 8 | 87,875 | 67,144 | -0.27 |
| 1994/95 | 20,329 | 5,234 | 5,830 | 2,115 | 1,122 | 137 | 86 | 9 | 10 | 83,114 | 64,899 | -0.25 |
| 1995/96 | 30,652 | 10,530 | 2,604 | 2,676 | 821 | 388 | 43 | 27 | 6 | 91,984 | 71,326 | -0.25 |
| 1996/97 | 30,752 | 15,507 | 5,013 | 1,151 | 1,028 | 267 | 119 | 13 | 10 | 105,073 | 58,232 | -0.59 |
| 1997/98 | 14,224 | 15,381 | 7,257 | 2,170 | 428 | 301 | 69 | 29 | 5 | 99,228 | 74,616 | -0.29 |
| 1998/99 | 22,720 | 7,189 | 7,439 | 3,260 | 828 | 126 | 55 | 9 | 3 | 91,512 | 85,095 | -0.07 |
| 1999/2000 | 26,052 | 11,684 | 3,534 | 3,422 | 1,325 | 277 | 36 | 13 | 3 | 92,856 | 72,639 | -0.25 |
| 2000/01 | 32,556 | 13,652 | 5,812 | 1,653 | 1,417 | 401 | 69 | 7 | 3 | 122,706 | 100,248 | -0.2 |
| 2001/02 | 32,082 | 17,278 | 6,867 | 2,769 | 674 | 482 | 113 | 18 | 3 | 129,121 | 117,864 | -0.09 |
| 2002/03 | 18,869 | 16,981 | 8,621 | 3,185 | 1,161 | 199 | 118 | 22 | 3 | 123,677 | 141,651 | 0.14 |
| 2003/04 | 16,385 | 9,791 | 8,241 | 3,860 | 1,261 | 408 | 41 | 15 | 5 | 96,934 | 113,689 | 0.16 |
| 2004/05 | 13,128 | 8,305 | 4,704 | 3,736 | 1,628 | 461 | 139 | 10 | 5 | 72,800 | 95,851 | 0.28 |
| 2005/06 | 22,668 | 6,502 | 3,831 | 2,011 | 1,370 | 462 | 99 | 25 | 3 | 54,792 | 46,752 | -0.16 |
| 2006/07 | 8,767 | 10,986 | 2,812 | 1,478 | 639 | 330 | 69 | 9 | 1 | 58,308 | 35,446 | -0.5 |
| 2007/08 | 26,005 | 4,245 | 5,027 | 1,227 | 552 | 143 | 48 | 6 | 0 | 41,785 | 32,103 | -0.26 |
| 2008/09 | 3,504 | 12,641 | 1,948 | 1,996 | 408 | 117 | 16 | 3 | 0 | 47,898 | 49,909 | 0.04 |

Estimated gillnet selectivity at age (averaged over all years):

| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| | 0.00 | 0.02 | 0.16 | 0.43 | 0.68 | 0.82 | 0.92 | 0.97 | 0.97 |

Spawn index proportionality coefficient (pre-1988): 0.99

Table 2.5. Estimated numbers at age, spawning stock biomass (SB), spawn index (SI), residuals (RES), and other model estimated parameters for the west coast of Vancouver Island stock assessment region. Age notation refers to age at beginning of fishery.

| | Estimated numbers at age (x 10,000 ) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | SB | SI | RES |
| 1950/51 | 3,940 | 2,441 | 2,652 | 395 | 109 | 38 | 15 | 6 | 4 | 23,524 | 19,597 | 0.15 |
| 1951/52 | 4,527 | 2,445 | 1,032 | 906 | 133 | 37 | 13 | 5 | 3 | 12,063 | 13,310 | 0.43 |
| 1952/53 | 7,827 | 2,611 | 660 | 174 | 148 | 22 | 6 | 2 | 1 | 22,474 | 39,571 | 0.9 |
| 1953/54 | 5,405 | 4,527 | 1,509 | 381 | 101 | 86 | 13 | 3 | 2 | 13,080 | 20,648 | 0.79 |
| 1954/55 | 10,755 | 2,800 | 1,035 | 207 | 50 | 13 | 11 | 2 | 1 | 22,635 | 15,112 | -0.07 |
| 1955/56 | 14,400 | 5,571 | 1,226 | 415 | 82 | 20 | 5 | 4 | 1 | 31,352 | 27,183 | 0.19 |
| 1956/57 | 13,866 | 7,244 | 2,076 | 388 | 130 | 26 | 6 | 2 | 2 | 47,752 | 44,114 | 0.25 |
| 1957/58 | 16,391 | 7,053 | 3,568 | 1,006 | 188 | 63 | 12 | 3 | 2 | 57,648 | 18,986 | -0.78 |
| 1958/59 | 11,055 | 8,383 | 3,587 | 1,810 | 510 | 95 | 32 | 6 | 2 | 27,068 | 12,979 | -0.4 |
| 1959/60 | 5,866 | 5,455 | 1,951 | 524 | 251 | 68 | 12 | 4 | 1 | 10,477 | 6,015 | -0.22 |
| 1960/61 | 16,773 | 2,825 | 854 | 138 | 35 | 17 | 5 | 1 | 0 | 14,560 | 10,556 | 0.01 |
| 1961/62 | 6,767 | 8,138 | 550 | 92 | 14 | 4 | 2 | 0 | 0 | 27,603 | 34,470 | 0.55 |
| 1962/63 | 8,836 | 3,378 | 2,722 | 147 | 24 | 4 | 1 | 0 | 0 | 24,531 | 11,245 | -0.45 |
| 1963/64 | 3,398 | 4,442 | 1,206 | 805 | 43 | 7 | 1 | 0 | 0 | 21,363 | 22,761 | 0.4 |
| 1964/65 | 2,311 | 1,727 | 1,511 | 328 | 215 | 11 | 2 | 0 | 0 | 14,561 | 11,891 | 0.13 |
| 1965/66 | 2,681 | 1,178 | 584 | 407 | 87 | 57 | 3 | 0 | 0 | 9,096 | 3,722 | -0.56 |
| 1966/67 | 2,483 | 1,372 | 385 | 149 | 102 | 22 | 14 | 1 | 0 | 5,017 | 4,813 | 0.29 |
| 1967/68 | 1,819 | 1,245 | 284 | 45 | 17 | 11 | 2 | 2 | 0 | 11,051 | 11,029 | 0.33 |
| 1968/69 | 5,398 | 973 | 666 | 152 | 24 | 9 | 6 | 1 | 1 | 16,448 | 10,465 | -0.12 |
| 1969/70 | 9,520 | 2,939 | 530 | 363 | 83 | 13 | 5 | 3 | 1 | 33,191 | 26,912 | 0.12 |
| 1970/71 | 6,189 | 5,381 | 1,661 | 299 | 205 | 47 | 7 | 3 | 3 | 59,849 | 36,206 | -0.17 |
| 1971/72 | 7,884 | 3,665 | 3,187 | 984 | 177 | 121 | 28 | 4 | 3 | 63,605 | 41,857 | -0.09 |
| 1972/73 | 10,020 | 4,897 | 2,138 | 1,759 | 535 | 96 | 66 | 15 | 4 | 68,876 | 19,481 | -0.93 |
| 1973/74 | 14,842 | 6,518 | 2,781 | 1,053 | 819 | 246 | 44 | 30 | 9 | 82,888 | 25,540 | -0.84 |
| 1974/75 | 5,735 | 10,153 | 4,086 | 1,549 | 526 | 388 | 115 | 21 | 18 | 109,962 | 49,149 | -0.47 |
| 1975/76 | 4,185 | 4,026 | 6,541 | 2,284 | 734 | 242 | 177 | 52 | 18 | 85,682 | 64,222 | 0.04 |
| 1976/77 | 7,742 | 2,943 | 2,538 | 3,431 | 874 | 245 | 79 | 57 | 23 | 68,123 | 58,679 | 0.18 |
| 1977/78 | 2,687 | 5,381 | 1,835 | 1,295 | 1,472 | 322 | 87 | 28 | 28 | 53,926 | 45,607 | 0.16 |
| 1978/79 | 8,290 | 1,833 | 3,442 | 1,051 | 525 | 417 | 76 | 19 | 12 | 46,714 | 66,397 | 0.68 |
| 1979/80 | 6,023 | 5,448 | 1,088 | 1,779 | 392 | 154 | 116 | 20 | 8 | 57,576 | 62,308 | 0.41 |
| 1980/81 | 3,594 | 3,793 | 3,370 | 655 | 1,007 | 202 | 77 | 57 | 14 | 54,210 | 52,063 | 0.29 |
| 1981/82 | 2,459 | 2,126 | 2,136 | 1,790 | 313 | 450 | 86 | 32 | 30 | 39,889 | 33,047 | 0.14 |
| 1982/83 | 4,548 | 1,370 | 1,148 | 1,098 | 858 | 133 | 182 | 32 | 23 | 27,648 | 16,771 | -0.17 |
| 1983/84 | 11,556 | 2,404 | 653 | 485 | 418 | 308 | 46 | 63 | 18 | 31,761 | 23,872 | 0.05 |
| 1984/85 | 10,744 | 5,987 | 1,108 | 264 | 184 | 156 | 114 | 17 | 30 | 53,545 | 30,010 | -0.25 |
| 1985/86 | 3,586 | 5,650 | 3,141 | 580 | 138 | 96 | 81 | 60 | 25 | 62,701 | 39,514 | -0.13 |
| 1986/87 | 16,785 | 1,934 | 3,041 | 1,688 | 311 | 74 | 52 | 44 | 45 | 55,490 | 16,858 | -0.86 |
| 1987/88 | 2,962 | 9,299 | 937 | 1,252 | 644 | 117 | 28 | 19 | 33 | 71,714 | 46,242 | -0.44 |
| 1988/89 | 3,366 | 1,716 | 5,017 | 465 | 590 | 300 | 54 | 13 | 24 | 52,091 | 47,718 | -0.09 |
| 1989/90 | 2,205 | 2,002 | 934 | 2,416 | 205 | 246 | 123 | 22 | 15 | 40,295 | 46,464 | 0.14 |
| 1990/91 | 7,136 | 1,322 | 1,097 | 461 | 1,123 | 93 | 111 | 56 | 17 | 31,607 | 30,456 | -0.04 |
| 1991/92 | 4,336 | 4,262 | 713 | 521 | 202 | 462 | 37 | 44 | 29 | 42,124 | 42,687 | 0.01 |
| 1992/93 | 3,420 | 2,583 | 2,423 | 385 | 272 | 104 | 237 | 19 | 38 | 38,834 | 34,728 | -0.11 |
| 1993/94 | 1,639 | 2,008 | 1,402 | 1,228 | 192 | 135 | 52 | 118 | 28 | 30,077 | 25,625 | -0.16 |
| 1994/95 | 2,714 | 946 | 1,062 | 679 | 569 | 87 | 60 | 23 | 64 | 26,116 | 28,057 | 0.07 |
| 1995/96 | 12,050 | 1,544 | 518 | 562 | 356 | 298 | 45 | 32 | 46 | 32,136 | 33,986 | 0.06 |
| 1996/97 | 4,239 | 6,701 | 844 | 279 | 301 | 191 | 160 | 24 | 41 | 40,052 | 46,490 | 0.15 |
| 1997/98 | 2,283 | 2,266 | 3,223 | 369 | 119 | 128 | 81 | 68 | 28 | 26,112 | 41,556 | 0.46 |
| 1998/99 | 2,736 | 1,174 | 1,053 | 1,327 | 142 | 37 | 34 | 20 | 22 | 16,999 | 20,390 | 0.18 |
| 1999/2000 | 4,386 | 1,361 | 531 | 432 | 495 | 50 | 11 | 9 | 11 | 16,519 | 13,267 | -0.22 |
| 2000/01 | 6,006 | 2,146 | 644 | 241 | 185 | 199 | 20 | 4 | 8 | 21,080 | 13,955 | -0.41 |
| 2001/02 | 5,991 | 2,935 | 1,049 | 315 | 118 | 91 | 97 | 10 | 6 | 24,170 | 22,086 | -0.09 |
| 2002/03 | 2,703 | 2,900 | 1,403 | 493 | 143 | 51 | 38 | 40 | 6 | 21,363 | 29,750 | 0.33 |
| 2003/04 | 3,137 | 1,250 | 1,245 | 559 | 180 | 44 | 14 | 9 | 11 | 11,385 | 15,844 | 0.33 |
| 2004/05 | 2,162 | 1,319 | 444 | 369 | 154 | 42 | 9 | 2 | 3 | 4,669 | 9,075 | 0.66 |
| 2005/06 | 3,127 | 801 | 358 | 85 | 38 | 9 | 1 | 0 | 0 | 4,773 | 2,705 | -0.57 |
| 2006/07 | 1,072 | 1,079 | 276 | 124 | 29 | 13 | 3 | 0 | 0 | 4,389 | 2,089 | -0.74 |
| 2007/08 | 2,926 | 379 | 382 | 98 | 44 | 10 | 5 | 1 | 0 | 4,373 | 2,548 | -0.54 |
| 2008/09 | 1,029 | 1,135 | 147 | 148 | 38 | 17 | 4 | 2 | 0 | 5,055 | 9,876 | 0.67 |

Estimated gillnet selectivity at age (averaged over all years):

| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.02 | 0.17 | 0.48 | 0.73 | 0.87 | 0.94 | 1.00 | 1.00 |

Spawn index proportionality coefficient (pre-1988): 0.72

## B Model description and documentation

The herring catch-age model consists of five major components: (1) data, (2) model initialization, (3) model dynamics, (4) the likelihood function and (5) forecasts. We have broken the description of the assessment model into these five components and use a series of tables to document model equations. Symbols and their definitions are defined in Table 3 of Appendix B. The model assumes each of the major and minor stock areas are independent from each other, although the majority of parameter start-values and bounds are common across stocks (described throughout).

Table 3. Notation for the herring catch-age model (HCAMv2).

| Symbol | Description |
|---|---|
| | **Indices and Index Ranges** |
| $a$ | age class index, where $a = 1$ corresponds to actual age $k$ |
| $A$ | plus age class ( $A = 8$, which corresponds to ages 9 and up ) |
| $k$ | youngest age in the model ( $k = 2$ ) |
| $k'$ | age of maturity/ recruitment to the fishery ( $k' = 3$) |
| $K$ | oldest age in the model ( $K = 10$ ) |
| $n$ | number of age classes ( $n = 9$ ) |
| $p$ | fishing period, where $p = 1$ corresponds to winter, $p = 2$ to seine, and $p = 3$ to gillnet |
| $p'$ | total number of fishing periods ( $p'=3$ ) |
| $t$ | year index |
| $t'$ | first year of catch and survey data ( 1951, $t' = 1$ ) |
| $T'$ | final year of surface survey ( 1987, $T' = 37$ ) |
| $T'+1$ | first year of dive survey ( 1988, $T'+1 = 38$ ) |
| $T$ | final year ( 2009, $T = 59$ ) |
| | **Data** |
| $C_{t,p}$ | observed catch biomass (metric tonnes) in period $p$ of year $t$ |
| $I_t$ | observed spawn survey index in year $t$ |
| $N^S_{t,p}$ | number of age samples processed in year $t$ |
| $P_{t,p,a}$ | observed proportion of fish at age $a$ in period $p$ of year $t$ (test fishery + commercial samples combined) |
| $w_{t,a}$ | observed mean weight-at-age $a$ in year $t$ (test fishery + commercial samples combined) |
| $w'_{t,a}$ | geometric mean weight-at-age $a$ in year $t$ (test fishery + commercial samples combined) |

### Parameters (fixed)

| | |
|---|---|
| $q_2$ | spawn index proportionality coefficient, $q_2 = 1$ for $t > T'$ |
| $\lambda_a$ | proportion of age *a* fish available to the fishery, constant across all years ( $\lambda_2$ =0.25, $\lambda_3$ =0.90, $\lambda_{a>3}$ =1 ) |
| $\sigma_h^2$ | variance of the steepness, *h* |
| $\sigma_R^2$ | variance of recruitment deviations, $d^R$ |

### Parameters (derived)

| | |
|---|---|
| $\alpha, \beta, h$ | parameters of the stock recruitment relationship |
| $a_{50}$ | age at 50% vulnerability to the fishing gear |
| $d_t^M$ | mortality deviations in year *t* |
| $d_t^R$ | recruitment deviations in year *t* |
| $d^{GN}$ | deviations in gillnet selectivity |
| $\varepsilon^{process}$ | process error in number of ageing samples, $N_{t,p}^S$ |
| $F'_{t,a}$ | fishing mortality rate for fish of age *a* in year *t* |
| $\kappa$ | initial fishing mortality rate for $t < t'$ |
| $q_1$ | spawn index proportionality constant for $t \le T'$ |
| $\psi$ | average natural mortality rate in year $t = t'$ |
| $\sigma_{a_{50}}$ | standard deviation in $a_{50}$ |

### State Variables

| | |
|---|---|
| $B_t$ | biomass in year *t* |
| $B_t^S$ | spawning stock biomass in year *t* |
| $\hat{C}_{t,p,a}$ | model estimated catch-at-age *a* by period *p* and year *t* |
| $F_{t,p}$ | instantaneous fishing mortality by period *p* and year *t* |
| $M_t$ | instantaneous natural mortality in year *t* |
| $\overline{M}$ | average natural mortality rate |
| $N_{t,a}$ | number of fish of age *a* at the beginning of year *t* |
| $N'_{t,p,a}$ | number of fish of age *a* at the beginning of period *p* of year *t* that are available to the fishery |
| $\hat{P}_{t,p,a}$ | model estimated proportion of fish at age *a* in period *p* of year *t* |
| $R_0$ | unfished recruitment |
| $R_t$ | recruitment in year *t* |
| $s_{t,p,a}$ | selectivity to the fishery at age *a* in period *p* of year *t* |

### B.1. Model initialization

Model initialization assumes equilibrium conditions with a constant level of fishing ($\kappa$) in years prior to the first year of the analysis ($t < t'$, pre-1951). To initialize the age structure of the model, we must first calculate the relative proportion of fish in each of the age groups ($a = k$ to $K$–1) for years $t = t'–n$ (subtracting one year for each age group). This means the model is initialized to $t$ = 1942. Equations used to initialize the population are laid out in Table 4 and Table 5.

Table 4. Population initialization

$$N_{t'-n-1,a} = R_0 \times \tilde{N}_a \quad \text{( T4.1 )}$$

$$\tilde{N}_{a=k} = \exp(-M_{a=k}) \quad \text{( T4.2 )}$$

$$\tilde{N}_{a>k} = \tilde{N}_{a-1} \times \exp(-M_a) \quad \text{( T4.3 )}$$

$$\tilde{N}_{a=K} = \tilde{N}_{a=K} \Big/ \left(1-\exp(-M_{a=K})\right) \quad \text{( T4.4 )}$$

$$B^S_{t'-n-1} = \sum N_{t,a} w'_{t,a} \lambda_a \quad \text{( T4.5 )}$$

$$N_{t+1,a} = N_{t,a}\lambda_a \exp(-M_{t,a} - F_t) + N_{t,a}\left(1-\lambda_a\right)\exp(-M_{t,a}) \quad \text{( T4.6 )}$$

$$B_{t>t',a} = \sum N_{t,a}\lambda_{t,a} w_{t,a} \quad \text{( T4.7 )}$$

In the year prior to population initialization, $t = t'–n-1$, numbers at age, $N_{t'-n-1,a}$ (T4.1), are calculated by multiplying the relative proportion of fish in each age group, $\tilde{N}_a$ (T4.2–T4.4), by the unfished recruitment, $R_0$ (Table 5). From here, we set $N_{t'-n,a} = N_{t'-n-1,a}$ and derive numbers at age for years $t' - n$ to $t'$ by calculating the spawning biomass, $B^S_{t,a}$ (T4.5), and subsequent recruits, $R_t$ (T5.1). We then add new recruits, $R_t$, to numbers at age, $N_{t-1}$, in the previous year. Natural mortality ($M_t$), availability ($\lambda_a$), and weight-at-age ($w_{t,a}$) for this initialization step are equivalent to those values used in $t'$, i.e. $M_{t>t'} = M_{t'}$. In the final steps (T4.6-T4.7), we subtract from the initial population the effects of natural mortality, $M_t$, and initial fishing mortality, $\kappa$, and then calculate the corresponding biomass, $B_t$.

Table 5. Stock-recruitment relationship

$$R_{t,a} = \frac{\alpha B_t}{\beta + B_t} \exp\left(d^R_t - 0.5\sigma^2_R\right) \quad \text{( T5.1 )}$$

$$\alpha = R_0 \frac{4h}{\left(5h-1\right)} \quad \text{( T5.2 )}$$

$$\beta = B_0 \frac{(1-h)}{(5h-1)} \quad \text{( T5.3 )}$$

$$B_0 = R_0 \left( \sum_{a=1}^{A} \begin{pmatrix} \lambda_a w_{t',a} \exp\left( \sum_{a=1}^{A} - M_{t',a} \right) + \\ \lambda_A w_{t',a=A} \exp\left( \sum_{a=1}^{A} - M_{t',a} \right) \left(1 - \exp\left(- M_{t',a=A}\right)\right)^{-1} \end{pmatrix} \right) \quad \text{( T5.4 )}$$

Model initialization also includes calculation of fishery selectivity, $s_{t,p,a}$, and natural mortality, $M_t$. Selectivity is modelled for each fishing period using variations of the logistic equation (T6.1 and T6.2). Time-varying natural mortality (T6.3 and T6.4) is apportioned across fishing periods as a fraction of annual mortality (T6.5 and T6.6), with annual deviations, $d_t^M$, modelled using a random walk. The 2006 implementation of the HCAM model included estimation of annual availability/ maturity, $\lambda_a$, however, in the 2008 and 2009 assessments a fixed availability schedule is used. Average natural mortality rate, $\overline{M}$, is also calculated (T6.7).

Table 6. Fishery selectivity and natural mortality

$$s_{t,p\le 2,a} = 1/1 + \exp\left(-\sigma_{a_{50}}\left(a - a_{50}\right)\right) \quad \text{( T6.1 )}$$

$$s_{t,p=3,a} = 1/\left(1 + \exp\left(a_{50} - \sigma_{a_{50}} w'_{t,a} \exp\left(0.2\, d^{GN}\right)\right)\right) \quad \text{( T6.2 )}$$

$$M_{t=t'} = \psi \quad \text{( T6.3 )}$$

$$M_{t>t'} = \exp(d_t^M)\, M_{t-1} \quad \text{( T6.4 )}$$

$$M_{t,p=1} = 0.90 M_t \quad \text{( T6.5 )}$$

$$M_{t,p>1} = 0.05 M_t \quad \text{( T6.6 )}$$

$$\overline{M} = \sum_{t=t'}^{T} M_t \Big/ \left((T - t' + 1)(K - k + 1)\right) \quad \text{( T6.7 )}$$

**B.2. Population and fishing dynamics**

After the model initialization step, the model estimates these variables: available numbers at age $N'_{t,a}$ and total numbers at age $N_{t,a}$, both estimated by year and period (T7.1–T7.5), estimated spawning biomass, (T7.6), catch, $\hat{C}_{t,p,a}$, and age composition, $\hat{P}_{t,p,a}$. Catch is predicted using the discrete catch equation (T7.7) and is assumed to be known with great certainty, thus differences between observed and predicted catch are assumed to follow a log normal distribution with a mean of 0 and standard deviation of 0.005. In this calculation, fishing mortality, $F'_{t,a}$ (T7.8), is estimated as a free parameter.

Fitted proportions at age, $\hat{P}_{t,p,a}$ , are estimated using predicted catch (T7.9). This implementation of the HCAMv2 assumes no ageing error.

Table 7. Population and fishing dynamics

$$N'_{t,p=1,a} = \lambda_a N_{t,a} \quad \text{( T7.1 )}$$

$$N'_{t,p>1,a} = \exp\left(-M_{t,p} - F_{t,p}\right) N'_{t,p,a} \quad \text{( T7.2 )}$$

$$N_{t+1,a+1} = N'_{t,p=p'+1,a} + \left(1-\lambda_a\right)\exp\left(-M_t\right) N_{t,a} \quad \text{( T7.3 )}$$

$$N_{t+1,a+1} = N'_{t,p=p'+1,a} + \left(1-\lambda_a\right)\exp\left(-M_t\right) N_{t,a} + N'_{t,p=p'+1,a=K} + \left(1-\lambda_{a=K}\right)\exp\left(-M_t\right) N_{t,a=K} \quad \text{( T7.4 )}$$

$$N_{t,a=K} = R_t \quad \text{( T7.5 )}$$

$$B_t^S = \sum_{a=k}^{K} N'_{t,p=p'+1,a} w_{t,a} \lambda_a \quad \text{( T7.6 )}$$

$$\hat{C}_{t,p,a} = \exp\left(-M_{t,p}\right) s_{t,p,a} F'_{t,p} N'_{t,p,a} \quad \text{( T7.7 )}$$

$$F_{t,p,a} = -\ln\left(s_{t,p,a} F'_{t,p}\right) \quad \text{( T7.8 )}$$

$$\hat{P}_{t,p,a} = \hat{C}_{t,p,a} \Big/ \sum_{a=k}^{K} \hat{C}_{t,p,a} \quad \text{( T7.9 )}$$

## B.3. Likelihoods

The final component of the estimation procedure is the objective function. Table 8 summarizes the likelihoods components and Table 9 the associated priors related to: 1) age composition with process error, 2) commercial catch and 3) the spawn index.

Table 8. Negative log likelihoods

*Age composition data*

$$-\ln(L) = N_{t,p}^S \ln\left(\hat{P}_{t,p,a}\right) - N_{t,p}^S \ln\left(P_{t,p,a}\right) \quad \text{( T8.1 )}$$

$$-\ln(L) = 0.5 \sum_{t,p,a} \ln\left(r_{t,p,a}\right) - \sum_{t,p,a} \ln\left[\exp\left[\frac{-\left(P_{t,p,a} - \hat{P}_{t,p,a}\right)^2}{2r_{t,p,a} \big/ N_{t,p}^S}\right] + 0.01\right] \quad \text{( T8.2 )}$$

$$\text{where } r_{t,p,a} = \left(1-P_{t,p,a}\right) P_{t,p,a} + \left(0.01 \big/ T - t' + 1\right) \quad \text{( T8.3 )}$$

$$N_{t,p}^S = \frac{1}{1 \big/ \tilde{N}_{t,p}^S + 1 \big/ \varepsilon^{process}} \quad \text{( T8.4 )}$$

*Catch*

$$-\ln(L)=\frac{\sum_{t=t'}^{T}\ln\left(C_{t,p,a}/\hat{C}_{t,p,a}\right)}{2\sigma_C^2} \qquad (\text{T8.5})$$

*Spawn index data*

$$-\ln(L)=\frac{\sum_{t=}^{T}\ln\left(I_t/qB_t\right)}{2\sigma_t^2} \qquad (\text{T8.6})$$

Table 9. Prior contributions to the objective function

*Average natural mortality rate*

$$\frac{\left(\overline{M}-0.45\right)}{2\sigma_{\overline{M}}^2} \qquad (\text{T9.1})$$

*Deviations in average natural mortality rate*

$$\frac{d_t^M}{2\sigma_M^2} \qquad (\text{T9.2})$$

*Recruitment deviations*

$$(T-t')\ln(\sigma_R)+\sum_{t=t'+1}^{T}\left[\frac{\left(d_t^R\right)^2}{2\sigma_R^2}\right] \qquad (\text{T9.3})$$

*Steepness*

$$\frac{(h-0.5)}{2\sigma_h^2} \qquad (\text{T9.4})$$

*Initial fishing mortality*

$$\ln(\kappa)-\frac{0.5(\ln(\kappa)-\ln(0.3166))^2}{(0.6633)^2} \qquad (\text{T9.5})$$