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Rock lobster catch and effort data: summaries and CPUE standardisations, 1979–80 to 2011–12

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Commercial catch and effort data are an important source of information for stock assessments of rock lobster. Summaries of these data are provided for fishing years (1 April to 31 March) 1979–80 to 2011–12 as are standardisations of catch per unit effort (CPUE) for each of the nine rock lobster Quota Management Areas (QMAs). Annual CPUE standardisations based on a 1 October–30 September year ("offset year") are provided for CRA 3, CRA 4, CRA 5, CRA 7, and CRA 8 which were used as input to management procedures (decision rules) that form the basis for TAC or TACC changes in these QMAs. This report also includes a summary of the half-year (seasonal) standardisations for CRA 7 and CRA 8, which were used as model input to the 2012 CRA 7 and CRA 8 stock assessments.

The spatial distribution of landings by statistical area has varied in most QMAs over the 32 years of available data. For example, in CRA 3, Area 911 (Mahia) rose to more than 50% of the landed catch in the early 2000s after being less than 30% of the landings in the mid 1990s. In CRA 5, landings taken in Area 916 increased substantially from 2000–01 with a corresponding drop in the proportion of landings taken in Area 917. These changes have since reversed, showing that the relative importance of statistical areas within a QMA is dynamic. In some other QMAs, notably CRA 2 and CRA 6, the distribution of landings between statistical areas has remained relatively consistent over time. The shift from a spring-summer (October to March) to an autumn-winter fishery occurred quite rapidly in the 1990s in most of the east coast QMAs, first in the North Island, followed by CRA 5 in the South Island east coast. This shift has now reversed in CRA 2, CRA 3, and CRA 4 (and may be slowing in CRA 5) but there is evidence that CRA 3 is changing back to a winter fishery, coinciding with an increase in overall CPUE in the QMA. CRA 8 is becoming a July and August fishery while CRA 7 seasonal catch is spreading out as the CPUE drops.

The standardisation procedure applied to each QMA did not usually result in much change relative to the arithmetic and unstandardised annual indices of CPUE. However, there was a general tendency for the standardisation procedure to adjust the relative peak CPUE upwards in the late 1990s in most QMAs (and recently in CRA 3 and CRA 8). This occurred because unstandardised catch rates tended to be lower in winter and these fisheries shifted to winter fishing when catch rates were high. Standardised CPUE for CRA 1 to CRA 5 showed a similar pattern: peaking in the early to mid 1980s, then declining steadily to the early 1990s, followed by a rapid rise in CPUE. In CRA 2, CRA 3, and CRA 4, CPUEs peaked towards the end of the decade, and these series then declined to low levels by the early to mid-2000s. CPUE for these three QMAs has now either levelled out or is increasing, with CRA 3 and CRA 4 reversing in 2008–09. CPUE in CRA 1 and CRA 5 increased beyond the end of the 1990s, although there was a drop in the CRA 5 CPUE from 2004–05 which reversed in 2008–09 and peaked in 2009–10. CRA 2 reached its lowest CPUE in 1987–88 but the other north and east coast QMAs recorded their lowest in 1992–93. The year of peak CPUE and its relative magnitude also differ between these QMAs.

Standardised CPUE in CRA 7 and CRA 8 declined steadily from 1979–80 to lows in the mid- to late 1990s. Relative CPUEs in both QMAs then rose to the highest levels in each series at the end of the 2000s, with the increases beginning after the first of two TACC (Total Allowable Commercial Catch) reductions were made in 1999–2000. Both CRA 7 and CRA 8 declined after reaching peaks in 2008–09 (CRA 7: by 60%) and 2009–10 (CRA 8: by 22%). The CRA 7 decline resulted in TACC reductions in 2010–11, 2011–12 and 2012–13 while the CRA 8 TACC was reduced in 2011–12.

1. INTRODUCTION

Commercial catch and effort data, collected through a compulsory programme administered and enforced by the Ministry for Primary Industries (MPI, formerly the Ministry of Fisheries), are an important source of information for stock assessments of rock lobster. They are used to provide an annual index of vulnerable biomass for each stock and to estimate the distribution of catch between seasons and among month/statistical area strata. There have been continuing refinements to the way in which rock lobster catch and effort data are checked and corrected (Booth et al. 1994, Vignaux & Kendrick 1998, Sullivan 2004, MPI 2012) and the way in which standardised indices of vulnerable biomass are calculated from them (Maunder & Starr 1995, Starr 2012a, Starr 2012b). Earlier versions of this report have been published by Starr & Bentley (2005) and Starr (2006, 2007, 2009a, 2009b, 2010, 2011, 2012a).

While the primary use of catch and effort data in stock assessments is to estimate annual indices that are assumed to be proportional to vulnerable biomass, the same data can also be used to examine the spatial and temporal distribution of catch and effort. Such analyses can be important for interpreting changes in catches and catch rates from a QMA (see Figure 1). They can also provide information for use in monitoring the fishery. For example, the proportion of catch by month and statistical area is used as a guideline for the allocation of catch sampling effort.

The annual abundance indices generated from these data are also used to manage five of the nine QMAs that support active commercial and non-commercial fisheries (Breen et al. 2009b, Breen et al. 2012). These index series are used as input to management procedures that set TAC or TACC levels, depending on the specifications of the rule. Management procedures are formal rules that set proposed catch limits based on changes in the abundance indices. They are tested with an operating model that simulates the population as it responds to the rule-based catch limit changes and evaluates the changes against agreed-upon management targets.

In this report, summaries of the spatial and temporal distribution of the catch and standardised indices of vulnerable biomass are presented. The following information is presented for each QMA:

(a) The number of vessels targeting rock lobster using pots by statistical area and fishing year;

(b) The percentage and tonnage of landings by statistical area and fishing year,

(c) The percentage and number of potlifts by statistical area and fishing year,

(d) The percentage of landings by month and fishing year,

(e) The percentage of landings by month and statistical area for the 2011–12 fishing year,

(f) The cumulative monthly landings by fishing year,

(g) The arithmetic catch per unit effort by statistical area and fishing year,

(h) Arithmetic, unstandardised, and standardised indices of CPUE for each fishing year.

This report also documents half-year (seasonal) standardisations for CRA 7 and CRA 8, which were used to inform the 2012 stock assessment and management procedure for these QMAs (Haist et al. 2013). This report also documents annual CPUE standardisations based on a 1 October–30 September year ("offset year") for CRA 3, CRA 4, CRA 5, CRA 7, and CRA 8, which are used as inputs to management procedures (Breen et al. 2009b, Breen et al. 2012) to set the TAC or TACC in the following fishing year.

The standardised indices of CPUE are assumed to reflect changes in vulnerable biomass within stock assessments and management procedures. The vulnerable biomass is the total weight of lobsters that can be captured by the fishery and legally retained. This definition also includes legal lobsters that are discarded voluntarily for economic reasons. Vulnerable biomass will be affected by changes in management of the fishery (e.g., changes in the size limit or changes to the escape gap regulations) in addition to other factors such as changes in abundance and the spatial and temporal distribution of fishing effort. The standardisation procedure takes into account these latter changes (at the scale of statistical area and month), but cannot adjust for changes in vulnerable biomass caused by management or regulatory changes, such as size limit or escape gap changes. Therefore, the CPUE indices within each series will not be comparable across the entire series if regulations such as these have changed the component of the stock that is vulnerable to commercial fishing during the period of analysis. Adjustments are made explicitly in the stock assessments to account for the effect of such regulation changes on the vulnerable biomass.

Changes in the definition of vulnerable biomass due to management actions need to be considered when interpreting the CPUE indices presented in this report. For example, there were significant management changes to the CRA 3 fishery in 1993–94, including a change in the commercial size limit for males in the winter. The CPUE indices will reflect the changes in the definitions of the vulnerable biomass caused by this management initiative. It is not possible to draw conclusions directly about the state of the stock based solely on the CPUE series presented in this report, partly because of changes over time in the definition of vulnerable biomass. The stock assessment model is better able to make these comparisons because it includes additional information such as catch sampling lengths and tagging data as well as the information in the CPUE indices about stock abundance.

2. METHODS

2.1 Data

Catch and effort data from 1 April 1979 to 30 June 1989 were obtained from the FSU (Fisheries Statistics Unit), and equivalent data from 1 July 1989 to 31 March 2012 were obtained from the WAREHOU database (MPI replog 8651). These data sources were documented by Bentley et al. (2005) and the data were stored and maintained in the CRACE database (Bentley et al. 2005). A further data extract (MPI replog 8717), covering the period 1 April 2012 to 30 September 2012, was used to extend the offset-year CPUE analyses for an additional one-half year for use in management procedures. Past management procedure evaluations (Breen et al. 2008, 2009a, Haist et al. 2011, Haist et al. 2013) found that adding an additional half year of data greatly improved the capacity of the rule to react to stock abundance changes, thus reducing risk to the stock .

Total annual landings, TACCs and TACs were obtained from QMRs from 1 April 1990 to 31 March 2001 and from MHRs after 1 April 2001 (Table 1). The catch totals from these two sources are considered to be the best available information for lobster removals for each QMA in any year.

2.2 Error checking

All records with error ratings equal to or greater than two were excluded from this analysis. These error designations, including how they were defined and applied, were described by Bentley et al. (2005). There are seven error codes used in CRACE for the MPI catch effort data: two apply to the estimated catch information, two apply to the potlift and statistical area information and three apply to the landing data (Bentley et al. 2005).

All records for vessel 4548 (a coded value), which fishes exclusively in CRA 2, have been dropped from this analysis because of a high number of outliers from this vessel. All other data have been retained in the analyses.

2.3 Catch correction

The FSU and CELR data nominally contain records for every event that occurs on a trip, where an event is defined as a day of fishing within a single statistical area using the method of rock lobster potting. In practice, many rock lobsters trips consist of a single event because they occur on a single day and do not include more than one statistical area. This pattern will vary between QMAs, with trips longer than a single day being common in some QMAs (e.g., CRA 8). The FSU data, while designed to report daily catch records, were collected monthly, so many operators reported the effort expended by day of fishing but reported only the monthly total catch (Booth et al. 1994). FSU data are reliable only on a monthly basis and so the current daily CELR data have been analysed in the same way, by making each record the summary of one vessel fishing for one month in one statistical area. Starr (2012b) compared standardised series compiled at different levels of data amalgamation (individual potlifts, daily records and monthly records) and concluded that the annual trends remained essentially unchanged, regardless of the level of data amalgamation.

Estimated catches from the top part of the CELR form (which reports the effort) are corrected proportionately using information from the bottom part (which reports the landings) on the same form. This is done to correct for possible differences in estimation methodology between fishers, thus standardising all catches relative to the reported greenweight landings. This approach assumes that the landings in the bottom part of the form correspond to the reported estimated catches and effort on the top part of the form. This assumption is often incorrect because of the practice in rock lobster fisheries of "holding" catch, either on land or in pots with no entry or egress, before final sale, thus breaking the link between effort and landings. The process of amalgamating catch and effort across an entire month reduces this problem to some extent (by averaging over the entire month), but in the early 2000s there were many months where a vessel reported effort and estimated catch, but not landings.

A procedure (known as "B4": described in Bentley et al. 2005 and in Appendix C) was developed in 2003 that identified vessel/month/statistical_area strata with no landings, dropping the information for that stratum and for the stratum in the following month for the same vessel operating in the same statistical area. It was hoped that this procedure would result in a data set that eliminated the bulk of misaligned effort and catch. However, this method failed to recognise situations where operators held and landed catch in the same month or in sequential months.

Consequently, a new procedure family was developed (known as "F": described in Appendix D) which adopted a different approach for correcting estimated catch to landed catch. Rather than calculating monthly correction factors specific to each vessel/month/statistical_area stratum, a "vessel correction factor" (*vcf*: the ratio of landed to estimated catch) was calculated for each vessel for each year, using the sum of landings divided by the estimated catches from the fishing year. The *vcf* was then applied to every estimated catch reported by that vessel in the year, on the assumption that the *vcf* was a reasonable estimate of the estimation process for that vessel. This procedure eliminated the "holding pot problem" because it used only estimated catches, under the assumption that holding behaviour would average out when considered across a fishing year. Unfortunately, the distribution of *vcf*, when considered across the entire fleet, contained many outliers that could not be used. Initially, three variants of the "F" algorithm were investigated (F1, F2 and F3: see Appendix D), which differed in how the outlier *vcf*s were handled. The RLFAWG selected the "F2" variant from the three investigated, which dropped out-of-range *vcf*s, reasoning that vessels with *vcf*s outside of the agreed bounds were less reliable than vessels with *vcf*s closer to 1. Descriptions of the three "F" algorithms, supporting analyses and comparisons with the "B4" algorithm are presented in Appendix B.

Most landings are recorded with the destination code "L" (landed to a licensed fish receiver), which is the route required for all catch which is sold commercially. However, as abundances have increased, so has the practice of landing only those lobsters that provide maximum economic return, with the balance of the legal lobsters being returned to sea. This practice is allowed for rock lobster through special provisions in the Fisheries Act (1996). From 1 April 2009, operators have been required to report the weight of legal lobsters returned to sea using the destination code "X". As noted above, for CPUE to be comparable across the entire range of abundance, all vulnerable lobsters must be included in the calculation, including those returned to the sea or those captured for other purposes. Consequently, the RLFAWG agreed that destination codes "X" and "F" (lobsters taken for personal use under Section 111 of the Fisheries Act) should be added to the "L" destination code landings when scaling estimated catches.

The "F2" algorithm, as adopted by the RLFAWG, truncates the *vcf* distribution at 0.8 (overestimates of landed catch) and 1.2 (underestimates of landed catch) and scales the estimated catches to the combined L, F and X ("LFX") destination codes. CPUE series based on the F2_LFX procedure differed noticeably from B4_L series in CRA 1, CRA 5 and CRA 9, with less important differences in the remaining QMAs (see Figure B.4). However, the direction of the differences between the two series was consistent with the hypothesis that adding the "F" and "X" destination codes would account for additional vulnerable biomass not included when scaling only to the "L" destination code. Furthermore, the consistency between the F2_LFX and B4_L series for CRA 2, CRA 3, CRA 4 and CRA 6 indicates that the F2 procedure is not substantially different from the B4 procedure in QMAs where holding pot activity is less prevalent.

2.4 Calculation of number of vessels fishing

The number of vessels that fished within each statistical area was determined for each fishing year using a data set based on vessels that targeted rock lobster using the rock lobster potting method. This data set was prepared using the "B4" catch correction algorithm (described in Appendix C), not the "F2" algorithm, because the latter algorithm drops vessels that did not meet the *vcf* cut-off criteria and will therefore give an incorrect vessel count. Because participating vessels are defined on the basis of landed commercial catch, estimated catches were scaled only to the "L" destination code, ignoring legal discards and Section 111 landings.

Many vessels report small quantities of rock lobster in an area during a fishing year. For example, on the landings part of CELR forms, 67 vessels reported landing rock lobsters in CRA 5 during 2001–02. However, 30 of these vessels each had a total catch for the year of less than 1 t (five had less than 10 kg). These vessels may have caught lobster accidentally as bycatch or mistakenly recorded CRA on returns. A "rock lobster" vessel is arbitrarily defined to be a vessel which reported at least 1 t of CRA from any of the statistical areas that make up the QMA within a fishing year.

For some Quota Management Areas, there is uncertainty in the estimated number of vessels for the 1989–90 fishing year. This fishing year had two different data sources (FSU and CELR), switching between systems on 1 July 1989. It is possible that, in some instances, each data source may have used different vessel identifiers for the same vessel, causing some duplicate counting. This problem appears to be restricted to the 1989–90 fishing year, and estimates of vessel numbers for that fishing year should be considered less accurate than for other years.

2.5 Annual indices of CPUE

Arithmetic, unstandardised, and standardised indices of annual CPUE were calculated for each QMA. Arithmetic CPUE for a QMA in year *y* $\left(\hat{A}_y\right)$, or for statistical area *a* in year *y* $\left(\hat{A}_{a,y}\right)$, were calculated as the total catch for the year divided by the total number of potlifts in the year:

Eq. 1 $$\hat{A}_y = \frac{\sum_{i=1}^{n_y} C_{i,y}}{\sum_{i=1}^{n_y} P_{i,y}} \quad ; \quad \hat{A}_{a,y} = \frac{\sum_{i \in k_{a,y}} C_{i,y}}{\sum_{i \in k_{a,y}} P_{i,y}}$$

where $C_{i,y}$ and $P_{i,y}$ are the catch and potlifts for the vessel-month-area record *i* in year *y*, and n_y is the number of vessel-month-area records in year *y*; $k_{a,y}$ is the set of the vessel-month-area records *i* that are from statistical area *a* in year *y*. Catches $\left(C_{i,y}\right)$ for Eq. 1 were scaled to the combined "LFX" destination codes and the data set prepared using the "F2" algorithm (see Appendix D).

Unstandardised CPUE for a QMA in year *y* $\left(\hat{G}_y\right)$ is the geometric mean of the ratio of catch to potlifts for each vessel-month-area record:

Eq. 2 $$\hat{G}_y = \exp\left[\frac{\sum_{i=1}^{n_y} \ln\left(C_{i,y} / P_{i,y}\right)}{n_y}\right]$$

where $C_{i,y}$, $P_{i,y}$ and n_y are as defined for Eq. 1. Unstandardised CPUE has the same log-normal distributional assumption as the standardised CPUE, but does not take into account changes in the seasonal and spatial distribution of fishing effort. This index is the same as the "year index" calculated by the standardisation procedure when not using additional explanatory variables. Presenting the arithmetic and unstandardised CPUE indices in this report provides measures of how much the standardisation procedure has modified the series obtained from these simpler indices.

Standardised CPUE (Eq. 3) is calculated from a generalised linear model (GLM) (Maunder & Starr 1995) using fishing year, month, and statistical area as explanatory variables:

Eq. 3 $$\ln(I_i) = B + Y_{y_i} + M_{m_i} + T_{t_i} + \varepsilon_i$$

where $I_i = C_i / P_i$, where C_i is the summed scaled "LFX" catch prepared using the F2 algorithm (Appendix D) and P_i is the summed potlifts for the i^{th} vessel-month-area record, Y_{y_i} is the year coefficient for the year corresponding to the i^{th} record, M_{m_i} is the month coefficient for the month corresponding to the i^{th} record, T_{t_i} is the area coefficient for the area corresponding to the i^{th} record, B is the intercept and the ε_i error term is assumed to be normally distributed.

Maunder & Starr (1995) examined alternative methods for standardising rock lobster catch and effort data to obtain indices of abundance. They found that vessel effects were small and suggested that a standardisation based on year, month, and area was adequate for these data. The lack of a vessel effect may be because vessels tend to fish in relatively few statistical areas and consequently any difference among vessels has been captured using the area and month explanatory variables. Starr (2012b) examined detailed potlift data from the observer catch sampling and logbook programmes and concluded that vessel was a potentially important explanatory variable in the standardisations. However, research into implementing this recommendation is incomplete.

Canonical coefficients and standard errors were calculated for each categorical variable (Francis 1999). Standardised analyses typically set one of the coefficients to 1.0 without an error term and estimate the remaining coefficients and the associated error relative to the fixed coefficient, because of parameter confounding. The Francis (1999) procedure rescales all coefficients by forcing the geometric mean of the coefficients to equal 1.0 and also calculates a standard error for each coefficient, including the fixed coefficient. For comparability, the normalised unstandardised and the canonical standardised coefficients were multiplied by the geometric mean of the appropriate arithmetic CPUE index (Eq. 1) so that all three sets of indices were scaled to the same mean.

Annual CPUE standardisations based on the offset year definition (1 October to 30 September) were prepared for CRA 3, CRA 4, CRA 5, CRA 7, and CRA 8. The methodology used to estimate these series is identical to the methodology used for the statutory fishing year (Eq. 3) and makes use of data up to 30 September 2012 (see Section 2.1). Diagnostic tables and figures for each offset-year standardisation, including "influence" CDI plots (Bentley et al. 2011) for the month and statistical area explanatory variables, are provided in Appendix B (CRA 3), Appendix F (CRA 4), Appendix G (CRA 5), Appendix H (CRA 7) and Appendix I (CRA 8).

2.6 Indices by assessment (seasonal) period for CRA 7 and CRA 8

Seasonal CPUE standardisations using periods based on sequential AW and SS seasons, instead of complete years, have been prepared for CRA 7 and CRA 8 (Eq. 4). Thus, the fishing year explanatory variable is replaced in the standardisation model by a period explanatory variable. The model becomes:

Eq. 4 $$\ln(I_i) = B + R_{r_i} + M_{m_i} + T_{t_i} + \varepsilon$$

where $I_i = C_i / P_i$, where C_i is the summed scaled "LFX" catch prepared using the F2 algorithm (Appendix D) and P_i is the summed potlifts for the i^{th} vessel-month-area record, R_{r_i} is the period coefficient for the period corresponding to the i^{th} record, M_{m_i} is the month coefficient for the month corresponding to the i^{th} record, T_{t_i} is the area coefficient for the area corresponding to the i^{th} record, B is the intercept, and ε is an error term.

The interpretation of the *month* explanatory variable in the model defined by Eq. 4 differs from the annual model described by Maunder & Starr (1995) and in Section 2.5. When the fishing year is split into two seasons, additional confounding occurs with the *month* effects within each season, requiring that one of the *month* coefficients be set to 1.0 in each period. The indices are slightly sensitive to the choice of the month dropped, with the estimated coefficients changing by small amounts when different months are fixed. A convention has been adopted that sets the month with the most records in each six-month period equal to 1.0, because this month should generally have the lowest standard error. The *month* coefficients in the seasonal model do not show as much variation as the *month* effects in an annual model because part of the seasonal variation is explained by differences between periods. In the seasonal standardisation, *month* effect will take into account only the within-period variation, rather than the full seasonal variation within a fishing year. Diagnostic tables and figures for the CRA 7 and CRA 8 seasonal standardisation models are provided in Starr et al. (2013).

The geometric mean of each seasonal standardised CPUE series (AW and SS) is scaled to the geometric mean of the appropriate seasonal arithmetic series (Eq. 1); this scales the standardised seasonal CPUE to reflect the difference in average CPUE between the two seasons for stock assessment modelling.

2.7 Annual QMA catch and potlift totals by statistical area

Scaled annual catch totals (Eq. 5) for each statistical area *a* and year *y* in a QMA $\left(\hat{Q}_{a,y}\right)$ were obtained by multiplying the estimated proportion from the catch/effort data set by the total QMA catches from the QMR/MHR (see Section 2.1):

Eq. 5 $$\hat{Q}_{a,y} = Q_y \frac{\sum_{i \in k_{a,y}} L_{i,y}}{\sum_{i=1}^{n_y} L_{i,y}}$$

where Q_y is the QMR/MHR annual catch estimate in year *y*; $k_{a,y}$ is as defined for Eq. 1; $L_{i,y}$ is scaled to the "L" destination code because only "L" codes contribute to the QMR/MHR totals. The "B4" data preparation procedure has been followed when preparing $L_{i,y}$ because more catch is retained by the B4 than by the F2 procedure. $L_{i,y}$ will be referenced as "landings" in this document from this point forward.

Scaled potlifts for the total QMA $\left(\hat{P}_y\right)$ and for each statistical area *a* $\left(\hat{P}_{a,y}\right)$ were calculated using Eq. 6:

Eq. 6 $$\hat{P}_y = \sum_{i=1}^{n_y} P_{i,y} \frac{Q_y}{\sum_{i=1}^{n_y} L_{i,y}} \quad ; \quad \hat{P}_{a,y} = \sum_{i \in k_{a,y}} P_{i,y} \frac{Q_y}{\sum_{i=1}^{n_y} L_{i,y}}$$

where $P_{i,y}$ and $k_{a,y}$ are as defined for Eq. 1; Q_y and $L_{i,y}$ are defined for Eq. 5.

3. RESULTS

3.1 Landed catch and TACC

Total landings in 2011–12 were only 30 t lower than the 2010–11 total at 2 750 t, both years having the highest levels since 2000–01 (Table 1). This stability occurred despite a 30 t reduction in landings in CRA 7 (which landed only 60% of a reduced TACC) and a 57 t reduction in CRA 8 (due to a drop in TACC from the operation of the MP), and was driven by an increase in the CRA 4 landings. Landings increased in CRA 4 in response to a TACC increase resulting from the operation of the CRA 4 MP. The operation of MPs in 2011–12 resulted in drops in TACC for CRA 7 and CRA 8, an increase for CRA 4, and no change for CRA 3 or CRA 5 (MPI 2012). The remaining QMAs reported landings that were close to the specified TACCs (Table 1).

There is reasonable correspondence in all QMAs between the landings reported to the QMR/MHR system and the sum of the landings from the bottom section of the CELR form when using the B4_L procedure (Table 2A). Over all the data since 1990–91, CELR landings have averaged 94% of the QMR/MHR catches after processing through this procedure. In the most recent five years, this average has been 90%, with all QMAs recording shortfalls in 2011–12 from –3% to –19% in landings. These shortfalls were due partly to the data grooming procedure partly due to exclusion of some landings by the B4 procedure. Loss of catch is greater when the F2 procedure is used, ranging from –8% to –68% in 2011–12 and averaging overall –29% between 1990–91 and 2011–12 (Table 2B).

There is year-to-year variation in the ratio of LFR landings to reported QMR/MHR landings. For instance, in CRA 8 ratios were near 90% from 2005–06 to 2008–09 and again in 2010–11 and 2011–12, dropping below 85% in years before 2004–05 or in 2009–10. The ratio in CRA 3 increased from a low value in 2004–05, but the 2009–10 ratio dropped to nearly the 2004–05 level followed by an increase to previous levels in 2010–11 and even higher in 2011–12. In CRA 5 the ratio dropped after 2007–08 compared to the preceding four years, with the next four years showing ratios similar to those observed in the late 1990s and the early 2000s. All QMAs have ratios of LFR landings relative to MHR reports in 2011–12 near to or above 0.9, with the exception of CRA 9, which is 0.81 (Table 2A). Landings for CRA 9 often exceeded the QMR/MHR reports, possibly because of misallocation of landings by the B4 algorithm, which assigns landings by vessel to a QMA on a monthly basis using statistical area, one of which straddles CRA 8 and CRA 9 (Figure 1). This effect is noticeable in CRA 9 because of the relatively small landings relative to those in CRA 8.

The annual ratios of corrected F2 catch to the QMR/MHR landings exceed 1.0 twice, once for CRA 7 in 2009–10 and once for CRA 9 in 2010–11 (Table 2B). This can occur because the F2 algorithm has been scaled to the combined “LFX” destination codes and the X and F destination codes are not included in the QMR/MHR totals. The ratios of F2 catch to QMR/MHR catches drop below 50% in over 20 instances, particularly in CRA 5 prior to 2003–04 and CRA 6 after 2002–03 (Table 2B). The low CRA 5 values probably occurred because many operators are dropped from the data set because of low reported *vcf* values, in turn because MFish at that time advised that estimated catches should include sub-legal lobsters (this has since been corrected; MPI Science 2012). It is not known why there are such low recent values for F2 catch in CRA 1, CRA 6 and CRA 9 (Table 2B).

The number of vessels in each QMA reporting at least 1 t of landings has decreased considerably from the early 1990s (Table 3), and was much greater in all QMAs during the 1980s, before entry of lobsters into the QMS. In 1989–90, there was inaccurate recording of vessels in some QMAs because of a change-over in the catch reporting system (see Section 2.4). The total number of vessels has declined by 50% from 1990–93 to 2007–12, see Table 3).

3.2 CRA 1

Thirteen vessels reported landings from CRA 1 in 2011–12, a decrease of one from the 14 in 2010–11, but a return to the value of 13 observed from 2006–07 to 2009–10 (Table 4). Fewer than 20 vessels reported from this QMA since 2000–01, a considerable drop from the 30 or more vessels that reported before the early 1990s. The proportion of landings from Area 901 increased during the late 1990s, and the proportion of landings from Areas 902 and 903 dropped (Table 5). This pattern changed in 2003–04, when over 45% of the landings were taken in Area 902, but the predominance of Area 901 returned over the next few years, with over 40% of the landings taken from Area 901 since 2005–06 (Table 5). The remaining four statistical areas each individually account for less than 20% of the landings. Potlifts tended to be more evenly distributed across the statistical areas, without showing the strong predominance for Area 901 in recent years (Table 6).

Cumulative monthly landings by fishing year were relatively stable in the early 1980s, with most landings taken in the late winter and spring months (Table 7, Figure 2). There was a shift towards a winter-spring fishery in the mid 1990s, with July–October accounting for 63–83% of the total annual landings since 1995–96, up from 25–45% before that fishing year. The July–October percentage of landings was 58% in 2011–12 (Table 7). Landings extended into February 2012 in all five CRA 1 statistical areas, with post-December landings in CRA 1 accounting for about 8% of the annual 2011–12 catch (Table 8).

Arithmetic CPUE trajectories from 1979–80 to 2001–02 were variable between areas, although the CPUE in Areas 901 and 939 increased since the mid 1990s (Table 9, Figure 3). Area 902 had high CPUE values in the early 2000s, but these have since dropped, although the CPUEs from this statistical area are still near 1.0 kg/potlift (Table 9). Arithmetic (Eq. 1) CRA 1 CPUE had a shallow peak in 1982–83 followed by a long steady decline to 1992–93 where catch rates were around 0.6 kg/potlift (Table 10, Figure 4). Catch rates increased after that, rising above 1.0 kg/potlift in 2000–01 and have remained above this level since then. Arithmetic catch rates increased steadily from that level to above 1.8 kg/potlift in 2007–08 but have since dropped to near 1.4 kg/potlift in 2010–11 and 2011–12 (Table 10). The standardised CPUE series is very similar to the arithmetic and the geometric series, although the standardised series exceeded 1.0 kg/potlift in the mid-1990s. These high CPUE levels appear to be driven by Area 901, which has consistently increased over time (see Table 9).

3.3 CRA 2

Thirty-five vessels reported landings greater than 1 t from CRA 2 in 2011–12, an increase of 1 vessel from 2010–11 and 2 vessels from the 32 that have reported since 2007–08 (Table 11). This is a drop of 4–5 vessels compared to those reporting in the early 2000s and fewer than half the number reporting in 1979–80. This increase of two vessels in 2011–12 was driven by increases in the number of vessels reporting from Area 905 (western Bay of Plenty, see Figure 1) and Area 906. The higher number of vessels in Area 905 was not associated with a corresponding increase in the proportion of the annual landings from this statistical area (which increased only from 17 to 20% in 2010–11 and dropped back to 16% in 2011–12, Table 12). Area 906 (western Bay of Plenty) has been the predominant statistical area in terms of landings, accounting for 35–45% of the annual landings since 1990–91. After dropping to 28% in 2010–11 the percentage attributed to Area 906 increased back to 34% in 2011–12 (Table 12). The percentage of landings coming from the eastern Bay of Plenty (combined Areas 907 and 908) has remained relatively constant between 40 and 50% since the mid 1990s and has moved slightly above 50% beginning in 2009–10, with the relative contribution between these two statistical areas varying between years. The distribution of potlifts among statistical areas is similar to that of the catch, but with slightly greater proportional representation in Area 906 and less in the eastern Bay of Plenty (Table 13).

Cumulative monthly landings by fishing year were stable in the early 1980s, with most taken in the spring and summer, apart from high landings in July 1989 (Table 14, Figure 5). There was a gradual shift towards a winter fishery in the early 1990s, with about 60% of the 1994–95 landings taken from April to September. There was a peak between 1996–97 and 1998–99 with over 85% of the landings in each of these three fishing years taken between April and September. The shift then reversed, with over 40% of the landings being taken from November beginning in 2002–03 and exceeding 50% in 2011–12, while in the latter half of the 1990s less than 10% of the landings were taken after October (Table 14). In 2011–12, 96% of the landings were taken between July and February, spread between the four statistical areas (Table 15).

Arithmetic CPUE increased in all areas from the early 1990s, most strongly in Area 907 (Table 16, Figure 6). Arithmetic CPUE for the QMA increased from the early 1990s to a peak in 1997–98 and 1998–99, then declined to 2002–03 where it has remained (Table 17, Figure 7). Arithmetic and standardised CPUE were similar, except that the standardised analysis estimated a higher peak for 1997–98 and 1998–99. This was likely to have been caused by the shift in effort towards the winter months, which reduced the arithmetic and unstandardised CPUEs. The standardised indices reached a minor peak in 2006–07 and have since declined. CPUE has not returned to the high levels observed between 1995–96 and 2000–01 (Table 17, Figure 7).

3.4 CRA 3

Vessel numbers decreased from about 80 in the early 1980s in CRA 3 (Table 18) to about 30 in the late 1990s. They increased to 38–39 in 2002–04 but then dropped to fewer than 30 by 2005–06 and are currently in the mid-20s (Table 18). Relatively high numbers of vessels (near 50 or more) continued to report landings in this QMA until the 1993–94 fishing year, when the TACC was cut by 50% and the main fishery shifted to the winter months.

The relative annual landings remained consistent among the three statistical areas until 2000–01, with Area 910 (Gisborne) being the most important (Table 19). Area 911 (Mahia Peninsula) then showed the highest area landings from 2001–02 to 2003–04, possibly because of higher catch rates. The proportion of the landings from Area 911 dropped in 2004–05 to about 40% and stayed at this level until 2008–09, when there was another drop to 34% where it remained until 2011–12 when it dropped again to below 30% (Table 19). Area 910 has increased in relative importance at the expense of landings from Area 911, while the contribution from Area 909 has varied between 12 and 21%. The distribution of potlifts is similar, with 57% of the effort in Area 910 taking 57% of the catch in 2011–12 (Table 20). The distribution of effort recorded in Area 911 and Area 909 in 2011–12 also matched the distribution of landings.

This fishery was primarily a summer fishery until regulations were changed for the 1993–94 fishing year to encourage the development of a winter fishery targeted at males. Regulation changes included lowering the minimum size limit for males in June to August from 54 to 52 mm tail width, prohibiting the take of females in the same period, and closing the fishery from the beginning of September to the end of November (Sullivan 2004). The cumulative monthly landing proportions by fishing year demonstrated the shift to a winter fishery, with 65% of the landings taken by the end of August in 1993–94, rising to over 95% in 1995–96 and remaining above 80% up to 1999–2000 (Table 21, Figure 8). This shift then reversed, with the winter landings (June–August) dropping to 58% in 2000–01 and then fluctuating around 50% until 2008–09. However, there has been a recent return to a winter fishery along with an apparent increase in abundance, with 62%, 80% and 82% of the landings taken in July–August in 2009–10, 2010–11 and 2011–12 respectively (Table 22). There were significant landings in November and December from 2002–03 to 2009–10, after these months were reopened to commercial fishing, but these landings disappeared in 2010–11 and 2011–12 with the voluntary closure described below. June, July, and August have remained important months for landings, especially in Area 910, with 51% of the total 2011–12 landings coming from that statistical area in those three months (Table 22). May has been closed to commercial fishing in CRA 3 since 1993 (MPI 2012). Commercial operators have closed, by voluntary agreement, Areas 909 and 910 from the beginning of September to mid-January and Area 911 from mid-December to mid-January in each of 2008–09, 2009–10 and 2011–12 (Ministry of Fisheries Science 2011). The effect of this voluntary commercial closure can be seen in Table 22, with little or no landings reported from these areas in September to December.

Arithmetic CPUE increased strongly in all statistical areas beginning in the early 1990s, with Area 909 increasing to a higher level than the other two statistical areas (Table 23, Figure 9). CPUE in all statistical areas peaked in 1997–98 and has since declined. Area 909 dropped the least (to about 0.8 kg/potlift in the early 2000s and rising to above 1.0 kg/potlift from 2006–07) while Areas 910 and 911 dropped to about 0.5–0.6 kg/potlift, except in 2004–05 when Area 911 dropped to about 0.4 kg/potlift. All statistical areas (909, 910, and 911) have shown increasing unstandardised CPUE since 2006–07 (Table 23). CPUE for the QMA increased from the early 1990s to a peak in 1997–98, followed by a decline to a level somewhat higher than was observed in the early 1990s (Table 24, Figure 10). The CPUE trends were all similar, except that the standardised analysis estimated a relatively higher peak for 1997–98 (Table 24, Figure 10), probably caused by the shift in effort towards winter months causing a reduction in average CPUE in the arithmetic series. All three sets of indices increased from about 0.6 in 2007–08 to approaching 2.0 kg/potlift in 2011–12 (Table 24, Figure 10). The CPUE level in CRA 3 for 2011–12 is now approaching the levels observed in late 1990s.

3.5 CRA 4

The decrease in the number of vessels reporting landings from CRA 4 since the 1979–80 fishing year was less than that observed in CRA 1, CRA 2, and CRA 3 (Table 25; see Table 3). There was a jump in the number of vessels in 2006–07, going from 54 to 66 in a single year, reversing a drop of 7 vessels in the previous year. Vessel numbers declined in 2007–08, dropping to 53 and then to 42 and 43 in 2008–09 and 2009–10 respectively. Vessel numbers increased in 2010–11 and 2011–12 to 51. The single count of 131 vessels in 1989 is probably an artefact of the changeover from the FSU to CELR systems where vessels may have been double-counted because vessel codes were not properly transferred between the systems (see Section 2.4).

The relative importance of the five statistical areas in this QMA has remained consistent, with Area 914 (South Wairarapa) being the most important in terms of total landings (Table 26). There was a decrease in the proportion of landings reported from this area since the peak (55%) observed in 2005–06, but the percentage landings from this statistical area increased considerably between 2009–10 and 2011–12, rising from 33 to 49%. The increase in Area 914 catches came with commensurate decreases in Area 912 (Hawke’s Bay) and Area 915 (Palliser) while Area 913 (North Wairarapa) increased to nearly 30% in 2011–12. The distribution of effort was similar to the distribution of catch, but with a slightly lower proportion of potlifts in Area 913 and higher in Area 912 relative to the distribution of catches (Table 27).

Before 1993–94, most fishing took place in the spring and summer months, with only about 25–30% of the landings taken from April to August (Table 28, Figure 11). From 1994–95, the period from April to August accounted for over 50% of the total landings and these five months continued to account for over 50% of the landings up to 2002–03, peaking at 86% in 1997–98 (Table 28, Figure 11). This trend has since reversed, with only 43% of the landings taken by the end of August in 2004–05 and 36% in 2005–06, followed by a drop to below 20% for these same five months from 2006–07 to 2008–09. However, this trend reversed again, starting in 2009–10, with 37%, 44% and 51% of the landings taken from April to August in 2009–10, 2010–11 and 2011–12 respectively. Concurrently, the proportion of landings taken from November to March increased from 41% in 2004–05, to 50% in 2005–06 and to near to or above 60% from 2006–07 to 2008–09. This has since dropped, with only 36% of the 2011–12 landings taken between November and March. Forty-eight percent of the total landings in 2011–12 were taken between April and September in Areas 913, 914, and 915 (Table 29).

Arithmetic CPUE increased in all statistical areas (the data for Area 934 are too sparse to draw a conclusion), beginning from 1992–93 (Table 30, Figure 12). The increase in CPUE for Area 914 stabilised after the 1996–97 fishing year, well below the peak catch rates observed in the two more northerly areas, and remained slightly above 1.0 kg/potlift while Areas 912 and 913 increased to much higher levels (Table 30, Figure 12). CPUE in the four main statistical areas declined to about the same mean catch per potlift by 2001–02, all near 1.0 kg/potlift except for Area 915 (Table 30). CPUE in these statistical areas dropped to below 1.0 kg/potlift in 2005–06, but have since returned to above this level in the most recent three fishing years (except for Area 912). Area 914 showed the greatest drop, going below 0.5 kg/potlift in 2007–08 but returning to above 1.2 kg/potlift in 2011–12. The patterns of increase and the peak year for mean catch rate in Areas 912 and 913 resembled the patterns observed in the CRA 2 and CRA 3 statistical areas (compare Figure 6 and Figure 9 with Figure 12). Peak catch rates in CRA 3 occurred one to two years earlier than in Areas 912 and 913.

The pattern in the CPUE indices for CRA 4 was similar to that for CRA 3, showing a steady increase from the early 1990s to a peak in 1998–99, one year later than in CRA 3 (Table 31, Figure 13). The CPUE trends for CRA 4 were all similar, except that the standardised analysis estimated a higher peak for 1998–99 (Table 31, Figure 13), probably because of the shift in effort towards winter months, causing a reduction in average CPUE in the arithmetic and unstandardised series. The standardised CPUE index for CRA 4 was 1.25 kg/potlift in 2011–12, continuing the recovery from a low point of 0.61 kg/potlift in 2007–08 (Figure 13).

3.6 CRA 5

The number of vessels fishing in CRA 5 declined substantially since the 1979–80 fishing year, with fewer than 40 vessels reporting in this QMA after 2000–01, compared to 80 to 90 vessels during the 1980s (Table 32). The number of vessels has continued to decline since 2000–01, dropping to below 30 in 2006–07 and is now 25 in 2011–12. There are six statistical areas in this QMA, but over 80% of the landings were reported from Area 916 (Cape Campbell) and Area 917 (Kaikoura-Motunau) and a lesser amount from Area 933 (Marlborough Sounds; Table 33). The relative landings proportions between these areas has changed somewhat, with Area 916 rising in importance in the early 2000s, peaking at 48% of the total annual landings in 2003–04. Since then, this statistical area has declined in relative importance to 32% and 25% of the total annual landings in 2010–11 and 2011–12 (Table 33). There has been a corresponding increase in the importance of Area 917, which exceeded 50% of the total landings from 2009–10 (Table 33). The other three statistical areas accounted for less than 20% of the annual landings, with most of that occurring in Area 933. The distribution of effort is slightly different, with 40% of the potlifts taking 57% of the landings in Area 917 and 21% of the potlifts taking 25% of the landings in Area 916 in 2011–12 (Table 34). Area 33 was much less efficient, using 36% of the effort to take 16% of the landings.

This fishery remained predominantly a summer fishery for longer than any of the North Island QMAs, not shifting to a winter fishery until 1996–97 when the proportion of the annual landings taken in April to September exceeded 50% (Table 35, Figure 14). Also, unlike the more northerly QMAs, the relative proportion of the landings taken in the winter months continued to stay high, exceeding 80% in the AW up to 2003–04. The AW accounted for 70% of the annual landings in 2011–12 (Table 35). About 47% of the landings were taken between April and July in Areas 916 and 917 in 2011–12, with the peak landings month being May in both Area 916 and Area 917 (Table 36). Historically May has been a strong landings month in this QMA, accounting for 14–37% of the annual landings since 1996–97 (with 37% in May 2011–12, see Table 35).

Arithmetic CPUE trajectories showed similar trends in each of the statistical areas up to 1997–98. At that time, CPUE increased in all areas, especially in Area 916 (Table 37, Figure 15). CPUE in Area 916 increased to much higher levels and more quickly than in other statistical areas, peaking in 2000–01. The arithmetic catch rate for Area 916 dropped to below 2.0 kg/potlift in 2006–07 and has since ranged between 1.7 and 2.1 kg/potlift. The Area 916 arithmetic CPUE (Eq. 1) for 2011–12 was 2.01. CPUE for CRA 5 increased until 2003–04, then dropped over three successive fishing years before rising to a peak in 2009–10 (Table 38, Figure 16). The unstandardised and standardised CPUE were nearly identical, while the arithmetic CPUE lay below these two series (Table 38, Figure 16). The CRA 5 2011–12 standardised CPUE index dropped to 2.00 kg/potlift, representing a 10% decline from the 2009–10 peak.

3.7 CRA 6

The number of vessels fishing in CRA 6 fluctuated between 39 and 59 during the 1980s and most of the 1990s. In 1999–2000, vessel numbers dropped to 34 and have since fluctuated near 35 (Table 39). The relative decline in vessel numbers has been much less in CRA 6 than for the other QMAs.

There are four statistical areas in this Chatham Islands QMA, with Area 942 (Southeast Chatham Islands) generally having about 40–50% of the total landings for the QMA since 1990–91 (Table 40). The proportion of the total CRA 6 landings in Area 942 dropped to about 40% in 2006–07, with most of these landings shifting to Area 940 and some to Area 943. The percentage of landings in Area 941 has been below 20% since 2007–08 (Table 40). The two northern statistical areas (940 and 941) have accounted for about 40% of the annual landings in recent years. The distribution of potlifts by statistical area is similar to the distribution of catch (Table 41).

This fishery has been predominantly a spring-summer fishery for its entire history, with little tendency to shift to a winter fishery as in the North and South Island fisheries (Table 42, Figure 17). The fishery is closed by regulation from 01 March to 30 April in each year (MPI 2012), accounting for the lack of data in these months (Table 42). In 2011–12, 77% of the landings was taken between October and February, with 32% of the annual landings coming from Area 942 during these months (Table 43).

Arithmetic CPUE declined in the early to mid-1980s for all statistical areas, except for Area 941 which never had the high catch rates seen in the other three statistical areas (Table 44, Figure 18). Area 942 consistently had the highest mean catch rate beginning in the mid 1980s, which is likely to account for the high catches in this area (Table 44). Mean catch rates in all four statistical areas, although variable, stabilised during the mid to late 1990s and now appear be increasing at a slow rate in all statistical areas, with variability between years. CPUE for the QMA dropped in the early 1980s, and was relatively stable near 1.0 kg/potlift through the 1990s (Table 45, Figure 19). CPUE then increased to over 1.7 kg/potlift in 2006–07, and has remained between 1.5 and 1.7 kg/potlift since that year. There was a 11% rise in the standardised index from 1.51 kg/potlift in 2009–10 to 1.68 kg/potlift in 2010–11, followed by a 11% drop in 2011–12. The standardised and unstandardised indices were slightly higher than the arithmetic index in recent years, with all three series showing a similar trend of a gradual increase since the late 1990s or the early 2000s, followed by a 7 year period of stability where the CPUE has varied between 1.5 and 1.7 kg/potlift (Figure 19).

3.8 CRA 7

The number of vessels reporting in CRA 7 has dropped precipitously over the 30+ years of record, with 70–90 vessels participating in the early 1980s compared to a low of 7 in 1997–98 (Table 46). The number of vessels increased to 25 by 2000–01, dropped to 14 in 2004–05 to 2006–07, and has since ranged between 15 and 20 vessels, with 16 qualifying vessels in 2010–11, but dropping again to 9 vessels in 2011–12, coinciding with total annual landings of only 47 t, the second lowest annual total since 1990–91 (see Table 1). There are only two statistical areas in this QMA, with Area 920 accounting for about two-thirds to three-quarters of the total landings in most years up to 2003–04, but with a shift towards more equal distribution of landings between the two areas from 2004–05 to 2006–07. The proportion of total landings in Area 920 increased to two-thirds in 2007–08 and 2008–09, but this proportion dropped to below 50% in 2010–11, but increased to 64% in 2011–12 (Table 47). The distribution of potlifts was much more skewed to Area 920 than were the landings, implying lower catch rates in this statistical area (Table 48).

The seasonal distribution for this fishery has tended to be consistent over most of the reported period because this fishery has been restricted by regulation to 01 June (with the beginning of the season shifting from 20 June to 01 June for 2010–11) to 19 November since the 1992–93 fishing year for the take of “concession” sized lobsters (Sullivan 2004) (Table 49, Figure 20). However, landings accumulated quickly in 2004–05 (Figure 20) and even more quickly in both 2005–06 and 2006–07, with 55% of the 2005–06 and 44% of the 2006–07 annual landings taken by the end of July compared to a more usual expectation of 20 to 36% taken to the end of that month. This trend has changed again, with the proportion of landings taken in June and July dropping in each year from 2007–08 to a low of 9% in 2009–10. This percentage increased in 2010–11 to 25% and to 31% in 2011–12. Sixty-nine percent of the landings were taken from August to November 2011 in combined Areas 920 and 921, which was a small drop from the 76% taken in the same months in 2010 (Table 50).

Arithmetic CPUE declined in the early 1980s, then was variable, declining to a low in 1999–2000 (Table 51, Figure 21). Area 921 consistently had higher mean catch rates, but they also tended to be more variable. Both areas had declines in CPUE to the end of the 1990s, although this pattern was variable and then reversed in both 920 and 921 (Figure 21). Overall CPUE for this QMA also reflected this downward trend, but there were notable increases in mean CPUE in 1986–87, 1991–92, and 1993–94 (Table 52, Figure 22). Mean CPUE rose after 1997–98, the lowest point in the series, to a peak of 1.81 kg/potlift in 2008–09, the highest in the series (Figure 22). The CPUE index dropped by 0.7 kg/potlift in 2009–10, to 1.1 kg/potlift, triggering a reduction in the TACC in April 2010 through the operation of the CRA 7 Management Procedure. Continuing declines in CPUE (24% in 2010–11 and 16% in 2011–12) have triggered further TACC drops in 1 April 2012 and 1 April 2013 through the operation of the CRA 7 Management Procedure. The three CPUE series (Eq. 1, Eq. 2, Eq. 3) were similar, with the arithmetic series lying below the others (Table 52, Figure 22).

3.9 CRA 8

Historically, CRA 8 had more vessels fishing than any other QMA (Table 53, see Table 3) and the decline in the number of vessels was almost as great as in CRA 7 (see Table 3). The number of qualifying vessels stabilised in the low to mid-60s over the last four to five years. Seven statistical areas make up this QMA, with about 80% of the landings reported from the combined Areas 926 to 928 (Fiordland) since the mid 1990s (Table 54). Area 926 (Puysegur) increased in relative importance among the other Fiordland statistical areas, accounting for about 50% of the total CRA 8 landings from 2002–03 to 2004–05. This proportion declined to less than 30% of total landings by 2008–09 and 2009–10, but increased to about one-third of the annual landings in 2010–11 and to nearly 40% in 2011–12 (Table 54). With the drop in the importance of Area 926, there were proportionate increases in the relative size of the landings in Areas 927 and 928. Area 924 (Stewart Island) contributed between 12 and 23% of the annual landings, with recent levels near 12–16% (Table 54). Distribution of potlifts among statistical areas is similar to the distribution of landings (Table 55), with slightly less relative effort in Area 924 and more effort in 927.

The seasonal distribution of landings for this fishery has been consistent except for the most recent six years, with about 60–80% of catch taken from August to November in the years prior to 2006–07 (Table 56, Figure 23). In some years, over 15% of the annual landings were taken in December and up to 16% in January, probably reflecting earlier poor landings during the period of low abundance (Table 56). After 2003–04, with the increase in abundance, the monthly distribution of landings shifted towards an earlier fishery (similar to that observed in the east coast QMAs). Landings from April to the end of July accounted for over 40% of the annual landings in 2006–07, increasing to 51% in 2010–11 but dropping to 37% in 2011–12, compared to a more usual cumulative total of less than 10% of the annual landings in the same four months before 2003–04 (Figure 23). More than two-thirds of the annual landings were taken by the end of September in the nine years from 2003–04, ranging from 68% in 2011–12 to 91% in 2008–09. Less than 3% of the total annual landings were taken in April 2005, but the percentage of landings taken in April increased considerably after that year, ranging from 11% in April 2006, 2010 and 2011 to 15% in April 2008. The amount of landings coming from this month is much larger than in earlier years, when only a small percentage (less than 0.5%) of the total landings were taken in April. This recent increase in April landings is likely to include lobsters captured in the previous fishing year and held over in holding pots. Twenty-eight percent of the total annual landings for CRA 8 was taken in Areas 926 to 928 between April and June 2011 (Table 57).

Arithmetic CPUE by statistical area showed a gradual decline during the 1980s and early 1990s (Table 58, Figure 24). CPUE was stable up to the early 2000s, with Areas 924 and 926 having the highest mean catch rates among the statistical areas with high total catch (Table 58). Catch rates then improved quickly, with increases in all statistical areas up to 2008–09 (Table 58). All CPUE series for total CRA 8 dropped from the early 1980s to the early 1990s, then was stable. A rising trend began in 1999–2000, with a strong increase in 2003–04 and successive rises from 2005–06 to 2008–09, all with relatively large standard errors (Table 59, Figure 25). The index for 2009–10 was slightly below that for 2008–09, but remained above 4 kg/potlift. There was a 19% drop in standardised CPUE between 2009–10 and 2010–11, but only a 1% drop in 2011–12. The lowest CPUE value was recorded in 1992–93 while 1997–98 was nearly as low (Table 59). The three CPUE series (Eq. 1, Eq. 2, Eq. 3) all show similar trajectories, with the standardised index rising the most steeply of the three (Table 59, Figure 25).

3.10 CRA 9

The number of vessels reporting lobster landings in CRA 9 has reduced considerably, from above 20 in the early 1980s to fewer than 10 after 2002–03, and then to only 6 from 2008–09 to 2010–11 and 5 in 2011–12 (Table 60). Many of the statistical area or month cells in this QMA had no vessels reporting landings at all or had fewer than the MPI criterion requiring at least three vessels reporting before summary data can be presented. Therefore the summary tables for this QMA are missing a considerable amount of information. There are seven statistical areas in CRA 9, with Areas 931 and 935 being the most important in terms of landings, and with lower proportions of landings in Areas 930, 936, and 937 (Table 61). The proportions of the annual landings among statistical areas have fluctuated widely, but Area 935 has consistently had the highest proportion of landings, possibly reflecting the distribution of effort rather than any underlying differences in relative abundance between statistical areas (Table 61). Effort is similarly concentrated in this statistical area (Table 62). Only one of the statistical area cells in Table 61 and Table 62 met the reporting criterion of at least three vessels in 2011–12.

Landings in this fishery shifted away from the summer to the late winter in the mid 1990s, with the cumulative landings to the end of September increasing past 50% in 1995–96 (Table 63, Figure 26). This shift was particularly strong from 2004–05, with over 80% of the annual landings taken by the end of September in that year, increasing to 95–97% between 2005–06 and 2007–08 (Table 63). This trend has reversed, because the total percentage landings taken from April to September dropped to 79% in 2008–09, 62% in 2009–10, 70% in 2010–11 and 57% in 2011–12, possibly indicating a shift to later months (66% of the catch was taken in Areas 931 and 935 from August to October 2011). Note that none of the cells in Table 64 satisfy the criterion of at least three vessels reporting.

Arithmetic CPUE trajectories by statistical area from 1979–80 to 2011–12 are difficult to interpret because many of the year/statistical area combinations cannot be reported (Table 65, Figure 27). Areas 931 and 935 have shown the highest catch rates in most years (Table 65). CPUE for this QMA increased strongly from 2002–03 to 2005–06 after a long period of stability. This was followed by a flattening of the series in 2006–07, and then by a drop to about 2 kg/potlift over the two years to 2008–09 (Table 66, Figure 28). The three index values from 2009–10 to 2011–12 represent an increasing trend from the 2008–09 index. The CPUE trends for the geometric (Eq. 2) and standardised (Eq. 3) indices are nearly identical, indicating that there is very little effect of the standardisation procedure. The arithmetic index (Eq. 1) seems less stable, which is likely to reflect outlier data issues. Starr (unpublished) investigated data issues in the CRA 9 offset-year CPUE analysis and found problems with the F2 algorithm applied to this data set, and problems with the “F” destination codes. Consequently, the CPUE indices presented in Table 65, Table 66, Figure 27 and Figure 28 should be interpreted cautiously, recognising that these values are likely to change as these problems are further investigated.

3.11 CRA 3 standardised CPUE: offset year

Annual standardised indices for CRA 3 were calculated for the 1 October–30 September offset year (Table 67, Figure 29). Data were available for this series up to 30 September 2012 (see Section 2.1) which provided input to the management procedure decision rule developed in 2009 for CRA 3 (Breen et al. 2009a). This series was based on a data set prepared using the B4 catch correction algorithm, scaled to the “L” destination code, because that was the procedure used to prepare the data set when the MP was evaluated in 2009. This series closely resembled the statutory fishing year series (Figure 10), but the upturn observed between low point in 2004–05 and 2011–12 was somewhat stronger in the offset year series (+315% for the offset series increase compared to +285% for the fishing year series: compare Table 24 with Table 67).

The total deviance explained by the standardisation analysis was 47% (Table E.2), with most of the explanatory power lying with the *offset_year* variable and some in the *month* variable. The standardised residuals showed some deviation away from the model lognormal assumption at the extreme tails of the residual distribution, but were acceptable for about 95% of the distribution (Figure E.1). There was strong contrast in the *month* variable, with quite high relative coefficients for October to January and June and low coefficients for March to May and August and September (Figure E.2). The CDI (influence) plot shows that the model adjusted for the nine years between 1993–94 and 2001–02 when there was virtually no fishing during the months of October to February by raising the annual coefficients during that period. As with the analysis presented in Section 3.4, Area 910 had the lowest relative catch rate, but there was little contrast between the three statistical areas that make up this QMA and little explanatory power in this variable (Figure E.3).

3.12 CRA 4 standardised CPUE: offset year

Annual standardised indices for CRA 4 were calculated for the 1 October–30 September offset year (Table 68, Figure 30). Data were available for this series up to 30 September 2012 (see Section 2.1) which provided input for the management procedure decision rule developed in 2011 (Breen et al. 2012). This series was based on a data set prepared using the B4 catch correction algorithm, scaled to the “L” destination code, because that was the procedure used to prepare the data set when the MP was evaluated in 2011. This series closely resembled the statutory fishing year series (Figure 13), but the upturn observed between low points in 2007–08 and 2011–12 was somewhat stronger in the offset year series (+124% for the offset series increase compared to +107% for the fishing year series: compare Table 31 with Table 68).

The total deviance explained by the standardisation analysis was acceptable but not as strong as for the CRA 3 analysis (26%, Table F.2), with most of the explanatory power lying with the *offset_year* variable and the remainder in the *month* variable. The standardised residuals showed similar deviations from the model lognormal assumption as did the CRA 3 analysis at the extreme tails of the residual distribution, but were acceptable for about 95% of the distribution (Figure F.1). As for the CRA 3 analysis, there was good contrast in the *month* variable, with the model adjusting for the 4–5 years with little data in the November to March period by raising the annual coefficients during that period (Figure F.2). The *statistical_area* variable had little explanatory power and contrast between the five statistical areas that make up this QMA (Figure F.3).

3.13 CRA 5 standardised CPUE: offset year

Annual standardised indices for CRA 5 were calculated for the 1 October–30 September offset year (Table 69, Figure 31). Data were available for this series up to 30 September 2012 (see Section 2.1) which formed the input for the management procedure decision rule developed for CRA 5 in 2010 (Haist et al. 2011). This series was based on a data set prepared using the B4 catch correction algorithm, scaled to the “L” destination code, because that was the procedure used to prepare the data set when the MP was evaluated in 2010. This series closely resembled the statutory fishing year series (Figure 16), but the upturn observed between low points in 2005–06 and 2011–12 was somewhat stronger in the fishing year series (+22% for the offset series increase compared to +39% for the fishing year series: compare Table 38 with Table 69).

The total deviance explained by the standardisation analysis was satisfactory (35%, Table G.2), with most of the explanatory power lying with the *offset_year* variable and lesser amounts with the *month* and *statistical_area* variables. The standardised residuals showed some deviation from the model lognormal assumption at the extreme tails of the residual distribution, but were acceptable for at least 95% of the distribution (Figure G.1). There was contrast in the *month* variable, with high relative coefficients estimated from November to February, but there was little explanatory power in this variable (Figure G.2). None of the winter months had coefficients greater than 1.0 except May, slightly above 1.0. As with the analysis presented in Section 3.6, Areas 916 and 918 had higher catch rates than the other statistical areas in this QMA, with the remainder all having coefficients less than 1.0 (Figure G.3). Again, there was little explanatory power in this variable.

3.14 CRA 7 standardised CPUE: offset year

Annual standardised indices for CRA 7 were calculated for the 1 October–30 September offset year (Table 70, Figure 32). Data were available for this series up to 30 September 2012 (see Section 2.1) which formed the input for the management procedure decision rule developed for CRA 7 in 2012 (Haist et al. 2013). This series was based on a data set prepared using the F2 catch correction algorithm (with *vcf* truncated below 0.8 and above 1.2), scaled to the combined “LFX” destination codes, because that was the procedure used to prepare the data set when the MP was evaluated in 2012. This series peaked in 2007–08 and has since dropped for a total decline of 67% between 2007–08 and 2011–12 (the equivalent drop for the fishing year analysis was –60%: compare Figure 22 with Figure 32). This observation leads to the conclusion that the decline in the CRA 7 CPUE began from 1 October 2008 and has shown a consistent response after that date.

The total deviance explained by the standardisation analysis was acceptable (30%, Table H.2), with most of the explanatory power lying with the *offset_year* variable, followed by *statistical_area*. There is almost no explanatory power in the *month* variable. The standardised residuals showed deviation from the model lognormal assumption at the extreme tails of the residual distribution and some clumping, but were acceptable for at least 95% of the distribution (Figure H.1). Area 921 had a much higher catch rate than Area 920 but there was no trend in the distribution of catch between these two areas and the influence on the annual coefficients is variable (Figure H.2). There was almost no contrast in the *month* variable, except for the March and April relative coefficients, which were well below 1.0. Fishermen cannot land lobster using the concession MLS from December, resulting in little fishing in these months and low relative catch rates (Figure H.3).

3.15 CRA 8 standardised CPUE: offset year

Annual standardised indices for CRA 8 were calculated for the 1 October–30 September offset year (Table 71, Figure 33). Data were available for this series up to 30 September 2012 (see Section 2.1) which formed the input for the management procedure decision rule developed for CRA 8 in 2013 (Haist et al. 2013). This series was based on a data set prepared using the F2 catch correction algorithm (with *vcf* truncated below 0.8 and above 1.2), scaled to the combined “LFX” destination codes, because that was the procedure used to prepare the data set when the MP was evaluated in 2012. This series peaked in 2008–09 and has since dropped for a total decline of 18% between 2008–09 and 2011–12 (the equivalent drop for the fishing year analysis was –22%: compare Table 59 with Table 71).

The total deviance explained by this standardisation analysis was the among the lowest of the five offset year models (28% within a range spanning 26–47%, see Table I.2), again with most of the explanatory power lying with the *offset_year* variable and relatively small amounts of explanatory power in the *month* and *statistical area* variables. The CRA 8 model standardised residuals showed slightly more deviation than the other four offset year analyses from the model lognormal assumption at both tails of the residual distribution, but were acceptable in the central 90–95% of the distribution (Figure I.1). The peak catching months in terms of CPUE extended from September to February, with considerably lower relative catch rates in the winter (Figure I.2). The influence plot shows that the model is able to compensate for the shift from a spring/summer fishery to a greater reliance on the winter period for catch lobster. Area 925 (Snares) had the highest relative catch rate, but little catch has been taken from there (Figure I.3). The relative catch rates for the other four important statistical areas (Area 924: Stewart Island; Areas 926 to 928: Fiordland), while showing some contrast, with Areas 924 and 926 being above 1.0 while Areas 927 and 928 were less than 1.0, appear to have little explanatory power (Figure I.3). The standardisation procedure raises the unstandardised analysis (Eq. 2) with the addition of the *month* explanatory variable (Figure I.4). This occurs because of the predominance of the winter fishery in the six most recent fishing years resulting in low overall unstandardised catch rates (Figure I.2).

3.16 CRA 7 and CRA 8: standardised CPUE indices by period

Standardised indices by season were calculated for CRA 7 (Table 72, Figure 34) and CRA 8 (Table 73; Figure 35), ending with the SS period in 2011–12, which was used as input to the 2012 CRA 7 and CRA 8 stock assessments (Starr et al. 2013; Haist et al. 2013). For CRA 7, the trend for the AW standardised series was almost identical to the trend for the annual CPUE series reported in Figure 22, which is not surprising considering that most of the catch in CRA 7 is taken during the winter. While the absolute size of the SS peak is noticeably greater than the peak of the AW series, the overall shape of the two series is similar. Similar conclusions can be made for the CRA 8 series: both the AW and the SS series resemble the annual series presented in Figure 25, although they differ in the direction taken in the final data point.

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5. REFERENCES

Bentley, N.; Kendrick, T.H.; Starr, P.J.; Breen, P.A. (2011). Influence plots and metrics: tools for better understanding fisheries catch-per-unit-effort standardisations. *ICES Journal of Marine Science*, doi:10.1093/icesjms/fsr174.

Bentley, N.; Starr, P.J.; Walker, N.A.; Breen, P.A. (2005). Catch and effort data for New Zealand rock lobster fisheries. *New Zealand Fisheries Assessment Report 2005/49*. 49 p. (http://fs.fish.govt.nz/Doc/10671/2005 FARs/05_49_FAR.pdf.ashx)

Booth, J.D.; Robinson, M.; Starr, P.J. (1994). Recent research into New Zealand rock lobsters, and a review of recent rock lobster catch and effort data. New Zealand Fisheries Assessment Research Document 94/7. 56 p. (Unpublished report held in NIWA library, Wellington.)

Breen, P.A.; Haist, V.; Smith, A.N.H.; Starr, P.J. (2008). Review of the NSS decision rule for stocks CRA 7 and CRA 8 and development of new operational management procedures. *New Zealand Fishery Assessment Report 2008/55*. 71 p.

Breen, P.A.; Haist, V.; Starr, P.J.; Kendrick, T.H. (2009a). Development of a management procedure for the CRA 3 stock of rock lobsters (*Jasus edwardsii*). Final Research Report for CRA2006–01B, 2009–10, Objective 4 (unpublished report held by Ministry for Primary Industries, Wellington). 50 p.

Breen, P.A.; Haist, V.; Starr, P.J.; Pomarède, M. (2012). The 2011 stock assessment and management procedure development for red rock lobsters (*Jasus edwardsii*) in CRA 4. *New Zealand Fisheries Assessment Report 2012/09*. 98 p.

Breen, P.A.; Starr, P.J.; Haist, V. (2009b). New Zealand decision rules and management procedures for rock lobsters. *New Zealand Fisheries Assessment Report 2009/43*. 18 p.

Francis, R.I.C.C. (1999). The impact of correlations on standardised CPUE indices. New Zealand Fishery Assessment Research Document 99/42. 30 p. (unpublished report held in NIWA library, Wellington).

Haist, V.; Breen, P.A.; Starr, P.J.; Kendrick, T.H. (2011). The 2010 stock assessment of red rock lobsters (*Jasus edwardsii*) in CRA 5, and development of an operational management procedure. *New Zealand Fisheries Assessment Report 2011/12*. 68 p.

Haist, V.; Starr, P.J.; Breen, P.A. (2013). The 2012 stock assessment of red rock lobsters (*Jasus edwardsii*) in CRA 7 and CRA 8. *New Zealand Fisheries Assessment Report 2013/60*. 90 p.

Maunder, M.N; Starr, P.J. (1995). Rock lobster standardised CPUE analysis. New Zealand Fisheries Assessment Research Document 95/11 28 p. (unpublished report held in NIWA library, Wellington).

Ministry of Fisheries (2010). Warehou database documentation. Catch effort base views and fields. Version 9. 80 p. (http://www.fish.govt.nz/NR/rdonlyres/53499660-15B3-42A2-92BE-71379A6DE63A/0/Warehou_Database_Documentation_V9.pdf)

Ministry of Fisheries, Science (2011). Report from the Mid-Year Fishery Assessment Plenary, November 2011: stock assessments and yield estimates. 222 p. (Unpublished report held in NIWA Greta Point library, Wellington.) (http://fs.fish.govt.nz/Doc/22937/November Plenary 2011.pdf.ashx)

Ministry for Primary Industries (2012). Fisheries Assessment Plenary, November 2012: stock assessments and yield estimates. Compiled by the Fisheries Science Group, Ministry for Primary Industries, Wellington, New Zealand. 531 p. (http://fs.fish.govt.nz/Doc/23102/November 2012 Plenary Online.pdf.ashx)

Starr, P.J. (2006). Rock lobster catch and effort data: summaries and CPUE standardisations, 1979–80 to 2004–05. *New Zealand Fisheries Assessment Report 2006/27*. 66 p.

Starr, P.J. (2007). Rock lobster catch and effort data: summaries and CPUE standardisations, 1979–80 to 2005–06. *New Zealand Fisheries Assessment Report 2007/31*. 69 p.

Starr, P.J. (2009a). Rock lobster catch and effort data: summaries and CPUE standardisations, 1979–80 to 2006–07. *New Zealand Fisheries Assessment Report 2009/5*. 70 p.

Starr, P.J. (2009b). Rock lobster catch and effort data: summaries and CPUE standardisations, 1979–80 to 2007–08. *New Zealand Fisheries Assessment Report 2009/38*. 72 p.

Starr, P.J. (2010). Rock lobster catch and effort data: summaries and CPUE standardisations, 1979–80 to 2008–09. *New Zealand Fisheries Assessment Report 2010/47*. 79 p.

Starr, P.J. (2011). Rock lobster catch and effort data: summaries and CPUE standardisations, 1979–80 to 2009–10. *New Zealand Fisheries Assessment Report 2011/18*. 85 p.

Starr, P.J. (2012a). Rock lobster catch and effort data: summaries and CPUE standardisations, 1979–80 to 2010–11. *New Zealand Fisheries Assessment Report 2012/22*. 95 p. (http://fs.fish.govt.nz/Doc/23004/12_22_FAR.pdf.ashx)

Starr, P.J. (2012b). Standardised CPUE analysis exploration: using the rock lobster voluntary logbook and observer catch sampling programmes. *New Zealand Fisheries Assessment Report 2012/34*. 77 p. (http://fs.fish.govt.nz/Doc/23065/12_34_FAR.pdf.ashx)

Starr, P.J.; Bentley, N. (2005). Rock lobster catch and effort data: summaries and CPUE standardisations, 1979–80 to 2003–04. *New Zealand Fisheries Assessment Report 2005/50*. 68 p.

Starr, P.J.; Haist, V.; Breen, P.A. (2013). Data for the 2012 stock assessment of red rock lobsters (*Jasus edwardsii*) in CRA 7 and CRA 8. *New Zealand Fisheries Assessment Report 2013/59*. 43 p.

Sullivan, K.J. (Ed.) (2004). Report from the Mid-Year Fishery Assessment Plenary: Stock assessments and yield estimates. MPI, Wellington. 46 p. (Unpublished report held in NIWA library, Wellington).

Vignaux, M.; Kendrick, T.H. (1998). CPUE analyses for rock lobster substocks and QMAs to 1997. *New Zealand Fisheries Assessment Research Document 98/19.* 24 p. (unpublished report held in NIWA library, Wellington).

Table 1: Reported commercial landings, TACC and TAC (tonnes) of *Jasus edwardsii* by QMA for each fishing year since the species was included into the QMS on 1 April 1990. –: TAC not set. N/A: current (incomplete) fishing year (Sources: QMR for 1990–91 to 2000–01 and MHR for 2001–02 to 2012–13)

			CRA 1			CRA 2			CRA 3			CRA 4
Fishing Year	Catch	TACC	TAC	Catch	TACC	TAC	Catch	TACC	TAC	Catch	TACC	TAC
1990–91	131.1	160.1	–	237.6	249.5	–	324.1	437.1	–	523.2	576.3	–
1991–92	128.3	146.8	–	229.7	229.4	–	268.8	397.7	–	530.5	529.8	–
1992–93	110.5	137.4	–	190.3	214.6	–	191.5	327.5	–	495.7	495.7	–
1993–94	127.4	130.5	–	214.9	214.6	–	179.5	163.7	–	492.0	495.7	–
1994–95	130.0	130.5	–	212.8	214.6	–	160.7	163.7	–	490.4	495.7	–
1995–96	126.7	130.5	–	212.5	214.6	–	156.9	163.7	–	487.2	495.7	–
1996–97	129.4	130.5	–	213.2	214.6	–	203.5	204.7	–	493.6	495.7	–
1997–98	129.3	130.5	–	234.4	236.1	452.6	223.4	224.9	379.4	490.4	495.7	–
1998–99	128.7	131.1	–	232.3	236.1	452.6	325.7	327.0	453.0	493.3	495.7	–
1999–00	125.7	131.1	–	235.1	236.1	452.6	326.1	327.0	453.0	576.5	577.0	771.0
2000–01	130.9	131.1	–	235.4	236.1	452.6	328.1	327.0	453.0	573.8	577.0	771.0
2001–02	130.6	131.1	–	225.0	236.1	452.6	289.9	327.0	453.0	574.1	577.0	771.0
2002–03	130.8	131.1	–	205.7	236.1	452.6	291.3	327.0	453.0	575.7	577.0	771.0
2003–04	128.7	131.1	–	196.0	236.1	452.6	215.9	327.0	453.0	575.7	577.0	771.0
2004–05	130.8	131.1	–	197.3	236.1	452.6	162.0	327.0	453.0	569.9	577.0	771.0
2005–06	130.5	131.1	–	225.2	236.1	452.6	170.1	190.0	319.0	504.1	577.0	771.0
2006–07	130.8	131.1	–	226.7	236.1	452.6	178.7	190.0	319.0	444.6	577.0	771.0
2007–08	129.8	131.1	–	229.7	236.1	452.6	172.4	190.0	319.0	315.2	577.0	771.0
2008–09	131.0	131.1	–	232.3	236.1	452.6	189.8	190.0	319.0	249.4	577.0	771.0
2009–10	130.9	131.1	–	235.2	236.1	452.6	164.0	164.0	293.0	262.2	266.0	461.0
2010–11	130.8	131.1		224.8	236.1	452.6	163.7	164.0	293.0	414.8	415.6	610.6
2011–12	130.4	131.1	–	229.0	236.1	452.6	163.9	164.0	293.0	466.2	466.9	661.9
2012–13	N/A	131.1	–	N/A	236.1	452.6	N/A	193.3	322.3	N/A	466.9	661.9

			CRA 5			CRA 6			CRA 7			CRA 8
Fishing Year	Catch	TACC	TAC	Catch	TACC	TAC	Catch	TACC	TAC	Catch	TACC	TAC
1990–91	308.6	465.2	–	369.7	518.2	–	133.4	179.4	–	834.5	1152.4	–
1991–92	287.4	426.8	–	388.3	503.0	–	177.7	164.7	–	962.7	1054.6	–
1992–93	258.8	336.9	–	329.4	503.0	–	131.6	153.1	–	876.5	986.8	–
1993–94	311.0	303.2	–	341.8	530.6	–	138.1	138.7	–	896.1	888.1	–
1994–95	293.9	303.2	–	312.5	530.6	–	120.3	138.7	–	855.6	888.1	–
1995–96	297.6	303.2	–	315.3	530.6	–	81.3	138.7	–	825.6	888.1	–
1996–97	300.3	303.2	–	378.3	530.6	–	62.9	138.7	–	862.4	888.1	–
1997–98	299.6	303.2	–	338.7	400.0	480.0	36.0	138.7	–	785.6	888.1	–
1998–99	298.2	303.2	–	334.2	360.0	370.0	58.6	138.7	–	808.1	888.1	–
1999–00	349.5	350.0	467.0	322.4	360.0	370.0	56.5	111.0	131.0	709.8	711.0	798.0
2000–01	347.4	350.0	467.0	342.7	360.0	370.0	87.2	111.0	131.0	703.4	711.0	798.0
2001–02	349.1	350.0	467.0	328.7	360.0	370.0	76.9	89.0	109.0	572.1	568.0	655.0
2002–03	348.7	350.0	467.0	336.3	360.0	370.0	88.6	89.0	109.0	567.1	568.0	655.0
2003–04	349.9	350.0	467.0	290.4	360.0	370.0	81.4	89.0	109.0	567.6	568.0	655.0
2004–05	345.1	350.0	467.0	323.0	360.0	370.0	94.2	94.9	114.9	603.0	603.4	690.4
2005–06	349.5	350.0	467.0	351.7	360.0	370.0	95.0	94.9	114.9	603.2	603.4	690.4
2006–07	349.8	350.0	467.0	352.1	360.0	370.0	120.2	120.2	140.2	754.9	755.2	842.2
2007–08	349.8	350.0	467.0	356.0	360.0	370.0	120.1	120.2	140.2	752.4	755.2	842.2
2008–09	349.7	350.0	467.0	355.3	360.0	370.0	120.3	123.9	143.9	966.0	966.0	1053.0
2009–10	349.9	350.0	467.0	345.2	360.0	370.0	136.5	189.0	209.0	1018.3	1019.0	1110.0
2010–11	350.0	350.0	467.0	357.4	360.0	370.0	74.8	84.5	104.5	1018.3	1019.0	1110.0
2011–12	350.0	350.0	467.0	359.1	360.0	370.0	45.7	75.7	95.7	961.2	962.0	1053.0
2012–13	N/A	350.0	467.0	N/A	360.0	370.0	N/A	63.9	83.9	N/A	962.0	1053.0

			CRA 9			Total
Fishing Year	Catch	TACC	TAC	Catch[1]	TACC[2]	TAC[3]
1990–91	45.3	54.7	–	2907.4	3793.0	–
1991–92	47.5	50.2	–	3020.9	3502.9	–
1992–93	45.7	47.0	–	2629.9	3201.9	–
1993–94	45.5	47.0	–	2746.2	2912.1	–
1994–95	45.2	47.0	–	2621.5	2912.1	–
1995–96	45.4	47.0	–	2548.6	2912.1	–
1996–97	46.9	47.0	–	2690.5	2953.1	–
1997–98	46.7	47.0	–	2584.2	2864.1	1312.0
1998–99	46.9	47.0	–	2726.0	2926.8	1275.6
1999–00	47.0	47.0	–	2748.5	2850.2	3442.6
2000–01	47.0	47.0	–	2795.9	2850.2	3442.6
2001–02	46.8	47.0	–	2593.0	2685.2	3277.6
2002–03	47.0	47.0	–	2591.1	2685.2	3277.6
2003–04	45.9	47.0	–	2451.5	2685.2	3277.6
2004–05	47.0	47.0	–	2472.3	2726.4	3318.8
2005–06	46.6	47.0	–	2475.8	2589.4	3184.8
2006–07	47.0	47.0	–	2604.8	2766.6	3362.0
2007–08	47.0	47.0	–	2472.5	2766.6	3362.0
2008–09	47.0	47.0	–	2640.7	2981.0	3576.5
2009–10	46.6	47.0	–	2688.8	2762.2	3362.6
2010–11	47.0	47.0	–	2781.7	2807.3	3407.7
2011–12	47.0	47.0	–	2752.5	2792.8	3393.2
2012–13	N/A	47.0	–	N/A	2810.3	3410.7

1 Catch totals exclude CRA 10 and ET catches (outside EEZ).
2 TACC totals exclude CRA 10 (TACC=0.1 t)
3 There is no TAC for CRA 10

Table 2A: Ratio of the sum of landed catch from the bottom portion of the CELR forms to the reported QMR/MHR catch for each QMA and fishing year. Landed catches from CELRs include only records with error ratings less than or equal to one and records not excluded by the B4 algorithm (Appendix A), scaled to the "L" destination code.

Fishing Year	CRA 1	CRA 2	CRA 3	CRA 4	CRA 5	CRA 6	CRA 7	CRA 8	CRA 9
1990–91	0.96	0.86	1.00	0.99	0.94	0.81	0.89	0.86	1.03
1991–92	1.12	0.91	0.99	0.99	1.00	0.84	0.94	0.93	1.02
1992–93	1.08	0.96	0.99	1.00	0.98	0.83	0.97	0.92	1.04
1993–94	1.06	0.99	1.03	1.00	0.97	0.85	0.98	0.89	1.17
1994–95	0.99	0.93	1.00	1.01	0.96	0.92	0.98	0.90	1.35
1995–96	0.93	0.93	1.02	0.98	0.95	0.94	0.96	0.88	1.24
1996–97	1.01	0.89	0.93	0.94	0.94	0.88	0.92	0.86	1.84
1997–98	0.87	0.87	0.91	0.95	0.94	0.87	0.92	0.85	1.55
1998–99	0.87	0.90	0.87	0.94	0.92	0.83	0.86	0.85	1.45
1999–00	0.98	0.86	0.97	0.94	0.90	0.75	0.58	0.84	1.74
2000–01	0.91	0.93	0.96	0.96	0.87	0.82	0.95	0.87	1.02
2001–02	0.95	0.93	0.94	0.96	0.87	0.85	0.97	0.85	0.93
2002–03	0.96	0.93	0.91	0.98	0.86	0.82	0.95	0.79	0.94
2003–04	0.96	0.94	0.91	0.92	0.94	0.83	1.00	0.83	0.92
2004–05	0.96	0.92	0.88	0.92	1.00	0.86	0.91	0.82	0.89
2005–06	0.92	0.94	0.95	0.87	0.97	0.86	0.94	0.90	1.01
2006–07	0.92	0.99	0.95	0.91	0.97	0.89	0.95	0.90	0.94
2007–08	0.95	0.91	0.95	0.88	0.92	0.88	0.95	0.88	0.89
2008–09	0.94	0.91	0.93	0.87	0.93	0.85	0.90	0.89	0.84
2009–10	0.89	0.92	0.90	0.80	0.91	0.86	0.95	0.84	0.88
2010–11	0.93	0.94	0.94	0.90	0.94	0.87	0.94	0.90	0.86
2011–12	0.89	0.94	0.97	0.89	0.87	0.89	0.87	0.89	0.81

Table 2B: Ratio of the sum of landed catch from the bottom portion of the CELR forms to the reported QMR/MHR catch for each QMA and fishing year. Landed catches from CELRs include only records with error ratings less than or equal to one and records not excluded by the F2 algorithm (Appendix A), scaled to the combined "LFX" destination codes and only accepting vessels with a *vcf* lying between 0.8 and 1.2. Cells with values <0.5 are coloured grey and >1 are coloured yellow.

Fishing Year	CRA 1	CRA 2	CRA 3	CRA 4	CRA 5	CRA 6	CRA 7	CRA 8	CRA 9
1990–91	0.81	0.78	0.91	0.95	0.83	0.75	0.82	0.72	0.78
1991–92	0.90	0.80	0.91	0.95	0.57	0.78	0.88	0.75	0.81
1992–93	0.75	0.73	0.89	0.97	0.44	0.77	0.87	0.75	0.84
1993–94	0.93	0.76	0.96	0.97	0.40	0.76	0.89	0.77	0.73
1994–95	0.93	0.77	0.88	0.94	0.42	0.84	0.90	0.76	0.46
1995–96	0.72	0.73	0.91	0.89	0.38	0.82	0.81	0.72	0.67
1996–97	0.52	0.69	0.75	0.77	0.41	0.77	0.71	0.67	0.62
1997–98	0.56	0.77	0.78	0.81	0.50	0.80	0.90	0.72	0.71
1998–99	0.64	0.79	0.75	0.81	0.44	0.62	0.70	0.58	0.53
1999–00	0.71	0.72	0.76	0.66	0.52	0.59	0.51	0.70	0.54
2000–01	0.89	0.78	0.70	0.79	0.48	0.70	0.75	0.83	0.66
2001–02	0.92	0.84	0.62	0.74	0.53	0.66	0.92	0.72	0.62
2002–03	0.84	0.73	0.43	0.80	0.45	0.57	0.91	0.67	0.45
2003–04	0.78	0.78	0.47	0.78	0.69	0.50	0.97	0.79	0.57
2004–05	0.62	0.65	0.49	0.70	0.61	0.46	0.86	0.70	0.47
2005–06	0.61	0.65	0.56	0.57	0.65	0.49	0.85	0.74	0.50
2006–07	0.55	0.75	0.67	0.68	0.79	0.53	0.94	0.81	0.51
2007–08	0.58	0.69	0.59	0.65	0.77	0.49	0.93	0.81	0.58
2008–09	0.45	0.68	0.58	0.63	0.77	0.51	0.94	0.78	0.58
2009–10	0.58	0.70	0.62	0.65	0.72	0.47	1.02	0.82	0.92
2010–11	0.51	0.69	0.75	0.69	0.87	0.44	0.91	0.81	1.08
2011–12	0.47	0.67	0.76	0.64	0.89	0.32	0.92	0.88	0.53

Table 3: Summary table showing the number of vessels reporting at least 1 t landings in each QMA by QMA and for all of New Zealand, 1979–80 to 2011–12. Vessels catching less than 1 t in a year for an entire QMA were excluded (along with vessel=4548). The problem fishing year with overlapping vessel codes from the previous FSU and the current CELR catch reporting systems is in bold and grey. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	CRA 1	CRA 2	CRA 3	CRA 4	CRA 5	CRA 6	CRA 7	CRA 8	CRA 9	All QMAs
1979–80	34	80	70	86	88	39	90	271	23	768
1980–81	34	89	85	86	86	42	86	253	23	778
1981–82	33	88	77	88	85	45	79	221	20	728
1982–83	33	82	85	89	93	54	42	214	19	708
1983–84	31	75	84	89	93	50	40	208	22	690
1984–85	30	73	86	90	95	53	59	212	21	715
1985–86	34	78	83	88	92	57	66	208	20	721
1986–87	35	70	76	88	91	48	58	187	20	663
1987–88	30	59	72	85	84	47	51	173	19	618
1988–89	26	55	58	87	71	42	38	135	10	518
1989–90	**27**	**17**	**77**	**131**	**66**	**55**	**17**	**178**	**18**	**577**
1990–91	27	57	58	85	62	40	37	134	12	503
1991–92	33	51	65	88	68	45	46	143	13	542
1992–93	31	47	54	94	59	50	35	144	12	519
1993–94	27	46	48	100	59	53	37	143	12	518
1994–95	22	47	41	89	51	59	32	122	16	474
1995–96	23	44	34	80	49	51	27	112	14	429
1996–97	26	40	32	74	47	50	22	111	18	410
1997–98	21	42	30	72	45	50	7	107	19	386
1998–99	19	35	30	65	41	42	18	104	16	361
1999–00	20	34	32	70	39	34	17	91	17	347
2000–01	18	39	33	61	36	33	25	87	9	336
2001–02	18	36	33	62	34	32	22	74	11	316
2002–03	17	37	38	65	34	32	20	69	10	316
2003–04	16	34	39	65	34	35	17	66	9	312
2004–05	15	31	33	61	32	34	14	62	8	284
2005–06	15	36	29	54	31	35	14	60	8	276
2006–07	13	35	28	66	28	36	14	57	7	281
2007–08	13	32	28	53	27	35	20	59	7	269
2008–09	13	32	26	42	26	35	15	64	6	258
2009–10	13	32	24	43	25	35	19	62	6	258
2010–11	14	34	26	51	27	36	16	64	6	272
2011–12	13	35	25	51	25	35	9	62	5	259
Mean: 1979–80 to 1983–84	33.0	82.8	80.2	87.6	89.0	46.0	67.4	233.4	21.4	734.4
Mean: 2007–08 to 2011–12	13.2	33.0	25.8	48.0	26.0	35.2	15.8	62.2	6.0	263.2
Percent drop	-60%	-60%	-68%	-45%	-71%	-23%	-77%	-73%	-72%	-64%

Table 4: Number of vessels by statistical area from CRA 1, 1979–80 to 2011–12. Vessels landing less than 1 t in a year for the entire QMA were excluded. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	901	902	903	904	939	CRA 1
1979–80	5	9	8	7	10	34
1980–81	3	9	10	11	9	34
1981–82	3	8	10	9	8	33
1982–83	3	10	8	9	9	33
1983–84	5	14	6	8	7	31
1984–85	5	14	4	8	7	30
1985–86	5	10	8	10	8	34
1986–87	5	11	12	9	9	35
1987–88	4	10	13	8	9	30
1988–89	5	6	8	6	8	26
1989–90	7	7	5	8	9	27
1990–91	12	10	7	7	8	27
1991–92	8	16	13	12	8	33
1992–93	3	11	7	10	8	31
1993–94	6	8	6	9	6	27
1994–95	4	6	5	9	4	22
1995–96	4	6	5	9	5	23
1996–97	3	3	8	11	5	26
1997–98	2	3	4	7	6	21
1998–99	2	3	3	6	6	19
1999–00	5	3	3	6	6	20
2000–01	4	3	3	6	5	18
2001–02	4	4	3	5	5	18
2002–03	6	6	3	3	6	17
2003–04	2	6	3	3	6	16
2004–05	3	5	4	2	5	15
2005–06	3	5	3	2	5	15
2006–07	5	2	3	2	3	13
2007–08	5	4	4	2	3	13
2008–09	6	3	3	2	3	13
2009–10	5	3	2	2	3	13
2010–11	5	6	2	2	3	14
2011–12	5	3	2	2	3	13

Table 5: Distribution and annual landings by statistical area from CRA 1, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels reporting in the year/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)					Annual Catch (t)					
Fishing year	901	902	903	904	939	901	902	903	904	939	CRA 1
1979–80	16.9	23.6	19.8	15.3	24.4	19.4	27.2	22.8	17.6	28.0	115.0
1980–81	12.5	31.0	13.4	17.8	25.2	22.4	55.8	24.1	32.1	45.4	179.8
1981–82	11.1	35.4	20.6	12.1	20.8	20.4	65.0	37.8	22.1	38.1	183.3
1982–83	18.3	32.4	12.1	14.1	23.1	40.8	72.3	26.9	31.4	51.4	222.9
1983–84	21.3	31.7	7.9	14.3	24.7	49.4	73.5	18.4	33.2	57.2	231.7
1984–85	16.4	39.6	7.4	14.7	21.9	34.8	83.7	15.8	31.0	46.3	211.6
1985–86	17.4	31.1	8.6	19.2	23.7	38.0	68.0	18.8	42.1	51.9	218.8
1986–87	11.0	25.0	19.5	22.2	22.2	23.3	52.9	41.2	47.0	47.0	211.4
1987–88	18.3	23.9	15.7	18.3	23.8	34.3	44.8	29.5	34.4	44.7	187.7
1988–89	20.1	25.2	12.0	19.6	23.1	35.9	45.0	21.4	35.0	41.2	178.6
1989–90	28.3	20.4	11.3	19.7	20.4	49.2	35.5	19.6	34.2	35.5	174.0
1990–91	27.2	27.9	10.0	14.0	20.9	35.7	36.5	13.0	18.4	27.4	131.1
1991–92	7.9	30.7	16.7	18.4	26.3	10.2	39.3	21.4	23.5	33.8	128.3
1992–93	15.5	28.6	14.0	20.1	21.8	17.2	31.5	15.4	22.2	24.1	110.5
1993–94	27.0	27.9	11.7	16.8	16.6	34.4	35.6	14.8	21.4	21.2	127.4
1994–95	25.2	20.7	13.6	24.4	16.2	32.7	26.9	17.7	31.7	21.0	130.0
1995–96	15.3	16.6	17.0	31.9	19.2	19.4	21.0	21.5	40.4	24.4	126.7
1996–97	16.3	16.1	19.1	30.6	18.0	21.1	20.9	24.7	39.5	23.3	129.4
1997–98	13.8	19.4	16.0	22.9	27.9	17.8	25.1	20.7	29.6	36.1	129.3
1998–99	x	18.5	12.0	15.7	30.6	x	23.8	15.4	20.2	39.4	128.7
1999–00	45.1	8.3	5.3	10.3	30.9	56.7	10.4	6.7	13.0	38.9	125.7
2000–01	51.5	10.9	8.0	10.2	19.4	67.4	14.3	10.5	13.4	25.4	130.9
2001–02	49.2	9.5	8.5	8.6	24.1	64.3	12.5	11.1	11.2	31.5	130.6
2002–03	36.8	21.1	7.0	6.9	28.3	48.1	27.6	9.1	9.0	37.0	130.8
2003–04	x	47.0	6.1	10.2	21.5	x	60.5	7.9	13.1	27.7	128.7
2004–05	28.2	30.7	7.8	9.3	24.0	36.9	40.1	10.2	12.2	31.4	130.8
2005–06	40.3	19.1	8.8	x	21.2	52.5	25.0	11.5	x	27.6	130.5
2006–07	44.8	x	13.9	x	15.7	58.6	x	18.2	x	20.6	130.8
2007–08	52.7	15.4	10.8	9.1	12.1	68.4	20.0	14.0	11.8	15.7	129.8
2008–09	45.0	16.2	11.1	x	16.5	58.9	21.2	14.6	x	21.6	131.0
2009–10	42.2	16.3	10.3	x	21.0	55.3	21.4	13.5	x	27.5	130.9
2010–11	43.1	18.2	10.6	8.4	19.7	56.3	23.8	13.9	11.0	25.8	130.8
2011–12	44.9	19.0	6.2	9.0	20.9	58.6	24.8	8.1	11.7	27.3	130.4

Table 6: Distribution and annual potlifts by statistical area from CRA 1, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)					Annual Potlifts ('000s)					
Year	901	902	903	904	939	901	902	903	904	939	CRA 1
1979–80	6.5	12.3	21.0	21.8	38.5	10.2	19.2	32.8	34.0	60.2	156.5
1980–81	6.2	17.5	19.3	23.8	33.2	11.0	31.0	34.3	42.2	58.9	177.2
1981–82	6.0	21.7	24.8	18.3	29.1	10.1	36.5	41.8	30.9	49.1	168.4
1982–83	7.1	17.6	23.3	21.8	30.2	14.2	35.1	46.4	43.4	60.2	199.4
1983–84	12.6	23.9	14.7	24.3	24.6	26.2	49.9	30.5	50.6	51.2	208.4
1984–85	9.4	27.7	11.3	24.4	27.3	20.7	61.0	24.8	53.7	60.1	220.2
1985–86	13.3	21.3	11.5	27.5	26.4	32.7	52.3	28.2	67.7	64.9	245.8
1986–87	6.1	19.3	19.7	31.4	23.5	17.3	54.4	55.7	88.7	66.3	282.4
1987–88	8.6	18.9	18.2	26.6	27.8	21.7	47.7	46.1	67.2	70.2	252.9
1988–89	10.0	20.8	20.6	23.3	25.3	22.1	46.1	45.8	51.6	56.2	221.9
1989–90	14.1	13.4	16.7	30.1	25.6	32.9	31.3	39.0	70.0	59.7	232.8
1990–91	16.7	27.7	11.9	19.9	23.7	32.4	53.7	23.0	38.7	46.0	193.8
1991–92	3.3	22.7	22.7	26.8	24.5	7.0	48.4	48.5	57.2	52.3	213.3
1992–93	4.7	23.0	15.6	33.1	23.5	9.9	48.4	32.8	69.7	49.5	210.4
1993–94	9.3	17.5	18.3	33.2	21.7	18.3	34.4	35.9	65.2	42.5	196.3
1994–95	11.0	13.3	17.1	39.9	18.8	18.5	22.5	28.9	67.4	31.7	169.1
1995–96	7.8	12.0	17.7	44.7	17.7	10.6	16.2	24.0	60.4	24.0	135.2
1996–97	6.3	14.8	21.6	43.7	13.6	8.7	20.3	29.6	59.8	18.6	137.0
1997–98	5.8	13.9	19.3	38.9	22.1	8.4	20.2	28.2	56.9	32.3	146.0
1998–99	x	16.4	15.6	30.3	29.5	0.0	20.2	19.3	37.4	36.4	123.2
1999–00	17.4	8.1	12.3	33.2	29.1	19.9	9.2	14.1	38.1	33.4	114.8
2000–01	21.4	10.4	13.1	29.7	25.3	23.9	11.7	14.7	33.3	28.4	112.0
2001–02	22.0	4.5	14.5	22.4	36.6	22.0	4.5	14.5	22.5	36.6	100.1
2002–03	21.5	8.3	11.7	23.1	35.3	23.4	9.1	12.7	25.2	38.4	108.9
2003–04	x	17.4	9.5	34.1	32.4	0.0	18.4	10.0	36.1	34.3	105.9
2004–05	10.0	18.8	8.8	19.7	42.6	10.6	20.0	9.3	20.9	45.2	106.0
2005–06	14.4	9.9	12.4	x	42.6	16.5	11.4	14.2	0.0	48.8	114.5
2006–07	20.5	x	15.7	x	26.4	20.3	0.0	15.6	0.0	26.2	99.4
2007–08	26.3	12.9	15.8	26.5	18.4	20.8	10.2	12.5	21.0	14.6	79.0
2008–09	19.6	13.7	16.1	x	19.3	16.4	11.4	13.4	0.0	16.1	83.4
2009–10	20.3	13.3	19.2	x	19.1	16.3	10.7	15.4	0.0	15.3	80.2
2010–11	23.4	16.7	18.1	24.9	16.9	21.9	15.6	16.9	23.3	15.9	93.6
2011–12	25.7	19.8	11.9	28.4	14.2	24.1	18.5	11.2	26.7	13.4	93.9

Table 7: Percentage of annual landings by month from CRA 1, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the month/year cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1979–80	0.9	x	0.1	4.4	9.4	7.3	10.1	16.5	15.8	14.9	16.4	4.2
1980–81	2.1	0.3	0.7	3.7	6.8	4.4	11.9	10.0	19.1	23.9	11.1	5.9
1981–82	1.2	x	x	2.6	6.4	7.1	11.1	13.4	22.1	22.3	8.9	4.6
1982–83	0.2	0.4	0.4	2.8	6.3	9.6	9.7	16.1	19.6	15.1	12.5	7.2
1983–84	2.0	x	0.3	5.5	9.0	7.8	15.8	14.8	14.2	15.1	10.6	4.9
1984–85	1.8	0.7	0.6	4.0	5.1	11.1	13.5	15.4	16.0	14.5	10.1	7.2
1985–86	1.4	0.8	1.1	6.3	8.2	6.6	10.4	13.9	15.0	17.6	12.8	5.7
1986–87	1.7	0.6	1.0	6.1	10.1	10.3	14.5	14.3	13.1	11.4	11.9	5.1
1987–88	1.1	0.4	0.6	3.7	9.1	6.6	14.7	14.2	13.9	17.3	12.0	6.4
1988–89	2.4	1.4	1.0	1.8	7.2	2.4	12.8	18.3	20.7	15.4	9.0	7.6
1989–90	1.1	0.4	0.5	4.0	5.3	8.9	5.9	18.6	20.9	16.9	12.2	5.2
1990–91	0.1	0.2	0.7	4.3	14.9	12.0	14.3	14.8	15.9	11.3	7.1	4.5
1991–92	0.2	0.4	1.1	8.0	9.5	10.3	10.3	9.8	19.7	16.8	9.9	3.9
1992–93	0.1	1.1	1.9	6.3	9.5	8.3	14.0	13.9	14.2	14.9	11.0	4.9
1993–94	0.1	0.3	1.8	7.2	9.2	7.2	18.4	14.7	17.7	12.9	7.9	2.6
1994–95	0.1	0.5	2.4	9.5	15.0	7.6	10.8	17.1	17.2	8.9	7.7	3.1
1995–96	1.2	2.1	2.8	11.9	19.0	18.9	16.8	10.6	6.8	2.4	3.4	4.1
1996–97	1.2	5.0	3.9	18.5	13.9	18.9	15.7	12.2	5.9	2.3	1.7	1.0
1997–98	5.3	6.7	5.4	20.8	20.0	18.4	12.2	4.0	2.4	0.4	0.3	4.0
1998–99	4.8	6.3	7.7	21.1	17.3	20.7	10.9	4.3	3.3	2.9	0.3	0.4
1999–00	3.1	4.4	5.0	19.5	25.7	20.1	13.1	4.7	2.6	0.7	x	0.9
2000–01	2.3	2.2	4.9	13.4	23.6	23.3	22.6	4.8	0.9	1.0	0.6	0.5
2001–02	3.3	4.1	5.6	14.8	20.5	26.8	11.4	7.5	3.9	1.3	x	0.4
2002–03	4.1	5.0	2.5	15.5	19.0	16.9	21.0	8.4	4.0	3.0	x	0.4
2003–04	3.1	0.7	0.5	19.5	15.7	10.3	24.1	8.5	9.9	4.2	2.3	1.0
2004–05	1.9	2.8	3.8	17.9	14.4	13.0	21.5	8.9	2.7	4.5	7.2	1.4
2005–06	x	1.0	1.6	9.8	17.7	19.0	21.1	13.5	8.5	3.9	0.9	0.6
2006–07	1.4	2.5	2.2	20.6	19.9	14.6	14.1	8.8	4.6	5.7	4.5	1.0
2007–08	3.5	4.1	2.7	14.5	17.9	18.6	11.7	9.9	6.3	6.1	2.7	1.8
2008–09	7.1	4.5	1.2	12.3	16.9	24.9	17.2	6.5	5.8	3.7	–	–
2009–10	8.3	1.5	2.0	14.7	17.3	20.3	20.3	7.6	1.6	2.8	3.3	x
2010–11	6.7	3.0	3.3	14.1	17.2	11.4	22.7	6.6	4.7	5.1	3.1	2.0
2011–12	7.4	2.9	2.2	3.9	20.2	11.4	22.9	14.1	5.5	5.8	2.5	1.1

Table 8: Percentage of landings from CRA 1 by statistical area and month for 2011–12. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (36 instances representing 40% of the annual catch). A '–'indicates no fishing in the month/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Month	901	902	903	904	939
Apr	x	–	–	–	x
May	1.3	x	–	–	x
Jun	x	x	x	–	x
Jul	x	x	x	–	x
Aug	6.4	3.5	x	x	7.1
Sep	3.5	2.5	x	x	3.5
Oct	14.4	4.8	x	x	x
Nov	6.6	4.8	x	x	x
Dec	x	x	x	x	x
Jan	x	x	0.4	1.4	–
Feb	x	x	x	x	–
Mar	–	–	x	x	x

Table 9: Arithmetic CPUE (kg/potlift) for CRA 1 by fishing year and statistical area, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	901	902	903	904	939
1979–80	1.91	1.42	0.70	0.52	0.47
1980–81	2.05	1.80	0.71	0.76	0.77
1981–82	2.01	1.78	0.90	0.72	0.78
1982–83	2.87	2.06	0.58	0.72	0.86
1983–84	1.89	1.47	0.60	0.66	1.12
1984–85	1.68	1.37	0.64	0.58	0.77
1985–86	1.16	1.30	0.67	0.62	0.80
1986–87	1.34	0.97	0.74	0.53	0.71
1987–88	1.58	0.94	0.64	0.51	0.64
1988–89	1.62	0.98	0.47	0.68	0.73
1989–90	1.48	1.15	0.50	0.63	0.57
1990–91	1.17	0.85	0.54	0.48	0.60
1991–92	1.38	1.24	0.42	0.41	0.65
1992–93	1.60	1.28	0.48	0.31	0.48
1993–94	1.85	1.41	0.42	0.35	0.48
1994–95	1.76	1.51	0.62	0.50	0.68
1995–96	1.74	1.34	0.86	0.62	0.99
1996–97	x	x	0.79	0.54	x
1997–98	x	x	0.74	0.46	x
1998–99	x	x	0.78	0.44	0.86
1999–00	2.37	x	0.57	0.29	0.90
2000–01	2.88	x	0.75	0.38	0.90
2001–02	2.92	2.84	0.81	0.46	0.84
2002–03	2.05	3.02	0.78	0.36	0.87
2003–04	2.79	3.04	x	0.38	0.84
2004–05	3.35	1.99	x	x	1.28
2005–06	3.32	2.03	0.90	x	0.92
2006–07	3.13	x	1.20	x	0.96
2007–08	3.89	1.84	1.25	0.65	1.25
2008–09	3.82	1.78	1.01	x	1.72
2009–10	3.97	2.09	1.09	x	2.34
2010–11	3.14	1.37	0.87	x	1.70
2011–12	3.18	0.95	0.78	0.47	1.95

Table 10: Annual arithmetic, unstandardised, and standardised (with standard error) CPUE indices for CRA 1 (kg/potlift). This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.74	0.78	0.83	0.037
1980–81	1.01	0.90	1.00	0.038
1981–82	1.09	0.91	0.94	0.041
1982–83	1.12	0.95	1.01	0.040
1983–84	1.11	0.99	0.96	0.039
1984–85	0.96	0.93	0.89	0.039
1985–86	0.89	0.83	0.83	0.037
1986–87	0.75	0.80	0.81	0.037
1987–88	0.74	0.75	0.76	0.038
1988–89	0.80	0.69	0.67	0.044
1989–90	0.80	0.77	0.70	0.046
1990–91	0.70	0.69	0.61	0.044
1991–92	0.61	0.65	0.70	0.041
1992–93	0.59	0.58	0.61	0.046
1993–94	0.72	0.67	0.67	0.043
1994–95	0.81	0.85	0.86	0.045
1995–96	0.95	1.05	1.18	0.053
1996–97	0.84	0.83	1.00	0.058
1997–98	0.84	0.76	0.96	0.064
1998–99	0.91	0.89	1.10	0.063
1999–00	0.97	0.81	0.90	0.064
2000–01	1.22	1.07	1.16	0.057
2001–02	1.28	1.14	1.19	0.058
2002–03	1.23	1.21	1.11	0.057
2003–04	1.24	1.23	1.20	0.062
2004–05	1.51	1.51	1.28	0.069
2005–06	1.46	1.56	1.40	0.064
2006–07	1.49	1.88	1.77	0.060
2007–08	1.86	2.07	1.84	0.058
2008–09	1.52	2.04	1.76	0.067
2009–10	1.78	2.01	1.77	0.061
2010–11	1.35	1.72	1.49	0.059
2011–12	1.43	1.61	1.51	0.057

Table 11: Number of vessels by statistical area from CRA 2, 1979–80 to 2011–12. Vessels catching less than 1 t in a year for the entire QMA were excluded. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	905	906	907	908	CRA 2
1979–80	12	31	14	27	80
1980–81	12	41	17	25	89
1981–82	16	38	15	26	88
1982–83	16	34	13	24	82
1983–84	14	29	15	20	75
1984–85	10	29	14	24	73
1985–86	14	30	15	23	78
1986–87	12	29	13	18	70
1987–88	6	25	15	18	59
1988–89	8	27	16	11	55
1989–90	14	3	1	1	17
1990–91	13	29	16	20	57
1991–92	12	27	15	17	51
1992–93	9	20	7	18	47
1993–94	8	24	11	15	46
1994–95	9	22	9	14	47
1995–96	9	23	8	15	44
1996–97	8	17	7	13	40
1997–98	12	16	8	10	42
1998–99	10	12	5	10	35
1999–00	8	14	7	9	34
2000–01	11	16	7	12	39
2001–02	11	14	7	10	36
2002–03	9	15	10	9	37
2003–04	8	13	7	9	34
2004–05	5	13	8	11	31
2005–06	12	13	9	9	36
2006–07	9	16	5	11	35
2007–08	9	12	6	10	32
2008–09	10	13	4	10	32
2009–10	9	13	5	7	32
2010–11	15	11	4	8	34
2011–12	12	14	4	10	35

Table 12: Distribution and annual landings by statistical area from CRA 2, 1979–80 to 2011–12. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)				Annual Catch (t)				
Fishing year	905	906	907	908	905	906	907	908	CRA 2
1979–80	10.6	31.4	25.0	32.9	31.0	92.1	73.4	96.5	292.9
1980–81	9.8	38.6	24.0	27.6	43.5	172.3	106.9	123.2	446.0
1981–82	12.0	40.0	18.6	29.4	47.0	156.3	72.7	115.0	391.0
1982–83	14.0	42.9	18.9	24.3	45.6	140.1	61.7	79.2	326.6
1983–84	13.8	41.5	18.7	26.0	37.9	114.0	51.4	71.3	274.6
1984–85	11.0	38.8	18.2	31.9	29.8	104.9	49.2	86.3	270.3
1985–86	11.2	38.4	25.1	25.3	37.9	129.5	84.8	85.5	337.7
1986–87	9.8	44.1	19.6	26.5	27.0	121.1	53.8	72.9	274.9
1987–88	8.2	50.2	17.3	24.3	20.8	127.7	44.0	61.9	254.4
1988–89	10.5	49.8	18.3	21.4	23.2	110.7	40.6	47.6	222.2
1989–90	68.1	15.2	5.8	10.9	172.0	38.5	14.7	27.5	252.7
1990–91	14.9	41.8	17.3	26.1	35.4	99.2	41.1	62.0	237.6
1991–92	11.1	44.8	19.3	24.9	25.5	102.8	44.2	57.1	229.7
1992–93	14.6	44.0	11.7	29.8	27.7	83.6	22.2	56.7	190.3
1993–94	15.2	45.1	14.4	25.3	32.7	97.0	30.8	54.4	214.9
1994–95	14.8	46.4	17.9	20.9	31.4	98.7	38.2	44.5	212.8
1995–96	13.8	47.6	14.7	23.9	29.4	101.2	31.2	50.7	212.5
1996–97	15.7	48.9	14.8	20.6	33.4	104.2	31.6	44.0	213.2
1997–98	15.0	45.9	21.4	17.7	35.1	107.7	50.2	41.5	234.4
1998–99	19.3	39.8	21.6	19.3	44.9	92.5	50.1	44.9	232.3
1999–00	15.7	41.7	25.2	17.4	37.0	97.9	59.4	40.8	235.1
2000–01	16.3	42.3	23.0	18.4	38.4	99.6	54.1	43.4	235.4
2001–02	15.9	41.7	21.2	21.2	35.8	93.7	47.8	47.7	225.0
2002–03	14.6	34.7	21.8	29.0	30.0	71.3	44.7	59.6	205.7
2003–04	17.2	35.6	24.5	22.7	33.7	69.7	48.1	44.6	196.0
2004–05	11.2	38.3	23.4	27.1	22.1	75.6	46.1	53.5	197.3
2005–06	16.7	37.7	24.1	21.6	37.5	84.8	54.2	48.6	225.2
2006–07	15.4	38.2	21.4	25.0	35.0	86.5	48.6	56.6	226.7
2007–08	15.6	39.8	21.3	23.3	35.9	91.3	48.8	53.6	229.7
2008–09	14.9	36.5	23.5	25.1	34.5	84.9	54.5	58.4	232.3
2009–10	17.4	31.4	26.8	24.4	41.0	73.7	63.1	57.3	235.2
2010–11	19.6	27.9	26.2	26.2	44.0	62.8	59.0	59.0	224.8
2011–12	16.1	33.7	23.0	27.2	36.8	77.2	52.7	62.4	229.0

Table 13: Distribution and annual potlifts by statistical area from CRA 2, 1979–80 to 2011–12. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)				Annual Potlifts ('000s)				
Fishing year	905	906	907	908	905	906	907	908	CRA 2
1979–80	8.1	41.3	19.0	31.6	45.7	232.2	106.7	178.0	562.6
1980–81	8.1	42.6	18.6	30.7	59.2	311.4	136.1	224.9	731.5
1981–82	11.8	42.0	15.3	30.9	83.3	297.1	108.6	219.0	708.0
1982–83	11.8	44.2	16.3	27.7	86.1	322.5	119.2	202.1	729.9
1983–84	11.2	45.4	16.5	27.0	79.2	322.4	117.2	191.5	710.4
1984–85	9.5	44.4	16.3	29.8	69.0	323.2	118.5	216.6	727.2
1985–86	10.5	42.2	20.8	26.5	82.2	331.8	163.5	208.0	785.5
1986–87	8.4	46.1	17.8	27.7	61.6	339.9	131.1	204.4	737.0
1987–88	7.0	49.3	16.9	26.9	51.8	363.4	124.3	198.1	737.7
1988–89	10.2	48.8	19.9	21.1	62.7	300.3	122.1	129.8	614.9
1989–90	56.4	22.3	10.0	11.3	378.7	149.4	67.1	75.7	670.9
1990–91	14.7	44.2	17.2	24.0	71.2	214.3	83.5	116.4	485.3
1991–92	9.8	44.6	18.3	27.2	52.6	239.6	98.2	146.2	536.7
1992–93	11.9	44.3	13.0	30.9	57.1	212.6	62.4	148.3	480.5
1993–94	14.0	44.3	11.3	30.3	68.0	214.6	54.9	146.8	484.3
1994–95	17.0	45.6	10.9	26.6	66.6	178.9	42.7	104.2	392.5
1995–96	12.9	47.4	8.0	31.7	39.5	145.0	24.5	97.0	306.0
1996–97	14.4	52.7	6.4	26.4	37.1	135.4	16.5	68.0	257.0
1997–98	14.5	48.8	8.5	28.2	39.9	134.0	23.2	77.3	274.4
1998–99	18.3	43.8	8.9	29.0	46.8	111.8	22.8	74.0	255.4
1999–00	15.0	43.8	15.1	26.1	49.6	145.3	50.2	86.6	331.7
2000–01	16.2	46.4	18.4	18.9	53.6	153.2	60.7	62.2	329.7
2001–02	15.0	49.1	18.3	17.7	60.8	198.8	74.1	71.6	405.3
2002–03	14.6	42.3	19.3	23.8	69.0	199.9	91.2	112.3	472.4
2003–04	13.9	42.1	22.7	21.2	63.5	192.7	104.0	97.1	457.4
2004–05	8.7	43.0	21.7	26.6	39.7	195.7	98.8	121.4	455.5
2005–06	15.2	37.2	24.0	23.7	73.4	180.0	116.2	114.5	484.1
2006–07	13.9	40.7	20.9	24.5	57.8	169.3	87.2	102.1	416.3
2007–08	14.4	38.3	18.7	28.6	62.6	166.6	81.5	124.2	434.8
2008–09	13.2	44.0	15.3	27.5	57.5	191.3	66.7	119.4	434.9
2009–10	16.0	38.3	19.1	26.6	76.6	183.1	91.0	126.9	477.5
2010–11	21.0	31.5	19.3	28.1	105.6	158.6	97.3	141.4	502.8
2011–12	18.7	39.2	17.6	24.6	98.6	207.2	92.9	129.9	528.6

Table 14: Percentage of annual landings by month from CRA 2, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the month/year cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1979–80	0.6	0.2	0.3	5.8	11.1	11.6	14.0	15.9	14.4	13.0	8.3	4.9
1980–81	1.1	0.8	2.3	9.8	13.6	10.4	17.0	10.1	13.1	12.1	6.6	3.1
1981–82	1.5	0.7	1.3	7.4	10.1	9.7	16.1	15.4	14.9	11.5	6.4	4.8
1982–83	1.7	0.2	1.2	7.8	11.5	11.1	15.2	15.1	14.9	10.3	6.9	4.1
1983–84	1.4	0.2	1.6	9.7	8.7	9.1	16.8	15.9	12.3	12.4	8.2	3.8
1984–85	1.5	0.3	1.0	7.7	8.9	14.6	18.0	13.1	13.9	11.7	6.0	3.2
1985–86	0.6	0.2	0.5	6.4	9.4	9.2	18.1	15.8	14.0	13.4	8.5	4.0
1986–87	1.0	0.2	0.5	6.4	10.2	11.6	17.5	15.5	15.9	11.3	6.1	3.6
1987–88	0.6	0.1	0.6	9.5	10.8	10.3	16.7	16.9	14.3	11.5	6.1	2.6
1988–89	1.2	0.1	0.9	8.2	13.9	13.1	16.5	11.4	13.3	10.1	6.9	4.2
1989–90	2.2	0.7	2.6	24.3	9.3	10.4	8.9	17.7	10.1	11.1	2.3	0.4
1990–91	x	0.1	0.5	7.9	16.7	14.7	16.4	14.6	12.4	8.3	5.8	2.6
1991–92	0.5	0.8	1.4	11.5	12.9	12.9	19.0	15.0	10.3	7.7	5.4	2.5
1992–93	0.4	0.5	2.6	9.8	10.3	11.2	16.6	13.3	13.7	9.3	7.2	5.1
1993–94	0.3	0.1	2.7	13.4	15.6	15.4	18.3	10.9	9.4	8.2	3.7	2.0
1994–95	0.3	0.3	5.2	18.6	18.6	16.0	20.5	10.6	5.0	2.6	1.7	0.8
1995–96	0.4	0.9	7.2	22.4	24.6	19.7	16.7	3.4	1.8	0.6	0.9	1.3
1996–97	3.2	5.8	7.0	35.1	19.6	16.0	6.8	1.8	1.1	1.4	1.1	0.9
1997–98	5.3	3.8	9.3	32.0	18.9	19.8	9.1	0.4	1.0	–	x	x
1998–99	1.7	4.3	8.0	21.8	21.8	29.7	5.6	2.5	0.6	0.1	2.2	1.6
1999–00	2.1	4.4	3.7	21.2	20.3	23.0	19.0	2.0	0.6	1.2	1.0	1.3
2000–01	4.7	1.8	1.2	10.6	18.8	19.1	24.2	7.7	2.9	1.4	3.2	4.6
2001–02	3.8	2.5	1.6	13.9	14.3	16.9	23.6	9.1	3.9	2.6	3.8	4.1
2002–03	2.8	1.2	1.2	10.4	10.5	9.0	23.5	13.4	9.7	6.1	6.8	5.5
2003–04	2.0	0.6	1.1	7.8	10.7	12.6	19.9	12.6	9.3	12.1	6.5	4.9
2004–05	2.0	1.5	2.2	12.6	9.7	10.4	16.6	14.3	7.4	9.5	7.6	6.2
2005–06	1.8	0.9	0.5	7.5	11.1	14.1	16.2	12.5	11.1	10.2	9.4	4.8
2006–07	1.6	0.5	1.2	10.2	11.6	14.2	18.1	11.5	10.6	9.9	6.0	4.5
2007–08	1.4	0.6	1.1	8.8	11.4	14.0	14.5	15.9	10.2	10.4	7.4	4.3
2008–09	2.3	0.7	0.8	8.3	12.4	13.5	18.3	15.9	10.2	8.6	4.7	4.4
2009–10	0.9	0.6	1.7	11.4	9.2	11.6	19.7	13.7	12.2	10.2	6.3	2.5
2010–11	0.7	0.4	1.9	9.4	10.3	9.5	18.5	17.4	11.3	10.0	6.5	4.0
2011–12	0.1	x	1.1	6.7	8.0	11.6	20.0	15.2	15.2	13.0	6.3	2.8

Table 15: Percentage of landings from CRA 2 by statistical area and month for 2011–12. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (2 instances representing 0.8% of the annual catch). A '–'indicates no fishing in the month/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Month	905	906	907	908
Apr	0.1	–	–	–
May	x	–	–	–
Jun	0.1	0.1	0.9	–
Jul	0.8	1.7	2.7	1.4
Aug	1.3	2.2	1.9	2.6
Sep	1.6	3.7	3.7	2.7
Oct	2.6	6.3	3.9	7.2
Nov	1.8	5.9	3.5	4.0
Dec	2.9	5.0	3.3	4.0
Jan	2.2	5.1	2.5	3.2
Feb	1.5	2.4	x	1.7
Mar	1.0	1.3	–	0.5

Table 16: Arithmetic CPUE (kg/potlift) for CRA 2 by fishing year and statistical area, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the F2 algorithm scaled to the combined LFX" destination codes.

Fishing year	905	906	907	908
1979–80	0.68	0.40	0.69	0.54
1980–81	0.74	0.55	0.79	0.55
1981–82	0.57	0.53	0.67	0.53
1982–83	0.53	0.43	0.52	0.39
1983–84	0.48	0.35	0.44	0.37
1984–85	0.43	0.33	0.42	0.40
1985–86	0.46	0.39	0.52	0.41
1986–87	0.44	0.36	0.41	0.36
1987–88	0.40	0.35	0.35	0.31
1988–89	0.37	0.37	0.33	0.37
1989–90	0.53	0.25	0.22	0.33
1990–91	0.50	0.47	0.49	0.53
1991–92	0.45	0.43	0.43	0.41
1992–93	0.46	0.39	0.28	0.35
1993–94	0.51	0.45	0.50	0.30
1994–95	0.51	0.56	0.83	0.36
1995–96	0.74	0.69	1.29	0.46
1996–97	0.84	0.74	1.96	0.64
1997–98	0.93	0.81	1.86	0.61
1998–99	0.94	0.83	1.86	0.63
1999–00	0.77	0.66	1.12	0.49
2000–01	0.63	0.66	0.90	0.66
2001–02	0.59	0.47	0.65	0.63
2002–03	0.46	0.36	0.54	0.55
2003–04	0.59	0.37	0.48	0.44
2004–05	0.72	0.40	0.44	0.42
2005–06	0.55	0.48	0.45	0.40
2006–07	0.56	0.53	0.52	0.54
2007–08	0.56	0.57	0.64	0.45
2008–09	0.58	0.49	0.81	0.53
2009–10	0.57	0.42	0.70	0.48
2010–11	0.48	0.41	0.61	0.48
2011–12	0.40	0.37	0.57	0.53

Table 17: Annual arithmetic, unstandardised, and standardised (with standard error) CPUE indices for CRA 2 (kg/potlift). This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.52	0.53	0.52	0.023
1980–81	0.61	0.62	0.62	0.022
1981–82	0.55	0.53	0.52	0.021
1982–83	0.45	0.44	0.43	0.022
1983–84	0.39	0.36	0.35	0.022
1984–85	0.37	0.35	0.34	0.023
1985–86	0.43	0.40	0.40	0.023
1986–87	0.37	0.37	0.36	0.024
1987–88	0.34	0.32	0.31	0.024
1988–89	0.36	0.35	0.34	0.027
1989–90	0.35	0.33	0.35	0.047
1990–91	0.49	0.49	0.47	0.029
1991–92	0.43	0.43	0.42	0.030
1992–93	0.38	0.39	0.39	0.034
1993–94	0.42	0.43	0.43	0.034
1994–95	0.52	0.52	0.52	0.037
1995–96	0.67	0.68	0.72	0.042
1996–97	0.82	0.82	0.91	0.047
1997–98	0.88	0.98	1.07	0.046
1998–99	0.91	1.01	1.09	0.045
1999–00	0.70	0.81	0.85	0.045
2000–01	0.69	0.75	0.75	0.040
2001–02	0.55	0.55	0.55	0.037
2002–03	0.44	0.44	0.43	0.036
2003–04	0.43	0.46	0.45	0.036
2004–05	0.44	0.51	0.52	0.039
2005–06	0.47	0.51	0.49	0.038
2006–07	0.53	0.57	0.57	0.037
2007–08	0.55	0.56	0.55	0.038
2008–09	0.58	0.53	0.52	0.041
2009–10	0.52	0.47	0.46	0.039
2010–11	0.49	0.41	0.40	0.039
2011–12	0.45	0.41	0.39	0.038

Table 18: Number of vessels by statistical area from CRA 3, 1979–80 to 2011–12. Vessels catching less than 1 t in a year for the entire QMA were excluded. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	909	910	911	CRA 3
1979–80	8	45	30	70
1980–81	11	46	36	85
1981–82	15	39	28	77
1982–83	16	44	29	85
1983–84	14	47	32	84
1984–85	14	49	33	86
1985–86	14	43	33	83
1986–87	12	38	29	76
1987–88	11	42	25	72
1988–89	11	30	22	58
1989–90	10	46	24	77
1990–91	9	30	23	58
1991–92	8	32	35	65
1992–93	6	24	32	54
1993–94	7	24	20	48
1994–95	7	21	16	41
1995–96	4	18	12	34
1996–97	4	18	11	32
1997–98	6	17	9	30
1998–99	7	16	9	30
1999–00	6	17	10	32
2000–01	5	17	12	33
2001–02	5	16	13	33
2002–03	5	20	14	38
2003–04	5	19	16	39
2004–05	4	15	16	33
2005–06	4	15	11	29
2006–07	4	13	12	28
2007–08	3	13	12	28
2008–09	4	13	9	26
2009–10	3	13	9	24
2010–11	3	15	9	26
2011–12	3	14	9	25

Table 19: Distribution and annual landings by statistical area from CRA 3, 1979–80 to 2011–12. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)			Annual Catch (t)			
Fishing year	909	910	911	909	910	911	CRA 3
1979–80	12.3	53.0	34.7	59.1	254.6	166.5	480.3
1980–81	16.1	44.8	39.1	97.5	271.7	237.2	606.3
1981–82	19.2	48.3	32.5	110.3	277.4	186.4	574.1
1982–83	16.8	51.9	31.3	123.6	380.7	229.7	733.9
1983–84	11.7	52.9	35.4	89.3	404.1	270.3	763.7
1984–85	16.7	41.7	41.7	118.1	295.5	295.4	708.9
1985–86	15.4	41.8	42.8	100.6	273.3	280.1	654.1
1986–87	13.2	51.1	35.7	75.3	291.2	203.5	570.0
1987–88	19.8	47.6	32.6	70.5	169.2	115.8	355.4
1988–89	14.9	42.0	43.1	42.1	118.4	121.3	281.8
1989–90	11.8	52.8	35.4	45.4	203.7	136.8	385.9
1990–91	11.0	49.8	39.3	35.6	161.2	127.2	324.1
1991–92	11.8	41.1	47.1	31.7	110.5	126.6	268.8
1992–93	12.1	40.1	47.9	23.1	76.7	91.7	191.5
1993–94	17.9	46.1	36.0	32.2	82.7	64.5	179.5
1994–95	16.8	47.7	35.5	26.9	76.7	57.1	160.7
1995–96	13.4	54.4	32.2	21.0	85.3	50.6	156.9
1996–97	14.9	55.6	29.4	30.3	113.3	59.9	203.5
1997–98	17.2	54.9	27.9	38.4	122.6	62.4	223.4
1998–99	17.3	59.3	23.4	56.4	193.0	76.4	325.7
1999–00	17.2	54.6	28.1	56.2	178.2	91.7	326.1
2000–01	15.0	45.4	39.6	49.3	149.0	129.8	328.1
2001–02	15.5	35.5	49.1	44.8	102.8	142.2	289.9
2002–03	12.0	36.3	51.8	34.8	105.7	150.8	291.3
2003–04	13.9	36.1	50.0	30.0	77.9	108.0	215.9
2004–05	18.5	41.0	40.4	30.1	66.4	65.5	162.0
2005–06	13.5	45.6	40.9	22.9	77.6	69.6	170.1
2006–07	15.3	41.2	43.5	27.3	73.6	77.8	178.7
2007–08	16.0	45.8	38.2	27.6	78.9	66.0	172.4
2008–09	20.9	44.9	34.2	39.6	85.2	65.0	189.8
2009–10	15.9	51.3	32.8	26.0	84.1	53.9	164.0
2010–11	12.1	52.5	35.4	19.8	85.9	58.0	163.7
2011–12	16.3	56.6	27.2	26.6	92.7	44.6	163.9

Table 20: Distribution and annual potlifts by statistical area from CRA 3, 1979–80 to 2011–12. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)			Annual Potlifts ('000s)			
Fishing year	909	910	911	909	910	911	CRA 3
1979–80	11.2	50.8	38.0	58.8	267.1	199.5	525.4
1980–81	12.5	49.4	38.1	81.5	322.9	248.8	653.2
1981–82	13.5	50.4	36.1	83.3	311.6	223.1	618.0
1982–83	16.9	53.5	29.6	129.1	408.6	226.5	764.3
1983–84	12.6	55.9	31.6	111.4	494.4	279.2	885.0
1984–85	16.4	49.2	34.4	154.3	462.4	322.8	939.6
1985–86	17.0	48.0	35.0	152.5	430.4	313.6	896.5
1986–87	12.9	53.0	34.1	109.2	448.7	288.4	846.3
1987–88	17.7	53.7	28.7	143.5	435.9	232.7	812.1
1988–89	14.3	53.3	32.4	90.0	334.9	203.3	628.3
1989–90	10.8	62.7	26.5	81.3	474.1	200.4	755.9
1990–91	10.8	53.7	35.6	77.6	387.0	256.3	720.9
1991–92	12.1	47.6	40.4	99.9	393.0	333.5	826.3
1992–93	9.8	41.7	48.5	68.2	289.0	336.3	693.5
1993–94	14.6	48.2	37.2	54.8	181.5	139.9	376.2
1994–95	14.1	49.4	36.5	25.9	90.9	67.1	183.9
1995–96	14.2	45.0	40.8	17.1	54.3	49.2	120.7
1996–97	13.0	52.4	34.6	15.1	60.7	40.0	115.8
1997–98	14.3	56.9	28.8	14.7	58.4	29.5	102.6
1998–99	14.6	61.7	23.7	29.1	123.1	47.4	199.5
1999–00	15.9	56.9	27.3	33.2	118.8	57.0	209.0
2000–01	12.3	58.3	29.3	34.0	160.9	80.9	275.8
2001–02	14.6	47.5	38.0	44.7	145.6	116.4	306.6
2002–03	10.8	48.5	40.7	43.1	193.7	162.7	399.5
2003–04	9.8	37.8	52.4	34.0	130.5	181.0	345.5
2004–05	11.8	38.7	49.5	36.8	120.5	154.4	311.7
2005–06	10.2	47.9	42.0	27.9	131.0	114.9	273.8
2006–07	8.9	50.1	41.0	27.5	154.9	126.5	308.9
2007–08	9.4	45.5	45.1	27.0	130.8	129.5	287.3
2008–09	13.9	44.2	42.0	37.3	118.8	112.9	269.0
2009–10	11.4	49.0	39.6	22.1	95.1	76.9	194.1
2010–11	11.2	50.2	38.6	17.4	77.9	59.8	155.0
2011–12	15.6	56.9	27.5	16.9	61.7	29.8	108.5

Table 21: Percentage of annual landings by month from CRA 3, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the month/year cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1979–80	1.4	0.3	5.3	7.2	3.1	4.8	14.8	26.6	16.7	12.1	4.8	2.9
1980–81	2.4	0.5	3.3	8.1	6.5	4.8	11.6	18.5	18.0	14.7	6.4	5.2
1981–82	2.6	0.3	4.7	9.5	4.4	5.3	8.4	12.3	23.4	16.1	5.7	7.3
1982–83	1.6	0.5	4.7	7.6	7.0	3.8	8.7	24.4	17.7	11.4	6.2	6.4
1983–84	2.4	1.2	9.1	7.4	7.0	5.2	11.2	19.6	13.9	12.2	5.3	5.5
1984–85	1.5	0.4	11.2	6.8	3.7	3.7	17.1	21.5	15.7	11.0	5.7	1.5
1985–86	1.8	0.2	6.1	8.1	4.0	3.4	12.8	20.2	17.5	13.1	8.9	3.8
1986–87	1.4	0.1	4.9	5.3	2.7	3.8	18.1	26.0	20.1	11.5	4.5	1.5
1987–88	1.2	0.9	7.7	4.7	5.2	4.4	22.5	15.6	19.4	10.8	4.7	2.8
1988–89	1.1	0.4	4.4	4.1	2.3	8.3	22.3	17.4	16.9	9.1	5.0	8.7
1989–90	1.9	1.1	3.6	4.1	1.7	6.4	10.1	21.8	23.1	14.8	5.9	5.4
1990–91	2.0	1.1	4.0	7.3	3.8	6.5	19.0	22.3	16.7	8.3	6.2	2.8
1991–92	3.7	0.5	2.4	7.9	5.2	4.2	14.4	21.2	20.6	11.2	5.0	3.7
1992–93	1.6	0.8	6.5	6.3	4.8	1.9	7.1	19.0	22.5	17.8	5.9	5.9
1993–94	3.1	2.8	27.1	23.6	8.4	x	x	x	x	x	29.5	4.1
1994–95	7.5	–	42.9	24.0	14.9	x	x	x	x	x	7.7	1.6
1995–96	6.1	x	38.2	37.7	13.4	x	x	x	x	–	3.3	0.6
1996–97	9.2	–	37.5	35.5	15.2	0.5	x	x	–	–	x	0.7
1997–98	7.2	–	32.3	42.9	16.2	x	–	–	–	–	x	0.6
1998–99	14.4	–	27.9	24.5	21.8	x	x	–	x	–	8.5	0.9
1999–00	4.6	x	32.1	31.5	18.3	x	x	–	–	–	8.8	3.0
2000–01	8.4	–	24.2	20.0	13.4	10.8	x	–	–	x	15.5	7.8
2001–02	9.1	x	25.7	16.9	11.7	x	x	–	–	x	17.3	18.6
2002–03	2.2	–	24.8	16.9	8.4	5.8	8.0	6.6	3.7	5.9	11.1	6.7
2003–04	1.1	–	28.6	15.7	5.2	5.1	8.0	14.4	7.2	4.5	4.9	5.3
2004–05	1.7	–	30.8	13.1	8.2	1.2	4.4	11.3	5.8	9.0	8.5	6.0
2005–06	0.3	–	21.2	21.2	7.9	3.1	9.2	14.3	8.1	4.5	7.1	3.1
2006–07	1.8	–	16.3	16.2	13.1	2.6	7.5	15.5	5.0	7.5	6.3	8.3
2007–08	0.6	–	15.7	23.8	10.0	2.6	6.0	15.5	5.5	4.8	7.5	8.0
2008–09	2.7	–	21.6	21.1	11.3	1.4	3.8	6.1	4.7	12.2	12.3	2.7
2009–10	–	–	11.8	29.7	20.1	2.8	1.6	3.5	4.4	17.1	8.7	0.3
2010–11	x	–	29.5	31.4	18.9	4.0	4.3	x	–	5.3	4.8	0.8
2011–12	3.9	–	23.2	39.9	18.7	5.1	0.8	–	x	6.3	1.8	x

Table 22: Percentage of landings from CRA 3 by statistical area and month for 2011–12. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (7 instances representing 4.4% of the annual catch). A '–'indicates no fishing in the month/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Month	909	910	911
Apr	–	x	2.1
May	–	–	–
Jun	2.7	15.2	5.3
Jul	8.4	25.8	5.6
Aug	3.7	10.3	4.7
Sep	–	x	4.2
Oct	–	–	0.8
Nov	–	–	–
Dec	x	–	x
Jan	x	2.4	2.6
Feb	x	–	1.7
Mar	–	–	x

Table 23: Arithmetic CPUE (kg/potlift) for CRA 3 by fishing year and statistical area, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	909	910	911
1979–80	1.01	0.95	0.84
1980–81	1.20	0.84	0.95
1981–82	1.32	0.89	0.84
1982–83	0.96	0.93	1.01
1983–84	0.80	0.82	0.97
1984–85	0.77	0.64	0.92
1985–86	0.66	0.64	0.89
1986–87	0.69	0.65	0.71
1987–88	0.49	0.39	0.50
1988–89	0.47	0.35	0.60
1989–90	0.55	0.43	0.70
1990–91	0.46	0.43	0.51
1991–92	0.34	0.28	0.38
1992–93	0.36	0.27	0.27
1993–94	0.66	0.46	0.46
1994–95	1.58	0.83	0.82
1995–96	2.16	1.52	1.01
1996–97	2.51	1.81	1.43
1997–98	2.79	1.96	2.05
1998–99	1.93	1.61	1.69
1999–00	2.08	1.53	1.63
2000–01	x	0.91	1.53
2001–02	0.88	0.70	1.27
2002–03	1.05	0.54	0.89
2003–04	0.97	0.58	0.76
2004–05	0.99	0.55	0.46
2005–06	1.08	0.57	0.61
2006–07	1.07	0.48	0.63
2007–08	1.07	0.62	0.49
2008–09	1.22	0.77	0.55
2009–10	1.28	0.99	0.68
2010–11	1.27	1.17	0.91
2011–12	1.48	1.62	1.53

Table 24: Annual arithmetic, unstandardised, and standardised (with standard error) CPUE indices for CRA 3 (kg/potlift). This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.91	0.84	0.78	0.022
1980–81	0.93	0.91	0.87	0.021
1981–82	0.93	0.90	0.86	0.021
1982–83	0.96	0.96	0.93	0.021
1983–84	0.86	0.87	0.85	0.020
1984–85	0.75	0.71	0.69	0.020
1985–86	0.73	0.68	0.66	0.021
1986–87	0.67	0.60	0.57	0.022
1987–88	0.44	0.42	0.41	0.022
1988–89	0.45	0.44	0.42	0.025
1989–90	0.51	0.46	0.45	0.023
1990–91	0.46	0.43	0.43	0.024
1991–92	0.33	0.30	0.29	0.023
1992–93	0.28	0.25	0.24	0.024
1993–94	0.48	0.45	0.50	0.034
1994–95	0.89	0.91	0.97	0.047
1995–96	1.34	1.47	1.55	0.050
1996–97	1.75	1.83	1.94	0.054
1997–98	2.10	2.32	2.46	0.055
1998–99	1.67	1.92	2.11	0.050
1999–00	1.61	1.77	1.93	0.050
2000–01	1.13	1.22	1.38	0.043
2001–02	0.90	0.97	1.05	0.043
2002–03	0.65	0.67	0.68	0.036
2003–04	0.68	0.64	0.61	0.037
2004–05	0.55	0.49	0.47	0.038
2005–06	0.61	0.60	0.57	0.038
2006–07	0.56	0.60	0.58	0.035
2007–08	0.61	0.61	0.59	0.040
2008–09	0.70	0.68	0.65	0.044
2009–10	0.86	0.91	0.88	0.047
2010–11	1.06	1.23	1.24	0.048
2011–12	1.57	1.74	1.81	0.050

Table 25: Number of vessels by statistical area from CRA 4, 1979–80 to 2011–12. Vessels catching less than 1 t in a year for the entire QMA were excluded. A '–' indicates no fishing in the statistical area/fishing year cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	912	913	914	915	934	CRA 4
1979–80	25	32	31	17	0	86
1980–81	26	20	30	19	0	86
1981–82	30	25	27	17	0	88
1982–83	28	22	29	18	0	89
1983–84	26	23	32	17	1	89
1984–85	25	24	32	19	1	90
1985–86	27	21	39	17	1	88
1986–87	25	23	35	17	2	88
1987–88	24	19	35	17	0	85
1988–89	22	24	42	16	0	87
1989–90	33	40	57	19	0	131
1990–91	26	25	32	18	0	85
1991–92	25	33	35	13	1	88
1992–93	31	29	33	11	1	94
1993–94	32	33	38	13	2	100
1994–95	23	29	41	14	4	89
1995–96	19	21	36	14	2	80
1996–97	19	15	35	16	1	74
1997–98	18	15	35	9	–	72
1998–99	22	15	32	11	–	65
1999–00	18	15	33	12	1	70
2000–01	21	13	25	11	1	61
2001–02	22	18	25	13	2	62
2002–03	16	16	25	13	1	65
2003–04	15	16	27	13	–	65
2004–05	16	16	27	10	2	61
2005–06	12	12	25	12	2	54
2006–07	14	15	33	11	4	66
2007–08	10	11	24	11	6	53
2008–09	10	13	18	7	1	42
2009–10	10	12	16	10	1	43
2010–11	12	12	21	12	1	51
2011–12	10	15	24	9	2	51

Table 26: Distribution and annual landings by statistical area from CRA 4, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)					Annual Catch (t)					
Fishing year	912	913	914	915	934	912	913	914	915	934	CRA 4
1979–80	21.4	30.2	38.2	10.1	x	107.6	152.3	192.3	50.9	x	503.7
1980–81	32.4	21.7	33.5	12.2	0.2	197.1	131.6	203.6	74.4	1.0	607.7
1981–82	35.6	22.6	29.3	12.4	x	218.9	138.9	180.1	76.4	x	614.2
1982–83	25.7	21.8	37.6	14.8	x	219.6	186.1	321.1	125.9	x	853.5
1983–84	19.8	27.8	40.0	12.2	x	185.9	261.7	376.5	115.0	x	940.4
1984–85	25.1	25.7	37.1	11.6	x	216.6	222.1	320.0	100.5	x	863.3
1985–86	27.0	21.2	36.7	14.7	0.4	228.9	180.1	310.9	124.3	3.8	848.0
1986–87	21.9	29.3	37.4	11.2	x	207.3	277.8	354.0	106.0	x	947.5
1987–88	19.3	25.0	44.3	11.4	x	179.2	232.5	411.3	106.2	x	929.3
1988–89	17.6	27.0	45.5	9.9	x	134.7	206.7	347.9	76.1	x	765.3
1989–90	23.0	35.3	33.8	7.9	x	174.5	267.4	256.3	60.1	x	758.4
1990–91	28.3	29.5	31.7	10.5	x	147.9	154.2	165.7	54.8	x	523.2
1991–92	31.6	29.3	30.0	8.8	x	167.5	155.3	159.3	46.9	x	530.5
1992–93	30.1	26.3	32.6	10.6	0.4	149.3	130.4	161.5	52.6	1.8	495.7
1993–94	23.8	28.8	36.7	9.9	x	116.9	141.5	180.6	48.8	x	492.0
1994–95	21.9	24.5	41.7	9.7	2.1	107.5	120.3	204.6	47.5	10.5	490.4
1995–96	22.9	23.1	46.8	6.3	0.9	111.4	112.5	228.2	30.6	4.5	487.2
1996–97	24.6	19.6	46.0	9.2	x	121.3	96.7	227.2	45.2	x	493.6
1997–98	25.5	22.0	45.0	7.5	–	125.2	107.7	220.6	36.9	–	490.4
1998–99	31.3	21.9	38.2	8.5	–	154.6	108.2	188.5	42.0	–	493.3
1999–00	26.5	22.4	39.7	10.6	0.8	153.0	129.2	228.7	60.8	4.8	576.5
2000–01	26.9	23.5	37.8	10.9	0.9	154.5	134.6	216.8	62.7	5.2	573.8
2001–02	22.2	21.6	42.3	12.8	1.3	127.3	123.7	242.6	73.2	7.2	574.1
2002–03	23.4	27.0	36.5	12.5	x	134.8	155.6	210.1	72.0	x	575.7
2003–04	19.3	31.9	40.8	8.0	–	110.9	183.9	234.8	46.1	–	575.7
2004–05	15.6	28.4	48.8	6.3	x	88.7	162.1	277.9	35.8	x	569.9
2005–06	9.7	21.1	55.0	12.9	x	48.9	106.5	277.2	65.0	x	504.1
2006–07	12.1	23.3	43.9	16.9	3.9	53.6	103.4	195.3	74.9	17.4	444.6
2007–08	15.9	21.0	38.4	21.1	3.6	50.1	66.1	121.1	66.6	11.3	315.2
2008–09	18.8	28.8	35.6	14.5	x	46.8	71.9	88.9	36.3	x	249.4
2009–10	17.1	25.8	33.4	22.4	x	44.9	67.7	87.5	58.7	x	262.2
2010–11	14.1	22.0	45.3	17.1	x	58.6	91.2	187.9	70.9	x	414.8
2011–12	9.7	29.5	49.3	10.9	x	45.2	137.5	229.6	50.8	x	466.2

Table 27: Distribution and annual potlifts by statistical area from CRA 4, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated using the B4 algorithm scaled to the "L" destination code.

Fishing	Distribution (%)					Annual Potlifts ('000s)					
Year	912	913	914	915	934	912	913	914	915	934	CRA 4
1979–80	20.1	27.0	37.1	15.8	x	116.1	155.9	214.1	91.1	x	577.6
1980–81	25.5	23.2	33.6	17.5	0.1	187.1	170.2	246.3	128.0	1.1	732.7
1981–82	27.0	22.6	33.0	17.4	x	200.3	168.1	244.9	128.9	x	742.4
1982–83	26.3	21.2	31.8	20.6	x	244.8	197.7	297.0	192.1	x	932.6
1983–84	23.2	24.7	34.3	17.4	x	241.3	257.2	357.1	180.4	x	1,039.5
1984–85	22.6	23.8	36.9	16.3	x	252.4	265.5	412.0	182.1	x	1,116.5
1985–86	24.7	20.0	37.1	17.7	0.4	288.6	232.8	433.2	206.6	5.0	1,166.3
1986–87	21.6	26.8	35.8	15.5	x	243.8	302.5	403.2	174.2	x	1,127.0
1987–88	21.6	23.3	40.8	14.2	x	275.0	297.2	520.5	181.4	x	1,274.3
1988–89	21.4	26.4	40.7	11.6	x	264.7	327.3	503.7	143.1	x	1,238.9
1989–90	21.2	28.1	39.2	11.5	x	271.4	359.3	500.6	146.5	x	1,278.5
1990–91	18.7	27.9	40.0	13.3	x	197.2	293.9	421.9	140.1	x	1,054.0
1991–92	21.3	27.3	39.6	11.6	x	226.2	289.7	419.7	122.8	x	1,061.2
1992–93	24.8	27.0	35.8	12.0	0.4	236.9	257.6	341.0	114.1	3.9	953.6
1993–94	25.1	25.7	34.3	14.1	x	212.4	217.9	290.8	119.3	x	847.8
1994–95	19.3	24.5	37.9	14.7	3.6	137.1	173.7	268.8	104.3	25.3	709.2
1995–96	20.7	24.1	44.0	9.1	2.1	117.5	136.8	249.4	51.6	12.1	567.4
1996–97	20.8	19.5	45.9	12.8	x	99.9	93.6	220.7	61.4	x	481.0
1997–98	18.5	18.2	52.2	11.1	–	73.2	72.1	207.0	44.0	–	396.3
1998–99	23.9	11.5	49.1	15.5	–	89.9	43.0	184.5	58.2	–	375.7
1999–00	24.3	15.8	47.8	10.8	1.3	110.8	71.9	217.6	49.3	5.8	455.4
2000–01	29.1	15.5	41.8	12.4	1.2	132.9	70.7	190.8	56.3	5.5	456.1
2001–02	25.2	19.5	41.4	12.2	1.6	136.7	105.8	223.8	66.1	8.9	541.3
2002–03	23.6	24.9	39.1	11.3	x	124.7	131.5	206.6	59.5	x	528.0
2003–04	20.0	26.8	43.1	10.1	–	100.5	135.0	216.9	51.0	–	503.5
2004–05	20.3	23.7	46.2	9.0	x	115.4	134.7	262.9	51.4	x	569.3
2005–06	14.1	19.7	51.5	14.0	x	81.4	113.3	296.5	80.8	x	575.4
2006–07	13.4	19.7	49.6	15.7	1.6	92.0	135.8	341.2	107.9	11.2	687.9
2007–08	14.4	17.8	49.2	16.0	2.6	76.2	93.9	260.3	84.3	14.0	528.7
2008–09	18.7	24.0	43.7	12.4	x	66.1	84.8	154.3	43.7	x	352.7
2009–10	22.3	25.2	33.0	18.8	x	57.4	64.9	84.9	48.5	x	257.5
2010–11	18.9	19.0	42.7	18.4	x	79.8	80.0	180.0	77.5	x	421.4
2011–12	14.8	24.2	48.8	11.7	x	53.8	87.7	176.9	42.4	x	362.8

Table 28: Percentage of annual landings by month from CRA 4, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the month/year cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1979–80	0.3	0.5	9.4	9.8	4.6	7.1	13.5	23.4	13.1	10.8	5.3	2.1
1980–81	0.8	3.3	8.6	8.3	7.1	8.8	14.3	13.4	12.8	13.5	6.8	2.4
1981–82	1.4	3.2	7.4	9.6	5.8	10.0	11.8	10.0	13.5	14.9	9.0	3.6
1982–83	0.4	5.4	6.6	8.5	8.2	6.9	11.7	13.8	15.3	12.9	8.2	2.3
1983–84	0.4	3.3	13.1	8.4	8.7	5.8	12.5	16.4	11.5	11.8	5.7	2.6
1984–85	0.2	6.3	13.8	7.1	4.3	7.8	15.4	16.1	13.4	9.9	4.6	1.1
1985–86	0.4	1.4	11.4	8.3	5.3	5.3	12.9	14.8	17.5	14.6	6.5	1.6
1986–87	0.3	3.4	10.7	4.9	2.8	6.6	17.8	17.3	17.0	14.0	4.3	1.1
1987–88	0.5	4.4	10.2	3.7	6.4	4.8	22.7	18.2	14.4	9.3	4.0	1.5
1988–89	0.5	5.1	8.9	4.4	3.4	9.3	16.9	21.5	14.4	8.5	4.3	2.6
1989–90	1.4	3.3	8.0	6.7	2.2	9.0	11.5	19.6	15.1	14.5	6.0	2.6
1990–91	0.3	2.7	8.1	6.4	2.7	11.4	19.2	18.3	13.6	8.6	7.0	1.6
1991–92	1.6	4.3	5.7	11.7	4.7	4.7	17.0	17.9	15.2	11.6	3.8	1.7
1992–93	0.9	2.6	17.2	8.7	3.7	4.0	11.5	17.2	16.2	10.7	4.7	2.5
1993–94	1.1	14.2	17.1	9.5	3.7	1.9	15.3	15.3	14.5	4.6	2.1	0.6
1994–95	3.2	17.5	13.3	10.3	6.6	4.3	13.1	17.2	8.2	4.3	0.8	1.2
1995–96	3.9	25.1	12.1	11.9	6.1	11.8	13.2	7.3	3.1	1.6	1.8	2.1
1996–97	9.3	30.3	18.9	11.1	11.2	10.7	4.4	2.1	0.7	0.5	x	1.1
1997–98	7.3	30.6	19.3	18.3	10.0	8.4	3.2	0.2	0.5	1.5	0.3	0.5
1998–99	4.3	21.5	13.2	19.3	18.2	14.0	4.6	1.4	0.5	0.8	1.7	0.5
1999–00	2.4	19.7	20.4	19.9	11.5	19.4	2.1	0.6	2.9	0.5	0.3	0.4
2000–01	5.5	24.3	24.4	16.6	6.2	10.8	6.4	2.9	0.7	0.4	0.8	1.1
2001–02	5.9	14.2	25.2	11.9	9.2	16.9	5.3	4.6	2.0	2.4	1.1	1.3
2002–03	5.6	11.9	22.9	13.6	9.1	13.8	2.7	5.5	2.9	6.2	4.2	1.5
2003–04	4.6	9.1	17.8	15.4	6.2	10.9	11.6	7.3	2.9	6.6	2.4	5.1
2004–05	3.5	9.9	18.1	7.8	3.2	3.3	13.3	7.7	6.2	17.5	7.7	1.9
2005–06	1.4	11.0	10.0	8.5	4.9	3.7	10.2	8.0	17.8	12.2	8.4	3.8
2006–07	0.8	3.0	6.0	5.6	4.1	5.4	11.9	16.8	13.3	18.5	8.9	5.6
2007–08	–	2.8	3.8	6.1	3.9	6.8	10.6	19.4	13.9	15.5	11.7	5.5
2008–09	0.1	x	7.5	6.8	5.5	7.7	14.1	15.4	18.5	19.8	4.3	0.3
2009–10	0.9	0.6	7.3	12.1	16.2	9.0	2.7	4.6	10.9	21.5	12.6	1.6
2010–11	2.8	9.3	13.1	9.9	8.4	6.3	8.9	6.9	4.3	15.6	11.9	2.6
2011–12	1.4	20.9	11.2	9.5	8.1	8.3	4.9	4.0	11.0	16.2	4.1	0.4

Table 29: Percentage of landings from CRA 4 by statistical area and month for 2011–12. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (15 instances representing 3.5% of the annual catch). A '–'indicates no fishing in the month/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Month	912	913	914	915	934
Apr	0.1	0.7	x	x	–
May	1.0	9.1	10.5	0.4	–
Jun	1.0	4.7	5.1	0.4	–
Jul	0.9	3.0	4.8	0.8	x
Aug	0.4	2.3	3.9	1.4	x
Sep	0.6	1.1	5.0	1.4	x
Oct	0.7	0.7	2.5	0.9	x
Nov	1.6	0.9	1.0	x	x
Dec	1.3	2.5	5.3	1.8	x
Jan	1.9	3.3	9.0	2.0	–
Feb	0.2	x	1.5	1.1	x
Mar	x	x	x	x	–

Table 30: Arithmetic CPUE (kg/potlift) for CRA 4 by fishing year and statistical area, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	912	913	914	915	934
1979–80	0.93	0.98	0.90	0.56	x
1980–81	1.05	0.77	0.83	0.58	0.93
1981–82	1.09	0.83	0.74	0.59	x
1982–83	0.90	0.94	1.08	0.66	x
1983–84	0.77	1.02	1.05	0.64	x
1984–85	0.86	0.84	0.78	0.55	x
1985–86	0.79	0.77	0.72	0.60	0.75
1986–87	0.85	0.92	0.88	0.61	x
1987–88	0.65	0.78	0.79	0.59	x
1988–89	0.51	0.63	0.69	0.53	x
1989–90	0.63	0.74	0.52	0.42	–
1990–91	0.75	0.52	0.43	0.40	x
1991–92	0.74	0.54	0.41	0.39	x
1992–93	0.63	0.51	0.47	0.50	0.47
1993–94	0.56	0.65	0.62	0.42	x
1994–95	0.83	0.69	0.77	0.49	x
1995–96	0.97	0.84	0.93	0.66	x
1996–97	1.35	1.06	0.99	0.67	x
1997–98	1.84	1.44	1.08	0.83	–
1998–99	1.82	2.65	1.02	0.72	–
1999–00	1.58	2.00	1.12	0.76	0.83
2000–01	1.30	2.08	1.21	0.91	x
2001–02	1.06	1.29	1.22	0.79	x
2002–03	1.13	1.28	1.09	0.75	x
2003–04	1.10	1.42	1.09	0.81	–
2004–05	0.78	1.30	1.05	0.73	–
2005–06	0.62	0.99	0.93	0.69	–
2006–07	0.60	0.78	0.64	0.75	1.48
2007–08	0.67	0.75	0.49	0.82	0.81
2008–09	0.73	0.77	0.60	0.84	x
2009–10	0.75	1.03	1.05	1.24	x
2010–11	0.73	1.12	1.06	0.92	x
2011–12	0.92	1.66	1.26	1.30	1.66

Table 31: Annual arithmetic, unstandardised, and standardised (with standard error) CPUE indices for CRA 4 (kg/potlift). This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.87	0.85	0.82	0.020
1980–81	0.83	0.82	0.79	0.020
1981–82	0.83	0.86	0.85	0.020
1982–83	0.92	0.93	0.91	0.019
1983–84	0.90	0.85	0.83	0.019
1984–85	0.77	0.77	0.75	0.019
1985–86	0.73	0.73	0.72	0.019
1986–87	0.84	0.79	0.77	0.019
1987–88	0.73	0.69	0.67	0.020
1988–89	0.62	0.58	0.56	0.020
1989–90	0.60	0.57	0.55	0.020
1990–91	0.52	0.53	0.51	0.020
1991–92	0.52	0.53	0.51	0.020
1992–93	0.53	0.51	0.49	0.019
1993–94	0.58	0.56	0.54	0.020
1994–95	0.71	0.69	0.68	0.022
1995–96	0.89	0.88	0.90	0.025
1996–97	1.04	1.10	1.21	0.030
1997–98	1.25	1.28	1.41	0.032
1998–99	1.36	1.44	1.60	0.032
1999–00	1.35	1.37	1.50	0.033
2000–01	1.32	1.29	1.38	0.031
2001–02	1.12	1.11	1.19	0.030
2002–03	1.11	1.18	1.22	0.027
2003–04	1.15	1.23	1.26	0.027
2004–05	1.02	0.96	0.96	0.026
2005–06	0.85	0.83	0.82	0.028
2006–07	0.69	0.71	0.69	0.025
2007–08	0.64	0.63	0.61	0.028
2008–09	0.72	0.80	0.76	0.032
2009–10	1.03	1.06	1.06	0.033
2010–11	0.99	1.03	1.04	0.028
2011–12	1.28	1.29	1.25	0.030

Table 32: Number of vessels by statistical area from CRA 5, 1979–80 to 2011–12. Vessels catching less than 1 t in a year for the entire QMA were excluded. A '–' indicates no fishing in the statistical area/fishing year cell and '0' indicates that only vessels with <1 t fished in the cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	916	917	918	919	932	933	CRA 5
1979–80	21	51	13	3	1	9	88
1980–81	19	50	12	1	1	11	86
1981–82	15	51	12	0	2	11	85
1982–83	19	60	13	3	1	13	93
1983–84	16	59	11	1	–	13	93
1984–85	16	60	10	2	0	14	95
1985–86	13	56	11	2	2	15	92
1986–87	11	55	11	4	5	11	91
1987–88	11	51	10	3	2	12	84
1988–89	7	44	9	3	1	9	71
1989–90	15	44	10	0	0	7	66
1990–91	11	40	10	1	3	11	62
1991–92	11	37	21	1	1	11	68
1992–93	12	31	13	0	–	11	59
1993–94	9	35	12	–	0	13	59
1994–95	9	27	8	–	0	11	51
1995–96	12	25	6	1	2	12	49
1996–97	10	22	9	2	1	12	47
1997–98	8	21	7	1	1	12	45
1998–99	6	18	5	–	1	13	41
1999–00	7	20	7	1	1	12	39
2000–01	8	18	6	–	–	10	36
2001–02	10	17	2	–	0	8	34
2002–03	10	16	2	–	–	9	34
2003–04	12	14	2	–	–	11	34
2004–05	12	13	1	–	2	9	32
2005–06	11	14	2	–	0	8	31
2006–07	10	14	2	–	–	8	28
2007–08	8	14	2	–	0	7	27
2008–09	6	12	5	1	–	7	26
2009–10	6	11	1	–	–	8	25
2010–11	8	12	2	–	0	8	27
2011–12	6	11	2	–	–	7	25

Table 33: Distribution and annual landings by statistical area from CRA 5, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)						Annual Catch (t)						
Fishing year	916	917	918	919	932	933	916	917	918	919	932	933	CRA 5
1979–80	26.7	47.9	12.8	1.1	x	10.4	107.4	192.6	51.5	4.5	x	41.9	402.0
1980–81	29.3	50.2	6.3	0.4	x	13.5	147.9	253.5	31.7	1.9	x	68.3	505.1
1981–82	23.0	52.0	7.3	x	x	16.1	109.6	247.5	34.6	x	x	76.6	476.0
1982–83	19.9	57.3	4.0	0.7	x	18.0	124.4	358.3	25.1	4.2	x	112.5	625.5
1983–84	19.2	57.5	5.6	0.3	–	17.4	114.8	344.8	33.5	1.6	–	104.4	599.1
1984–85	19.5	61.4	4.7	0.7	x	13.6	140.6	443.5	33.8	5.2	x	98.2	721.9
1985–86	19.4	62.1	6.7	0.7	0.3	10.8	140.2	450.1	48.6	5.2	2.5	78.0	724.6
1986–87	15.9	65.3	7.3	1.9	1.6	8.0	99.8	408.9	45.8	11.7	9.8	50.1	626.1
1987–88	22.4	58.0	6.3	3.2	x	9.4	111.2	288.1	31.4	15.8	x	46.5	496.5
1988–89	19.3	58.6	8.2	3.2	x	10.0	68.0	206.3	29.0	11.1	x	35.0	351.7
1989–90	28.7	56.1	9.5	x	x	5.6	89.6	175.1	29.7	x	x	17.4	312.4
1990–91	28.4	57.6	4.9	x	0.6	8.4	87.6	177.8	15.3	x	1.9	26.0	308.6
1991–92	29.9	46.2	10.9	x	0.1	13.0	86.0	132.7	31.2	x	0.2	37.3	287.4
1992–93	24.9	58.4	7.0	x	–	9.6	64.3	151.2	18.1	x	–	24.8	258.8
1993–94	23.5	54.3	8.1	–	x	14.1	73.0	168.8	25.2	–	x	43.8	311.0
1994–95	28.0	50.5	4.3	–	x	17.2	82.1	148.4	12.8	–	x	50.5	293.9
1995–96	26.9	43.2	3.2	x	x	25.3	80.2	128.7	9.5	x	x	75.2	297.6
1996–97	24.4	45.0	4.8	x	x	23.7	73.3	135.1	14.3	x	x	71.2	300.3
1997–98	23.9	42.4	4.4	x	x	26.9	71.7	126.9	13.2	x	x	80.7	299.6
1998–99	23.3	41.7	5.8	–	x	25.7	69.4	124.5	17.4	–	x	76.7	298.2
1999–00	29.6	41.7	4.0	x	x	24.7	103.4	145.8	14.1	x	x	86.2	349.5
2000–01	31.0	40.1	2.8	–	–	26.1	107.9	139.3	9.7	–	–	90.5	347.4
2001–02	42.8	39.2	1.5	–	x	16.4	149.3	136.9	5.3	–	x	57.1	349.1
2002–03	45.8	35.6	1.0	–	–	17.6	159.7	124.0	3.5	–	–	61.5	348.7
2003–04	47.8	32.4	0.9	–	–	18.9	167.2	113.4	3.2	–	–	66.1	349.9
2004–05	43.4	39.7	0.9	–	x	16.0	149.9	136.9	3.1	–	x	55.1	345.1
2005–06	44.4	40.8	1.4	–	x	13.4	155.1	142.6	5.1	–	x	46.8	349.5
2006–07	41.2	45.6	x	–	–	12.4	144.1	159.6	x	–	–	43.2	349.8
2007–08	37.4	45.3	x	–	x	16.2	130.7	158.4	x	–	x	56.6	349.8
2008–09	30.5	48.6	3.6	x	–	17.3	106.7	169.9	12.6	x	–	60.4	349.7
2009–10	29.1	50.6	x	–	–	18.8	101.9	177.1	x	–	–	65.9	349.9
2010–11	31.9	53.9	x	–	x	12.4	111.6	188.7	x	–	x	43.4	350.0
2011–12	25.3	56.9	x	–	–	15.6	88.4	199.0	x	–	–	54.6	350.0

Table 34: Distribution and annual potlifts by statistical area from CRA 5, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)						Annual Potlifts ('000s)						
Fishing year	916	917	918	919	932	933	916	917	918	919	932	933	CRA 5
1979–80	24.2	53.5	8.8	0.9	x	10.7	128.9	284.7	46.9	4.8	x	57.1	532.2
1980–81	26.6	52.1	6.6	0.3	x	13.6	148.5	291.3	37.2	1.6	x	76.2	559.1
1981–82	28.5	48.1	7.1	x	x	15.7	171.3	289.6	42.4	x	x	94.5	601.7
1982–83	25.1	51.3	5.5	0.8	x	16.8	186.6	381.8	41.0	6.3	x	125.3	744.7
1983–84	22.5	53.7	5.8	0.5	–	17.5	180.5	430.3	46.1	4.0	–	140.4	801.3
1984–85	19.7	57.7	5.1	1.3	x	16.0	187.4	547.8	48.1	12.1	x	151.7	949.0
1985–86	17.0	60.2	6.1	1.1	0.5	15.1	181.4	641.8	64.7	11.7	5.5	160.6	1065.8
1986–87	16.3	60.9	5.7	2.0	1.2	13.9	162.7	607.5	57.3	19.9	11.7	139.0	998.1
1987–88	17.9	61.4	4.2	2.6	x	13.1	188.1	645.1	44.2	27.7	x	138.1	1051.4
1988–89	15.8	62.3	4.6	3.9	x	13.1	141.1	555.7	40.7	34.9	x	116.4	892.1
1989–90	21.6	62.8	6.9	x	x	8.2	159.5	464.3	50.9	x	x	61.0	739.9
1990–91	27.4	58.8	4.5	x	0.5	8.8	197.8	424.3	32.2	x	3.5	63.4	721.3
1991–92	25.0	54.8	7.3	x	0.1	12.8	195.6	428.6	56.8	x	1.0	100.5	782.7
1992–93	23.7	59.9	5.4	x	–	10.9	174.0	439.4	39.8	x	–	80.0	733.8
1993–94	21.3	58.2	6.4	–	x	14.0	170.3	465.5	51.1	–	x	112.2	800.6
1994–95	20.9	60.2	4.8	–	x	14.0	147.1	424.3	34.1	–	x	98.5	704.9
1995–96	20.7	54.9	3.8	x	x	19.5	125.8	334.3	23.1	x	x	118.7	608.6
1996–97	19.9	54.2	4.1	x	x	20.1	106.8	291.0	22.1	x	x	108.1	537.3
1997–98	17.9	50.7	5.6	x	x	22.2	68.6	194.0	21.6	x	x	85.0	382.4
1998–99	18.5	49.4	5.9	–	x	22.0	62.1	166.1	19.8	–	x	74.0	335.9
1999–00	13.8	54.4	4.6	x	x	27.1	48.4	190.6	16.1	x	x	94.8	350.2
2000–01	10.4	56.1	2.3	–	–	31.2	31.0	167.8	6.9	–	–	93.3	299.1
2001–02	19.1	59.9	1.2	–	x	19.7	52.5	164.7	3.2	–	x	54.2	275.0
2002–03	25.7	48.0	1.0	–	–	25.3	71.1	132.8	2.7	–	–	70.1	276.7
2003–04	28.1	40.6	0.9	–	–	30.4	70.7	102.2	2.3	–	–	76.6	251.9
2004–05	24.8	51.2	0.8	–	x	23.2	67.7	139.9	2.3	–	x	63.3	273.4
2005–06	27.4	49.3	1.0	–	x	22.4	81.5	146.6	2.9	–	x	66.5	297.6
2006–07	29.0	49.2	x	–	–	21.3	85.9	145.9	x	–	–	63.2	296.6
2007–08	25.8	45.2	x	–	x	28.2	75.6	132.6	x	–	x	82.9	293.4
2008–09	19.6	45.7	3.0	x	–	31.6	53.4	124.4	8.3	x	–	86.2	272.3
2009–10	22.6	39.3	x	–	–	36.8	55.1	95.8	x	–	–	89.6	243.6
2010–11	25.8	44.8	x	–	x	26.9	58.2	101.2	x	–	x	60.8	225.6
2011–12	21.1	39.6	x	–	–	36.3	46.3	87.0	x	–	–	79.9	219.8

Table 35: Percentage of annual landings by month from CRA 5, 1979–80 to 2011–12. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1979–80	0.7	7.0	6.4	6.2	4.6	7.5	11.6	17.9	13.5	15.6	7.6	1.5
1980–81	1.2	9.0	2.6	3.2	4.5	6.6	13.2	20.4	14.6	16.1	7.6	1.1
1981–82	0.9	6.2	2.6	3.4	2.4	4.8	12.1	18.7	21.2	16.4	8.2	3.1
1982–83	1.3	6.7	3.1	2.9	4.3	5.0	10.5	20.1	20.3	16.0	7.7	2.1
1983–84	1.2	4.8	5.0	4.3	5.5	5.4	8.5	8.8	17.1	23.6	11.8	4.0
1984–85	1.9	8.2	6.0	4.3	2.7	3.8	8.5	19.9	20.0	16.5	6.1	2.0
1985–86	2.7	4.7	2.1	2.8	3.6	4.4	12.4	14.8	21.0	20.8	8.0	2.7
1986–87	3.1	7.7	3.6	2.4	2.0	4.6	9.8	22.3	21.4	16.9	5.2	0.9
1987–88	2.3	4.4	5.1	2.8	4.7	4.2	13.6	18.6	22.2	15.7	4.9	1.3
1988–89	1.5	4.9	3.5	2.7	3.6	6.4	7.9	20.6	20.6	21.6	4.6	2.1
1989–90	2.2	5.1	2.4	2.4	2.0	4.0	6.9	15.8	20.8	25.4	10.4	2.5
1990–91	2.7	3.8	1.6	2.8	2.1	3.9	13.4	24.8	22.8	14.7	6.2	1.3
1991–92	0.4	3.4	1.9	3.8	3.6	4.0	10.8	19.9	19.1	22.1	8.9	2.1
1992–93	0.9	2.5	5.7	3.5	3.7	2.3	7.9	12.0	21.1	25.0	12.2	3.1
1993–94	0.7	6.7	7.3	7.6	5.6	3.8	10.0	13.0	19.9	15.3	7.7	2.2
1994–95	1.8	9.9	4.6	5.2	5.7	5.1	7.0	19.0	17.0	13.3	7.9	3.6
1995–96	1.8	10.9	5.1	5.5	5.0	5.9	10.9	14.3	15.3	10.6	8.2	6.5
1996–97	8.3	20.9	7.4	5.9	7.7	9.0	10.7	8.8	10.2	6.1	3.2	1.6
1997–98	15.2	24.1	10.9	7.6	7.3	7.4	7.7	5.6	5.1	4.5	3.2	1.3
1998–99	7.7	18.0	14.1	11.5	12.9	12.3	9.3	4.0	3.7	2.0	2.2	2.2
1999–00	11.1	19.0	11.7	13.3	12.1	11.6	8.2	2.8	3.1	2.8	2.1	2.1
2000–01	7.6	24.1	16.7	13.9	10.6	10.7	9.1	2.2	1.5	2.5	0.2	1.1
2001–02	9.0	21.3	13.1	17.2	17.2	12.4	4.6	2.3	0.5	0.6	0.9	0.9
2002–03	9.1	21.7	15.9	13.4	15.8	10.1	3.3	2.3	1.0	2.8	2.3	2.3
2003–04	1.4	14.3	19.7	18.7	12.7	13.9	7.8	2.0	2.1	3.9	1.8	1.7
2004–05	3.7	22.6	13.2	13.9	7.1	6.7	7.0	7.9	4.1	10.1	1.9	1.7
2005–06	3.1	28.4	12.9	10.5	8.3	5.6	8.8	7.3	6.2	6.6	1.4	1.0
2006–07	8.7	25.8	11.3	5.9	5.1	4.1	5.5	11.6	7.8	10.7	3.1	0.4
2007–08	10.0	25.7	8.4	6.2	4.3	6.1	6.9	4.9	8.8	13.7	3.9	1.1
2008–09	10.9	24.0	15.8	7.0	3.2	6.8	8.5	4.6	3.5	14.5	0.9	0.3
2009–10	8.5	19.1	13.1	18.7	6.7	7.0	3.8	4.5	2.6	9.7	5.8	0.6
2010–11	10.9	31.0	8.5	5.8	13.8	6.1	3.5	3.2	2.9	10.6	3.3	0.5
2011–12	5.9	37.3	4.4	3.6	4.1	14.6	7.2	4.7	4.1	11.8	1.8	0.5

Table 36: Percentage of landings from CRA 5 by statistical area and month for 2011–12. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (19 instances representing 6.9% of the annual catch). A '–'indicates no fishing in the month/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Month	916	917	918	919	932	933
Apr	2.3	3.6	–	–	–	–
May	12.1	24.1	–	–	–	1.1
Jun	x	2.6	x	–	–	1.5
Jul	x	1.9	x	–	–	1.0
Aug	x	2.3	x	–	–	x
Sep	x	12.1	x	–	–	1.1
Oct	x	3.9	x	–	–	3.0
Nov	–	x	x	–	–	3.9
Dec	x	0.6	x	–	–	2.6
Jan	6.3	4.1	x	–	–	1.1
Feb	1.3	x	–	–	–	x
Mar	x	0.5	–	–	–	–

Table 37: Arithmetic CPUE (kg/potlift) for CRA 5 by fishing year and statistical area, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	916	917	918	919	932	933
1979–80	0.83	0.68	1.10	0.95	x	0.73
1980–81	1.00	0.87	0.85	1.22	x	0.90
1981–82	0.64	0.86	0.82	x	x	0.81
1982–83	0.67	0.94	0.61	0.67	x	0.90
1983–84	0.64	0.80	0.73	0.40	–	0.74
1984–85	0.75	0.81	0.70	0.43	x	0.65
1985–86	0.77	0.70	0.75	0.44	0.45	0.49
1986–87	0.61	0.67	0.80	0.59	0.84	0.36
1987–88	0.59	0.45	0.71	0.57	x	0.34
1988–89	0.48	0.37	0.71	0.32	x	0.30
1989–90	0.56	0.37	0.56	x	–	0.26
1990–91	0.43	0.43	0.46	x	0.45	0.37
1991–92	0.42	0.31	0.48	–	0.21	0.38
1992–93	0.43	0.32	0.47	x	–	0.30
1993–94	0.34	0.33	0.40	–	x	0.30
1994–95	0.59	0.34	0.36	–	x	0.53
1995–96	0.69	0.36	0.34	x	x	0.58
1996–97	0.88	0.40	0.62	x	x	0.56
1997–98	0.88	0.56	0.52	x	–	0.82
1998–99	0.82	0.70	0.71	–	–	0.78
1999–00	1.75	0.79	0.76	x	x	0.84
2000–01	3.65	0.79	1.35	–	–	1.05
2001–02	2.96	0.76	x	–	–	1.05
2002–03	2.64	0.92	1.31	–	–	0.94
2003–04	2.62	1.12	1.39	–	–	0.89
2004–05	2.26	0.98	x	–	x	0.98
2005–06	2.07	0.99	1.84	–	–	0.75
2006–07	1.69	1.17	x	–	–	0.78
2007–08	1.75	1.31	x	–	x	0.82
2008–09	1.96	1.47	1.71	x	–	0.94
2009–10	1.94	2.09	–	x	–	0.96
2010–11	2.08	2.13	x	x	x	0.92
2011–12	1.98	2.69	x	–	–	0.81

Table 38: Annual arithmetic, unstandardised, and standardised (with standard error) CPUE indices for CRA 5 (kg/potlift). This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.76	0.68	0.64	0.023
1980–81	0.90	0.81	0.78	0.026
1981–82	0.79	0.73	0.69	0.026
1982–83	0.84	0.78	0.76	0.025
1983–84	0.75	0.70	0.68	0.025
1984–85	0.76	0.70	0.69	0.025
1985–86	0.68	0.58	0.57	0.025
1986–87	0.63	0.51	0.50	0.026
1987–88	0.47	0.43	0.42	0.026
1988–89	0.39	0.37	0.36	0.028
1989–90	0.42	0.40	0.37	0.033
1990–91	0.43	0.40	0.37	0.031
1991–92	0.37	0.33	0.31	0.031
1992–93	0.35	0.33	0.31	0.035
1993–94	0.33	0.35	0.34	0.037
1994–95	0.39	0.38	0.37	0.038
1995–96	0.43	0.42	0.42	0.044
1996–97	0.49	0.52	0.54	0.043
1997–98	0.68	0.73	0.76	0.044
1998–99	0.74	0.86	0.90	0.048
1999–00	0.93	0.94	0.97	0.046
2000–01	1.12	1.16	1.25	0.054
2001–02	1.26	1.25	1.37	0.059
2002–03	1.41	1.51	1.61	0.058
2003–04	1.49	1.64	1.77	0.052
2004–05	1.32	1.40	1.44	0.049
2005–06	1.23	1.42	1.44	0.048
2006–07	1.34	1.48	1.49	0.046
2007–08	1.40	1.59	1.59	0.044
2008–09	1.53	1.77	1.79	0.046
2009–10	1.78	2.12	2.20	0.049
2010–11	1.83	2.05	2.11	0.048
2011–12	2.01	1.99	2.00	0.052

Table 39: Number of vessels by statistical area from CRA 6, 1979–80 to 2011–12. Vessels catching less than 1 t in a year for the entire QMA were excluded. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	940	941	942	943	CRA 6
1979–80	11	13	17	8	39
1980–81	13	12	15	11	42
1981–82	11	16	21	19	45
1982–83	18	17	27	15	54
1983–84	12	16	24	9	50
1984–85	18	18	26	9	53
1985–86	14	19	26	17	57
1986–87	20	14	22	12	48
1987–88	15	17	24	12	47
1988–89	12	13	18	8	42
1989–90	18	18	20	9	55
1990–91	15	14	20	5	40
1991–92	15	19	28	5	45
1992–93	14	20	25	6	50
1993–94	16	19	28	9	53
1994–95	19	15	31	15	59
1995–96	17	15	24	12	51
1996–97	21	14	23	10	50
1997–98	20	11	23	8	50
1998–99	16	11	17	8	42
1999–00	12	9	16	4	34
2000–01	14	8	17	5	33
2001–02	11	10	14	6	32
2002–03	11	8	15	5	32
2003–04	12	12	15	6	35
2004–05	11	10	15	3	34
2005–06	13	10	19	6	35
2006–07	11	13	16	9	36
2007–08	10	11	12	7	35
2008–09	15	10	15	5	35
2009–10	10	10	15	7	35
2010–11	9	10	16	7	36
2011–12	13	7	20	7	35

Table 40: Distribution and annual landings by statistical area from CRA 6, 1979–80 to 2011–12. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)				Annual Catch (t)				
Fishing year	940	941	942	943	940	941	942	943	CRA 6
1979–80	21.5	24.6	38.4	15.5	86.0	98.5	153.8	62.0	400.3
1980–81	28.5	21.3	31.2	19.0	101.5	75.8	110.9	67.7	355.9
1981–82	19.6	29.0	34.8	16.6	91.4	134.8	162.1	77.1	465.4
1982–83	24.6	19.1	40.1	16.1	116.2	90.3	189.3	75.8	471.7
1983–84	21.8	24.2	38.9	15.1	119.3	132.8	213.2	82.4	547.7
1984–85	25.6	25.1	36.7	12.6	126.2	123.4	180.5	61.9	492.0
1985–86	28.4	22.1	33.1	16.5	171.5	133.2	199.6	99.3	603.6
1986–87	29.0	15.6	37.1	18.3	168.3	90.3	215.5	106.2	580.3
1987–88	24.0	19.2	41.1	15.7	107.7	86.1	184.5	70.3	448.5
1988–89	20.4	13.9	50.0	15.6	92.0	62.5	225.3	70.4	450.2
1989–90	30.0	21.9	38.7	9.4	95.5	69.6	123.3	30.0	318.3
1990–91	23.4	19.2	50.5	6.9	86.5	71.1	186.6	25.5	369.7
1991–92	21.2	22.0	52.3	4.5	82.3	85.3	203.0	17.7	388.3
1992–93	23.1	21.2	47.5	8.2	76.1	69.7	156.6	27.0	329.4
1993–94	24.9	20.2	45.4	9.5	85.1	69.0	155.2	32.4	341.8
1994–95	22.5	19.5	49.4	8.7	70.2	60.8	154.3	27.1	312.5
1995–96	27.9	14.1	46.8	11.2	88.0	44.6	147.5	35.2	315.3
1996–97	27.0	18.2	43.0	11.8	102.2	68.9	162.6	44.5	378.3
1997–98	29.2	19.9	43.4	7.4	99.0	67.4	147.0	25.2	338.7
1998–99	29.0	19.4	43.5	8.2	96.9	64.8	145.3	27.3	334.2
1999–00	24.0	21.6	47.2	7.1	77.5	69.7	152.1	23.0	322.4
2000–01	24.1	17.4	51.8	6.6	82.8	59.6	177.7	22.6	342.7
2001–02	24.2	18.5	48.2	9.1	79.7	60.8	158.5	29.8	328.7
2002–03	19.5	24.2	43.1	13.2	65.6	81.4	145.0	44.2	336.3
2003–04	23.4	21.4	45.7	9.5	68.0	62.1	132.6	27.7	290.4
2004–05	20.3	23.7	50.5	5.5	65.5	76.5	163.2	17.7	323.0
2005–06	22.0	20.5	48.0	9.5	77.5	72.2	168.7	33.3	351.7
2006–07	28.3	20.9	39.7	11.2	99.5	73.6	139.7	39.3	352.1
2007–08	26.5	19.2	41.3	13.1	94.2	68.4	147.0	46.5	356.0
2008–09	24.2	18.0	43.9	13.8	86.1	64.0	156.0	49.2	355.3
2009–10	23.1	15.4	42.2	19.3	79.7	53.1	145.6	66.8	345.2
2010–11	24.5	17.7	40.0	17.8	87.7	63.2	142.8	63.7	357.4
2011–12	22.3	16.2	41.0	20.5	80.1	58.1	147.2	73.7	359.1

Table 41: Distribution and annual potlifts by statistical area from CRA 6, 1979–80 to 2011–12. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)				Annual Potlifts ('000s)				
Fishing year	940	941	942	943	940	941	942	943	CRA 6
1979–80	24.5	40.0	24.3	11.2	42.2	68.9	41.9	19.2	172.2
1980–81	24	33.6	27.8	14.7	39.2	54.9	45.4	24.0	163.5
1981–82	15.9	45.2	24.6	14.4	33.7	96.1	52.3	30.6	212.6
1982–83	20.2	35.3	32.0	12.6	53.6	93.6	84.8	33.3	265.3
1983–84	16.1	32.8	37.3	13.8	51.0	103.9	118.2	43.8	317.0
1984–85	22.5	31.5	34.8	11.2	82.0	115.1	127.3	41.0	365.4
1985–86	23.4	27.4	32.9	16.3	100.2	117.4	140.7	69.7	428.0
1986–87	31.6	19.5	30.8	18.1	110.8	68.5	108.0	63.4	350.6
1987–88	23.5	26.2	34.2	16.1	71.0	79.2	103.4	48.6	302.2
1988–89	23.4	17.8	43.3	15.6	75.2	57.2	139.2	50.0	321.7
1989–90	27.4	26.9	34.7	11.0	65.1	64.0	82.5	26.1	237.7
1990–91	23.8	28.8	37.4	10.1	63.6	77.0	100.0	27.1	267.7
1991–92	22.1	32.9	38.0	7.0	66.6	98.8	114.2	21.1	300.6
1992–93	28	30.3	31.5	10.3	81.1	87.9	91.2	29.8	290.0
1993–94	27.6	24.6	35.1	12.7	88.0	78.5	112.2	40.5	319.2
1994–95	22.1	28.4	36.2	13.3	64.5	82.7	105.6	38.9	291.7
1995–96	30.2	19.9	35.2	14.8	87.7	57.8	102.2	43.1	290.7
1996–97	31.3	22.2	33.9	12.6	116.3	82.4	125.8	46.7	371.2
1997–98	35.2	22.8	35.1	6.9	136.1	88.1	135.9	26.8	386.9
1998–99	37.3	21.7	33.2	7.7	106.7	62.1	94.9	22.0	285.7
1999–00	29.4	27.5	32.9	10.3	79.7	74.6	89.2	27.9	271.3
2000–01	30.1	21.9	38.8	9.1	89.6	65.3	115.7	27.2	297.8
2001–02	28.5	24.8	37.8	9.0	81.5	70.9	108.1	25.8	286.2
2002–03	20.3	28.4	38.3	13.0	58.8	82.1	110.9	37.5	289.3
2003–04	22.4	30.9	36.0	10.7	59.0	81.5	95.0	28.1	263.7
2004–05	21.6	32.2	39.8	6.4	57.6	85.8	106.3	17.1	266.8
2005–06	22.8	30.3	38.4	8.4	59.5	79.0	100.0	22.0	260.5
2006–07	32.6	29.2	29.9	8.2	79.7	71.3	73.1	20.1	244.2
2007–08	29.2	25.5	31.1	14.2	68.1	59.4	72.5	33.2	233.3
2008–09	27	20.2	38.9	13.9	64.0	48.0	92.4	32.9	237.4
2009–10	28.6	17.2	33.5	20.7	72.6	43.5	84.9	52.4	253.4
2010–11	26.1	17.5	39.6	16.7	65.8	44.0	99.7	42.1	251.7
2011–12	25.1	18.7	37.4	18.8	58.6	43.7	87.6	44.1	233.9

Table 42: Percentage of annual landings by month from CRA 6, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the month/year cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1979–80	–	7.2	8.1	6.1	3.5	3.5	12.1	14.5	15.1	18.5	11.3	–
1980–81	–	2.2	8.5	9.2	2.1	1.7	8.2	14.1	16.8	25.6	11.7	–
1981–82	–	4.8	6.6	4.8	2.9	3.5	18.4	14.6	14.2	15.2	14.8	–
1982–83	–	2.5	10.3	9.1	3.9	3.1	7.6	10.9	11.8	23.1	17.8	–
1983–84	–	1.4	7	7.9	6.5	2.6	7	17.6	15.9	18.7	15.4	–
1984–85	–	4.1	6	5	3.2	2	12.3	13.7	19.1	20.8	13.8	x
1985–86	–	4.1	5.9	3.4	1.8	6.3	12.2	13	19.1	14.8	19.2	–
1986–87	–	2.1	4	3.3	3.1	2.9	10.7	16.9	20.4	19.9	16.8	–
1987–88	–	1.1	4.6	4.4	4.8	1.3	9.7	15.6	21.3	18.1	15.7	3.3
1988–89	–	3.1	7.2	4.7	2.8	1.4	8.7	14.4	16.9	22.3	18.5	–
1989–90	–	3.6	5.4	5.7	3.3	1.6	9.9	10.4	19.2	21.4	19.5	x
1990–91	–	1.9	5.5	3.4	1.6	1.5	16	15	16.7	17	21.3	x
1991–92	–	1.4	5.9	4	1.8	2.1	10.7	9.6	17.4	30.9	13.5	2.8
1992–93	–	1.3	8.2	7.3	6	3.3	2.4	10.1	16	20.9	17.7	6.7
1993–94	–	1.6	8.7	8.2	4.8	3.2	8.8	15.7	13.1	14	21.9	–
1994–95	x	4.4	6.2	5.1	4.4	2.6	8.6	16.1	14.8	20.9	17	–
1995–96	–	4.2	6.8	3.8	5.9	6.7	23.7	11.9	10	12.2	14.6	0.3
1996–97	–	5.3	8.3	5.7	5.1	8.7	20.3	11.1	13	12.5	10.1	x
1997–98	x	8	9.4	8.2	5.4	6.7	11.3	12.1	14.8	11.7	12.4	x
1998–99	–	6.5	7.1	5.6	5.2	6.5	16.6	18.7	11.9	9.4	12.6	–
1999–00	–	6.6	7.3	6.2	5.6	8.3	17.6	12.9	11.2	12.1	12	x
2000–01	–	5.2	6.8	6.7	4.8	9.7	17.8	16	10.2	10.7	11.9	x
2001–02	–	2.9	7.9	6.3	4.1	4.3	15.1	14.3	13.2	17	14.8	x
2002–03	–	2.2	6.2	9.5	5.9	5.7	8	15.9	11.1	18.4	17	x
2003–04	–	1.7	5.3	6.6	8.6	6.3	15.9	12.8	12.4	19	11.2	x
2004–05	–	3.9	7.1	10.1	3.9	4.8	10.3	15.1	12.4	17	14.9	0.6
2005–06	–	3.8	6.4	7.2	5.5	5.5	10.3	14.1	18.1	16.8	12.3	–
2006–07	–	3.3	8.1	9.6	6.7	6.7	15.7	11.3	12.7	11.6	13.6	x
2007–08	–	1.4	4.9	9.7	8.7	6.5	5.7	17.2	13.5	20.4	11.8	x
2008–09	–	2.5	6.9	6.7	5.8	7	15.9	16.6	10.1	17.8	10.7	–
2009–10	–	1.6	2.5	6.9	6.9	5.1	5.2	12.2	19.6	19.3	20.7	–
2010–11	–	4.9	8.2	6.3	3.5	6.5	15.9	15	9	15.8	14.9	–
2011–12	–	2.6	4.3	5.9	4.2	5.6	14.3	15.6	17.4	13.9	15.9	x

Table 43: Percentage of landings from CRA 6 by statistical area and month for 2011–12. An 'x' indicates fewer than 3 vessels in the month/statistical area cell. A '–'indicates no fishing in the month/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Month	940	941	942	943
Apr	–	–	–	–
May	1.0	0.2	0.7	0.8
Jun	1.2	0.6	1.7	0.8
Jul	1.8	0.9	2.2	1.0
Aug	1.1	0.5	1.9	0.7
Sep	1.1	1.0	2.5	1.0
Oct	3.9	2.0	6.1	2.3
Nov	2.8	2.1	6.9	3.9
Dec	2.7	3.7	7.7	3.4
Jan	3.1	2.9	5.0	2.9
Feb	3.2	2.4	6.4	3.9
Mar	x	–	–	–

Table 44: Arithmetic CPUE (kg/potlift) for CRA 6 by fishing year and statistical area, 1979–80 to 2011–12. This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	940	941	942	943
1979–80	2.04	1.43	3.67	3.22
1980–81	2.59	1.38	2.44	2.82
1981–82	2.71	1.40	3.10	2.52
1982–83	2.17	0.97	2.23	2.28
1983–84	2.34	1.28	1.80	1.88
1984–85	1.54	1.07	1.42	1.51
1985–86	1.71	1.14	1.42	1.42
1986–87	1.52	1.32	2.00	1.68
1987–88	1.52	1.09	1.78	1.45
1988–89	1.22	1.09	1.62	1.41
1989–90	1.45	1.06	1.53	0.94
1990–91	1.36	0.92	1.84	0.94
1991–92	1.22	0.86	1.83	0.84
1992–93	0.96	0.89	1.72	0.88
1993–94	0.96	0.88	1.38	0.78
1994–95	1.07	0.71	1.48	0.69
1995–96	0.91	0.72	1.51	0.82
1996–97	0.91	0.82	1.27	1.06
1997–98	0.71	0.75	1.07	0.94
1998–99	0.95	1.04	1.46	1.20
1999–00	0.89	0.99	1.76	0.85
2000–01	0.92	0.99	1.67	0.84
2001–02	0.96	0.85	1.75	1.20
2002–03	1.17	0.99	1.64	1.14
2003–04	1.26	0.68	1.60	1.12
2004–05	1.32	0.72	1.86	1.31
2005–06	1.40	0.81	1.88	1.61
2006–07	1.31	0.77	2.24	2.11
2007–08	1.35	0.99	2.03	1.65
2008–09	1.46	1.08	1.83	2.01
2009–10	1.05	1.14	1.95	1.39
2010–11	1.45	1.16	1.66	1.56
2011–12	1.15	1.09	1.75	1.56

Table 45: Annual arithmetic, unstandardised, and standardised (with standard error) CPUE indices for CRA 6 (kg/potlift). This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	2.33	2.12	2.20	0.033
1980–81	2.18	2.05	2.03	0.035
1981–82	2.19	2.30	2.31	0.032
1982–83	1.78	1.63	1.66	0.029
1983–84	1.73	1.65	1.63	0.029
1984–85	1.35	1.31	1.30	0.029
1985–86	1.41	1.39	1.38	0.029
1986–87	1.66	1.53	1.51	0.031
1987–88	1.48	1.36	1.33	0.031
1988–89	1.40	1.29	1.27	0.033
1989–90	1.30	1.17	1.12	0.034
1990–91	1.35	1.20	1.18	0.034
1991–92	1.28	1.24	1.23	0.031
1992–93	1.19	1.16	1.12	0.030
1993–94	1.07	1.03	1.03	0.028
1994–95	1.05	1.02	1.00	0.028
1995–96	1.05	1.02	1.04	0.028
1996–97	1.03	1.07	1.08	0.030
1997–98	0.86	1.00	1.01	0.029
1998–99	1.14	1.23	1.28	0.036
1999–00	1.23	1.28	1.29	0.039
2000–01	1.20	1.21	1.23	0.036
2001–02	1.15	1.15	1.21	0.039
2002–03	1.23	1.28	1.33	0.040
2003–04	1.09	1.24	1.28	0.040
2004–05	1.28	1.41	1.40	0.040
2005–06	1.37	1.54	1.53	0.037
2006–07	1.55	1.72	1.73	0.040
2007–08	1.59	1.53	1.55	0.040
2008–09	1.62	1.65	1.64	0.039
2009–10	1.54	1.57	1.51	0.041
2010–11	1.54	1.69	1.68	0.041
2011–12	1.54	1.53	1.50	0.043

Table 46: Number of vessels by statistical area from CRA 7, 1979–80 to 2011–12. Vessels catching less than 1 t in a year for the entire QMA were excluded. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	920	921	CRA 7
1979–80	64	35	90
1980–81	58	35	86
1981–82	50	35	79
1982–83	24	22	42
1983–84	23	22	40
1984–85	39	24	59
1985–86	47	26	66
1986–87	40	25	58
1987–88	41	16	51
1988–89	28	15	38
1989–90	12	7	17
1990–91	28	12	37
1991–92	34	15	46
1992–93	29	11	35
1993–94	32	10	37
1994–95	26	8	32
1995–96	22	16	27
1996–97	16	8	22
1997–98	7	4	7
1998–99	13	9	18
1999–00	13	6	17
2000–01	18	12	25
2001–02	17	9	22
2002–03	18	6	20
2003–04	16	3	17
2004–05	12	4	14
2005–06	10	5	14
2006–07	9	7	14
2007–08	15	8	20
2008–09	11	5	15
2009–10	15	7	19
2010–11	11	8	16
2011–12	6	5	9

Table 47: Distribution and annual landings by statistical area from CRA 7, 1979–80 to 2011–12. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing	Distribution (%)		Annual Catch (t)		
Year	920	921	920	921	CRA 7
1979–80	61.3	38.7	247.3	156.1	403.4
1980–81	62.0	38.0	184.7	113.0	297.8
1981–82	60.5	39.5	161.7	105.4	267.0
1982–83	53.6	46.4	69.3	60.1	129.4
1983–84	52.3	47.7	57.1	52.1	109.1
1984–85	63.5	36.5	121.6	70.0	191.7
1985–86	74.5	25.5	238.4	81.5	319.9
1986–87	72.6	27.4	237.5	89.6	327.1
1987–88	78.5	21.5	232.1	63.7	295.8
1988–89	70.1	29.9	150.0	63.9	213.9
1989–90	63.9	36.1	64.8	36.6	101.4
1990–91	66.5	33.5	88.7	44.6	133.4
1991–92	71.9	28.1	127.8	49.9	177.7
1992–93	69.9	30.1	91.9	39.6	131.6
1993–94	67.4	32.6	93.1	45.0	138.1
1994–95	64.9	35.1	78.1	42.3	120.3
1995–96	57.2	42.8	46.5	34.8	81.3
1996–97	62.9	37.1	39.6	23.3	62.9
1997–98	51.6	48.4	18.6	17.4	36.0
1998–99	48.3	51.7	28.3	30.3	58.6
1999–00	74.0	26.0	41.8	14.7	56.5
2000–01	50.7	49.3	44.3	43.0	87.2
2001–02	72.7	27.3	55.9	21.0	76.9
2002–03	76.5	23.5	67.8	20.8	88.6
2003–04	70.5	29.5	57.4	24.0	81.4
2004–05	58.4	41.6	55.1	39.1	94.2
2005–06	52.0	48.0	49.4	45.6	95.0
2006–07	51.4	48.6	61.7	58.5	120.2
2007–08	64.5	35.5	77.5	42.6	120.1
2008–09	64.7	35.3	77.8	42.5	120.3
2009–10	56.8	43.2	77.6	58.9	136.5
2010–11	45.0	55.0	33.7	41.1	74.8
2011–12	63.8	36.2	29.2	16.5	45.7

Table 48: Distribution and annual potlifts by statistical area from CRA 7, 1979–80 to 2011–12. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)		Annual Potlifts ('000s)		
Fishing year	920	921	920	921	CRA 7
1979–80	70.6	29.4	271.0	112.7	383.7
1980–81	73.5	26.5	245.5	88.7	334.2
1981–82	71.9	28.1	244.2	95.5	339.7
1982–83	67.5	32.5	173.3	83.6	256.9
1983–84	63.7	36.3	172.1	98.2	270.3
1984–85	71.5	28.5	232.4	92.7	325.1
1985–86	77.5	22.5	330.0	95.6	425.5
1986–87	79.4	20.6	321.6	83.3	404.9
1987–88	81.4	18.6	332.3	75.7	408.0
1988–89	78.0	22.0	373.7	105.4	479.0
1989–90	81.0	19.0	228.0	53.6	281.6
1990–91	81.3	18.7	262.5	60.4	322.9
1991–92	77.2	22.8	166.0	49.0	215.0
1992–93	84.1	15.9	276.7	52.1	328.9
1993–94	82.5	17.5	180.9	38.5	219.4
1994–95	84.0	16.0	209.4	39.8	249.2
1995–96	73.1	26.9	191.0	70.5	261.5
1996–97	78.5	21.5	194.3	53.3	247.6
1997–98	68.6	31.4	105.0	48.1	153.1
1998–99	59.3	40.7	115.5	79.3	194.8
1999–00	81.4	18.6	205.9	46.9	252.8
2000–01	65.2	34.8	163.8	87.3	251.1
2001–02	75.1	24.9	125.7	41.6	167.3
2002–03	88.6	11.4	151.6	19.4	171.0
2003–04	90.9	9.1	128.2	12.8	141.0
2004–05	80.6	19.4	100.9	24.3	125.2
2005–06	70.3	29.7	59.8	25.2	85.0
2006–07	62.9	37.1	48.6	28.7	77.2
2007–08	74.3	25.7	67.9	23.5	91.4
2008–09	70.9	29.1	50.6	20.7	71.3
2009–10	74.0	26.0	99.3	35.0	134.2
2010–11	59.6	40.4	61.6	41.7	103.3
2011–12	62.9	37.1	46.6	27.5	74.1

Table 49: Percentage of annual landings by month from CRA 7, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the month/year cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Fishing year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1979–80	1.7	x	5.7	18.1	26.8	22.6	13.4	6.5	3.4	1.1	0.6	0.3
1980–81	0.0	0.2	8.6	19.9	33.4	15.4	12.3	5.4	2.1	1.2	0.9	0.6
1981–82	0.1	0.0	8.5	27.5	25.0	19.9	9.3	5.5	1.9	1.6	0.7	0.0
1982–83	x	x	5.7	25.8	24.3	15.3	11.6	10.0	5.0	1.8	0.3	x
1983–84	–	–	5.8	19.0	24.9	19.9	15.4	6.6	5.3	2.0	0.8	0.2
1984–85	x	x	15.8	30.5	16.6	12.6	11.7	7.6	3.1	1.5	0.5	0.1
1985–86	x	x	10.9	28.1	25.5	12.9	10.6	5.4	3.8	1.5	1.1	0.1
1986–87	–	0.0	5.6	17.5	19.9	24.9	14.3	8.9	5.7	2.2	0.9	0.1
1987–88	0.0	x	7.1	24.7	27.4	16.0	12.0	7.0	2.8	1.6	0.9	0.5
1988–89	x	–	4.3	18.6	28.1	14.8	18.3	11.5	1.8	1.5	1.0	x
1989–90	–	x	2.6	6.0	18.0	27.2	16.5	11.7	8.6	6.5	2.7	0.2
1990–91	x	–	7.0	25.0	20.0	19.6	9.1	5.9	6.8	4.2	1.9	0.2
1991–92	x	x	21.9	34.6	32.7	9.6	0.9	0.2	0.1	–	0.0	–
1992–93	–	–	5.9	18.7	19.9	24.1	17.9	7.8	5.0	0.4	x	x
1993–94	x	–	15.7	40.1	24.4	11.6	8.0	0.1	x	x	–	–
1994–95	–	x	9.4	28.7	33.5	19.6	7.4	1.2	–	–	x	–
1995–96	–	x	5.9	39.0	26.1	19.9	8.1	1.0	–	–	–	–
1996–97	–	–	4.8	19.4	32.1	19.1	19.2	5.4	–	–	–	–
1997–98	–	–	2.4	17.9	22.9	21.3	13.5	22.0	–	–	–	–
1998–99	–	–	6.0	30.1	21.0	9.1	12.5	20.2	x	–	–	–
1999–00	–	–	7.3	20.4	27.5	17.4	14.0	13.5	–	–	–	–
2000–01	–	–	6.6	22.2	28.6	15.6	17.7	9.2	–	x	–	–
2001–02	–	–	9.0	27.1	25.7	18.6	12.6	6.9	–	–	x	–
2002–03	–	x	10.2	21.2	30.5	20.6	15.8	1.8	–	–	–	–
2003–04	–	x	7.1	29.1	25.5	15.2	18.4	4.8	–	–	–	–
2004–05	x	–	11.5	36.2	30.8	12.8	5.9	2.9	–	–	–	–
2005–06	–	–	9.0	45.7	32.1	10.9	2.0	x	–	–	–	–
2006–07	–	–	11.1	33.3	33.3	17.6	4.4	x	–	–	–	–
2007–08	–	x	3.3	26.5	34.4	24.3	10.6	0.6	–	–	–	–
2008–09	–	–	3.7	9.2	36.2	32.0	18.9	x	–	–	–	–
2009–10	–	–	1.6	7.6	17.5	30.3	23.0	20.0	–	–	–	–
2010–11	–	–	11.0	13.3	13.8	23.7	13.6	24.7	–	–	–	–
2011–12	–	–	6.9	24.4	30.8	18.8	12.8	6.4	–	–	–	–

Table 50: Percentage of landings from CRA 7 by statistical area and month for 2011–12. A '–'indicates no fishing in the month/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Month	920	921
Apr	–	–
May	–	–
Jun	4.4	2.5
Jul	17.1	7.3
Aug	20.9	9.9
Sep	10.0	8.8
Oct	7.8	5.0
Nov	3.7	2.7
Dec	–	–
Jan	–	–
Feb	–	–
Mar	–	–

Table 51: Arithmetic CPUE (kg/potlift) for CRA 7 by fishing year and statistical area, 1979–80 to 2011–12. This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	920	921
1979–80	0.91	1.39
1980–81	0.75	1.27
1981–82	0.66	1.10
1982–83	0.40	0.72
1983–84	0.33	0.53
1984–85	0.52	0.76
1985–86	0.72	0.85
1986–87	0.74	1.08
1987–88	0.70	0.84
1988–89	0.40	0.61
1989–90	0.28	0.56
1990–91	0.33	0.74
1991–92	0.77	1.00
1992–93	0.34	0.82
1993–94	0.52	1.37
1994–95	0.38	1.14
1995–96	0.26	0.53
1996–97	0.22	0.45
1997–98	0.18	0.40
1998–99	0.23	0.40
1999–00	0.19	0.35
2000–01	0.27	0.52
2001–02	0.45	0.55
2002–03	0.44	1.09
2003–04	0.45	1.83
2004–05	0.54	1.63
2005–06	0.82	1.82
2006–07	1.27	2.03
2007–08	1.22	2.04
2008–09	2.30	2.59
2009–10	1.03	1.78
2010–11	0.73	1.10
2011–12	0.76	0.66

Table 52: Annual arithmetic, unstandardised, and standardised (with standard error) CPUE indices for CRA 7 (kg/potlift). This table generated from data prepared using the F2 algorithm scaled to the combined “LFX” destination codes.

Fishing year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	1.05	0.99	0.99	0.031
1980–81	0.89	0.86	0.87	0.033
1981–82	0.79	0.74	0.74	0.033
1982–83	0.50	0.49	0.48	0.036
1983–84	0.40	0.42	0.41	0.037
1984–85	0.59	0.55	0.55	0.037
1985–86	0.75	0.73	0.73	0.036
1986–87	0.81	0.83	0.84	0.038
1987–88	0.73	0.69	0.71	0.040
1988–89	0.45	0.42	0.42	0.046
1989–90	0.33	0.31	0.33	0.047
1990–91	0.40	0.41	0.43	0.042
1991–92	0.81	0.99	0.99	0.054
1992–93	0.39	0.38	0.40	0.048
1993–94	0.63	0.61	0.62	0.058
1994–95	0.48	0.45	0.47	0.055
1995–96	0.32	0.29	0.29	0.055
1996–97	0.25	0.24	0.25	0.065
1997–98	0.24	0.18	0.18	0.064
1998–99	0.29	0.26	0.26	0.064
1999–00	0.22	0.23	0.24	0.070
2000–01	0.33	0.35	0.35	0.063
2001–02	0.48	0.53	0.51	0.066
2002–03	0.51	0.59	0.61	0.068
2003–04	0.57	0.56	0.60	0.075
2004–05	0.77	0.90	0.90	0.093
2005–06	1.12	1.36	1.29	0.110
2006–07	1.56	1.92	1.80	0.091
2007–08	1.43	1.67	1.59	0.083
2008–09	2.40	1.93	1.81	0.103
2009–10	1.26	1.17	1.12	0.074
2010–11	0.88	0.86	0.85	0.083
2011–12	0.73	0.77	0.71	0.082

Table 53: Number of vessels by statistical area from CRA 8, 1979–80 to 2011–12. Vessels catching less than 1 t in a year for the entire QMA were excluded. A ‘–’ indicates no fishing in the statistical area/fishing year cell. This table generated from data prepared using the B4 algorithm scaled to the “L” destination code.

Fishing year	922	923	924	925	926	927	928	CRA 8
1979–80	6	48	76	5	67	69	67	271
1980–81	6	50	85	4	63	59	50	253
1981–82	8	39	76	5	68	40	34	221
1982–83	6	32	67	6	71	46	33	214
1983–84	6	41	56	7	73	47	34	208
1984–85	8	33	59	7	70	57	36	212
1985–86	3	38	54	5	63	58	40	208
1986–87	3	28	51	5	56	42	36	187
1987–88	5	24	53	1	57	38	28	173
1988–89	4	29	38	5	43	23	22	135
1989–90	7	36	40	11	78	42	27	178
1990–91	3	15	35	14	65	38	25	134
1991–92	5	19	34	4	71	43	34	143
1992–93	4	16	32	7	52	33	37	144
1993–94	3	19	33	8	51	34	34	143
1994–95	2	10	32	16	42	29	34	122
1995–96	3	10	18	10	36	27	30	112
1996–97	3	11	21	9	36	25	31	111
1997–98	2	12	18	8	36	23	35	107
1998–99	1	11	17	9	34	20	37	104
1999–00	2	13	16	7	29	21	21	91
2000–01	1	8	14	4	32	24	18	87
2001–02	2	6	13	3	34	15	18	74
2002–03	1	2	12	2	33	12	15	69
2003–04	1	5	11	4	29	11	14	66
2004–05	2	6	10	4	29	9	13	62
2005–06	1	6	8	1	28	10	14	60
2006–07	2	4	7	–	25	11	13	57
2007–08	2	5	12	3	22	13	16	59
2008–09	2	4	14	2	21	13	17	64
2009–10	3	2	12	1	23	16	18	62
2010–11	2	2	12	2	28	14	20	64
2011–12	1	1	12	1	28	11	19	62

Table 54: Distribution and annual landings by statistical area from CRA 8, 1979–80 to 2011–12. An ‘x’ indicates fewer than 3 vessels, and a ‘–’ indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the “L” destination code.

	Distribution (%)							Annual Catch (t)							
Fishing year	922	923	924	925	926	927	928	922	923	924	925	926	927	928	CRA 8
1979–80	1.9	12.7	25.6	0.4	22.4	19.5	17.6	32.5	218.9	442.0	7.2	385.7	335.8	303.5	1 725.6
1980–81	1.2	11.3	30.5	1.3	24.1	17.1	14.5	17.4	165.8	446.1	18.5	353.1	250.3	212.2	1 463.4
1981–82	1.5	11.9	27.5	1.9	32.4	13.8	11.0	20.8	166.1	383.8	26.2	452.1	192.7	153.9	1 395.7
1982–83	1.4	9.9	24.9	1.0	33.2	18.8	10.8	21.4	148.4	374.3	14.7	498.8	283.1	161.6	1 502.4
1983–84	1.1	10.2	22.3	1.5	35.8	17.2	11.9	16.1	154.9	339.8	22.5	546.6	263.0	182.0	1 524.9
1984–85	1.3	9.4	22.0	0.8	30.5	24.9	11.2	20.1	145.5	341.4	11.9	472.0	385.2	173.2	1 549.3
1985–86	0.7	10.5	21.3	1.0	29.5	24.2	12.9	12.2	196.2	397.0	18.7	549.6	452.1	239.7	1 865.6
1986–87	1.1	9.9	27.8	0.4	30.2	16.2	14.3	18.1	159.0	444.3	6.6	483.8	259.0	229.3	1 600.1
1987–88	1.3	12.5	27.8	x	32.0	15.5	10.8	21.5	207.6	462.5	x	532.9	258.6	179.6	1 665.3
1988–89	1.7	16.2	23.8	1.0	32.8	11.5	12.9	18.3	169.8	249.8	10.6	343.4	120.9	134.8	1 047.7
1989–90	1.1	8.9	23.0	0.5	36.5	19.3	10.7	14.3	110.9	287.8	6.0	456.6	241.3	133.4	1 250.2
1990–91	0.9	6.7	23.0	1.4	37.9	18.9	11.2	7.2	56.1	192.3	11.6	316.2	157.3	93.7	834.5
1991–92	1.0	6.0	19.6	1.3	32.3	23.1	16.6	9.9	58.0	189.1	12.6	310.8	222.4	159.9	962.7
1992–93	0.8	5.6	19.6	1.4	33.0	18.4	21.2	7.0	49.3	171.4	12.2	289.4	161.3	185.8	876.5
1993–94	1.5	6.4	22.9	1.7	30.2	17.4	19.8	13.8	57.3	205.3	15.7	270.2	156.1	177.6	896.1
1994–95	1.0	3.9	24.2	4.0	27.8	18.7	20.3	8.1	33.7	207.4	34.0	238.3	160.2	173.9	855.6
1995–96	0.8	5.1	17.0	3.6	30.4	21.1	21.9	6.8	41.7	140.5	29.9	251.1	174.5	181.2	825.6
1996–97	0.8	5.5	16.1	2.7	33.3	21.7	20.0	6.7	47.8	138.6	23.0	287.5	186.8	172.2	862.4
1997–98	0.3	4.4	16.6	1.2	32.6	19.2	25.6	2.7	34.8	130.7	9.1	256.1	151.0	201.3	785.6
1998–99	x	6.0	11.6	1.3	35.0	20.0	25.7	x	48.1	94.1	10.6	282.9	161.6	207.9	808.1
1999–00	x	6.5	13.7	3.1	36.4	22.8	17.1	x	46.4	96.9	22.0	258.2	162.0	121.1	709.8
2000–01	x	3.6	15.5	2.1	40.8	25.3	12.1	x	25.3	109.3	14.8	286.8	178.0	85.4	703.4
2001–02	x	3.3	14.9	0.3	42.8	22.9	15.0	x	19.1	85.0	1.7	244.9	131.1	85.8	572.1
2002–03	x	x	15.6	x	48.4	18.3	13.9	x	x	88.4	x	274.3	103.9	78.8	567.1
2003–04	x	3.9	12.8	0.3	51.5	16.8	14.2	x	22.2	72.6	1.5	292.2	95.3	80.4	567.6
2004–05	x	3.8	12.1	1.2	50.0	16.7	15.6	x	22.7	72.7	7.2	301.2	100.6	93.8	603.0
2005–06	x	2.9	12.4	x	45.9	19.8	18.0	x	17.6	74.7	x	276.8	119.2	108.3	603.2
2006–07	x	3.2	13.4	–	41.2	23.0	18.1	x	24.1	101.5	–	311.0	173.4	136.5	754.9
2007–08	x	2.5	13.3	0.8	35.6	21.3	25.6	x	18.8	100.1	6.1	267.6	160.3	192.9	752.4
2008–09	x	0.4	15.3	x	28.8	22.4	32.3	x	4.3	147.6	x	278.2	216.8	311.6	966.0
2009–10	0.6	x	14.1	x	27.6	21.3	35.2	6.6	x	143.5	x	280.9	216.7	358.8	1 018.3
2010–11	x	0.1	12.5	x	34.1	24.5	28.3	x	0.9	127.5	x	346.8	249.2	288.5	1 018.3
2011–12	x	x	12.4	x	38.8	25.1	23.4	x	x	118.9	x	372.5	240.9	224.5	961.2

Table 55: Distribution and annual potlifts by statistical area from CRA 8, 1979–80 to 2011–12. An ‘x’ indicates fewer than 3 vessels, and a ‘–’ indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the “L” destination code.

Fishing	Distribution (%)							Annual Potlifts (000’s)							
Year	922	923	924	925	926	927	928	922	923	924	925	926	927	928	CRA 8
1979–80	1.7	10.2	24.2	0.1	21.7	22.9	19.2	16.3	98.2	233.7	1.4	209.7	220.9	185.7	966.0
1980–81	1.5	10.3	26.2	0.3	21.2	22.2	18.2	13.1	87.4	222.8	2.3	180.2	188.5	154.8	849.2
1981–82	1.8	11.8	25.9	0.3	27.0	17.1	16.1	13.7	92.0	202.3	2.5	210.9	133.2	125.9	780.5
1982–83	2.0	8.6	22.6	0.3	26.3	24.3	15.8	19.4	81.8	216.2	3.3	251.0	232.2	150.5	954.4
1983–84	1.6	10.7	22.5	0.4	29.3	21.8	13.7	19.9	130.9	275.2	5.1	357.9	266.4	167.3	1 222.8
1984–85	1.8	9.2	20.2	0.3	28.7	25.5	14.3	23.4	116.8	256.4	3.2	363.2	323.3	181.1	1 267.3
1985–86	0.9	9.6	17.4	0.1	26.4	28.8	16.8	13.0	131.8	239.7	1.4	363.0	396.4	231.5	1 376.8
1986–87	1.2	9.8	18.9	0.2	28.1	23.6	18.2	16.4	136.1	263.2	3.1	392.0	328.6	253.1	1 392.7
1987–88	1.6	10.7	20.0	x	29.4	23.5	14.8	21.3	143.1	268.6	x	393.9	314.2	198.0	1 339.6
1988–89	3.0	14.0	20.6	0.6	29.2	15.2	17.4	34.0	159.1	233.3	6.7	331.3	172.7	196.9	1 133.9
1989–90	1.3	9.0	16.1	0.7	35.9	23.7	13.4	17.8	126.9	226.4	9.9	505.2	334.2	188.2	1 408.5
1990–91	1.2	6.3	16.3	0.9	35.1	22.9	17.3	11.8	60.4	156.2	8.4	335.4	219.0	165.3	956.5
1991–92	2.0	5.7	14.3	0.5	31.7	25.6	20.1	23.5	67.4	168.5	6.3	371.6	300.4	236.3	1 174.1
1992–93	1.1	4.9	12.5	1.0	31.8	23.3	25.3	14.8	62.7	160.8	13.2	410.4	300.7	326.4	1 289.0
1993–94	1.2	4.4	12.9	0.9	29.6	22.8	28.1	11.5	43.0	124.9	8.8	286.8	221.4	272.7	969.1
1994–95	1.1	3.9	17.5	2.7	27.3	22.0	25.4	11.1	37.8	169.5	26.3	265.0	214.0	247.0	970.8
1995–96	0.8	6.0	14.0	2.6	25.5	22.4	28.7	7.3	54.6	128.5	24.1	233.3	204.8	263.1	915.7
1996–97	0.9	6.4	14.6	1.9	29.0	22.9	24.3	8.4	63.5	144.5	19.1	285.7	225.8	239.6	986.8
1997–98	0.4	4.9	13.4	0.9	30.3	20.3	29.8	4.2	53.1	145.5	9.7	329.5	220.7	323.8	1 086.5
1998–99	x	6.4	13.0	1.2	27.6	18.4	32.9	x	65.7	132.6	12.0	280.9	187.8	335.7	1 018.8
1999–00	x	7.3	13.0	3.2	26.8	21.6	27.7	x	61.6	109.9	26.7	226.7	182.9	234.4	845.4
2000–01	x	2.9	12.1	1.3	31.4	30.2	21.6	x	21.0	86.9	9.5	225.0	216.8	154.9	717.5
2001–02	x	2.1	10.3	0.5	38.2	26.8	21.5	x	13.3	64.1	2.8	236.6	166.3	133.5	620.0
2002–03	x	x	12.8	x	41.4	21.8	20.9	x	x	66.0	x	213.1	112.0	107.3	514.1
2003–04	x	2.4	9.2	0.3	44.6	17.9	25.3	x	8.1	31.2	1.0	152.1	61.1	86.0	340.7
2004–05	x	2.4	9.9	1.6	45.3	18.4	21.7	x	9.3	37.9	6.3	172.9	70.2	82.8	381.8
2005–06	x	1.2	7.0	x	41.7	28.6	20.9	x	4.1	24.3	x	144.1	98.8	72.4	345.5
2006–07	x	3.5	7.5	–	37.4	32.2	18.5	x	11.9	26.0	–	128.9	111.0	64.0	345.1
2007–08	x	1.6	11.8	0.7	44.0	23.9	15.9	x	4.9	36.0	2.1	134.2	72.9	48.6	305.1
2008–09	x	0.4	14.7	x	36.3	24.6	22.0	x	1.2	44.3	x	109.5	74.1	66.3	301.5
2009–10	1.8	x	11.0	x	35.0	20.5	31.1	5.8	x	36.1	x	114.6	67.2	101.8	327.3
2010–11	x	0.3	10.4	x	34.0	28.7	25.6	x	1.5	46.3	x	150.9	127.3	113.4	443.2
2011–12	x	x	9.1	x	35.2	32.6	22.4	x	x	37.3	x	144.4	133.5	92.0	409.8

Table 56: Percentage of annual landings by month from CRA 8, 1979–80 to 2011–12. An ‘x’ indicates fewer than 3 vessels, and a ‘–’ indicates no fishing, in the month/year cell. This table generated from data prepared using the B4 algorithm scaled to the “L” destination code.

Fishing year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1979–80	0.2	0.3	2.2	4.0	8.4	16.5	25.0	18.9	9.3	8.9	5.0	1.2
1980–81	0.2	0.3	2.4	5.4	7.0	14.4	25.3	21.2	12.6	7.4	3.1	0.8
1981–82	0.1	0.3	1.9	2.7	10.7	22.2	26.0	18.6	9.1	5.2	2.1	1.1
1982–83	0.3	0.2	3.4	3.3	7.2	20.3	29.2	10.5	10.5	8.3	5.5	1.2
1983–84	0.4	0.2	2.1	3.3	5.3	13.2	18.8	22.4	15.5	11.7	5.8	1.4
1984–85	0.2	0.3	1.3	2.4	9.6	24.8	24.8	14.8	10.6	5.6	3.5	2.0
1985–86	0.3	0.7	3.1	3.6	18.5	21.2	21.1	14.3	8.7	4.2	2.9	1.5
1986–87	0.6	0.6	1.4	2.1	9.5	19.1	20.1	20.1	11.7	7.8	4.5	2.6
1987–88	0.4	0.2	0.7	2.2	8.9	19.7	20.2	19.0	12.7	8.0	6.0	1.9
1988–89	0.7	0.7	2.9	3.2	5.7	12.1	17.0	17.9	14.0	16.0	7.3	2.6
1989–90	0.6	0.3	0.8	1.6	11.1	22.9	13.9	19.2	12.4	9.0	6.2	2.0
1990–91	0.3	x	0.9	2.5	8.3	17.6	17.1	19.7	10.5	11.9	7.0	4.2
1991–92	0.3	0.4	2.9	3.5	7.1	14.7	18.2	16.0	14.7	12.9	7.2	2.1
1992–93	0.5	0.2	2.2	4.0	8.3	17.4	15.5	15.8	15.1	8.6	8.5	3.9
1993–94	0.1	0.2	1.0	4.5	19.2	27.6	19.7	11.9	7.0	3.4	2.9	2.4
1994–95	0.1	0.4	3.5	5.2	11.2	25.6	18.5	11.4	10.4	9.0	3.3	1.3
1995–96	0.2	0.2	2.9	4.2	11.9	20.4	19.9	18.9	8.3	7.1	4.3	1.9
1996–97	0.2	0.3	2.2	4.0	10.0	19.1	22.4	19.1	11.1	8.2	2.4	0.9
1997–98	0.2	0.3	3.0	4.7	8.1	21.0	21.6	15.9	11.1	9.6	3.6	0.9
1998–99	0.1	0.3	1.4	2.4	7.6	17.5	16.6	22.4	13.2	10.4	6.3	1.8
1999–00	x	0.1	0.6	2.1	16.0	24.9	22.5	14.0	8.7	7.9	2.1	1.1
2000–01	0.1	x	0.4	2.6	14.9	37.7	15.3	13.0	6.5	4.9	3.7	1.0
2001–02	x	0.6	1.2	5.8	14.3	33.2	21.5	14.5	3.6	3.8	1.1	0.2
2002–03	0.8	0.8	0.7	5.3	20.7	31.6	19.2	8.8	3.4	4.9	1.0	2.7
2003–04	0.5	0.8	1.5	10.5	29.6	38.8	10.6	2.1	0.3	3.6	1.1	0.7
2004–05	0.7	2.0	2.8	14.0	22.2	40.6	6.6	2.4	0.7	3.7	2.8	1.4
2005–06	2.6	3.0	7.6	13.5	23.7	37.1	5.7	0.7	0.5	4.2	0.6	0.9
2006–07	10.9	7.4	11.5	11.0	24.7	24.6	3.5	0.2	0.1	0.6	3.3	2.0
2007–08	12.7	8.5	12.5	11.6	17.1	20.8	3.6	1.0	0.4	8.2	3.2	0.3
2008–09	14.7	12.5	7.1	14.4	19.6	22.7	4.2	0.5	x	4.2	–	0.1
2009–10	13.5	9.8	9.5	6.4	9.4	23.7	8.9	2.1	1.6	7.0	7.5	0.6
2010–11	10.6	13.2	13.3	14.0	9.5	15.9	11.4	3.2	0.3	3.6	2.9	2.3
2011–12	10.5	6.8	11.7	7.5	11.9	19.8	9.8	6.3	1.0	9.3	4.0	1.3

Table 57: Percentage of landings from CRA 8 by statistical area and month for 2011–12. An ‘x’ indicates fewer than 3 vessels in the month/statistical area cell (15 instances representing 3.9% of the annual catch). A ‘–’ indicates no fishing in the month/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to “L” destination code.

Month	922	923	924	925	926	927	928
Apr	–	–	–	–	3.1	5.0	2.4
May	–	–	–	–	1.9	2.8	2.2
Jun	–	–	1.3	–	5.3	2.6	2.5
Jul	–	–	0.4	–	3.3	1.6	2.2
Aug	–	x	1.5	–	5.3	2.6	2.5
Sep	–	x	4.3	x	9.0	3.8	2.5
Oct	–	x	2.6	x	3.2	1.3	2.5
Nov	–	–	2.0	x	3.2	x	x
Dec	–	–	–	–	0.7	–	x
Jan	x	x	x	–	2.0	3.0	4.0
Feb	–	–	x	–	1.2	1.0	x
Mar	–	–	x	–	0.7	0.6	–

Table 58: Arithmetic CPUE (kg/potlift) for CRA 8 by fishing year and statistical area, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	922	923	924	925	926	927	928
1979–80	1.99	2.23	1.89	5.01	1.84	1.52	1.63
1980–81	1.32	1.90	2.00	7.95	1.96	1.33	1.37
1981–82	1.52	1.81	1.90	10.43	2.14	1.45	1.22
1982–83	1.10	1.82	1.73	4.44	1.99	1.22	1.07
1983–84	0.81	1.18	1.23	4.46	1.53	0.99	1.09
1984–85	0.86	1.25	1.33	3.67	1.30	1.19	0.96
1985–86	0.94	1.49	1.66	13.46	1.51	1.14	1.04
1986–87	1.10	1.17	1.69	2.11	1.23	0.79	0.91
1987–88	1.01	1.45	1.72	x	1.35	0.82	0.91
1988–89	0.54	1.07	1.07	1.58	1.04	0.70	0.69
1989–90	0.41	0.95	1.34	0.37	0.98	0.73	0.72
1990–91	0.52	1.08	1.30	1.34	0.95	0.76	0.56
1991–92	0.44	0.93	1.20	2.08	0.85	0.75	0.67
1992–93	0.51	0.79	1.07	0.87	0.69	0.53	0.59
1993–94	1.06	1.36	1.73	1.65	0.92	0.70	0.71
1994–95	0.49	0.83	1.30	1.31	0.90	0.75	0.65
1995–96	x	0.77	1.23	1.36	1.07	0.82	0.66
1996–97	x	0.67	1.04	1.14	0.94	0.80	0.66
1997–98	0.73	0.67	1.00	0.83	0.73	0.67	0.64
1998–99	–	0.89	0.74	0.74	0.93	0.78	0.58
1999–00	x	0.76	1.11	1.08	1.04	0.81	0.52
2000–01	–	1.23	1.26	2.18	1.24	0.76	0.65
2001–02	–	2.62	1.39	1.04	1.07	0.78	0.64
2002–03	x	x	1.26	x	1.31	0.87	0.78
2003–04	x	3.02	2.30	0.51	1.82	1.35	0.99
2004–05	x	2.59	2.47	1.80	1.63	1.51	1.13
2005–06	x	3.46	3.52	x	1.86	1.23	1.48
2006–07	x	1.61	4.36	–	2.35	1.60	2.15
2007–08	x	2.87	3.05	4.00	2.28	2.05	3.87
2008–09	x	3.54	3.50	x	2.71	2.93	5.29
2009–10	x	x	4.04	x	2.70	3.42	4.55
2010–11	x	x	3.28	x	2.55	1.89	3.23
2011–12	–	–	3.61	x	3.16	2.04	3.37

Table 59: Annual arithmetic, unstandardised, and standardised (with standard error) CPUE indices for CRA 8 (kg/potlift). This table generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

Fishing year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	1.79	2.01	1.97	0.019
1980–81	1.72	1.78	1.71	0.020
1981–82	1.79	1.77	1.65	0.022
1982–83	1.57	1.47	1.41	0.020
1983–84	1.25	1.12	1.06	0.020
1984–85	1.22	1.09	1.03	0.020
1985–86	1.36	1.25	1.22	0.020
1986–87	1.15	1.11	1.08	0.021
1987–88	1.24	1.18	1.14	0.022
1988–89	0.92	0.90	0.85	0.026
1989–90	0.93	0.91	0.84	0.026
1990–91	0.93	0.88	0.81	0.027
1991–92	0.85	0.81	0.79	0.025
1992–93	0.69	0.69	0.68	0.024
1993–94	0.94	0.92	0.91	0.027
1994–95	0.88	0.83	0.81	0.027
1995–96	0.92	0.89	0.87	0.030
1996–97	0.84	0.83	0.81	0.029
1997–98	0.71	0.68	0.69	0.027
1998–99	0.74	0.72	0.72	0.031
1999–00	0.84	0.79	0.76	0.033
2000–01	1.00	0.95	0.92	0.035
2001–02	0.96	0.99	0.97	0.042
2002–03	1.09	1.16	1.18	0.041
2003–04	1.63	1.72	1.75	0.045
2004–05	1.60	1.74	1.82	0.044
2005–06	1.80	2.07	2.28	0.047
2006–07	2.20	2.45	2.81	0.046
2007–08	2.61	2.83	3.07	0.044
2008–09	3.51	3.61	4.14	0.045
2009–10	3.60	3.69	4.03	0.042
2010–11	2.64	2.91	3.28	0.042
2011–12	2.93	3.04	3.24	0.040

Table 60: Number of vessels by statistical area from CRA 9, 1979–80 to 2011–12. Vessels catching less than 1 t in a year for the entire QMA were excluded. A '–' indicates no fishing in the statistical area/fishing year cell and '0' indicates that only vessels with <1 t fished in the cell. This table generated from data prepared using the B4 algorithm scaled to "L" destination codes.

Fishing year	929	930	931	935	936	937	938	CRA 9
1979–80	4	6	6	3	6	3	–	23
1980–81	2	4	5	4	8	5	1	23
1981–82	1	3	7	3	4	4	–	20
1982–83	2	3	7	2	4	4	–	19
1983–84	1	3	7	3	6	6	–	22
1984–85	0	3	6	3	6	5	–	21
1985–86	0	2	7	7	6	6	–	20
1986–87	0	2	6	5	6	6	–	20
1987–88	0	2	5	5	6	5	–	19
1988–89	–	1	1	4	5	2	0	10
1989–90	1	4	4	7	3	1	–	18
1990–91	0	1	5	5	2	1	1	12
1991–92	–	1	5	6	0	1	0	13
1992–93	–	3	4	5	0	1	0	12
1993–94	0	3	3	6	0	0	–	12
1994–95	1	6	3	5	0	1	–	16
1995–96	1	4	1	6	1	1	–	14
1996–97	1	6	5	6	1	2	–	18
1997–98	1	6	5	7	4	1	–	19
1998–99	1	5	5	5	1	1	1	16
1999–00	1	7	6	4	0	1	–	17
2000–01	0	3	2	3	3	2	0	9
2001–02	0	2	2	4	2	3	0	11
2002–03	0	1	2	4	2	2	–	10
2003–04	–	1	3	3	2	1	–	9
2004–05	–	0	2	4	2	1	–	8
2005–06	0	1	2	4	1	1	–	8
2006–07	–	1	2	3	–	1	–	7
2007–08	–	1	2	3	1	1	–	7
2008–09	–	1	2	2	0	1	–	6
2009–10	–	1	2	2	1	1	–	6
2010–11	0	1	3	2	1	0	–	6
2011–12	–	1	2	2	0	–	–	5

Table 61: Distribution and annual landings by statistical area from CRA 9, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

	Distribution (%)							Annual Catch (t)							
Fishing year	929	930	931	935	936	937	938	929	930	931	935	936	937	938	CRA 9
1979–80	14.7	14.7	28.8	13.1	13.4	15.3	–	13.1	13.1	25.6	11.7	11.9	13.7	–	89.0
1980–81	3.3	10.9	16.9	14.4	29.2	25.0	x	3.3	10.5	16.5	14.0	28.3	24.3	x	97.1
1981–82	4.3	8.9	32.5	10.2	20.0	24.1	–	3.1	6.4	23.4	7.4	14.4	17.3	–	72.0
1982–83	7.2	9.0	42.3	16.0	8.5	17.1	–	4.2	5.4	25.0	9.5	5.0	10.1	–	59.1
1983–84	x	6.3	50.1	8.2	12.6	20.7	–	x	4.4	35.4	5.8	8.9	14.6	–	70.6
1984–85	x	12.2	42.1	16.5	12.4	16.1	–	x	9.8	34.0	13.3	10.0	13.0	–	80.8
1985–86	x	7.0	38.6	18.8	16.3	19.2	–	x	5.6	30.6	14.9	12.9	15.2	–	79.2
1986–87	x	6.3	34.6	23.2	23.4	11.5	–	x	5.9	32.2	21.6	21.8	10.8	–	93.3
1987–88	x	x	33.5	36.3	16.1	11.2	–	x	x	31.0	33.7	15.0	10.4	–	92.7
1988–89	–	5.5	x	46.9	19.5	8.0	x	–	1.4	x	12.2	5.1	2.1	x	26.0
1989–90	2.1	19.5	24.2	43.4	6.5	4.4	–	0.5	5.2	6.5	11.6	1.7	1.2	–	26.8
1990–91	x	x	40.4	46.5	5.3	x	2.1	x	x	18.3	21.1	2.4	x	1.0	45.3
1991–92	–	x	49.8	40.2	x	x	x	–	x	23.7	19.1	x	x	x	47.5
1992–93	–	12.5	41.7	40.2	x	x	x	–	5.7	19.0	18.4	x	x	x	45.7
1993–94	x	23.0	26.3	47.5	x	x	–	x	10.5	12.0	21.6	x	x	–	45.5
1994–95	x	31.9	13.2	46.1	x	x	–	x	14.4	6.0	20.9	x	x	–	45.2
1995–96	5.7	27.9	x	43.2	x	x	–	2.6	12.7	x	19.6	x	x	–	45.4
1996–97	x	19.0	22.8	45.5	x	x	–	x	8.9	10.7	21.3	x	x	–	46.9
1997–98	5.7	16.5	19.7	45.4	9.9	x	–	2.7	7.7	9.2	21.2	4.6	x	–	46.7
1998–99	4.7	31.1	19.2	35.2	x	x	x	2.2	14.6	9.0	16.5	x	x	x	46.9
1999–00	x	34.8	28.4	28.7	x	x	–	x	16.3	13.3	13.5	x	x	–	47.0
2000–01	1.2	7.5	x	35.3	10.3	x	x	0.6	3.5	x	16.6	4.9	x	x	47.0
2001–02	x	10.0	24.0	41.6	x	11.5	x	x	4.7	11.2	19.5	x	5.4	x	46.8
2002–03	x	x	x	44.4	x	x	–	x	x	x	20.9	x	x	–	47.0
2003–04	–	x	36.5	30.7	x	x	–	–	x	16.8	14.1	x	x	–	45.9
2004–05	–	x	x	54.7	x	x	–	–	x	x	25.7	x	x	–	47.0
2005–06	x	x	x	56.2	x	5.1	–	x	x	x	26.2	x	2.4	–	46.6
2006–07	–	x	28.8	59.1	–	x	–	–	x	13.5	27.8	–	x	–	47.0
2007–08	–	x	x	63.9	x	x	–	–	x	x	30.1	x	x	–	47.0
2008–09	–	x	x	39.6	x	x	–	–	x	x	18.6	x	x	–	47.0
2009–10	–	x	x	x	x	x	–	–	x	x	x	x	x	–	46.6
2010–11	x	x	45.3	38.0	x	x	–	x	x	21.3	17.8	x	x	–	47.0
2011–12	–	x	x	42.0	x	–	–	–	x	x	19.7	x	–	–	47.0

Table 62: Distribution and annual potlifts by statistical area from CRA 9, 1979–80 to 2011–12. An ‘x’ indicates fewer than 3 vessels, and a ‘–’ indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to the “L” destination codes.

Fishing	Distribution (%)							Annual Potlifts (000’s)							
Year	929	930	931	935	936	937	938	929	930	931	935	936	937	938	CRA 9
1979–80	13.5	15.8	12.8	23	21.8	13.1	–	10.8	12.7	10.2	18.5	17.5	10.5	–	80.2
1980–81	5.9	11.8	8.5	20.1	37.7	15.8	x	5.0	10.1	7.2	17.1	32.2	13.5	x	85.4
1981–82	5.8	10.5	13.6	20.3	31.3	18.4	–	4.3	7.7	10.0	14.9	22.9	13.5	–	73.3
1982–83	7.5	16.2	23	19.9	15.8	17.6	–	5.2	11.1	15.8	13.6	10.9	12.1	–	68.7
1983–84	x	8.4	26.2	12.3	27.4	22.1	–	x	6.3	19.6	9.2	20.5	16.5	–	74.7
1984–85	x	17.6	20.9	19.5	21.6	18.7	–	x	16.1	19.1	17.8	19.7	17.0	–	91.2
1985–86	x	9.9	26.8	20.8	22.5	19.8	–	x	10.5	28.6	22.2	24.0	21.1	–	106.8
1986–87	x	8.6	26.2	22.4	25.8	15.9	–	x	9.2	28.2	24.1	27.7	17.1	–	107.6
1987–88	x	x	31.8	25.6	22.4	15.5	–	x	x	34.8	28.1	24.5	17.0	–	109.6
1988–89	–	10.7	x	29.2	30.1	9.8	x	–	3.5	x	9.4	9.7	3.2	x	32.3
1989–90	3.7	26.6	14	34.9	12.9	7.8	–	1.2	8.5	4.5	11.2	4.1	2.5	–	32.1
1990–91	x	x	28.9	52.7	4.6	x	3	x	x	13.4	24.4	2.1	x	1.4	46.2
1991–92	–	x	34.3	46.3	x	x	x	–	x	17.5	23.6	x	x	x	51.0
1992–93	–	17.5	25.8	45.7	x	x	x	–	9.1	13.3	23.6	x	x	x	51.7
1993–94	x	24.9	23	48.5	x	x	–	x	8.7	8.1	16.9	x	x	–	34.9
1994–95	x	45.1	9.2	34.7	x	x	–	x	22.0	4.5	16.9	x	x	–	48.8
1995–96	11.2	39.1	x	33.4	x	x	–	5.2	18.1	x	15.5	x	x	–	46.3
1996–97	x	26.9	25.9	35.7	x	x	–	x	12.9	12.4	17.1	x	x	–	47.9
1997–98	5.4	23.6	25.7	35.1	7.4	x	–	3.2	14.0	15.2	20.8	4.4	x	–	59.4
1998–99	6.9	38.8	14.5	33.2	x	x	x	3.5	19.7	7.4	16.9	x	x	x	50.9
1999–00	x	41.2	25	24.9	x	x	–	x	22.2	13.5	13.4	x	x	–	53.8
2000–01	1.6	9.9	x	43.9	20.2	x	x	0.8	5.0	x	22.3	10.2	x	x	50.8
2001–02	x	15.1	10.9	51.9	x	10.3	x	x	8.6	6.2	29.6	x	5.9	x	57.0
2002–03	x	x	x	40.8	x	x	–	x	x	x	17.2	x	x	–	42.2
2003–04	–	x	33.2	22.6	x	x	–	–	x	9.4	6.4	x	x	–	28.2
2004–05	–	x	x	50.8	x	x	–	–	x	x	11.2	x	x	–	22.0
2005–06	x	x	x	58.1	x	7.1	–	x	x	x	12.2	x	1.5	–	21.0
2006–07	–	x	19	67.9	–	x	–	–	x	4.6	16.4	–	x	–	24.2
2007–08	–	x	x	67.3	x	x	–	–	x	x	17.1	x	x	–	25.4
2008–09	–	x	x	28.6	x	x	–	–	x	x	7.6	x	x	–	26.8
2009–10	–	x	x	x	x	x	–	–	x	x	x	x	x	–	28.4
2010–11	x	x	33	45.5	x	x	–	x	x	9.7	13.4	x	x	–	29.4
2011–12	–	x	x	45.5	x	–	–	–	x	x	10.1	x	–	–	22.2

Table 63: Percentage of annual landings by month from CRA 9, 1979–80 to 2011–12. An ‘x’ indicates fewer than 3 vessels, and a ‘–’ indicates no fishing, in the month/year cell. This table generated from data prepared using the B4 algorithm scaled to “L” destination code.

Fishing year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1979–80	3.4	x	0.6	3.6	2.9	2.0	15.0	26.0	11.6	17.5	11.0	6.3
1980–81	0.8	0.1	0.2	2.7	2.7	2.4	13.4	5.7	21.1	32.0	15.0	3.8
1981–82	0.6	0.2	1.4	2.4	3.0	1.2	9.0	19.9	20.7	19.7	14.7	7.3
1982–83	4.0	x	2.4	4.6	8.1	3.1	8.2	8.0	16.0	14.8	20.8	9.3
1983–84	2.6	x	x	11.2	5.2	0.9	5.5	11.6	11.6	21.1	18.4	8.2
1984–85	0.8	2.3	x	5.1	5.3	8.3	7.9	16.4	13.4	15.6	14.4	8.2
1985–86	4.4	1.6	0.3	2.9	6.5	10.4	10.4	14.6	17.3	12.8	11.6	7.3
1986–87	2.0	0.6	0.6	4.8	4.3	5.1	9.5	16.2	20.8	15.3	10.6	10.2
1987–88	2.7	x	x	3.0	5.9	4.8	15.9	18.0	13.6	15.2	11.4	7.8
1988–89	4.4	–	x	4.9	3.0	8.3	3.7	13.6	18.6	21.3	12.9	8.8
1989–90	1.3	x	x	3.9	7.6	16.1	7.8	10.6	12.5	15.8	18.3	6.0
1990–91	0.4	–	–	2.2	5.1	11.9	21.4	12.2	6.4	13.1	11.1	16.2
1991–92	1.1	x	x	17.1	6.1	8.9	9.8	17.4	12.5	10.1	7.4	7.4
1992–93	0.5	x	11.7	11.9	3.4	13.6	11.6	11.1	10.4	9.1	11.7	4.3
1993–94	1.0	x	1.0	24.3	9.3	12.7	16.3	7.1	11.0	5.7	8.7	2.5
1994–95	x	x	4.4	12.0	11.6	13.7	22.4	8.9	13.8	9.4	2.0	1.4
1995–96	x	x	2.4	7.4	16.5	24.1	23.9	13.1	5.1	3.7	0.5	x
1996–97	x	0.5	4.6	16.2	17.2	22.3	17.0	8.1	7.3	4.6	0.7	1.1
1997–98	x	x	12.5	21.0	15.0	17.1	12.0	7.3	7.0	3.6	3.9	x
1998–99	1.1	1.2	2.6	8.2	12.7	17.9	12.6	18.4	10.8	8.3	3.7	2.6
1999–00	0.8	1.6	6.4	9.4	15.9	27.3	18.2	12.5	5.7	2.2	x	x
2000–01	3.2	2.3	6.0	20.4	19.5	12.6	13.9	12.5	6.8	x	x	x
2001–02	4.2	2.7	8.8	25.3	13.5	23.3	13.9	3.8	2.8	x	x	x
2002–03	11.3	5.0	1.9	18.0	14.1	14.2	6.3	8.1	8.1	3.2	8.2	x
2003–04	8.0	0.7	x	16.1	28.8	9.0	8.7	5.8	9.5	10.7	–	x
2004–05	x	x	3.6	34.6	27.6	16.3	13.3	–	1.1	x	x	x
2005–06	x	2.5	12.0	20.6	28.8	29.5	2.6	x	0.8	x	x	x
2006–07	x	7.8	21.4	30.4	17.5	16.3	–	x	1.8	–	–	–
2007–08	x	x	16.1	39.2	23.5	12.2	x	x	x	x	–	x
2008–09	x	2.9	7.4	11.4	22.8	34.4	12.9	x	1.7	x	x	x
2009–10	4.9	3.1	8.2	11.6	5.3	28.9	25.3	3.2	5.3	x	x	x
2010–11	5.5	3.2	9.0	28.8	11.8	11.5	23.4	–	x	x	x	–
2011–12	x	x	x	5.2	11.8	30.6	30.0	x	x	x	–	x

Table 64: Percentage of landings from CRA 9 by statistical area and month for 2011–12. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (21 instances representing 100% of the annual catch). A '–' indicates no fishing in the month/statistical area cell. This table generated from data prepared using the B4 algorithm scaled to "L" destination code.

Month	929	930	931	935	936	937	938
Apr	–	–	–	x	–	–	–
May	–	–	–	x	–	–	–
Jun	–	–	–	x	–	–	–
Jul	–	x	x	x	x	–	–
Aug	–	x	x	x	–	–	–
Sep	–	x	x	x	x	–	–
Oct	–	–	x	x	–	–	–
Nov	–	–	x	–	–	–	–
Dec	–	–	x	x	–	–	–
Jan	–	–	–	x	–	–	–
Feb	–	–	–	–	–	–	–
Mar	–	–	–	–	x	–	–

Table 65: Arithmetic CPUE (kg/potlift) for CRA 9 by fishing year and statistical area, 1979–80 to 2011–12. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing, in the year/statistical area cell. This table generated from data prepared using the F2 algorithm scaled to combined "LFX" destination codes.

Fishing year	929	930	931	935	936	937	938
1979–80	1.21	1.03	2.51	0.63	0.68	1.30	–
1980–81	0.65	1.05	2.28	0.82	0.88	1.80	x
1981–82	0.73	0.83	2.35	0.49	0.63	1.28	–
1982–83	0.82	0.48	1.58	0.69	0.46	0.83	–
1983–84	x	0.70	1.81	0.63	0.44	0.89	–
1984–85	x	0.61	1.78	0.75	0.51	0.77	–
1985–86	x	0.53	1.07	0.67	0.54	0.72	–
1986–87	x	0.64	1.14	0.90	0.79	0.63	–
1987–88	x	x	0.89	1.20	0.61	0.61	–
1988–89	–	0.42	x	1.29	0.52	0.66	x
1989–90	–	1.18	–	1.15	0.45	x	–
1990–91	x	x	1.29	0.96	x	–	x
1991–92	–	x	1.56	0.78	x	x	–
1992–93	–	x	1.50	0.74	x	x	–
1993–94	–	2.43	x	1.41	x	x	–
1994–95	x	–	x	1.49	x	x	–
1995–96	x	x	x	1.35	x	x	–
1996–97	–	x	x	1.33	x	x	–
1997–98	x	0.66	1.96	1.22	0.92	x	–
1998–99	x	x	x	1.11	–	x	x
1999–00	x	x	1.69	0.79	–	x	–
2000–01	x	0.78	x	1.13	0.53	x	x
2001–02	x	x	1.58	0.81	x	1.11	x
2002–03	x	–	x	1.42	0.94	x	x
2003–04	–	–	x	1.98	0.80	x	–
2004–05	–	x	x	2.78	4.74	x	–
2005–06	x	–	x	2.81	5.05	x	–
2006–07	–	–	x	2.14	4.64	x	–
2007–08	–	–	2.25	2.52	2.00	x	–
2008–09	–	x	x	4.99	1.43	x	–
2009–10	–	x	x	4.09	x	x	–
2010–11	x	x	x	6.75	x	–	–
2011–12	–	x	x	4.88	–	–	–

Table 66: Annual arithmetic, unstandardised, and standardised (with standard error) CPUE indices for CRA 9 (kg/potlift). This table generated from data prepared using the F2 algorithm scaled to combined "LFX" destination codes.

Fishing year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	1.11	1.10	1.20	0.050
1980–81	1.14	1.15	1.29	0.049
1981–82	0.98	0.95	1.00	0.056
1982–83	0.86	0.82	0.84	0.056
1983–84	0.94	0.90	0.87	0.057
1984–85	0.89	0.83	0.83	0.055
1985–86	0.74	0.72	0.73	0.056
1986–87	0.87	0.85	0.85	0.057
1987–88	0.85	0.90	0.87	0.060
1988–89	0.81	0.78	0.84	0.073
1989–90	1.04	0.70	0.94	0.178
1990–91	1.06	0.96	0.87	0.084
1991–92	0.99	1.04	0.94	0.082
1992–93	1.00	1.16	1.02	0.090
1993–94	1.55	1.41	1.26	0.101
1994–95	1.37	0.99	0.90	0.116
1995–96	1.36	1.15	1.18	0.103
1996–97	1.30	1.07	1.12	0.101
1997–98	1.10	0.87	0.93	0.089
1998–99	1.29	1.45	1.41	0.109
1999–00	1.18	1.26	1.09	0.115
2000–01	1.31	1.08	1.08	0.090
2001–02	1.03	1.16	1.13	0.091
2002–03	1.64	1.93	1.90	0.089
2003–04	1.49	2.63	2.57	0.103
2004–05	2.40	3.05	3.18	0.090
2005–06	2.65	3.54	3.59	0.097
2006–07	2.56	3.49	3.57	0.104
2007–08	2.31	3.10	3.00	0.102
2008–09	1.88	1.98	1.99	0.103
2009–10	2.91	2.56	2.47	0.103
2010–11	3.57	2.59	2.64	0.112
2011–12	2.79	2.67	2.70	0.128

Table 67: Annual standardised offset year CPUE analysis, with standard errors, used to operate the 2011–12 CRA 3 decision rule. This table generated from data prepared using the B4 algorithm scaled to "L" destination code.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.9325	0.8842	0.8447	0.0217
1980–81	0.9246	0.9104	0.8682	0.0213
1981–82	0.9356	0.9476	0.9269	0.0212
1982–83	0.9232	0.9251	0.9079	0.0206
1983–84	0.8148	0.7812	0.7661	0.0202
1984–85	0.7384	0.6921	0.6661	0.0203
1985–86	0.7119	0.6692	0.6344	0.0220
1986–87	0.6433	0.5316	0.5176	0.0215
1987–88	0.4426	0.4321	0.4055	0.0238
1988–89	0.4417	0.4223	0.4208	0.0243
1989–90	0.4900	0.4723	0.4658	0.0226
1990–91	0.4142	0.3591	0.3549	0.0232
1991–92	0.3147	0.2717	0.2615	0.0222
1992–93	0.3581	0.3518	0.3333	0.0241
1993–94	0.7881	0.8231	0.8593	0.0389
1994–95	1.2423	1.2848	1.3383	0.0472
1995–96	1.7305	1.6929	1.7911	0.0483
1996–97	2.1664	2.4650	2.6222	0.0516
1997–98	1.6005	1.7901	1.9807	0.0498
1998–99	1.6256	1.8550	1.9912	0.0474
1999–00	1.1891	1.2895	1.4527	0.0419
2000–01	0.9928	1.0533	1.1437	0.0427
2001–02	0.8226	0.7753	0.8559	0.0375
2002–03	0.7184	0.6916	0.6839	0.0330
2003–04	0.5514	0.5253	0.4989	0.0335
2004–05	0.5676	0.5825	0.5590	0.0367
2005–06	0.5867	0.5933	0.5682	0.0352
2006–07	0.5951	0.6079	0.5826	0.0353
2007–08	0.6613	0.6663	0.6268	0.0381
2008–09	0.7391	0.8191	0.7866	0.0430
2009–10	0.9952	1.0145	1.0005	0.0443
2010–11	1.4166	1.5701	1.6272	0.0493
2011–12	1.9628	2.1970	2.3143	0.0539

Table 68: Annual standardised offset year CPUE analysis, with standard errors, used to operate the 2011–12 CRA 4 decision rule. This table generated from data prepared using the B4 algorithm scaled to "L" destination code.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.8869	0.8750	0.8412	0.0208
1980–81	0.8224	0.8344	0.8094	0.0208
1981–82	0.8536	0.8944	0.8890	0.0210
1982–83	0.9250	0.9163	0.9011	0.0200
1983–84	0.8385	0.8090	0.7896	0.0198
1984–85	0.7163	0.7136	0.6976	0.0205
1985–86	0.7543	0.7669	0.7507	0.0204
1986–87	0.8101	0.7443	0.7165	0.0208
1987–88	0.6908	0.6537	0.6325	0.0211
1988–89	0.6092	0.5569	0.5433	0.0214
1989–90	0.5729	0.5540	0.5314	0.0208
1990–91	0.4868	0.5112	0.5006	0.0204
1991–92	0.5205	0.5103	0.4916	0.0203
1992–93	0.5429	0.5298	0.5077	0.0200
1993–94	0.6371	0.6446	0.6293	0.0214
1994–95	0.8102	0.7852	0.7755	0.0236
1995–96	1.0119	1.0675	1.1079	0.0257
1996–97	1.2389	1.2818	1.3681	0.0296
1997–98	1.2947	1.3719	1.5110	0.0307
1998–99	1.2753	1.3985	1.5268	0.0294
1999–00	1.2286	1.1217	1.2187	0.0309
2000–01	1.0762	1.0633	1.1540	0.0291
2001–02	1.0336	1.0721	1.1318	0.0285
2002–03	1.1436	1.1983	1.2401	0.0284
2003–04	0.9935	0.9733	0.9997	0.0279
2004–05	1.0448	1.0013	0.9784	0.0279
2005–06	0.7665	0.7630	0.7596	0.0273
2006–07	0.6546	0.6757	0.6471	0.0264
2007–08	0.6112	0.6347	0.6136	0.0293
2008–09	0.8230	0.8875	0.8559	0.0331
2009–10	0.9637	0.9662	1.0012	0.0312
2010–11	1.2109	1.2139	1.2115	0.0293
2011–12	1.4606	1.4069	1.3741	0.0335

Table 69: Annual standardised offset year CPUE analysis, with standard errors, used to operate the CRA 5 decision rule. This table generated from data prepared using the B4 algorithm scaled to "L" destination code.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.7693	0.6942	0.6598	0.0246
1980–81	0.8630	0.7410	0.7048	0.0275
1981–82	0.7832	0.7588	0.7438	0.0258
1982–83	0.8410	0.7490	0.7368	0.0255
1983–84	0.7478	0.6988	0.6869	0.0255
1984–85	0.7255	0.6114	0.5983	0.0260
1985–86	0.6694	0.5455	0.5344	0.0258
1986–87	0.6002	0.4720	0.4610	0.0267
1987–88	0.4548	0.4064	0.3953	0.0278
1988–89	0.4081	0.3796	0.3636	0.0308
1989–90	0.4166	0.4098	0.3867	0.0300
1990–91	0.3979	0.3458	0.3328	0.0278
1991–92	0.3692	0.3283	0.3088	0.0271
1992–93	0.3647	0.3508	0.3372	0.0282
1993–94	0.3998	0.3763	0.3633	0.0307
1994–95	0.4360	0.4217	0.4094	0.0327
1995–96	0.5301	0.5325	0.5312	0.0325
1996–97	0.7088	0.7355	0.7539	0.0367
1997–98	0.8656	0.9972	1.0301	0.0393
1998–99	0.9821	1.0585	1.1201	0.0406
1999–00	1.1431	1.1855	1.2208	0.0431
2000–01	1.2854	1.3926	1.4784	0.0472
2001–02	1.2404	1.3600	1.4991	0.0529
2002–03	1.3104	1.4691	1.5708	0.0491
2003–04	1.2792	1.5363	1.6011	0.0501
2004–05	1.1673	1.4078	1.4330	0.0467
2005–06	1.1170	1.3273	1.3466	0.0474
2006–07	1.1958	1.3571	1.3858	0.0502
2007–08	1.3275	1.3989	1.4197	0.0483
2008–09	1.4600	1.6428	1.6926	0.0543
2009–10	1.5509	1.7327	1.7778	0.0537
2010–11	1.6052	1.7213	1.7345	0.0603
2011–12	1.4916	1.6102	1.6365	0.0561

Table 70: Annual standardised offset year CPUE analysis, with standard errors, used to operate the 2011–12 CRA 7 decision rule. This table generated from data prepared using the F2 algorithm scaled to combined "LFX" destination codes.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.9429	0.9720	0.9761	0.0321
1980–81	0.8043	0.7719	0.7719	0.0324
1981–82	0.5021	0.4967	0.4956	0.0354
1982–83	0.4410	0.4487	0.4396	0.0378
1983–84	0.5801	0.5439	0.5393	0.0370
1984–85	0.7586	0.7092	0.7095	0.0371
1985–86	0.7490	0.7260	0.7333	0.0375
1986–87	0.7783	0.8130	0.8352	0.0400
1987–88	0.4722	0.4718	0.4762	0.0417
1988–89	0.3798	0.3214	0.3316	0.0485
1989–90	0.4241	0.4279	0.4565	0.0439
1990–91	0.6827	0.6195	0.6469	0.0428
1991–92	0.4134	0.4291	0.4398	0.0590
1992–93	0.5186	0.5477	0.5844	0.0485
1993–94	0.5439	0.4965	0.5040	0.0581
1994–95	0.3203	0.3102	0.3136	0.0550
1995–96	0.2318	0.2182	0.2277	0.0634
1996–97	0.2242	0.1866	0.1894	0.0629
1997–98	0.2932	0.2550	0.2489	0.0650
1998–99	0.2464	0.2535	0.2595	0.0703
1999–00	0.3075	0.3139	0.3115	0.0652
2000–01	0.4609	0.5022	0.4881	0.0650
2001–02	0.4717	0.5328	0.5450	0.0650
2002–03	0.5636	0.6110	0.6393	0.0770
2003–04	0.8031	0.7508	0.7823	0.0833
2004–05	1.0164	1.2269	1.1746	0.1029
2005–06	1.5457	1.9653	1.7984	0.0968
2006–07	1.4380	1.6678	1.6285	0.0877
2007–08	2.2213	2.0050	1.8871	0.0975
2008–09	1.2346	1.0906	1.0261	0.0871
2009–10	1.1607	1.0833	1.0500	0.0778
2010–11	0.8091	0.8442	0.7976	0.0799
2011–12	0.5318	0.6498	0.6247	0.0967

Table 71: Annual standardised offset year CPUE analysis, with standard errors, used to operate the 2011–12 CRA 8 decision rule. This table generated from data prepared using the F2 algorithm scaled to combined "LFX" destination codes.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	1.8442	1.9999	1.9390	0.0192
1980–81	1.7787	1.8168	1.6922	0.0202
1981–82	1.6015	1.5858	1.4988	0.0208
1982–83	1.4111	1.2630	1.2029	0.0203
1983–84	1.3159	1.2209	1.1436	0.0197
1984–85	1.3478	1.1986	1.1509	0.0196
1985–86	1.1665	1.0741	1.0388	0.0208
1986–87	1.2025	1.1747	1.1297	0.0212
1987–88	1.1362	1.1086	1.0365	0.0227
1988–89	0.9672	0.9456	0.8826	0.0258
1989–90	0.9298	0.9211	0.8401	0.0268
1990–91	0.8212	0.8061	0.7755	0.0248
1991–92	0.8298	0.8016	0.7751	0.0245
1992–93	0.8069	0.7944	0.7749	0.0241
1993–94	0.8876	0.8586	0.8501	0.0266
1994–95	0.8940	0.8781	0.8365	0.0277
1995–96	0.8314	0.8202	0.8007	0.0294
1996–97	0.7727	0.7532	0.7537	0.0280
1997–98	0.7540	0.7099	0.6882	0.0288
1998–99	0.8264	0.8205	0.8035	0.0302
1999–00	0.9454	0.8629	0.8261	0.0328
2000–01	0.8959	0.9201	0.8829	0.0355
2001–02	1.0389	1.0540	1.0604	0.0398
2002–03	1.4889	1.5911	1.5942	0.0411
2003–04	1.5714	1.6755	1.7666	0.0438
2004–05	1.7753	2.0098	2.1460	0.0447
2005–06	2.1371	2.3869	2.7480	0.0458
2006–07	2.5204	2.7109	3.0978	0.0459
2007–08	3.4586	3.4884	3.8856	0.0427
2008–09	3.2928	3.5446	4.0709	0.0459
2009–10	2.8247	3.1637	3.5215	0.0400
2010–11	2.7252	2.9264	3.2122	0.0409
2011–12	3.2552	3.0807	3.3457	0.0411

Table 72: Seasonal standardised indices with associated standard error and the corresponding arithmetic CPUE (kg/potlift) for CRA 7 from AW 1979–80 through AW 2011–12. This table generated from data prepared using the F2 algorithm scaled to combined "LFX" destination codes.

Fishing	AW season			SS season		
year	Arithmetic	Standardised	s.e.	Arithmetic	Standardised	s.e.
1979–80	1.1250	1.0297	0.0402	0.8810	0.9247	0.0493
1980–81	0.9729	1.0082	0.0429	0.6894	0.6965	0.0518
1981–82	0.8478	0.8191	0.0422	0.5999	0.6100	0.0560
1982–83	0.4607	0.4302	0.0463	0.6556	0.5766	0.0615
1983–84	0.3799	0.3730	0.0483	0.4720	0.4863	0.0613
1984–85	0.6122	0.5696	0.0471	0.5293	0.5216	0.0622
1985–86	0.8264	0.8355	0.0470	0.5738	0.6052	0.0577
1986–87	0.8343	0.8427	0.0499	0.7569	0.8365	0.0597
1987–88	0.7899	0.8250	0.0545	0.5810	0.5946	0.0598
1988–89	0.4142	0.3794	0.0587	0.5255	0.4844	0.0742
1989–90	0.2806	0.2465	0.0642	0.4654	0.4675	0.0682
1990–91	0.4142	0.4461	0.0576	0.3803	0.4162	0.0628
1991–92	0.8111	0.9617	0.0590	1.2405	1.3291	0.1572
1992–93	0.4064	0.3692	0.0642	0.3686	0.4535	0.0739
1993–94	0.5976	0.7068	0.0644	1.4225	0.3432	0.1368
1994–95	0.5094	0.5461	0.0646	0.2705	0.3117	0.1040
1995–96	0.3289	0.3155	0.0650	0.2280	0.2468	0.1082
1996–97	0.2325	0.2197	0.0779	0.3166	0.3420	0.1186
1997–98	0.1908	0.1519	0.0742	0.5164	0.3181	0.1250
1998–99	0.2497	0.2288	0.0760	0.4255	0.3804	0.1235
1999–00	0.1941	0.2181	0.0853	0.3237	0.2861	0.1249
2000–01	0.3051	0.3221	0.0763	0.4285	0.4225	0.1107
2001–02	0.4726	0.5281	0.0800	0.4850	0.4880	0.1185
2002–03	0.4690	0.5729	0.0776	0.7932	0.8249	0.1473
2003–04	0.5275	0.5850	0.0899	0.7760	0.6597	0.1371
2004–05	0.8103	0.8663	0.1040	0.5223	1.0996	0.2119
2005–06	1.1185	1.2090	0.1170	1.2828	2.4470	0.3277
2006–07	1.5481	1.7562	0.1012	1.7454	2.0992	0.2119
2007–08	1.4245	1.5450	0.0961	1.4909	1.8003	0.1646
2008–09	2.3796	1.9501	0.1200	2.4870	1.5243	0.2038
2009–10	1.1130	0.9419	0.0961	1.5965	1.4880	0.1159
2010–11	0.8788	0.8024	0.1040	0.8711	0.9658	0.1395
2011–12	0.7740	0.7336	0.0969	0.5365	0.6824	0.1537

Table 73: Seasonal standardised indices with associated standard error and the corresponding arithmetic CPUE (kg/potlift) for CRA 8 from AW 1979–80 through AW 2011–12. This table generated from data prepared using the F2 algorithm scaled to combined "LFX" destination codes.

Fishing	AW season			SS season		
year	Arithmetic	Standardised	s.e.	Arithmetic	Standardised	s.e.
1979–80	1.5409	1.9265	0.0308	1.9284	2.1723	0.0251
1980–81	1.6484	1.8251	0.0331	1.7570	1.7940	0.0261
1981–82	1.8225	1.7779	0.0349	1.7679	1.7049	0.0282
1982–83	1.3853	1.3671	0.0330	1.6978	1.5580	0.0270
1983–84	0.9767	0.8906	0.0333	1.3693	1.2789	0.0259
1984–85	1.2239	1.0786	0.0331	1.2216	1.0874	0.0265
1985–86	1.5166	1.3878	0.0316	1.2365	1.1852	0.0278
1986–87	1.0530	0.9422	0.0338	1.2037	1.2799	0.0274
1987–88	1.2001	1.0420	0.0365	1.2647	1.3049	0.0284
1988–89	0.7364	0.7428	0.0424	1.0107	1.0053	0.0335
1989–90	0.8820	0.8058	0.0436	0.9646	0.9439	0.0339
1990–91	0.8710	0.7918	0.0476	0.9563	0.9078	0.0334
1991–92	0.6551	0.6789	0.0396	0.9783	0.9472	0.0325
1992–93	0.6200	0.6298	0.0404	0.7257	0.7659	0.0319
1993–94	0.9214	0.8926	0.0399	0.9625	0.9876	0.0373
1994–95	0.8255	0.7537	0.0401	0.9287	0.9062	0.0367
1995–96	0.8528	0.8217	0.0451	0.9829	0.9729	0.0408
1996–97	0.6709	0.6720	0.0446	0.9773	0.9957	0.0396
1997–98	0.5722	0.5786	0.0417	0.8444	0.8370	0.0366
1998–99	0.6028	0.5512	0.0501	0.8330	0.9075	0.0398
1999–00	0.8178	0.7420	0.0493	0.8625	0.8266	0.0443
2000–01	1.0176	0.8985	0.0515	0.9646	0.9929	0.0476
2001–02	0.8348	0.8182	0.0561	1.1898	1.2504	0.0635
2002–03	0.9494	0.9395	0.0529	1.4446	1.6982	0.0651
2003–04	1.5076	1.5182	0.0547	2.3650	2.3388	0.0826
2004–05	1.4417	1.5073	0.0531	2.8116	2.7366	0.0827
2005–06	1.6331	1.8519	0.0548	3.6644	3.9218	0.0972
2006–07	2.0166	2.3212	0.0536	4.1013	4.5994	0.0965
2007–08	2.3264	2.5814	0.0539	4.5420	4.2559	0.0775
2008–09	3.2952	3.5730	0.0531	5.8127	5.8198	0.0934
2009–10	3.0511	3.4093	0.0544	5.8566	5.2287	0.0677
2010–11	2.3099	2.7384	0.0516	4.5193	4.6693	0.0771
2011–12	2.3706	2.6294	0.0500	5.2228	4.6765	0.0677

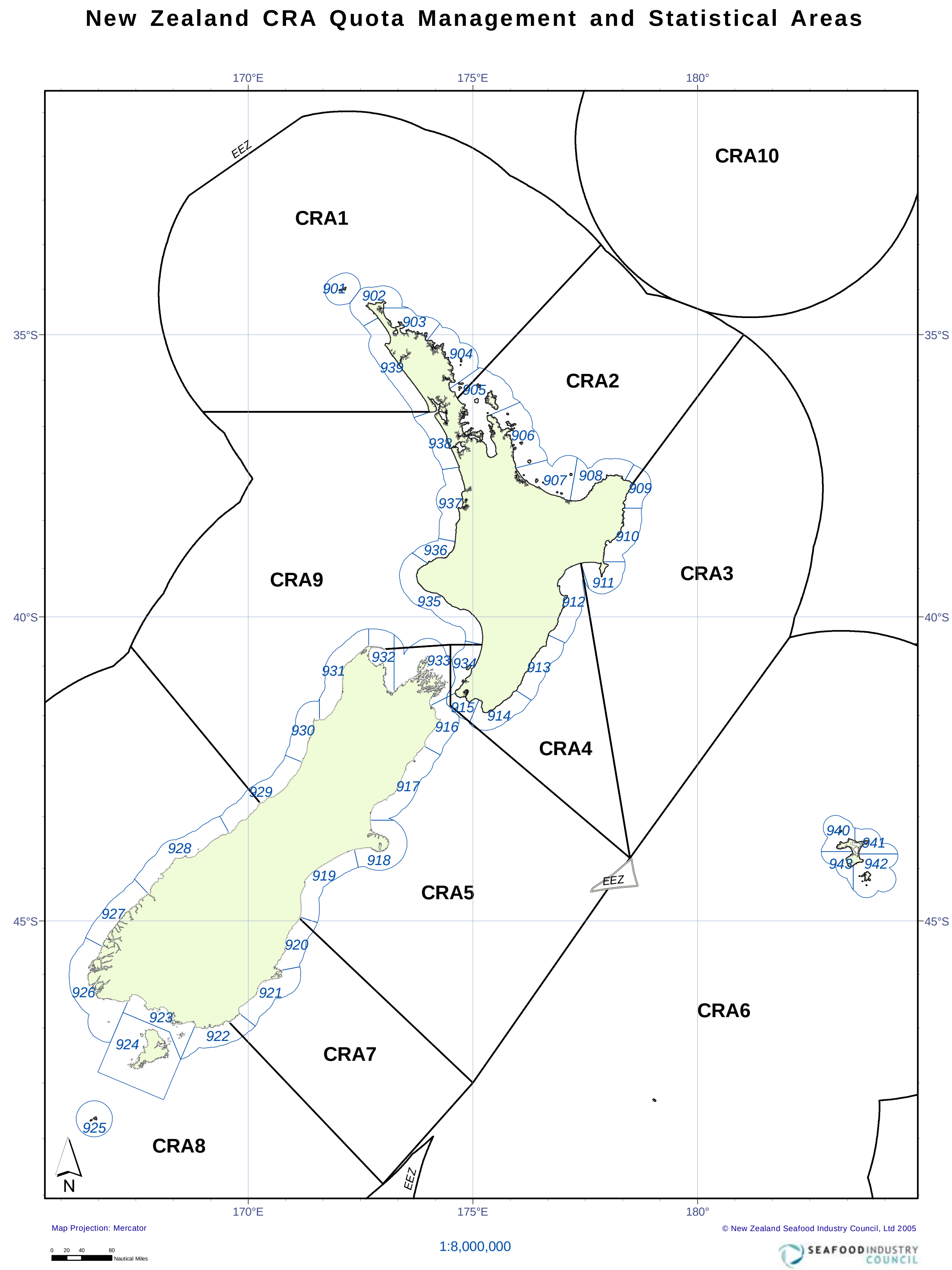

Figure 1: Map of rock lobster statistical areas and Quota Management Areas.

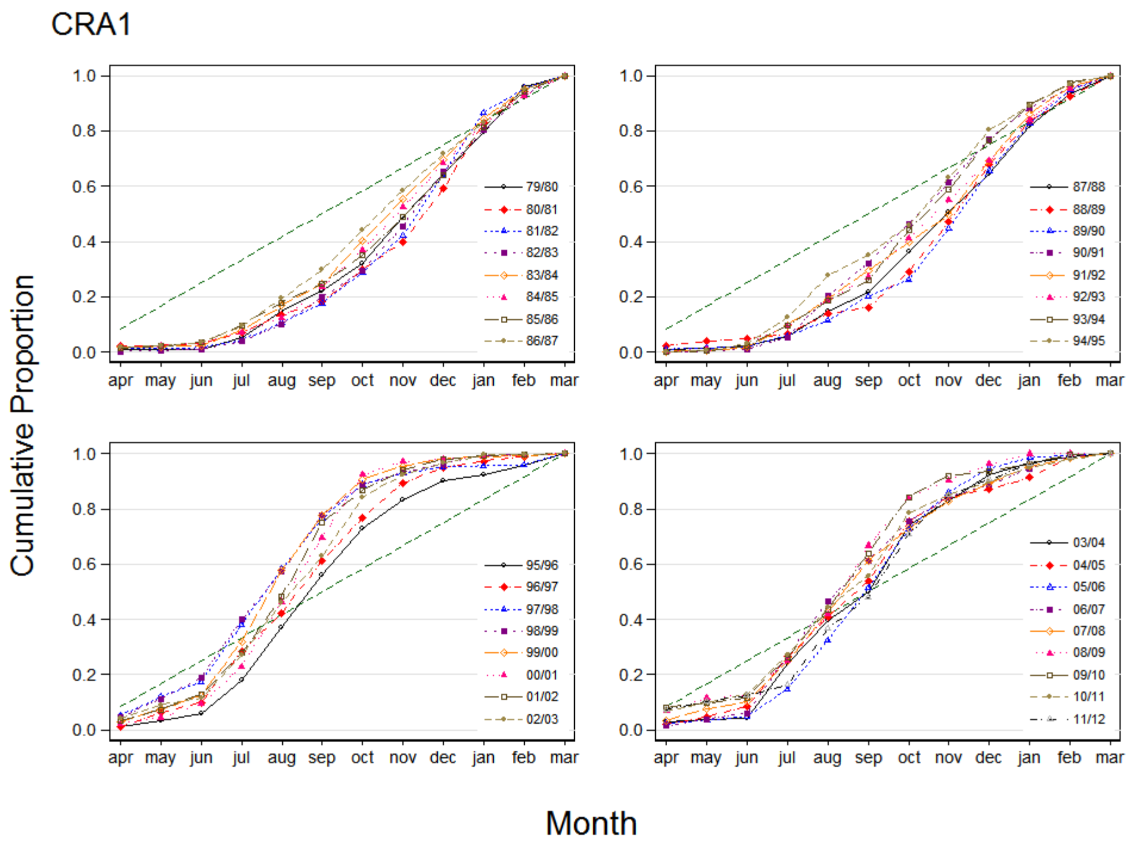

Figure 2: Cumulative landing percentages by fishing month for CRA 1, 1979–80 to 2011–12. Dotted line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

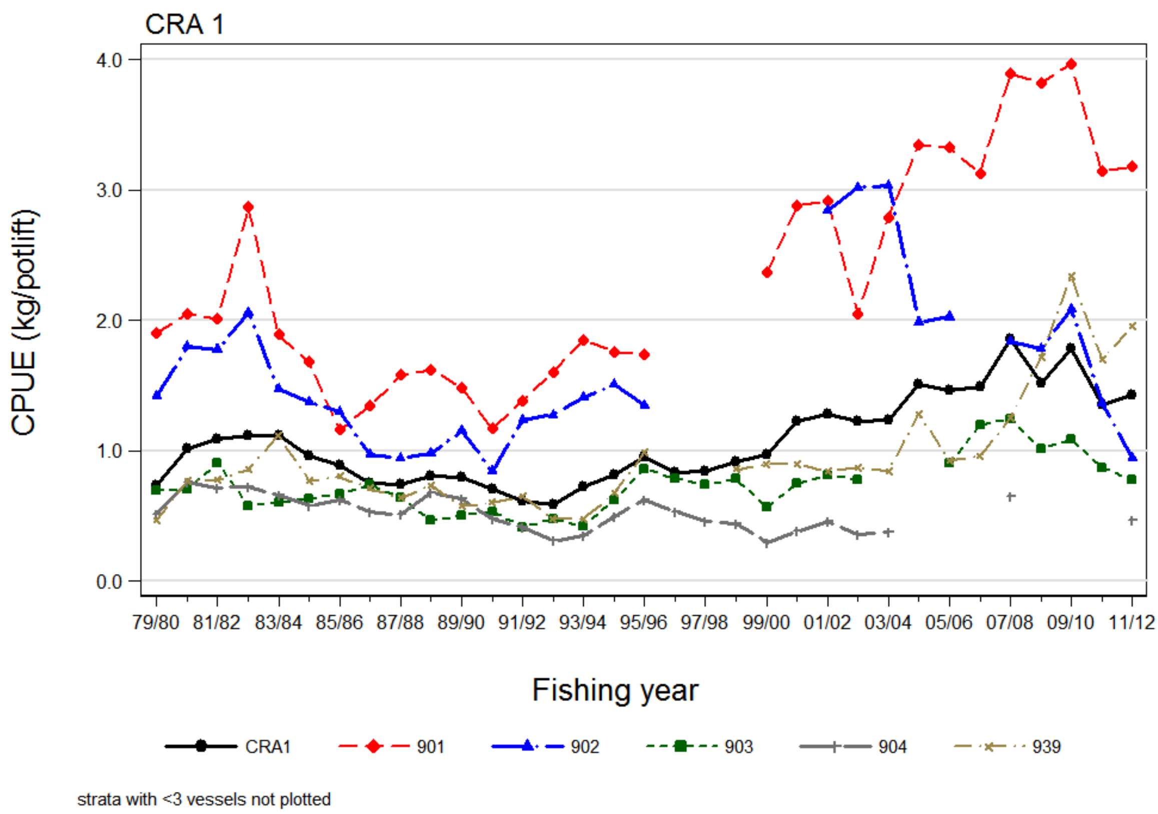

Figure 3: Arithmetic CPUE for CRA 1 by fishing year and statistical area from 1979–80 to 2011–12. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

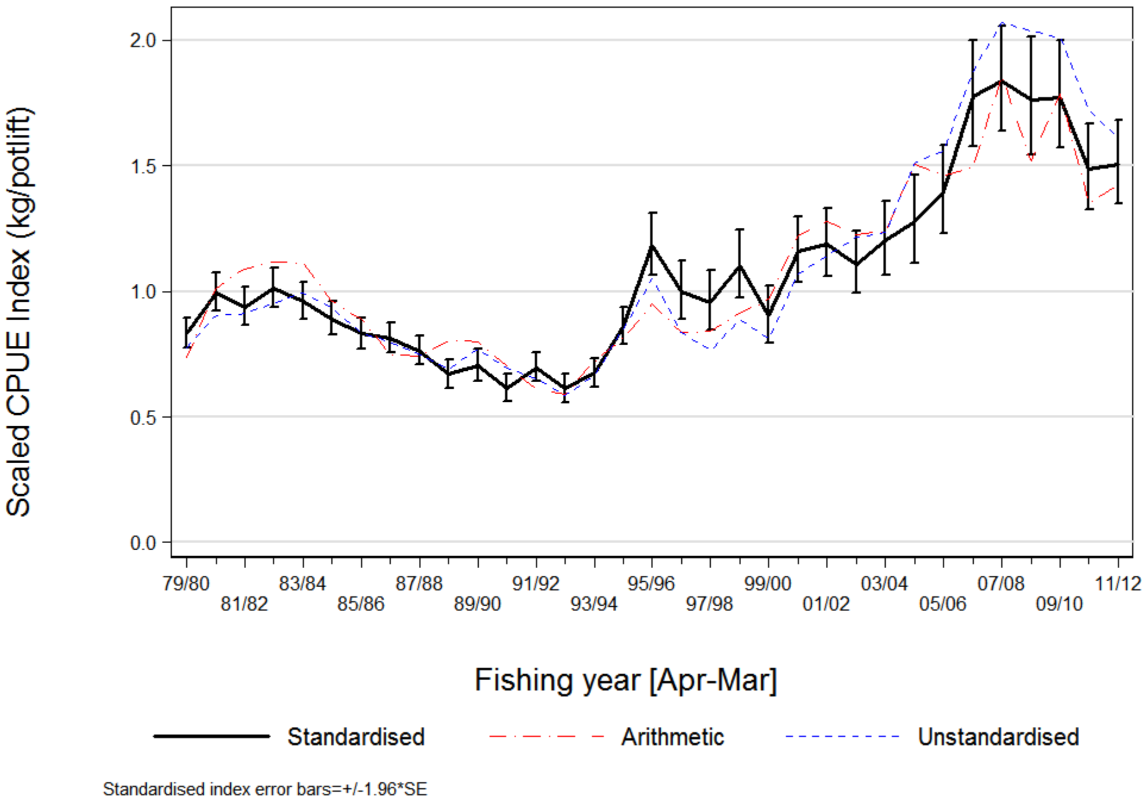

Figure 4: Annual CPUE indices for CRA 1: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 2 s.e. from 1979–80 to 2011–12. The geometric mean for each series = 1.02 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

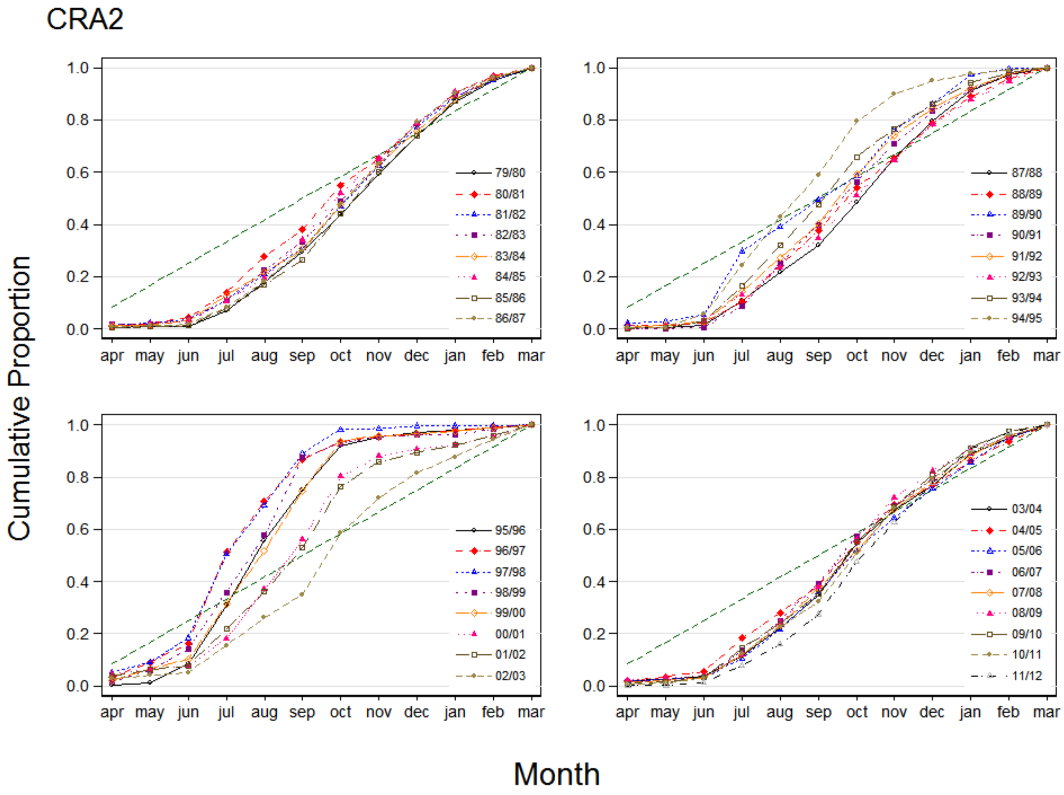

Figure 5: Cumulative landing percentages by fishing month for CRA 2, 1979–80 to 2011–12. Dotted line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

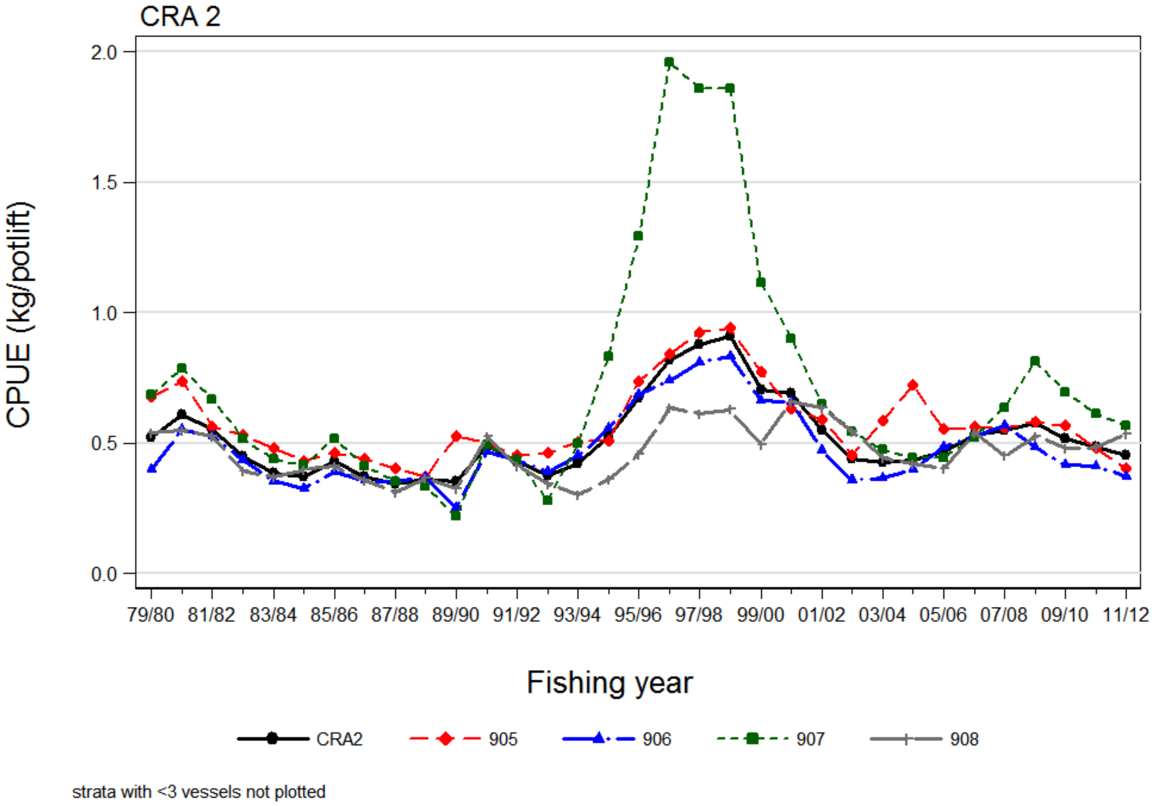

Figure 6: **Arithmetic CPUE for CRA 2 by fishing year and statistical area from 1979–80 to 2011–12. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.**

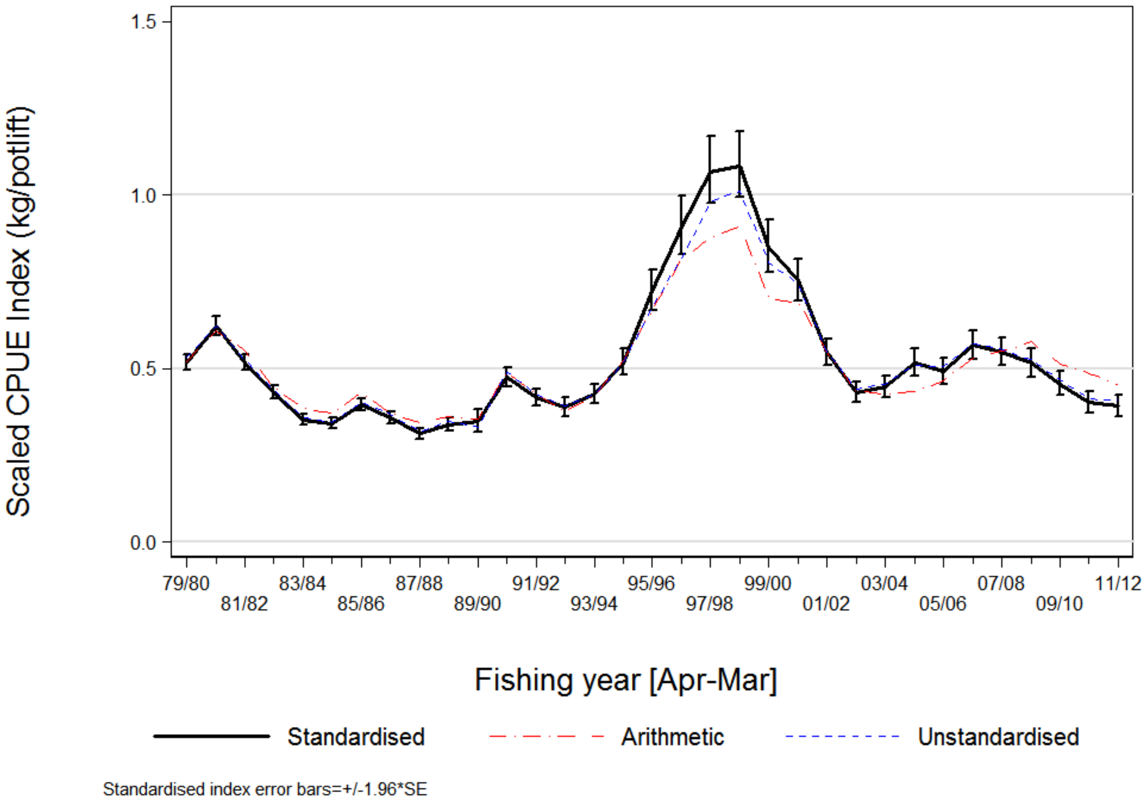

Figure 7: **Annual CPUE indices for CRA 2: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 2 s.e. from 1979–80 to 2011–12. The geometric mean for each series = 0.50 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.**

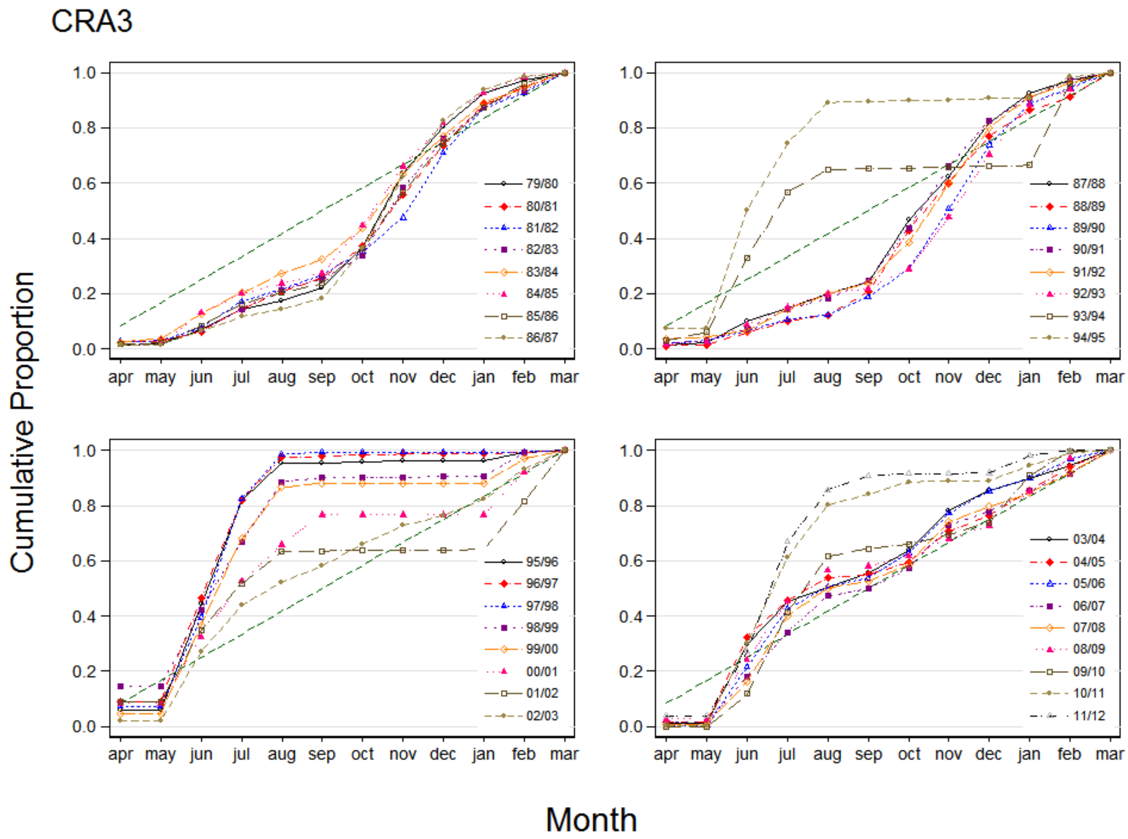

Figure 8: Cumulative landing percentages by fishing month for CRA 3, 1979–80 to 2011–12. Dotted line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

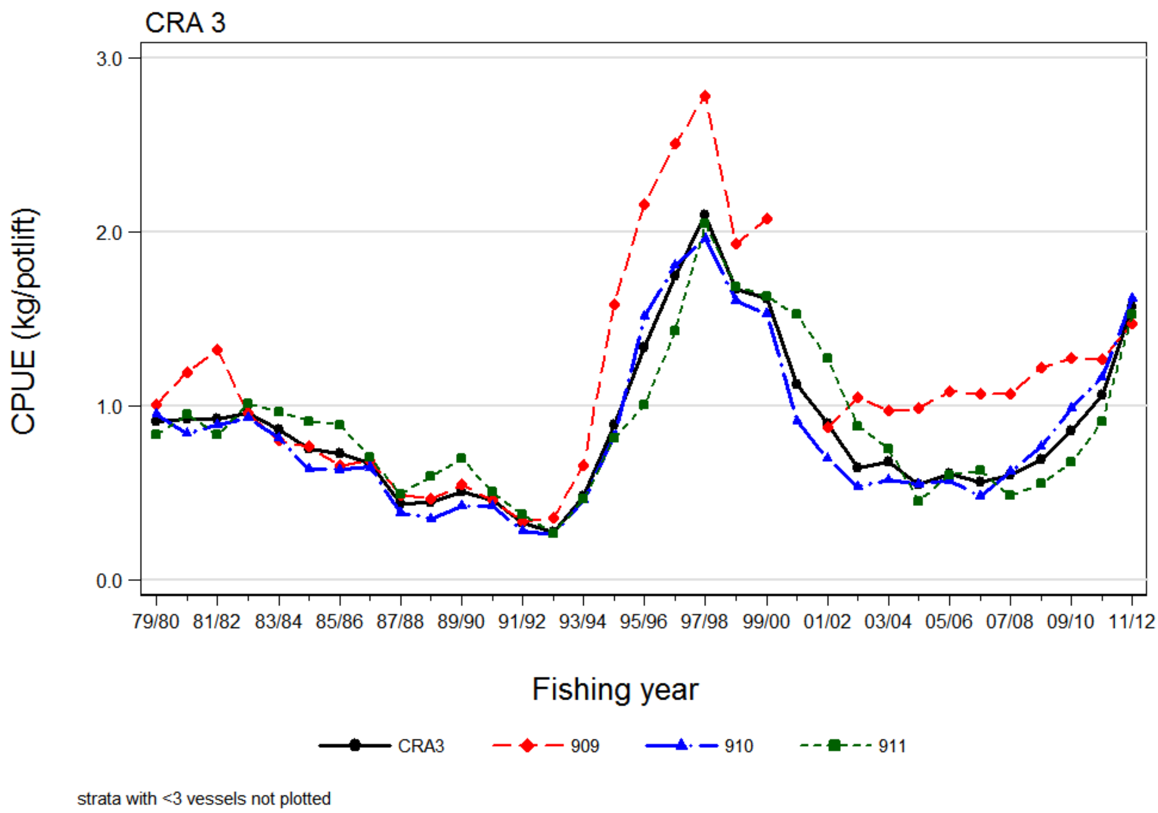

Figure 9: Arithmetic CPUE for CRA 3 by fishing year and statistical area from 1979–80 to 2011–12. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

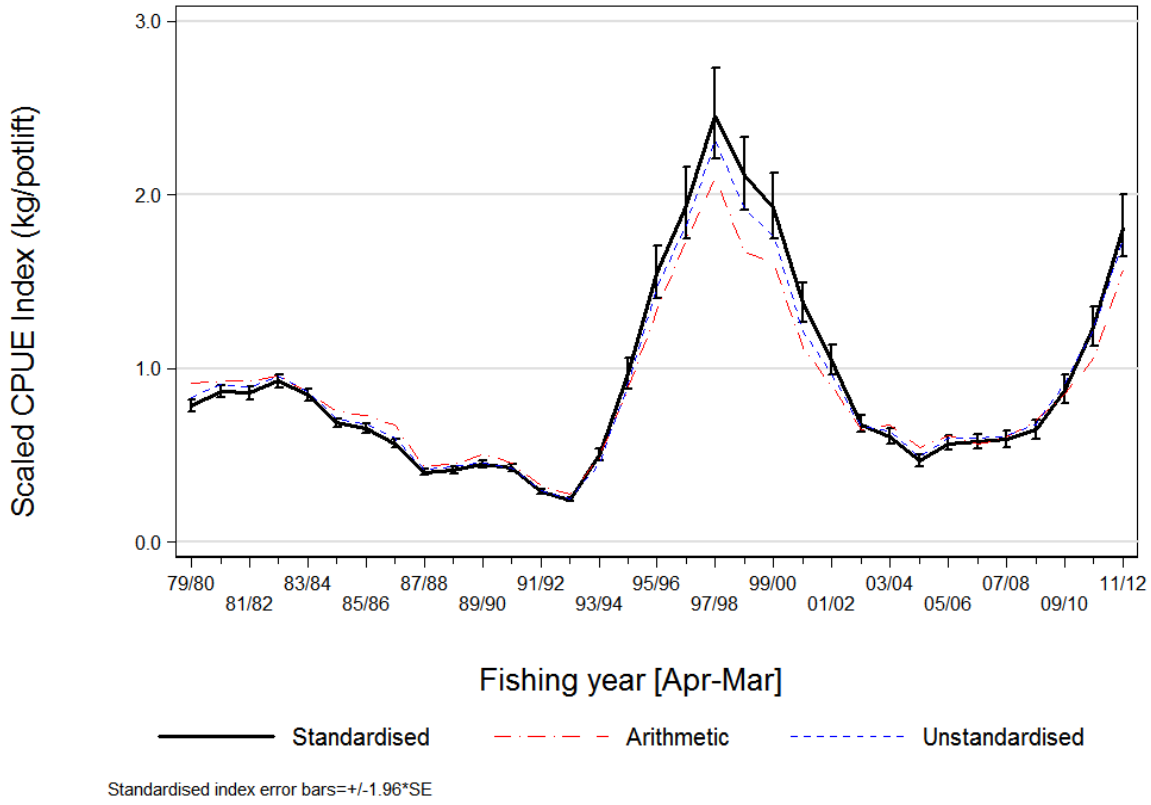

Figure 10: Annual CPUE indices for CRA 3: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 2 s.e. from 1979–80 to 2011–12. The geometric mean for each series = 0.78 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

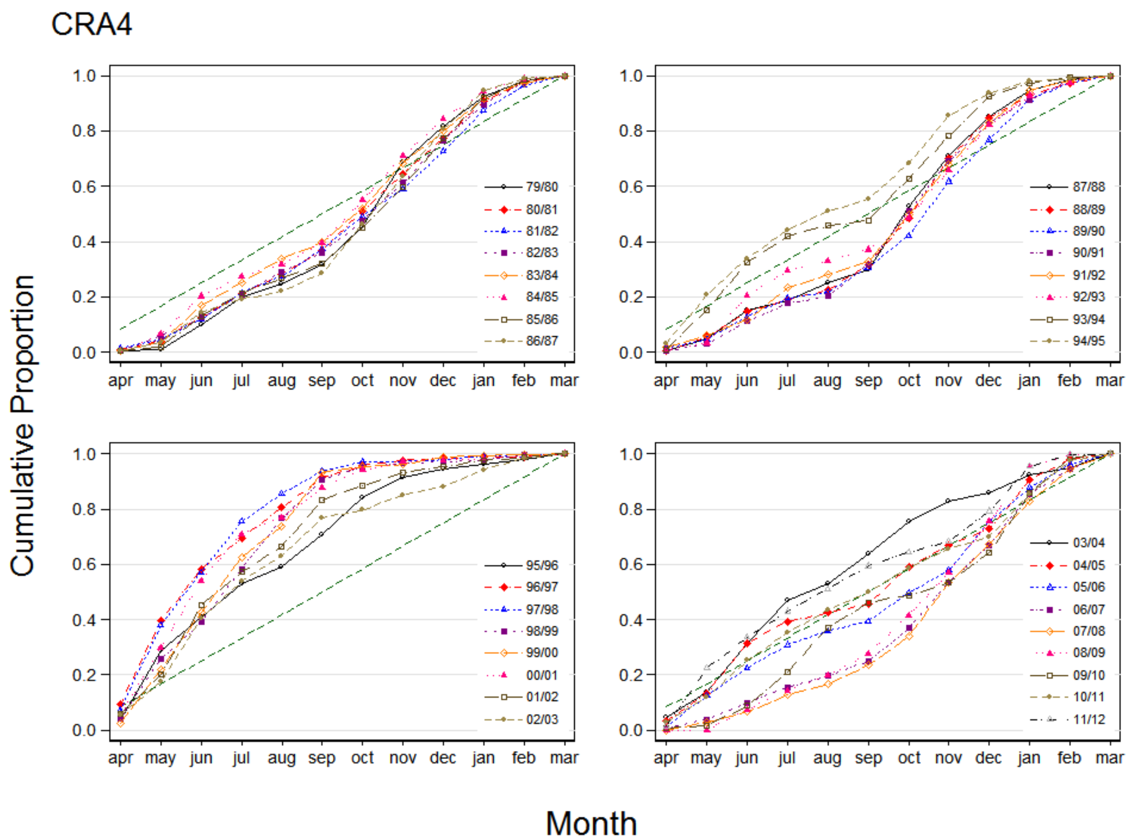

Figure 11: Cumulative landing percentages by fishing month for CRA 4, 1979–80 to 2011–12. Dotted line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

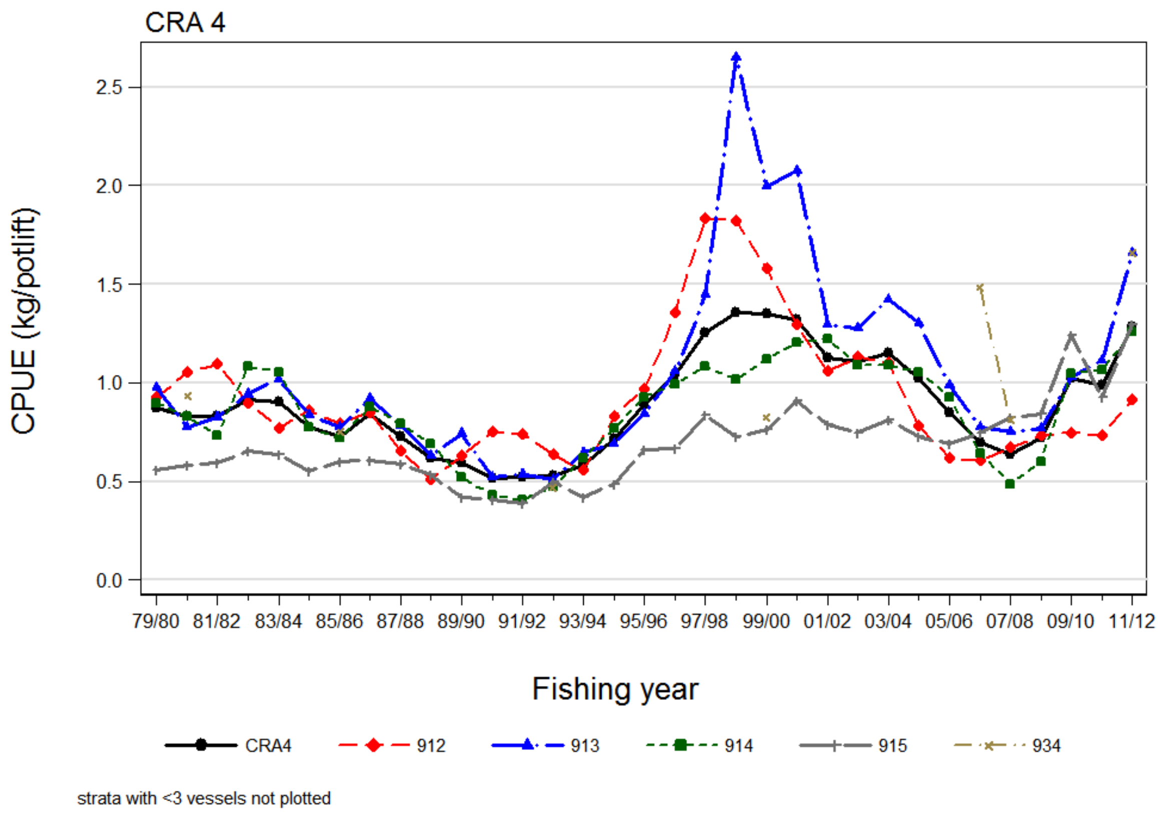

Figure 12: Arithmetic CPUE for CRA 4 by fishing year and statistical area from 1979–80 to 2011–12. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

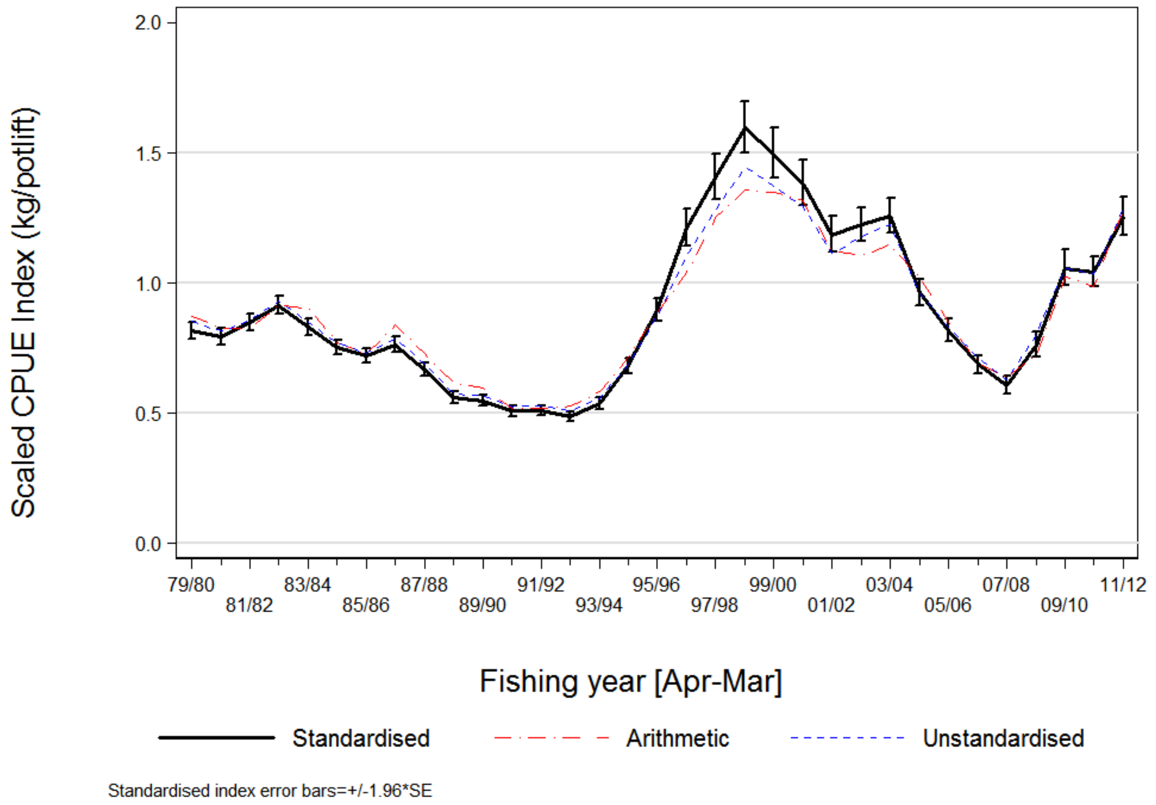

Figure 13: Annual CPUE indices for CRA 4: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 2 s.e. from 1979–80 to 2011–12. The geometric mean for each series = 0.85 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

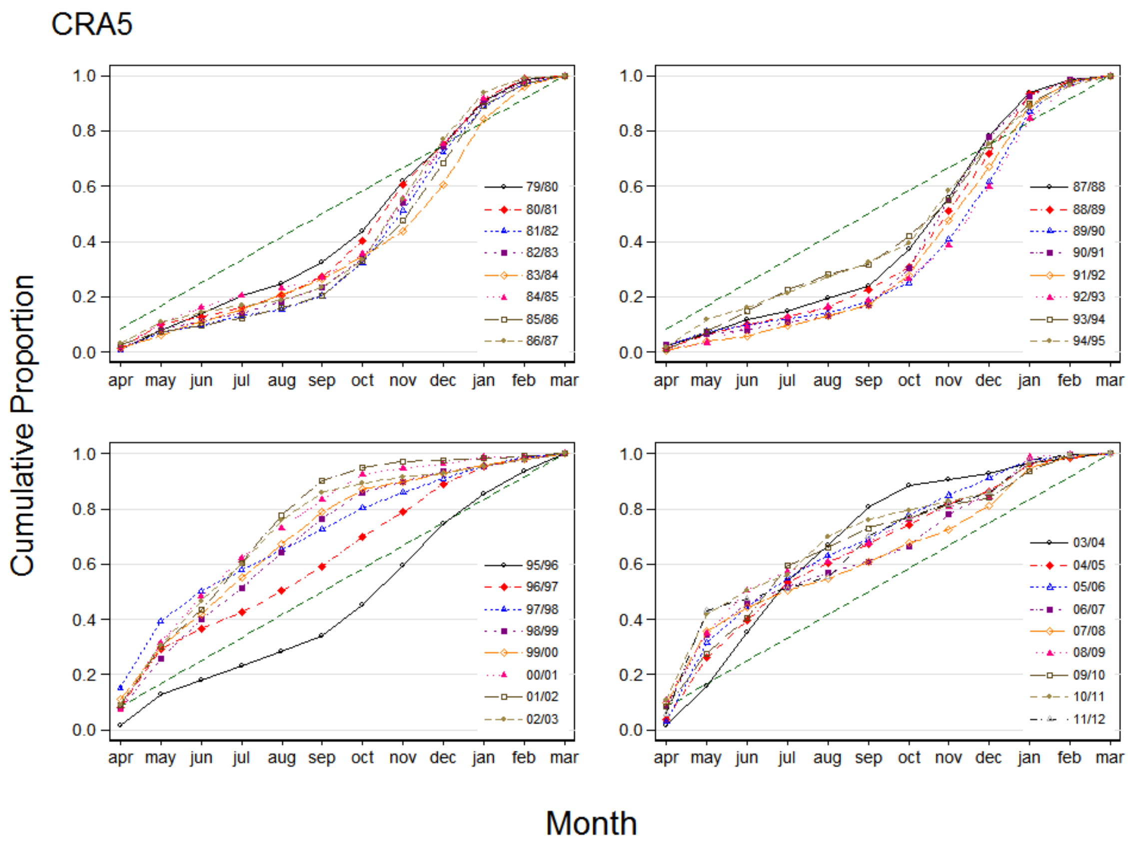

Figure 14: Cumulative landing percentages by fishing month for CRA 5, 1979–80 to 2011–12. Dotted line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

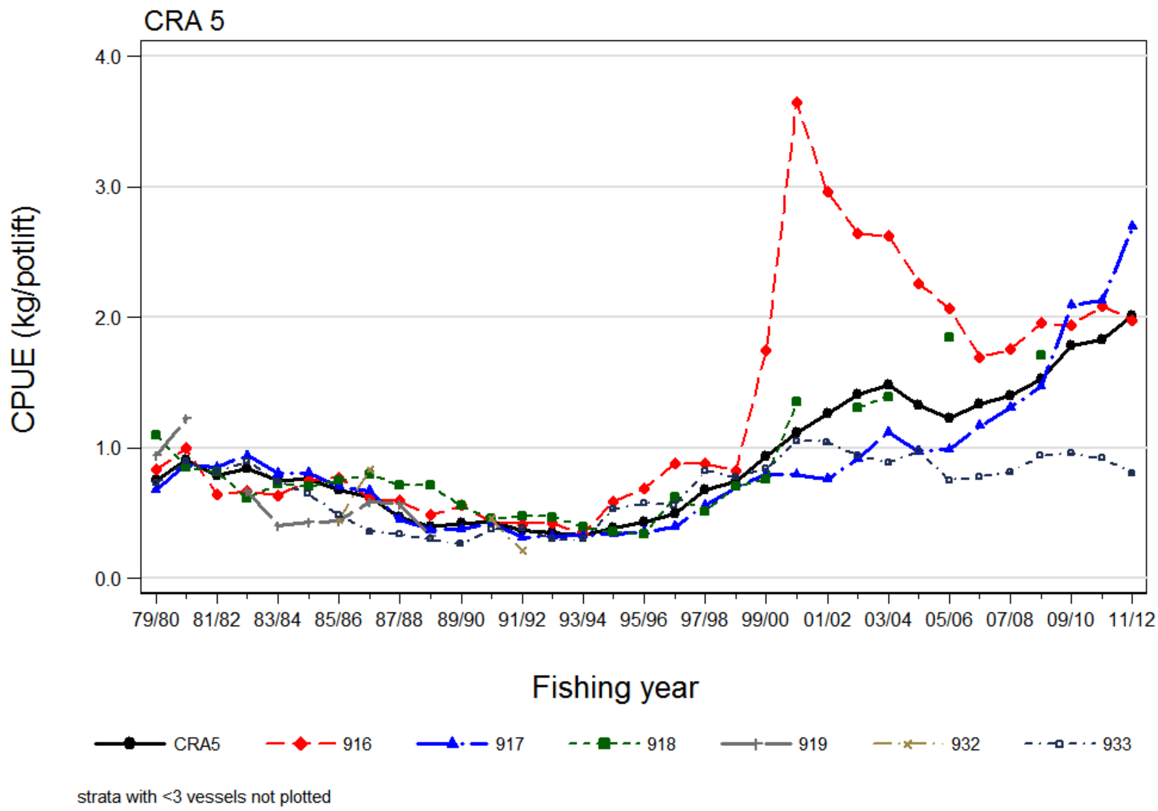

Figure 15: Arithmetic CPUE for CRA 5 by fishing year and statistical area from 1979–80 to 2011–12. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

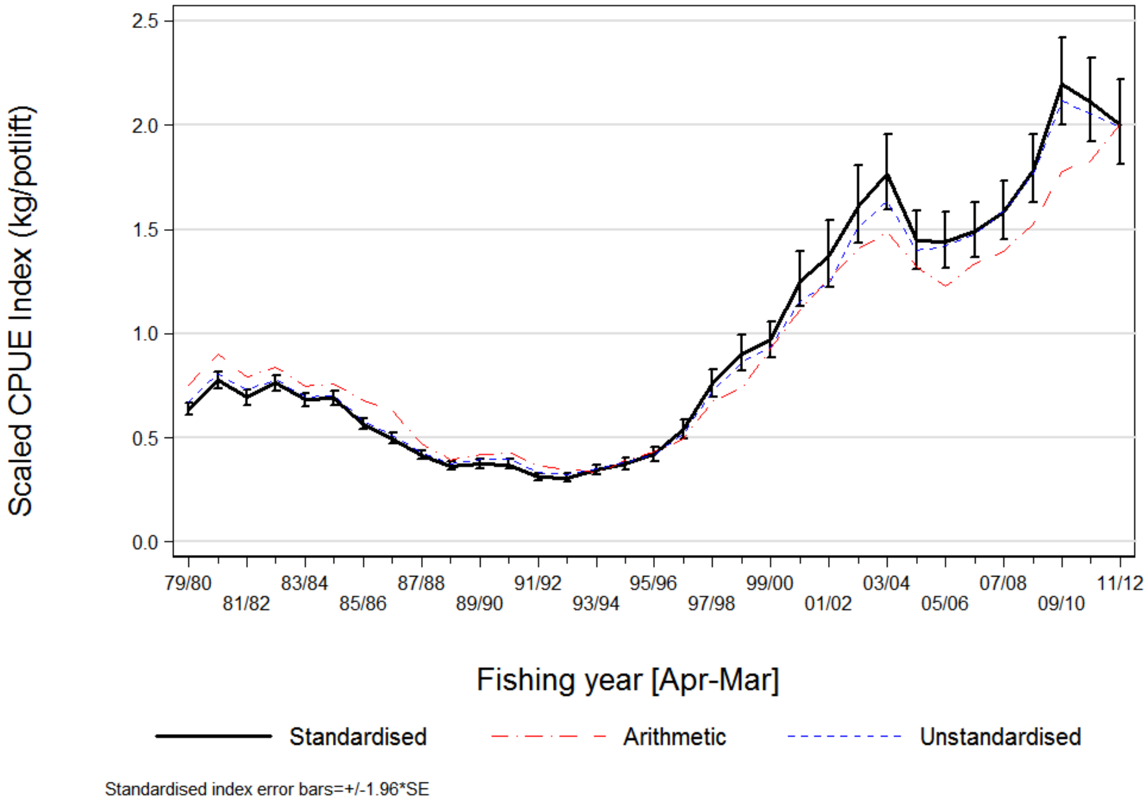

Figure 16: Annual CPUE indices for CRA 5: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 2 s.e. from 1979–80 to 2011–12. The geometric mean for each series = 0.80 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

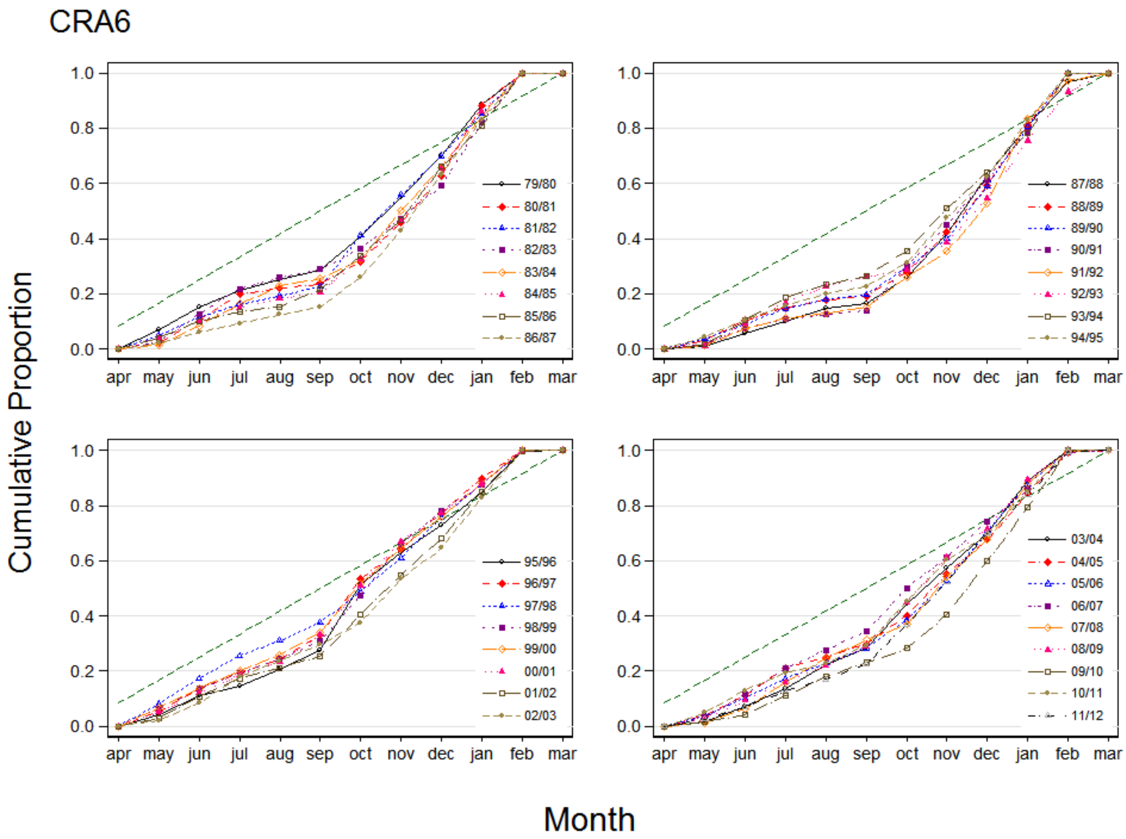

Figure 17: Cumulative landing percentages by fishing month for CRA 6, 1979–80 to 2011–12. Dotted line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

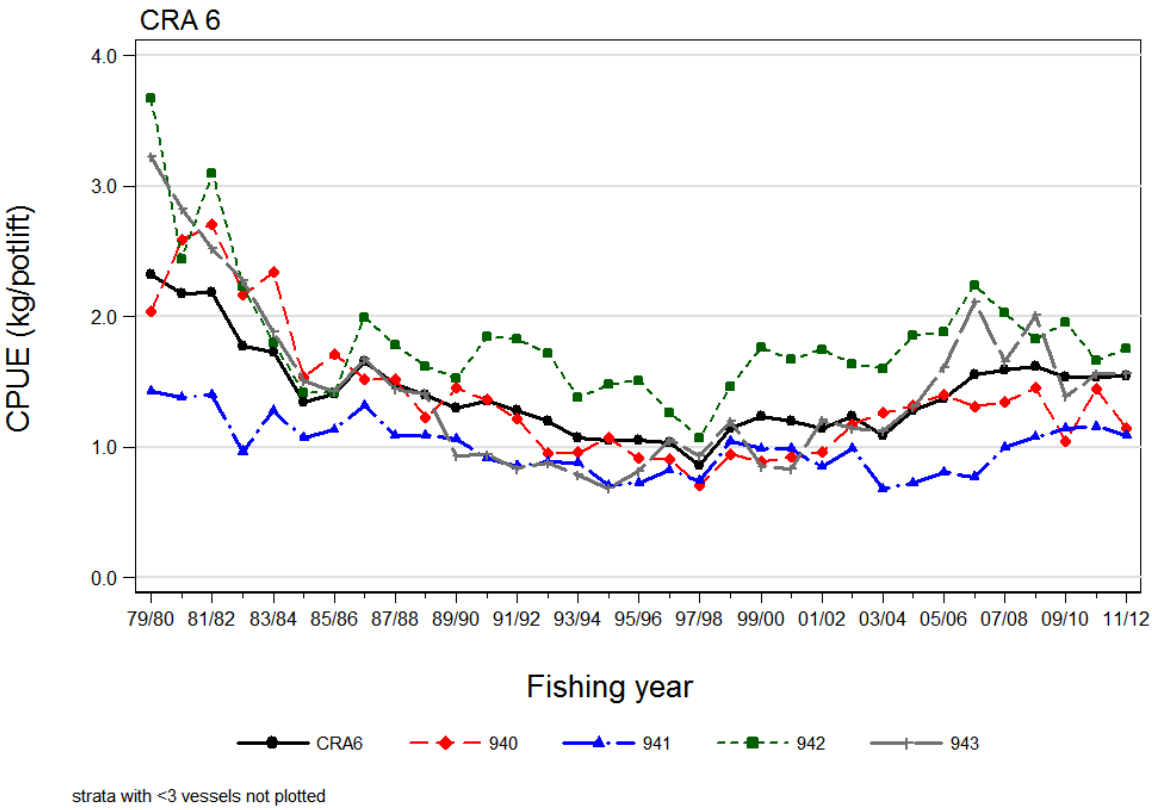

Figure 18: Arithmetic CPUE for CRA 6 by fishing year and statistical area from 1979–80 to 2011–12. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

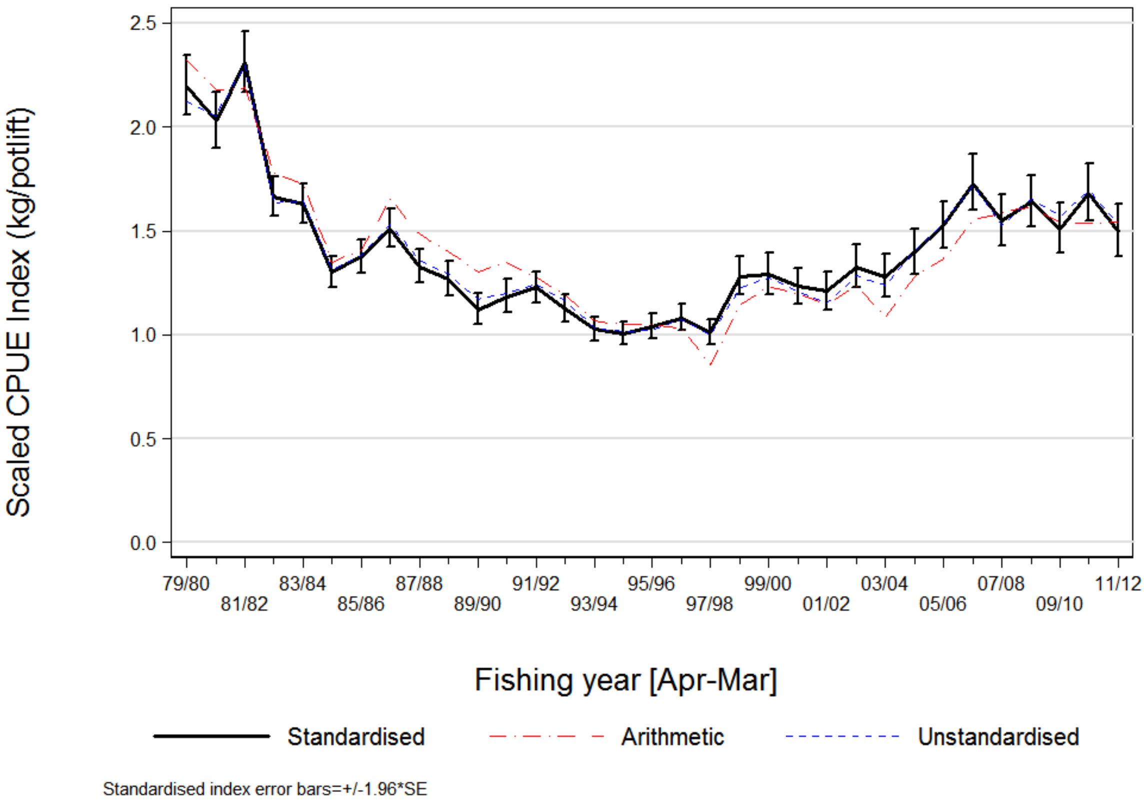

Figure 19: Annual CPUE indices for CRA 6: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 2 s.e. from 1979–80 to 2011–12. The geometric mean for each series = 1.38 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

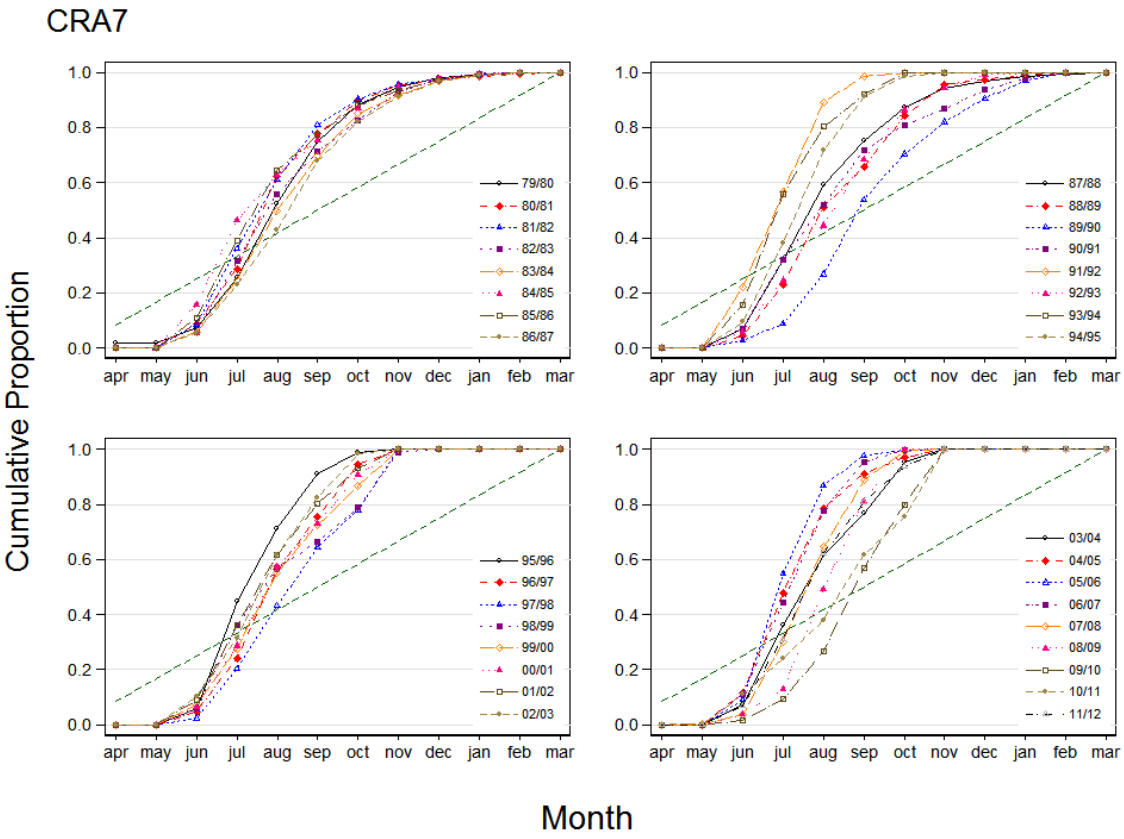

Figure 20: Cumulative landing percentages by fishing month for CRA 7, 1979–80 to 2011–12. Dotted line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

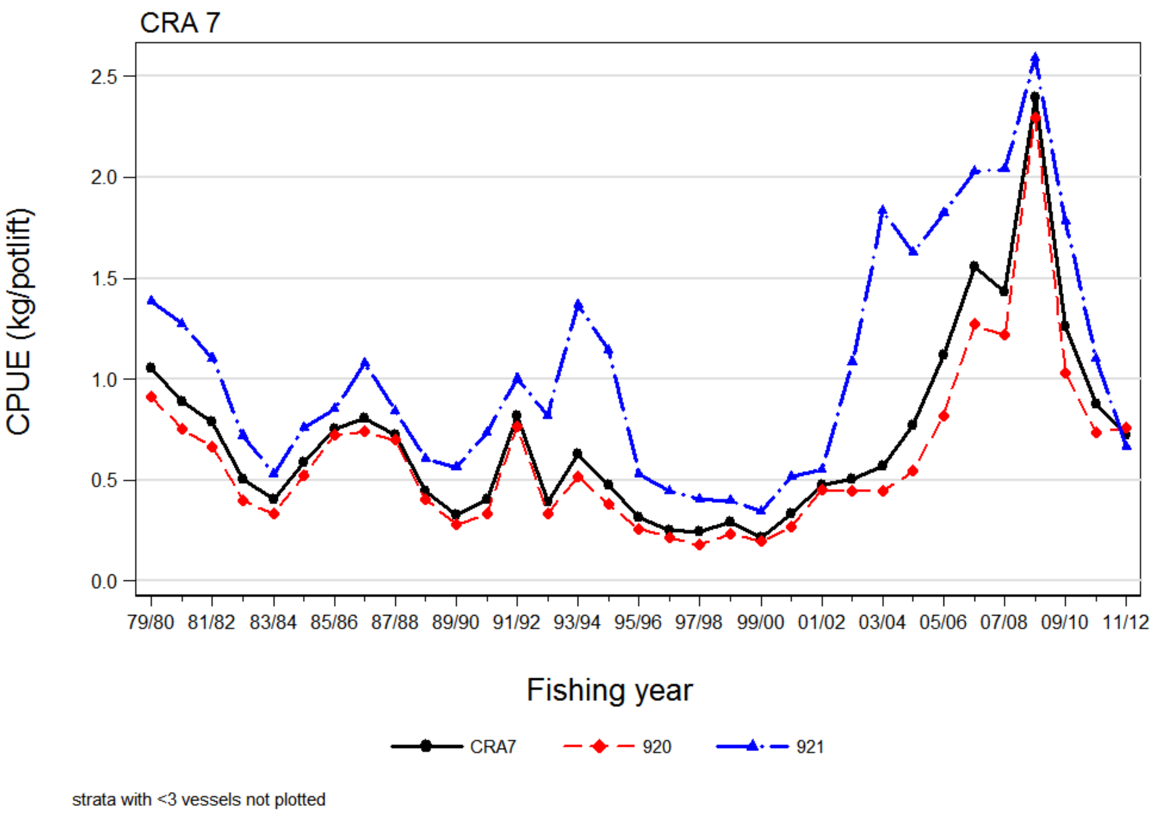

Figure 21: Arithmetic CPUE for CRA 7 by fishing year and statistical area from 1979–80 to 2011–12. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

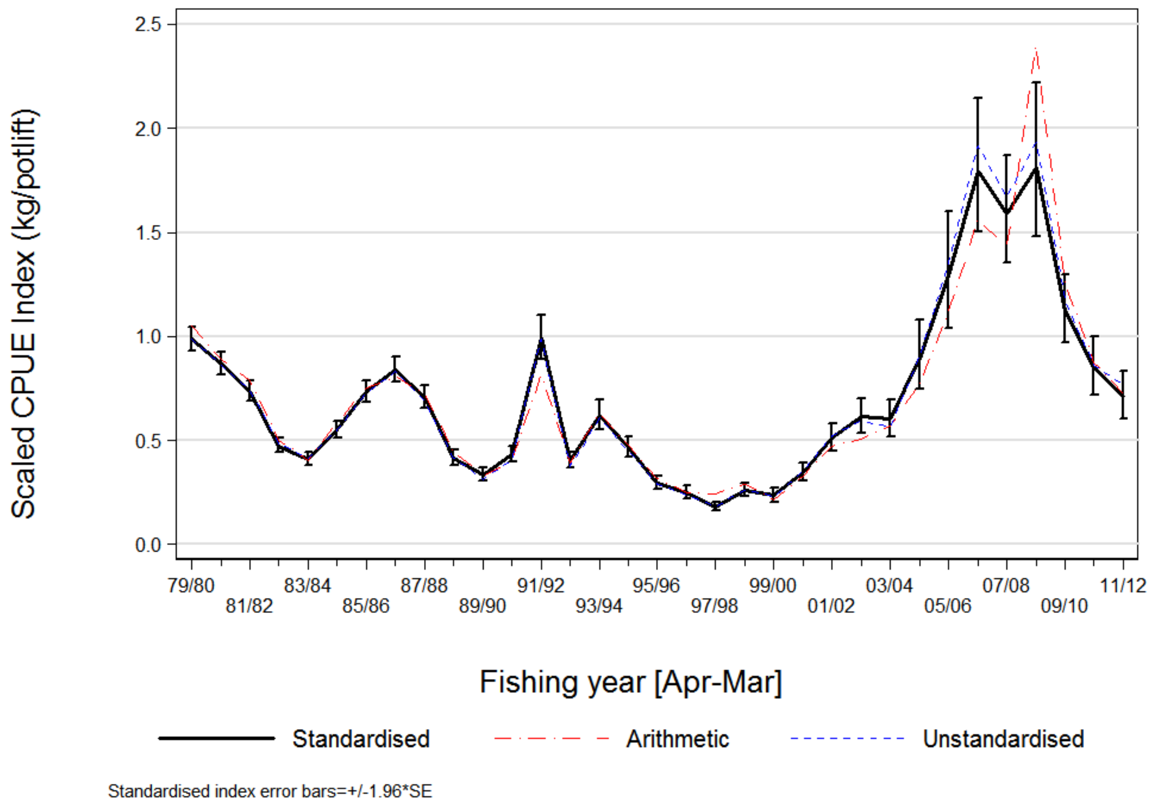

Figure 22: Annual CPUE indices for CRA 7: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 2 s.e. from 1979–80 to 2011–12. The geometric mean for each series = 0.60 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

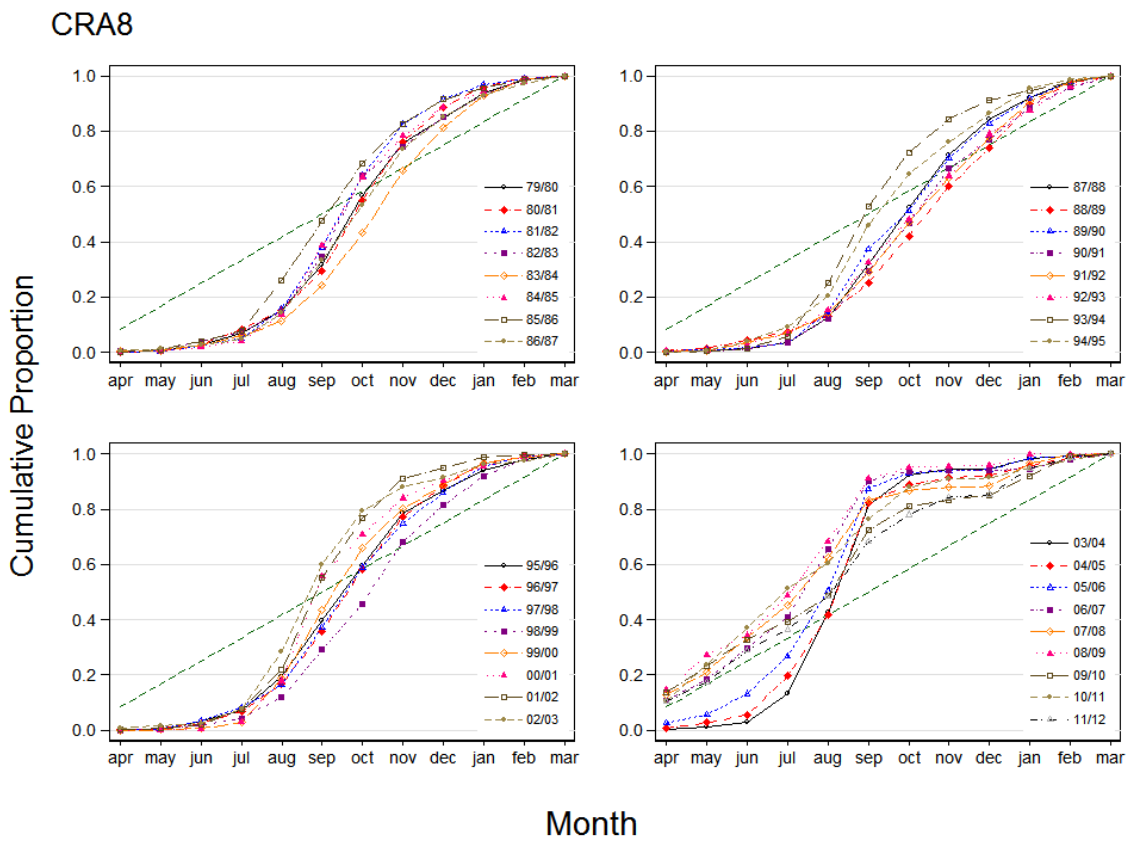

Figure 23: Cumulative landing percentages by fishing month for CRA 8, 1979–80 to 2011–12. Dotted line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

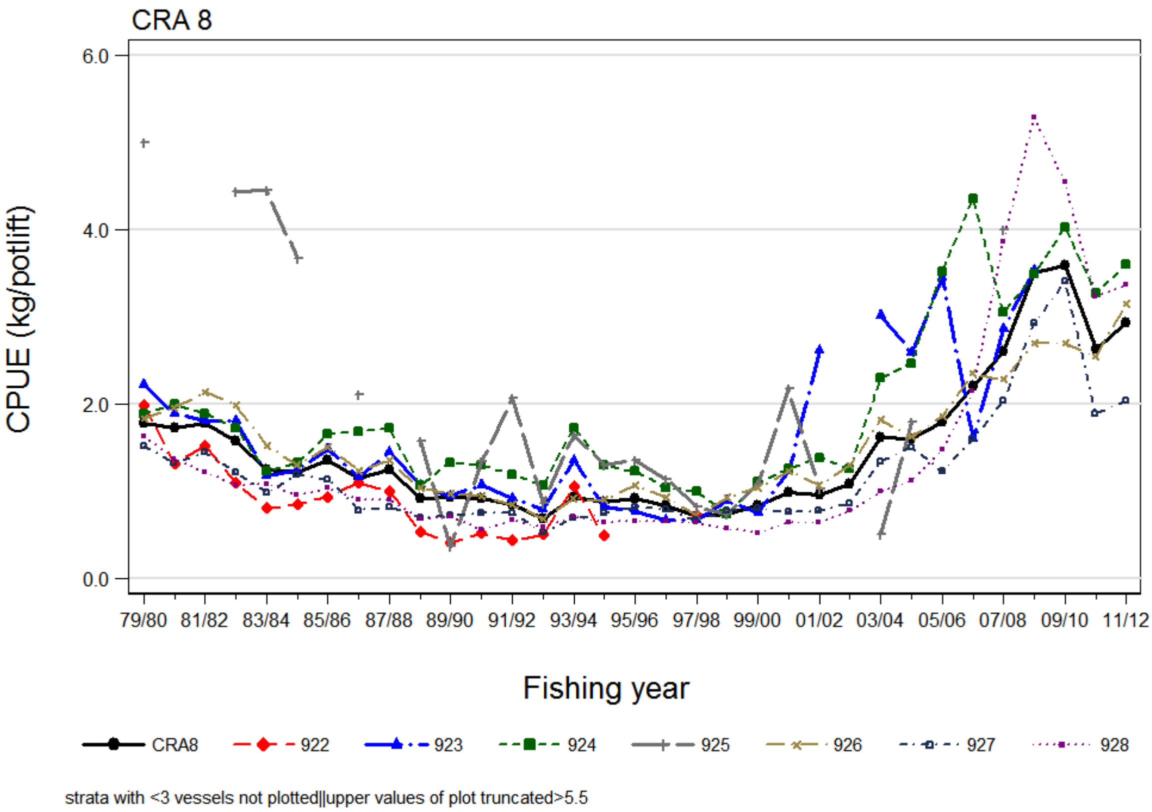

Figure 24: Arithmetic CPUE for CRA 8 by fishing year and statistical area from 1979–80 to 2011–12. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes. See Table 58 for truncated values for Area 925.

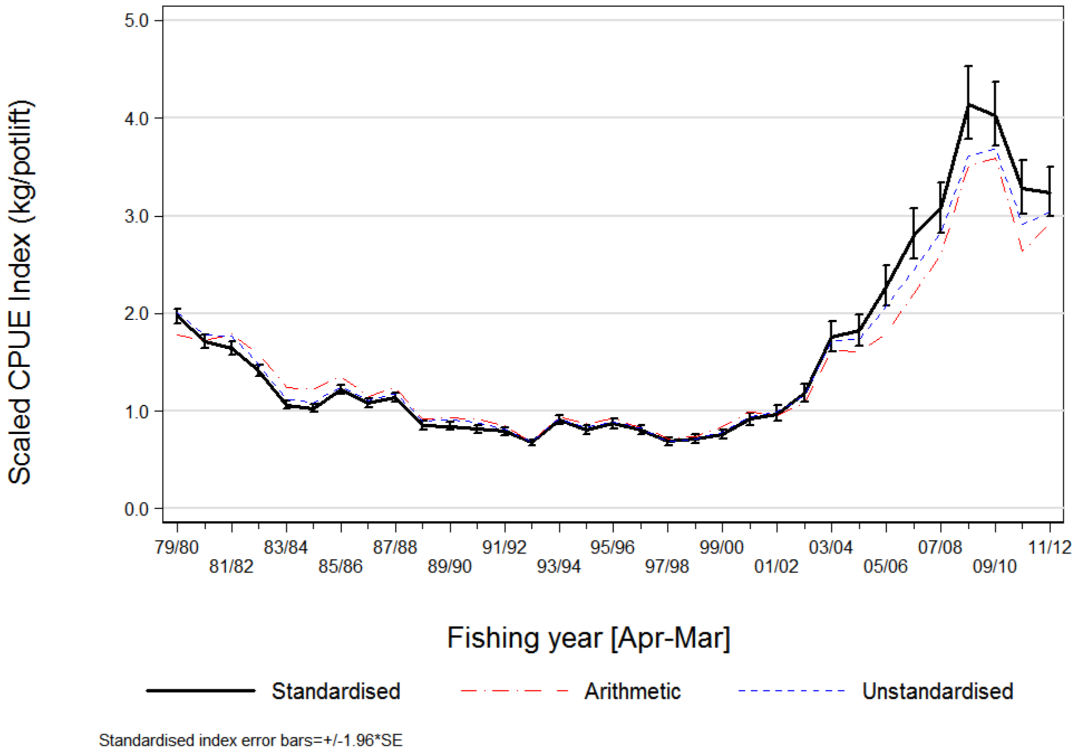

Figure 25: Annual CPUE indices for CRA 8. arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 2 s.e. 1979–80 to 2011–12. The geometric mean for each series = 1.32 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

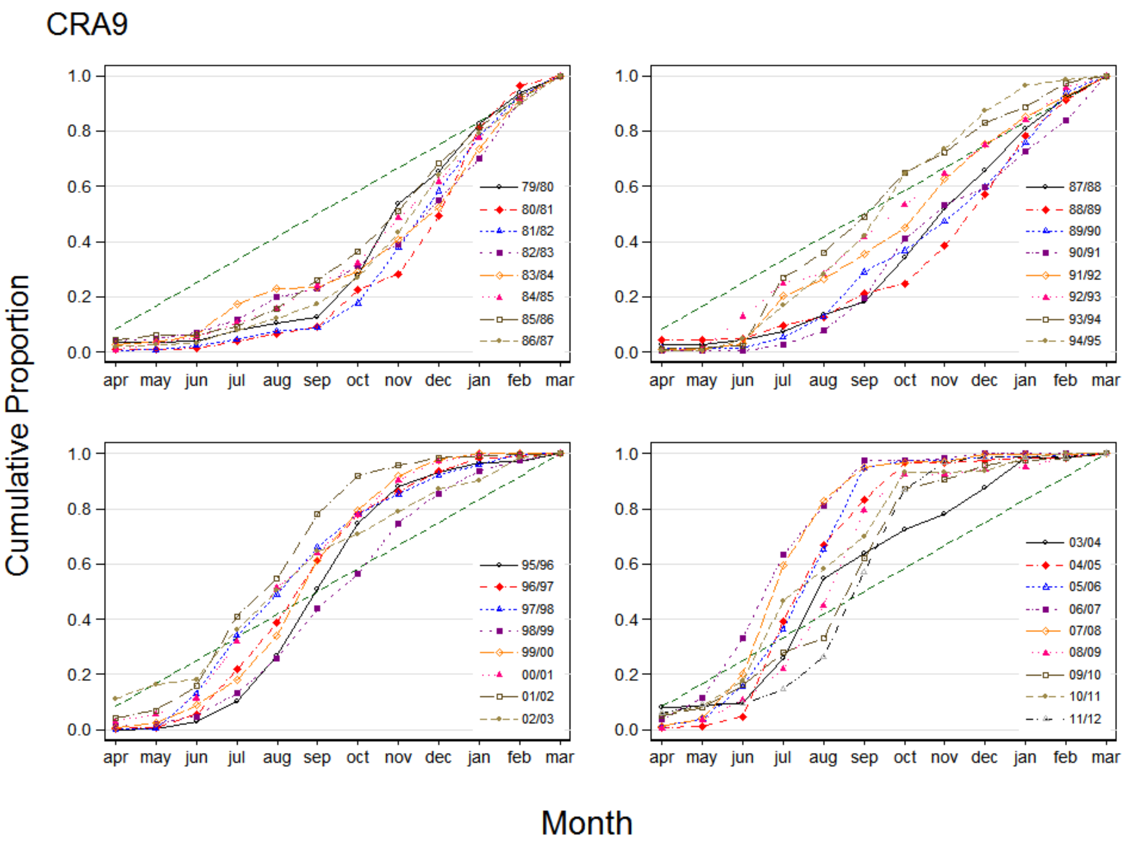

Figure 26: Cumulative landing percentages by fishing month for CRA 9, 1979–80 to 2011–12. Dotted line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

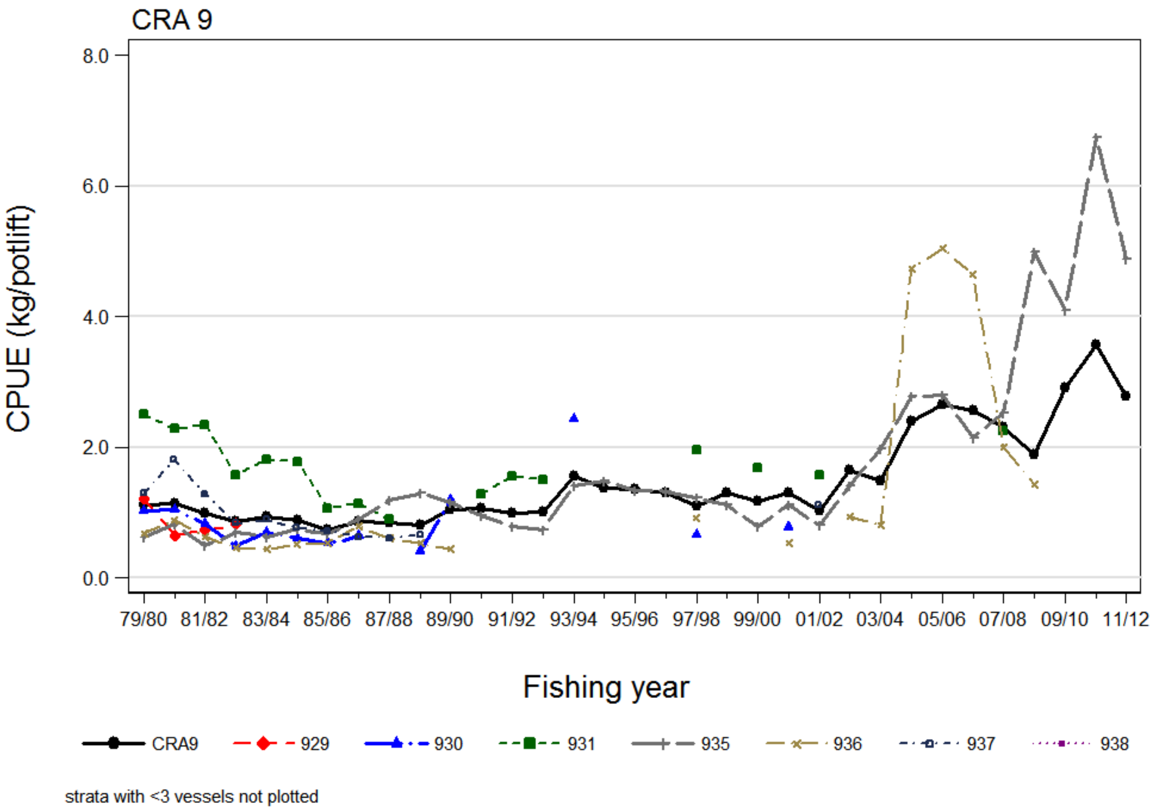

Figure 27: Arithmetic CPUE for CRA 9 by fishing year and statistical area from 1979–80 to 2011–12. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

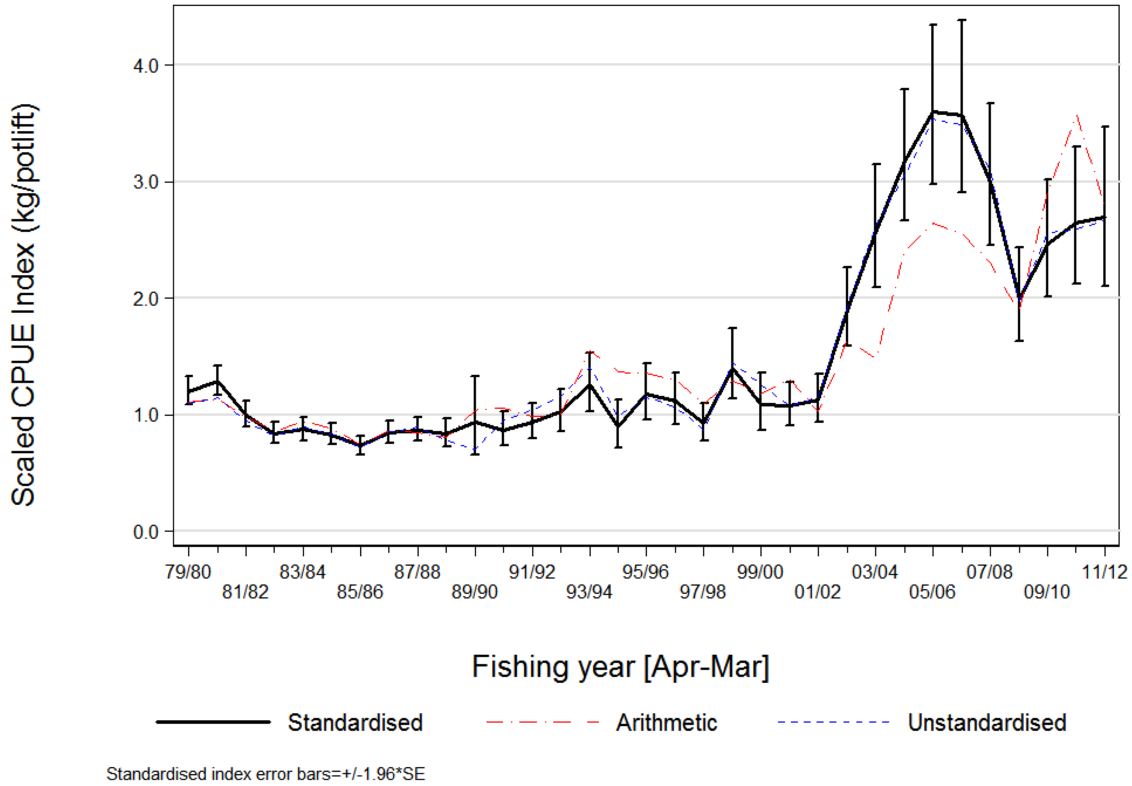

Figure 28: Annual CPUE indices for CRA 9: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 2 s.e. from 1979–80 to 2011–12. The geometric mean for each series = 1.35 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

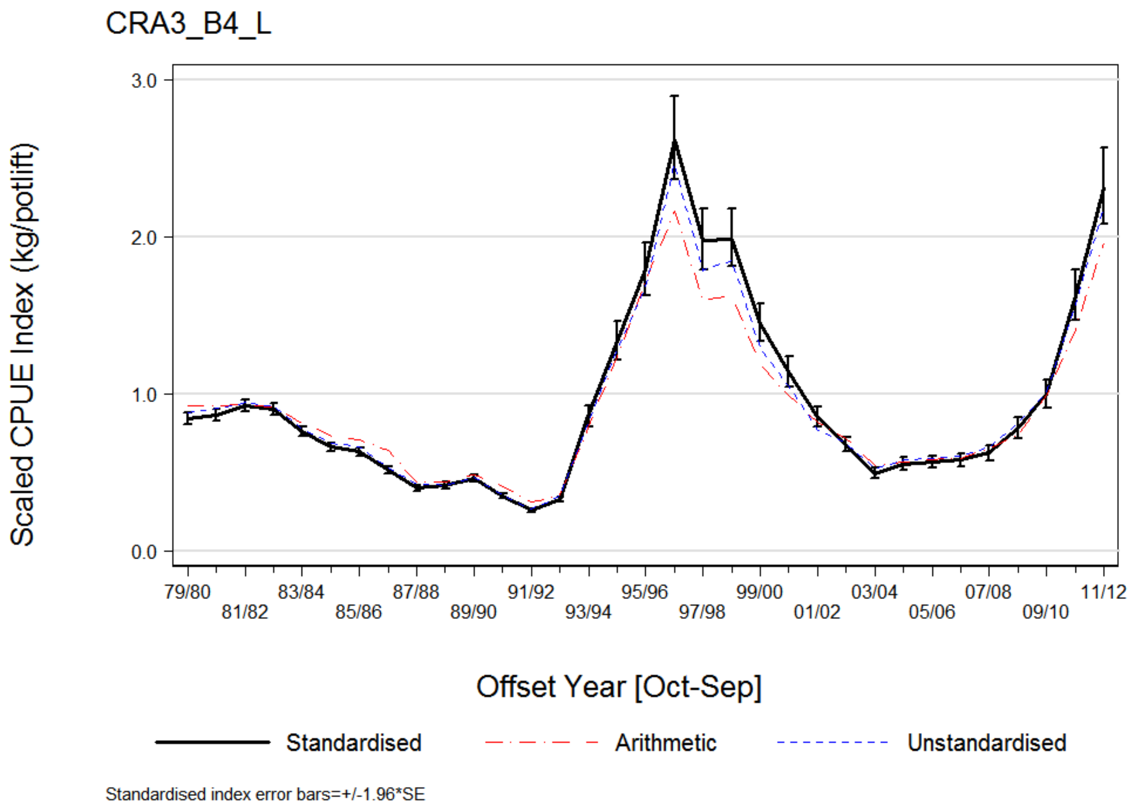

Figure 29: Standardised, unstandardised, and arithmetic offset year CPUE indices for CRA 3 from 1979–80 to 2011–12. Vertical bars are 95% confidence intervals. The geometric mean for all three series = 0.81 kg/potlift. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

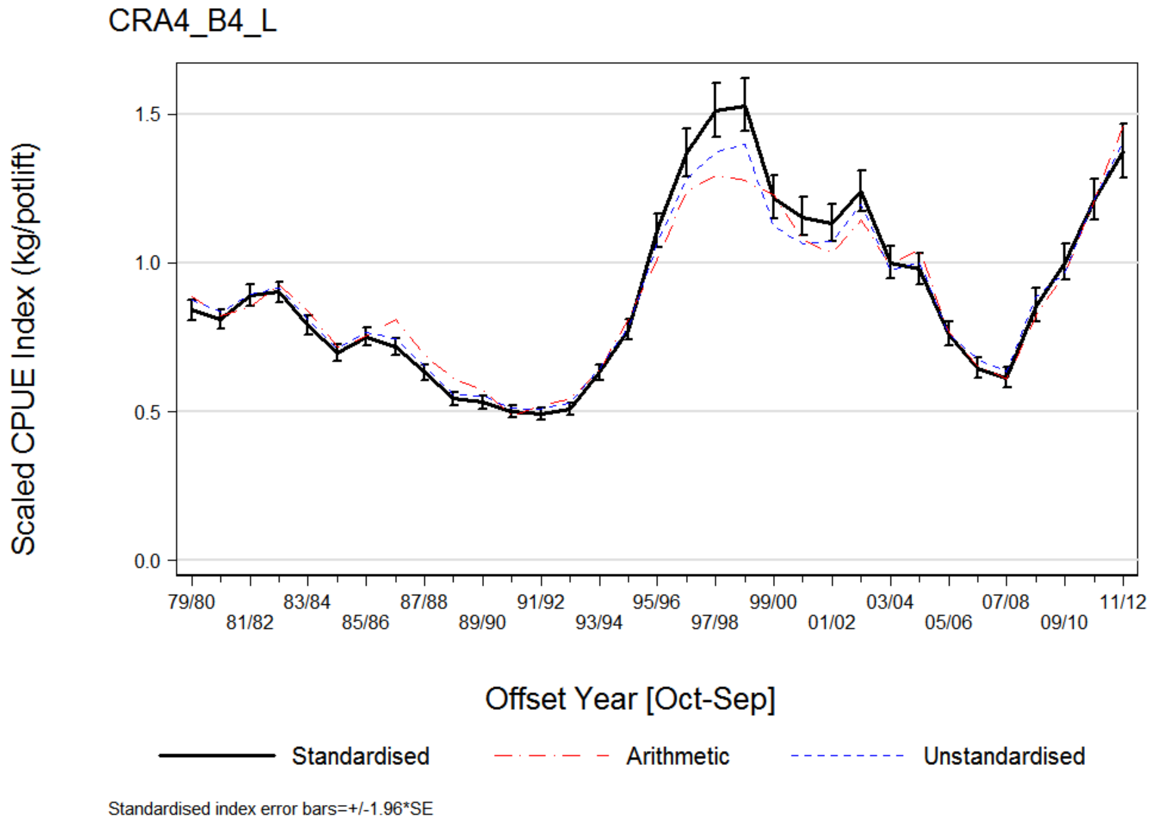

Figure 30: Standardised, unstandardised, and arithmetic offset year CPUE indices for CRA 4 from 1979–80 to 2011–12. Vertical bars are 95% confidence intervals. The geometric mean for all three series = 0.85 kg/potlift. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

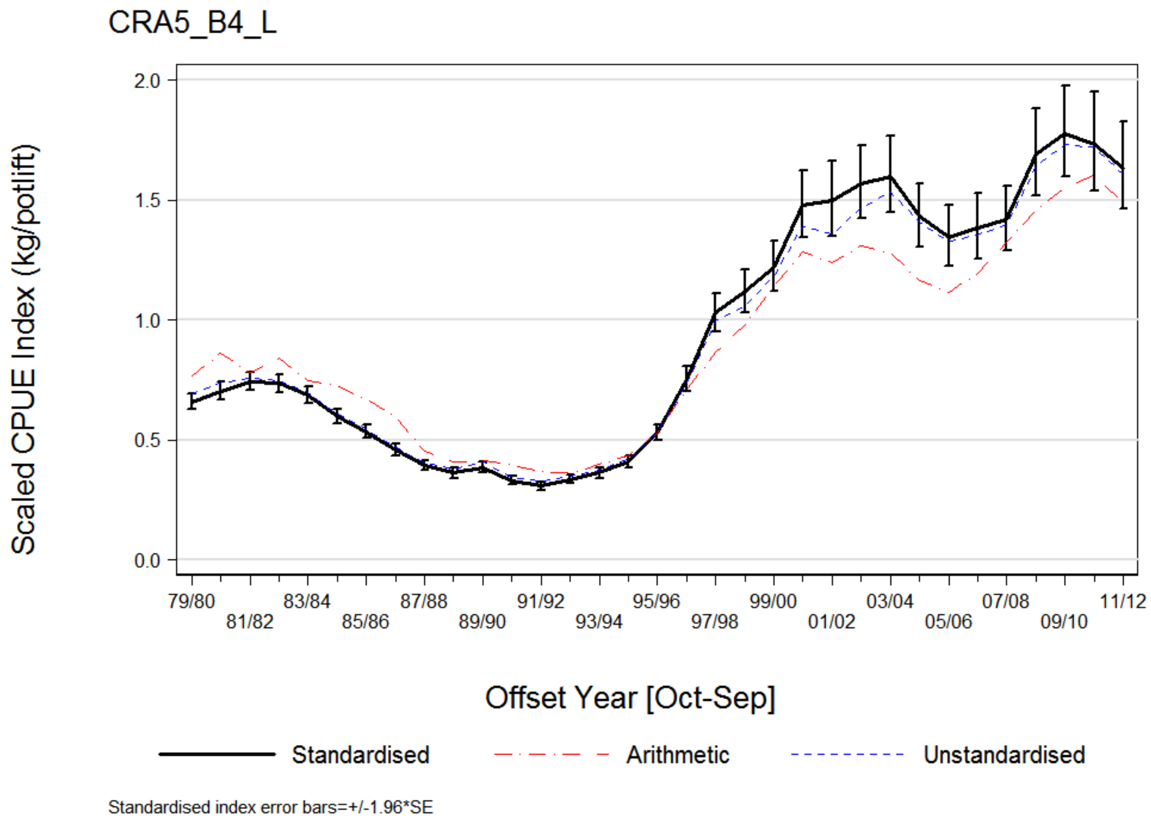

Figure 31: Standardised, unstandardised, and arithmetic offset year CPUE indices (kg/potlift) for CRA 5 from 1979–80 to 2011–12. Vertical bars are 95% confidence intervals. The geometric mean for all three series = 0.80 kg/potlift. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

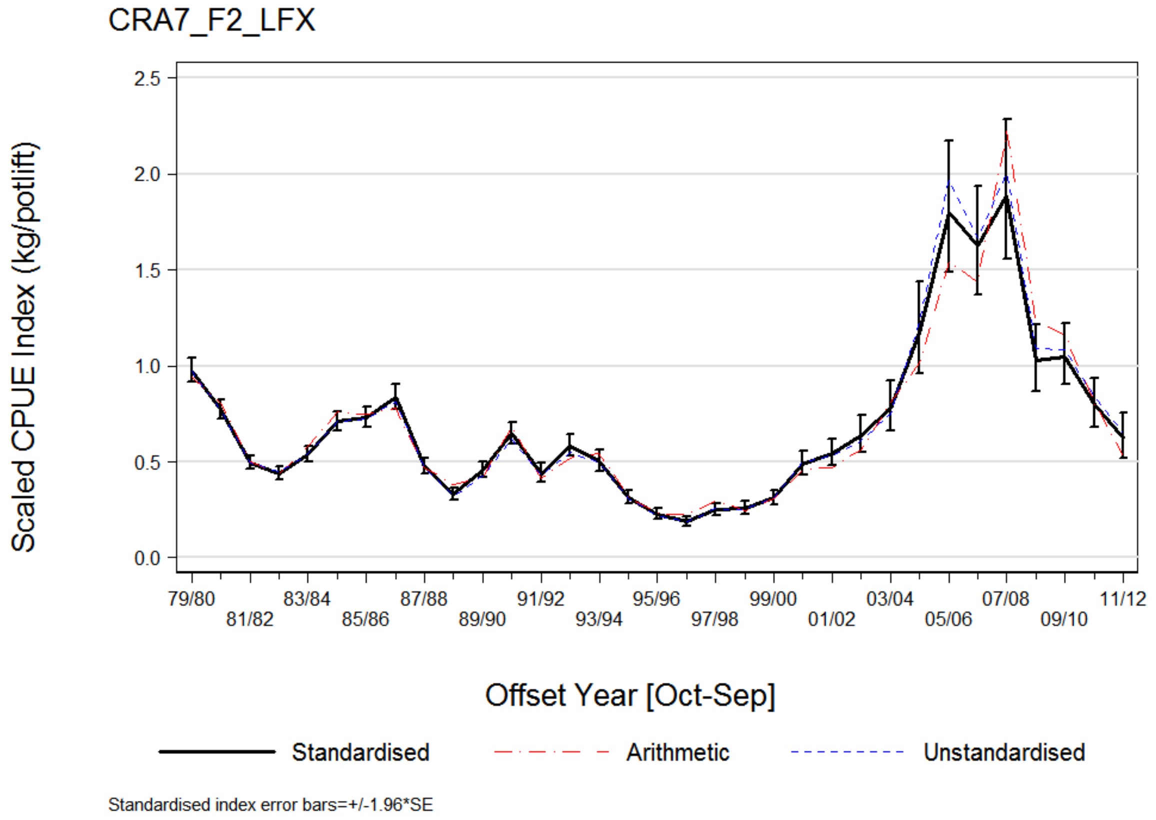

Figure 32: Standardised, unstandardised, and arithmetic offset year CPUE indices (kg/potlift) for CRA 7 from 1979–80 to 2011–12. Vertical bars are 95% confidence intervals. The geometric mean for all series = 0.59 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

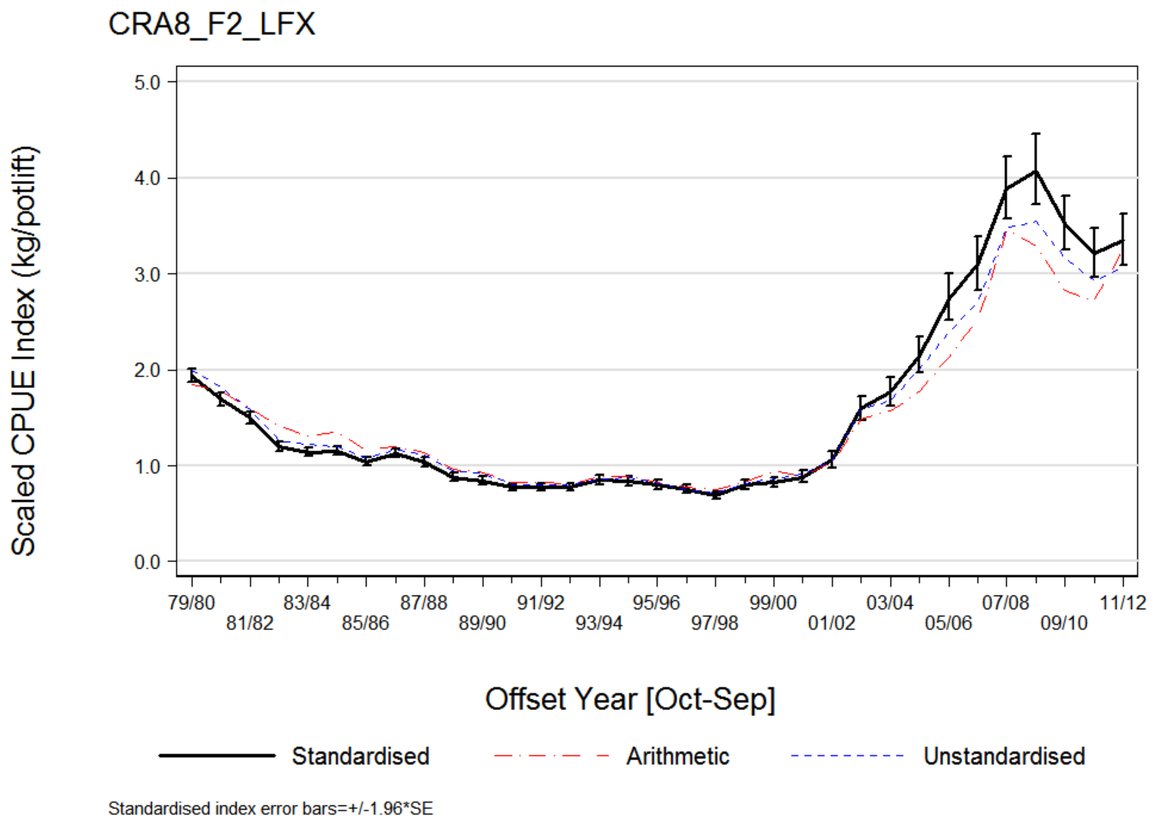

Figure 33: Standardised, unstandardised, and arithmetic offset year CPUE indices (kg/potlift) for CRA 8 from 1979–80 to 2011–12. Vertical bars are 95% confidence intervals. The geometric mean for all three series = 1.35 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

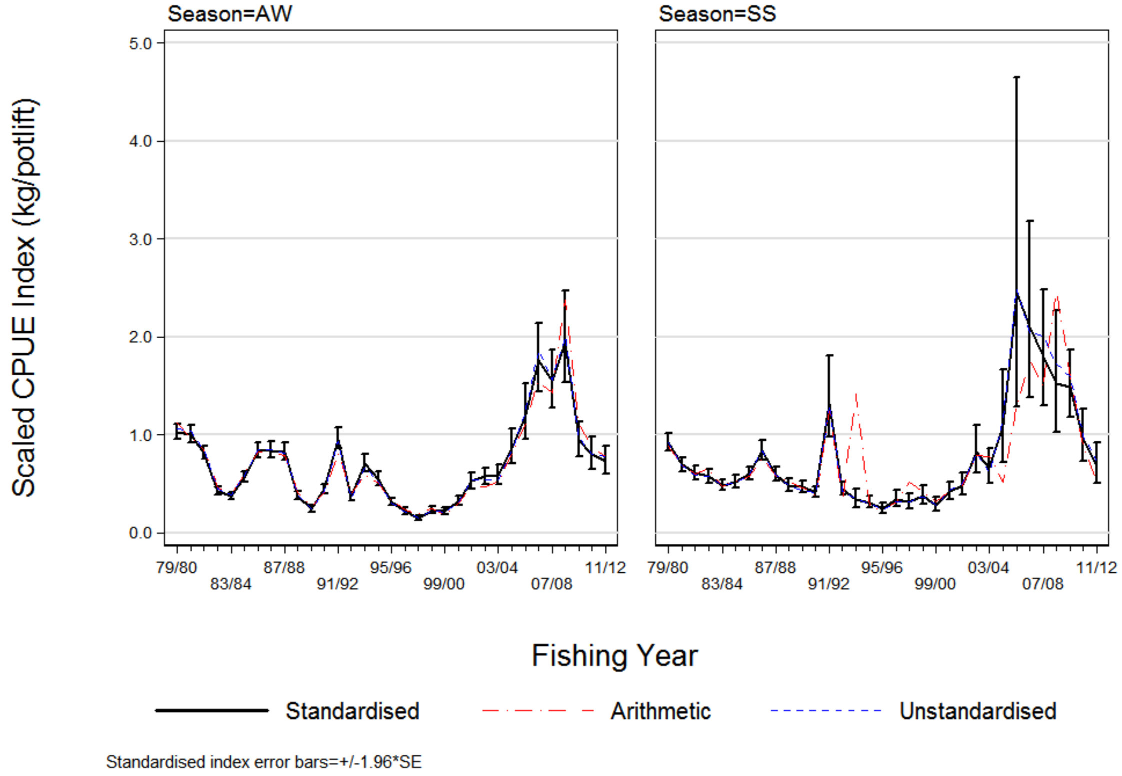

Figure 34: Standardised, unstandardised, and arithmetic CPUE indices (kg/potlift) by season and fishing year for CRA 7: 1979–80 to 2011–12. Vertical bars are 95% confidence intervals. The geometric mean for the AW series (left panel) = 0.59 kg/potlift and for the SS series (right panel) = 0.65 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

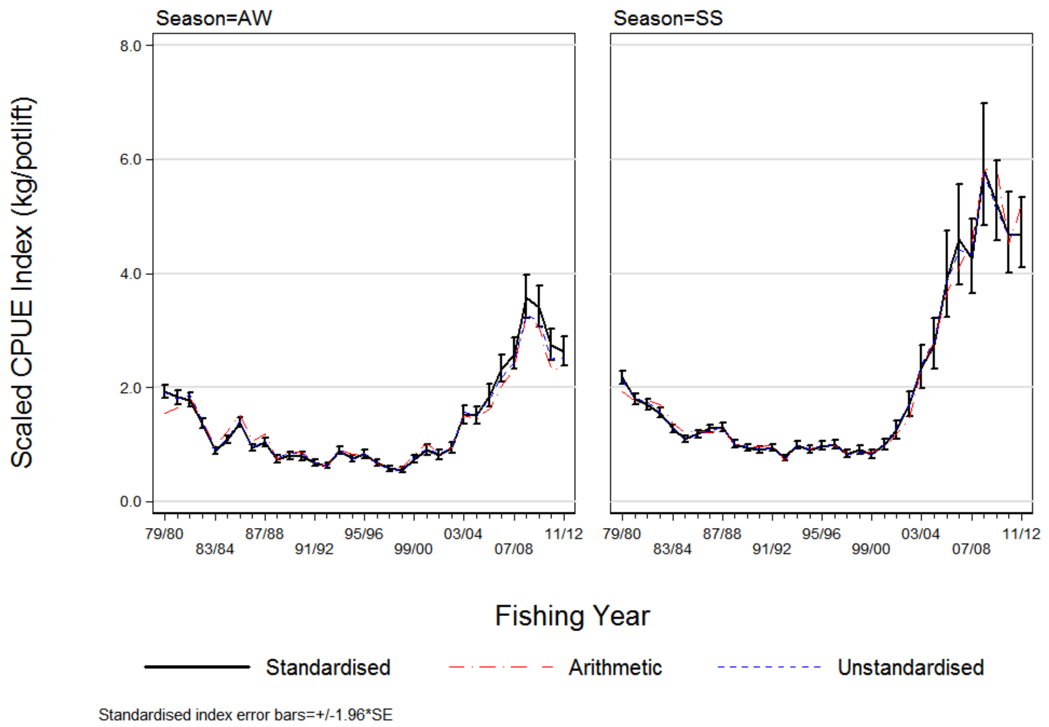

Figure 35: Standardised, unstandardised, and arithmetic CPUE indices (kg/potlift) by season and fishing year for CRA 8: 1979–80 to 2011–12. Vertical bars are 95% confidence intervals. The geometric mean for the AW series (left panel) = 1.19 kg/potlift and for the SS series (right panel) = 1.61 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

APPENDICES

A. TABLE OF ABBREVIATIONS AND DEFINITIONS OF TERMS

Term/Abbreviation	**Definition**
arithmetic CPUE	Eq. 1
autumn/winter (AW) season	1 April – 30 September period
CDI plot	Coefficient-distribution-influence plot (see Figure E.2 for an example) (Bentley et al. 2011)
CPUE	catch per unit effort
CRACE	name of shadow database holding groomed rock lobster catch and effort data
"concession" fishery in CRA 7	during the regulated period (currently 01 June–19 November), the MLS for commercial fishing is a tail length (TL) of 127 mm, which applies to both sexes. This measurement corresponds to 46 mm (males) and 47 mm (females) TW
fishing year	1 April – 31 March period (statutory, defined by the QMS)
FSU	Fisheries Statistics Unit: format used to report rock lobster catches, January 1979 to June 1989
LFR	Licensed Fish Receiver: processors legally allowed to receive commercially caught rock lobster
MPI	Ministry for Primary Industries, formerly Ministry of Fisheries (merged with the Ministry of Agriculture and Forestry [MAF] on 1 July 2011)
MHR	Monthly Harvest Return: monthly returns used after 1 October 2001. Replaced QMRs but have same definition and utility
MLS	Minimum Legal Size: tail width (TW) measurement below which rock lobster are required by law to be released. These size limits vary between sexes and among QMAs
NRLMG	National Rock Lobster Management Group: stakeholder committee charged with giving the Minister for Primary Industries advice on the management of rock lobster
offset year	1 October – 30 September period
potlift	unit of effort in rock lobster potting fishery: one lift for a single trap (usually daily)
QMA	Quota Management Area: legally defined unit area used for rock lobster management (see Figure 1)
QMR	Quota Management Report: monthly harvest reports submitted by commercial fishers to MPI. Considered to be best estimates of commercial harvest. In use from 1986 to 2001.
QMS	Quota Management System: name of the management system used in New Zealand to control commercial and non-commercial catches
raw catches or potlifts	unadjusted catches or potlifts (observed from catch/effort data)
raw CPUE	synonym for arithmetic CPUE (Eq. 1)
replog	data extract identifier issued by MPI data unit
RLFAWG	MPI Rock Lobster Fishery Assessment Working Group
scaled catches	Eq. 5: raw catches adjusted to sum to QMR/MHR totals
scaled potlifts	Eq. 6: raw potlifts adjusted because of missing or discarded records
s.e.	Standard error of estimate
spring/summer (SS) season	1 October – 31 March period
standardised CPUE	Eq. 3 and Eq. 4
statistical area	sub-areas contained within a rock lobster QMA which are identified in catch/effort returns (see Figure 1). These statistical areas differ from those used for finfish.
TAC	Total Allowable Catch: catch limit for a QMA set by the Minister for Primary Industries that includes allowances from all sources of fishery-related mortalities, including commercial, recreational, illegal and customary
TACC	Total Allowable Commercial Catch: catch limit set by the Minister for Primary Industries for a QMA that applies to commercial fishing
unstandardised CPUE	Eq. 2

B. DEVELOPING A NEW CATCH CORRECTION ALGORITHM

B.1 INTRODUCTION

The methods used to prepare rock lobster catch and effort data for use in stock assessments have been documented in Bentley et al. (2005). These data are loaded into the shadow database CRACE, which maintains the original data structure while flagging errors and identifying some inconsistencies in the data (Bentley et al. 2005). Using only records that have error levels less than 2 (Bentley et al. 2005), data are summarised by vessel, month and statistical area, with the effort and location information coming from the fishing event part of the CELR form. Catch data are based on the estimated catch data which have been scaled to the landings by the vessel in the same month and area (Eq. C.5). The algorithm used to perform this summary is known as "B4" and is documented briefly in Bentley et al. (2005) and in more detail in Appendix C.

The most important destination code is "L", used to designate sale to an LFR. Table B.1 lists all destination codes in the MPI data system. While most destination codes are "terminal" (T), with no ambiguity in whether the fish will be landed again under another code, several are intermediate (I) because they indicate catch which is being held temporarily before being transferred to a terminal code (almost always "L"). These non-terminal landings (primarily codes "P" and "Q", along with some "R"; Figure B.1) cannot be included in data preparation because they would lead to double-counting of landings.

The data summarisation procedure assumes that effort and landings, because they are aggregated by month, will balance over time, with landings under-represented (relative to the effort) in some months but over-represented in the subsequent month. However, because of changes in fishing practices in the 2000s, there are many instances when holding ("P" and "Q" codes) extends for more than a month, resulting in month/area combinations with considerable effort but no associated "L" landings. In the following month, the presumption is that reported landings are likely to include catch from the previous month, thus biasing the CPUE. Data preparation by the "B4" algorithm identifies these sequential combinations and drops vessel/month/area cells with zero landings and drops the effort and landings from the following month. However, it is not possible to identify situations where holding is confounded with landings in the initial month. These situations can cause bias, but are not tractable with the B4 data preparation procedure.

The main purpose of the B4 algorithm is to adjust estimated catches to avoid bias relative to the final L landings. However, the algorithm assumes that terminal landings occur in the same month as effort, an assumption that appears to be violated often in several QMAs. An alternative to the B4 algorithm estimates the bias in landing to estimated catch by vessel and fishing year directly from the data. This "F" algorithm (described in detail in Appendix D) begins by calculating, for each vessel, a "vessel correction factor" (*vcf*), or the ratio of landed to estimated catch. This is done for each vessel and year, without reference to QMA, on the assumption that, within the fishing year, all expended effort and associated estimated catch will be matched with terminal landings. It also assumes that the correction factor is constant for all months in a fishing year for the originating vessel. This correction factor is applied to every record from the vessel in the year, correcting the estimated catch weight with the *vcf*. The new algorithm removes the effects of destination codes "P" and "Q", because the correction factor is applied to the estimated catches, which should not be affected by holding.

A further problem with the catch and effort data has arisen in recent years. Before the mid-2000s, over 99% of the "terminal" landings (by weight) were made to the "L" destination code. However, with the NZ-wide increase in abundance, there has been a concomitant increase in high-grading: sorting and releasing marketable lobster of lesser value. This is legal for rock lobster, but could lead to bias in CPUE if not included in the calculation. In April 2009, MPI added destination code "X", requiring operators to record the weight of legal catch returned to the water. This requirement applies to every landing, and the RLFAWG has agreed that this catch weight needs to be added to "L" landing data.

The RLFAWG has also agreed that destination code “F” (lobster taken for personal use under the provisions of Section 111 of the Fisheries Act) should be added to the landings because these lobster also contribute to the observed CPUE. All other terminal destination codes currently have no importance (see Figure B.1). The F algorithm (see Appendix D) has no difficulty in accommodating with these two additional destination codes because they can be added to the numerator when calculating the *vcf*.

B.2 PRELIMINARY CONSIDERATION OF THE F-ALGORITHM BY THE RLFAWG

Preliminary investigations of *vcf* (Eq. D.1) indicated that this variable took on a broad range of values, with the 1%–99% empirical quantiles ranging from about 0.25 to 2.6 and with minimum/maximum values of about 0.01 to 2754. While the median values of *vcf* were near 1.0, the key to implementing the F-algorithm was to find a defensible and acceptable truncation scheme for the *vcf* variable.

Initially, the RLFAWG was presented with three variants of the F catch-correction algorithm that proposed alternative methods for dealing with small and large values of *vcf* (Appendix D). Variant F1 substituted *vcf*=1.0 for vessels outside of the nominated bounds, accepting the estimated catch estimate for the out-of-range *vcf* vessels. Variant F2 dropped vessels which were outside of the accepted *vcf* range. Variant F3 substituted the lower or upper bound (depending on which side of the range was the *vcf* value) of the accepted range for the out-of-range *vcf* vessels. Variants F1 and F3 attempted to conserve as much catch information in the analysis as possible, while variant F2 accepted the loss of catch information in return for retaining a data set with greater apparent reliability.

The RLFAWG accepted the F2 variant of the F-algorithm on first principles, rejecting the F1 and F3 variants without requiring supporting analyses. The reasoning of the RLFAWG was that the increased reliability of the estimate outweighed the loss of data. However, the RLFAWG requested supporting analyses to investigate the behaviour of F2 at different levels of truncation and to quantify the data that were discarded at different truncation levels.

B.3 FOLLOW-UP ANALYSES FOR THE F2 VARIANT OF THE F-ALGORITHM

The following analyses were conducted on a data extract received from MPI in May 2012 (MPI replog 8487). These data were current up to 31 March 2012, but were possibly incomplete for the final few months of 2011–12.

B.3.1 DISTRIBUTION BY QMA OF *VCF* AT DIFFERENT LEVELS OF F2 TRUNCATION

Distributions for the *vcf* (Eq. D.1) variable were generated by CRA QMA for every valid vessel/fishing-year/QMA combination from 1989–90 to 2011–12 as well as for all QMAs combined (note that L_{giy} in Eq. D.1 includes destination codes “L”, “F”, and “X” in these tables and figures). Four levels of symmetrical fixed *vcf* bounds were applied to every QMA to form four separate data sets: 0.6–1.4, 0.7–1.3, 0.8–1.2 and 0.85–1.15. All vessels outside these bounds were dropped.

There were just over 10 000 vessel/year estimates of *vcf* in the total data set, ranging from just under 300 records in CRA 9 to nearly 2400 records in CRA 8 (Table B.2). For a *vcf* to be valid, the vessel must have reported effort and estimated catch for the QMA/year combination that was landed. This criterion failed a surprising number of records (there were 2600 “Null” observations: see [Number missing] column in Table B.2), but these amounted to just over 2% of the total landed catch. The *vcf* distributions differ somewhat between QMAs: for instance, an upper bound of 1.2 dropped 18% of the vessels in CRA 1 while dropping only 7% in CRA 6 (Table B.3). Across all 9 QMAs, the selected F2 range of 0.8–1.2 dropped about 18% (8.6% + 9.1%) of the vessels. Table B.4 summarises the total amount of data (records, potlifts and catch) dropped through the truncation process defined by each of the four F2 variants, relative to a dataset with no truncation. This was done to investigate the differences between the four F2 datasets. Overall, the selected F2 range of 0.8–1.2 dropped nearly 8 000 000 potlifts and 13 000 t of catch (Table B.4). Histograms of *vcf* show very tight distributions, centred around 1.0 with long tails (Figure B.2).

B.3.2 COMPARISON BY QMA OF STANDARDISED CPUE PLOTS AT DIFFERENT LEVELS OF *VCF* TRUNCATION USING THE F2_LFX ALGORITHM

Annual (1 April–31 March) CPUE analyses by QMA were conducted, based on the following criteria, while fixing the *vcf* bounds which were applied uniformly to all QMAs at the indicated levels:

Analysis	Destination codes	Algorithm	Years included	*vcf* bounds [lb]–[ub]	Explanatory variables used
1	"L", "F", & "X"	F2	79/80 – 11/12	0.6–1.4	[`year`], [`month`], [`stat_area`]
2	"L", "F", & "X"	F2	79/80 – 11/12	0.7–1.3	[`year`], [`month`], [`stat_area`]
3	"L", "F", & "X"	F2	79/80 – 11/12	0.8–1.2	[`year`], [`month`], [`stat_area`]
4	"L", "F", & "X"	F2	79/80 – 11/12	0.85–1.15	[`year`], [`month`], [`stat_area`]

Plots overlaying the four F2 variant analyses described in the text table above were prepared for each QMA (Figure B.3). These plots showed almost no sensitivity to the selection of bounds in all the year index series.

B.3.3 COMPARISON BY QMA OF STANDARDISED CPUE: F2_LFX (*VCF* BOUNDS: 0.8–1.2) WITH B4_L

Comparison plots that match one of the F2 variant analyses presented in Figure B.3 (*vcf* bounds: 0.8–1.2) with the B4 analysis scaled to the "L" destination code (the analysis used in all assessments from 2003 to 2011) showed sensitivity in some QMAs, particularly in the final one or two fishing years (Figure B.4). The differences between the F2_LFX and B4_L algorithms were greatest in CRA 1, CRA 5 and CRA 9, with the most recent years lying well above the B4_L series, outside of the F2_LFX confidence bounds. The CRA 7 and CRA 8 F2_LFX series were also above the B4_L series, but the divergence between the two series was less than for the previous three QMAs. The direction of the shift in all cases was consistent with the hypothesis that adding the "F" and "X" destination codes would account for additional vulnerable biomass not included when scaling only to the "L" destination code. The consistency between the F2_LFX and B4_L series for CRA 2, CRA 3, CRA 4 and CRA 6 indicated that the F2 procedure is not substantially different from the B4 procedure in QMAs where holding pot activity was less prevalent. The RLFAWG agreed in September 2012 to use the F2_LFX catch correction algorithm based on *vcf* bounds of 0.8 to 1.2.

Table B.1. Destination codes and description for landings in the MPI catch-effort data system (taken from table on page 76, Ministry of Fisheries 2010). The destination "type" is T: terminal (final); U: unknown; I: intermediate, eventually moving to a "terminal" code.

6. Destination code	Description	Type of destination
A	Accidental loss	T
C	Disposed to Crown	T
E	Eaten	T
F	Section 111 Recreational Catch	T
H	Loss from holding pot	T
L	Landed in NZ (to LFR)	T
M	QMS returned to sea (Part 6A[1])	T
O	Conveyed outside NZ	T
S	Seized by Crown	T
U	Bait used on board	T
W	Sold at wharf	T
X	QMS returned to sea, except 6A[1]	T
B	Bait stored for later use	U
D	Discarded (non-ITQ)	U
P	Holding receptacle in water	I
Q	Holding receptacle on land	I
R	Retained on board	I
T	Transferred to another vessel	I
NULL	Nothing	U

[1] a provision under the NZ Fisheries Act legislation

Table B.2. Statistics for the vessel correction factor (*vcf*, Eq. D.1) by QMA and for all QMAs combined, summed over the period 1989–90 to 2011–12. Number missing=number of landing/estimated_catch pairs with no estimated_catch observations in the QMA of landing.

QMA	Number observations	Number missing	Total landings (t)	Landings w/o *vcf* (t)	% landings w/o *vcf*	Minimum *vcf*	Median *vcf*	Mean *vcf*	Maximum *vcf*
1	556	289	3 049	107	3.5	0.008	1.023	1.766	169.9
2	1,047	218	4 899	105	2.2	0.035	1.020	1.682	226.3
3	962	426	5 128	57	1.1	0.012	1.013	1.072	26.9
4	1,735	226	11 021	54	0.5	0.044	1.008	1.073	41.7
5	1,238	457	7 463	153	2.0	0.015	1.004	1.308	173.8
6	1,064	358	7 587	517	6.8	0.033	1.015	4.390	2 754.9
7	734	212	2 282	50	2.2	0.083	1.015	2.122	174.3
8	2,388	324	18 517	243	1.3	0.035	1.019	1.162	55.1
9	291	89	1 072	29	2.7	0.007	1.013	1.033	7.3
Total	10,015	2,599	61 019	1,315	2.2	0.007	1.013	1.653	2 754.9

Table B.3. Proportion (P) of observations where the vessel correction factor (*vcf*) is less than or greater than the indicated limit by CRA QMA and for all CRA QMAs totalled, the latter without reference to QMA and consequently weighted by the number of observations.

QMA	Number	P(*vcf*<0.6)	P(*vcf*<0.7)	P(*vcf*<0.8)	P(*vcf*<0.85)	P(*vcf*>1.15)	P(*vcf*>1.2)	P(*vcf*>1.3)	P(*vcf*>1.4)
1	556	0.038	0.040	0.059	0.085	0.225	0.176	0.131	0.108
2	1 047	0.031	0.043	0.062	0.071	0.117	0.088	0.068	0.055
3	962	0.021	0.036	0.052	0.062	0.085	0.058	0.030	0.022
4	1 735	0.035	0.045	0.059	0.069	0.068	0.050	0.033	0.028
5	1 238	0.153	0.178	0.201	0.212	0.110	0.090	0.070	0.059
6	1 064	0.017	0.023	0.049	0.068	0.099	0.070	0.051	0.045
7	734	0.023	0.040	0.057	0.076	0.151	0.110	0.084	0.069
8	2 388	0.049	0.074	0.101	0.126	0.158	0.119	0.078	0.061

9	291	0.082	0.082	0.096	0.124	0.131	0.113	0.065	0.058
Total	10 015	0.050	0.065	0.086	0.103	0.121	0.091	0.064	0.052

Table B.4: Percentage of records (N: vessel, year, month, statistical area strata), total potlifts, and total catch from 1989–90 to 2011–12 dropped relative to a dataset without truncation (Table B.5) by each the four variants of the F2 algorithm described in the above text table.

	Analysis 1: bounds: 0.6–1.4			Analysis 2: bounds: 0.7–1.3			Analysis 3: bounds: 0.8–1.2			Analysis 4: bounds: 0.85–1.15		
	N (%)	Potlifts (%)	Catch (%)	N (%)	Potlifts (%)	Catch (%)	N (%)	Potlifts (%)	Catch (%)	N (%)	Potlifts (%)	Catch (%)
CRA 1	-5.4	-5.3	-31.0	-6.7	-6.6	-31.9	-9.4	-9.1	-33.8	-13.6	-12.4	-36.8
CRA 2	-2.7	-1.9	-16.9	-3.7	-2.9	-18.0	-5.3	-4.8	-19.8	-7.0	-7.0	-21.9
CRA 3	-1.7	-1.3	-7.2	-2.6	-2.0	-7.8	-4.5	-3.4	-9.3	-6.0	-4.5	-10.4
CRA 4	-2.6	-1.2	-7.3	-3.3	-1.6	-7.7	-4.6	-2.6	-9.0	-6.1	-3.7	-10.1
CRA 5	-10.1	-13.3	-16.1	-11.8	-14.8	-17.3	-13.9	-16.4	-18.9	-15.0	-17.2	-19.7
CRA 6	-2.0	-1.0	-2.1	-2.8	-1.9	-2.8	-5.3	-3.8	-4.3	-8.2	-6.3	-6.2
CRA 7	-2.7	-2.0	-2.9	-3.8	-2.9	-3.7	-5.8	-4.7	-5.5	-8.2	-6.9	-7.9
CRA 8	-4.9	-4.3	-5.9	-6.9	-6.4	-7.5	-10.3	-9.7	-10.5	-13.5	-13.2	-13.4
CRA 9	-6.6	-8.0	-29.6	-7.0	-8.4	-30.2	-9.6	-10.0	-31.6	-11.2	-11.8	-32.8
Total	-4.3	-4.1	-9.8	-5.5	-5.2	-10.8	-7.8	-7.2	-12.8	-10.0	-9.2	-14.8

Table B.5: Sum of the number of records (N: vessel, year, month, statistical area strata), total potlifts, and total catch from 1989–90 to 2011–12 in the dataset with no truncation by QMA and for all QMAs totalled. The percentages of dropped data provided in Table B.4 are relative to each of these totals.

	N	Potlifts (‘000s)	Catch (t)
CRA 1	6 654	4 518	5 908
CRA 2	14 596	14 349	8 276
CRA 3	12 635	13 400	10 355
CRA 4	20 253	21 183	18 203
CRA 5	16 177	16 109	12 253
CRA 6	11 577	7 060	9 923
CRA 7	8 298	7 123	4 605
CRA 8	29 370	24 755	31 821
CRA 9	3 509	1 435	2 104
Total	123 069	109 933	103 448

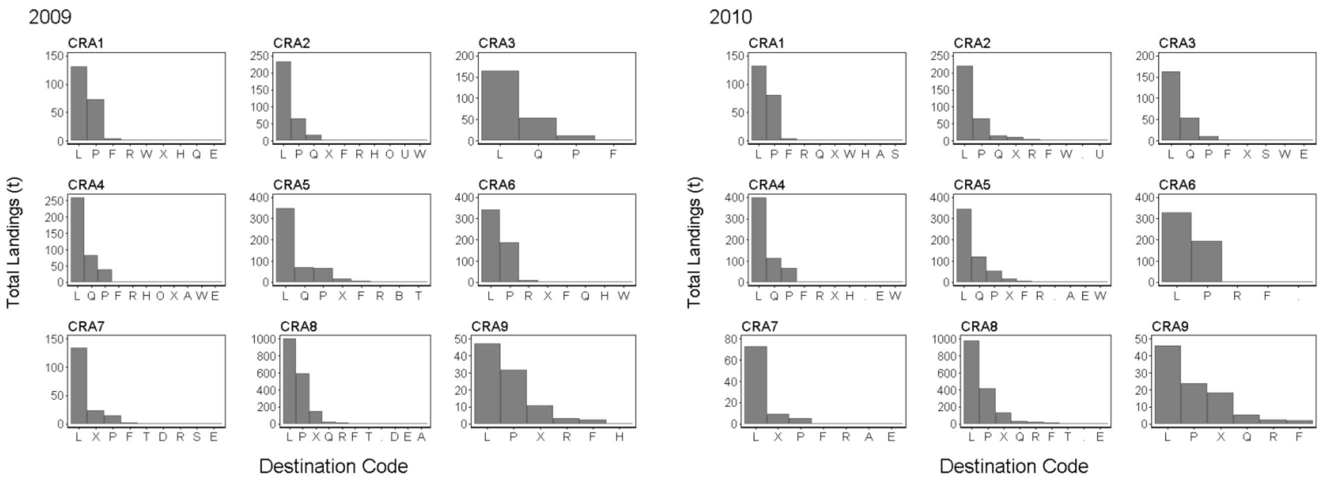

Figure B.1. Distribution of landings by destination code (Table B.1)and QMA for the 2009–10 [left panel] and 2010–11 [right panel] fishing years. Destination codes present in each QMA and year are plotted in descending order of total landings. The NULL destination code is identified with “.”

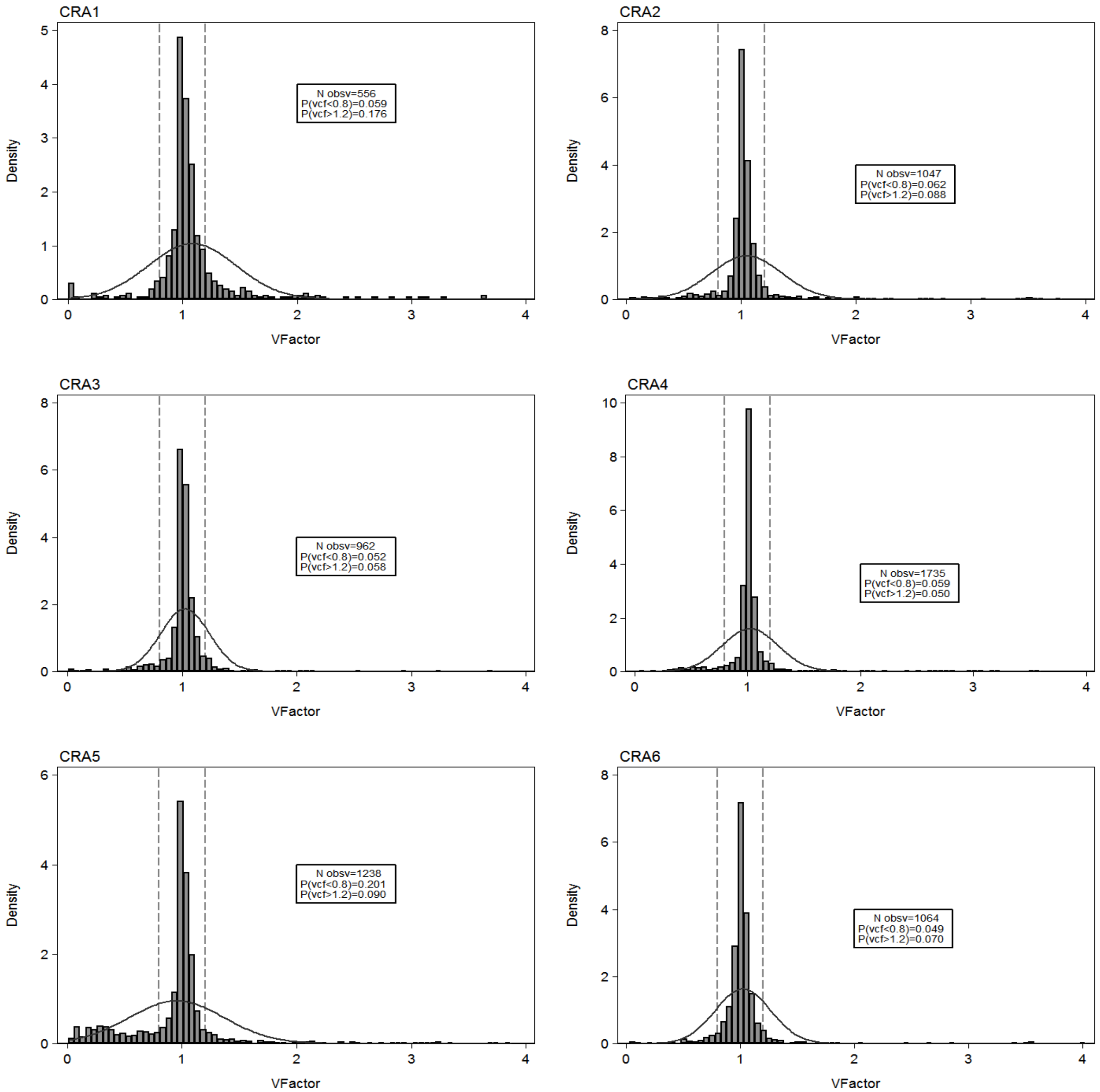

Figure B.2. Distribution of annual vessel correction factors (*vcf*) for CRA 1 to CRA 6. Vertical dashed lines bracket *vcf*=0.8 and *vcf*=1.2. Values for *vcf*>4 have been truncated for clarity; proportion of distribution above and below 1.2 and 0.8 calculated without truncation. Smoothed line is a fitted normal distribution using mean and standard deviation from each *vcf* distribution.

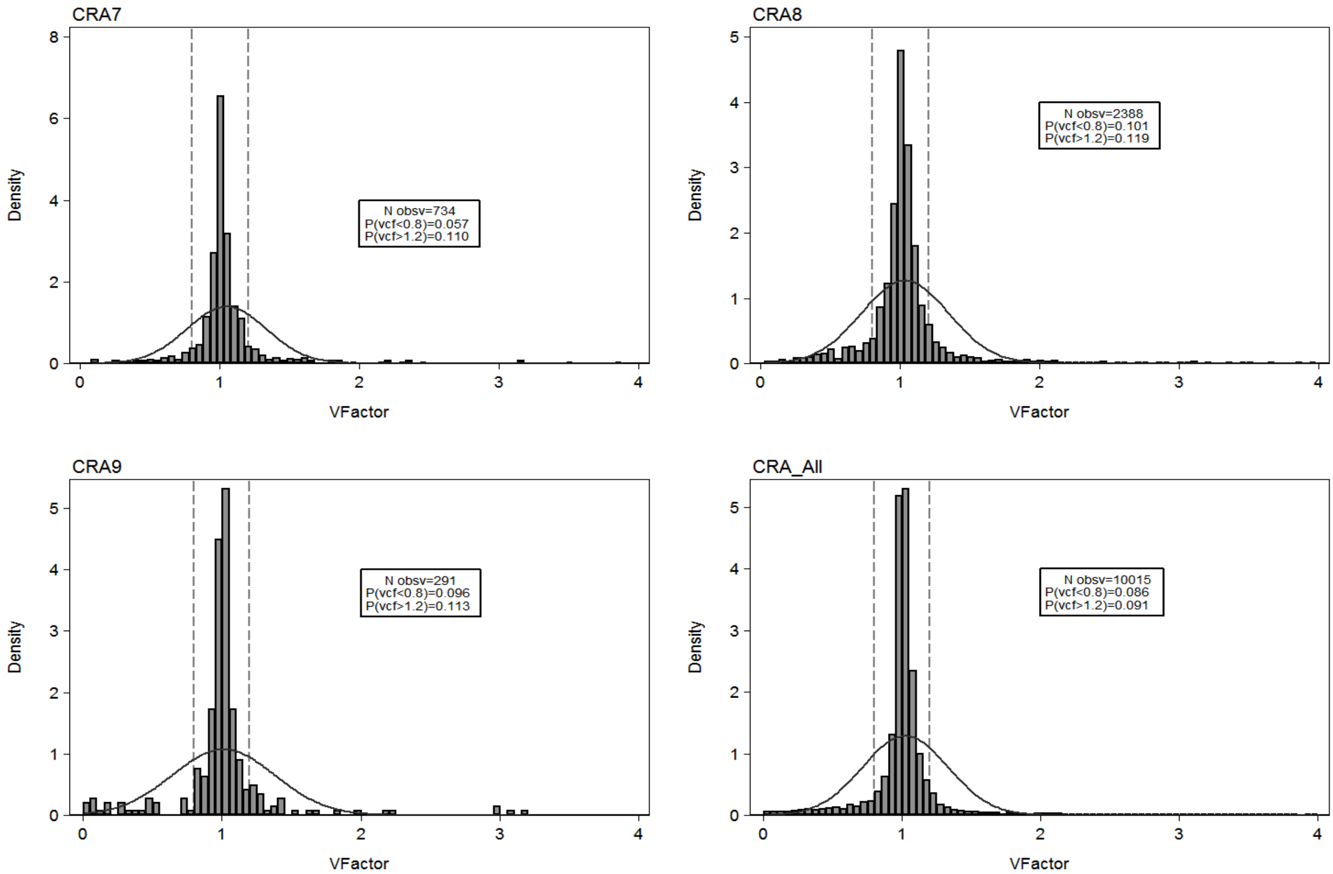

Figure B.2 (cont.): Distribution of annual vessel correction factors (*vcf*) for CRA 7 to CRA 9 and for all CRA QMAs combined. Vertical dashed lines bracket *vcf*=0.8 and *vcf*=1.2. Values for *vcf*>4 have been truncated for clarity; proportion of distribution above and below 1.2 and 0.8 calculated without truncation. Smoothed line is a fitted normal distribution using mean and standard deviation from each *vcf* distribution.

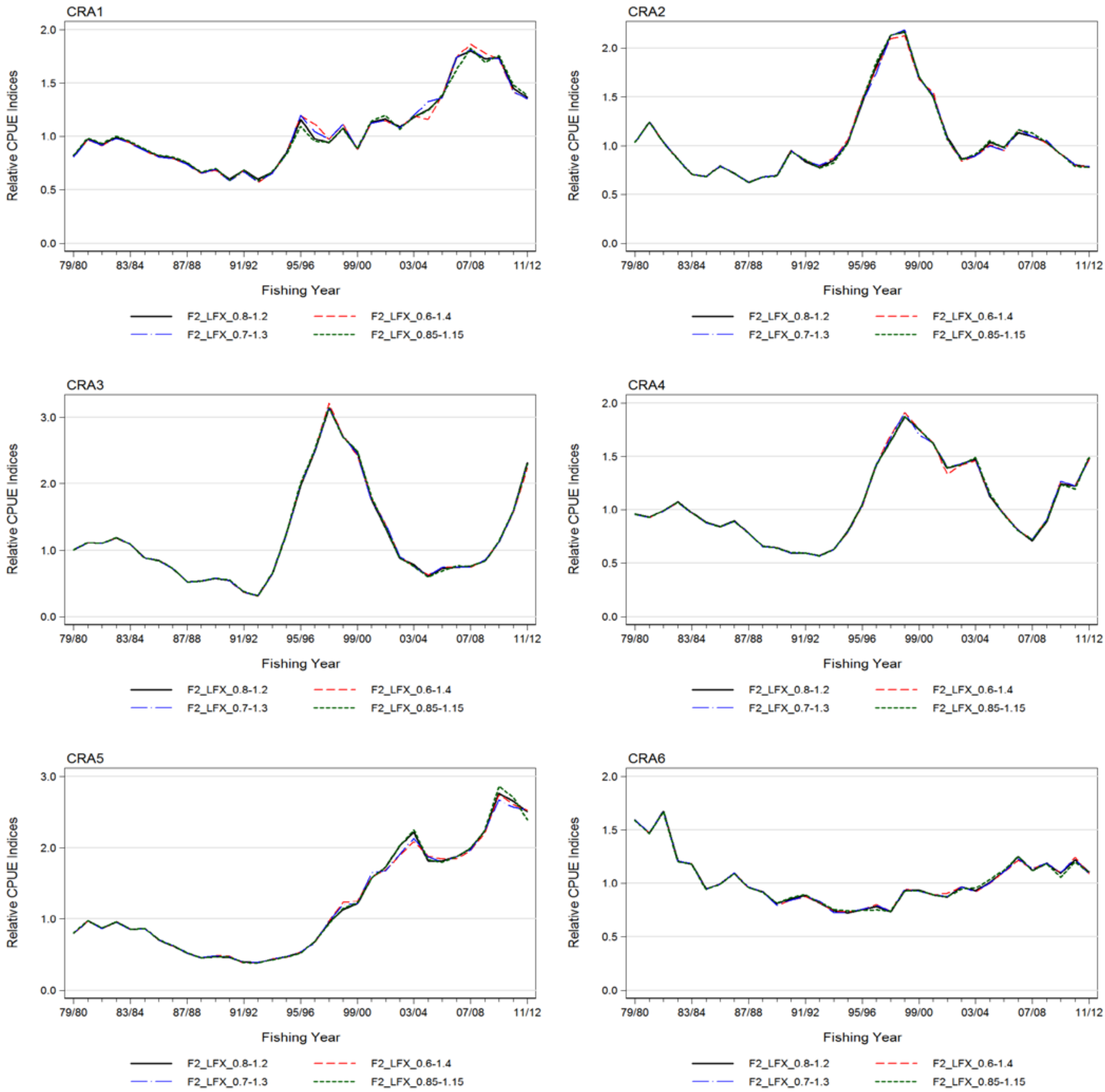

Figure B.3. Comparison of year indices from standardised GLM analyses based on four variants of the F2 algorithm (Analyses 1 to 4 in the above text table), each defined by the width of the bounds used to exclude vessel corrections factors (*vcf*), for CRA 1 to CRA 6.

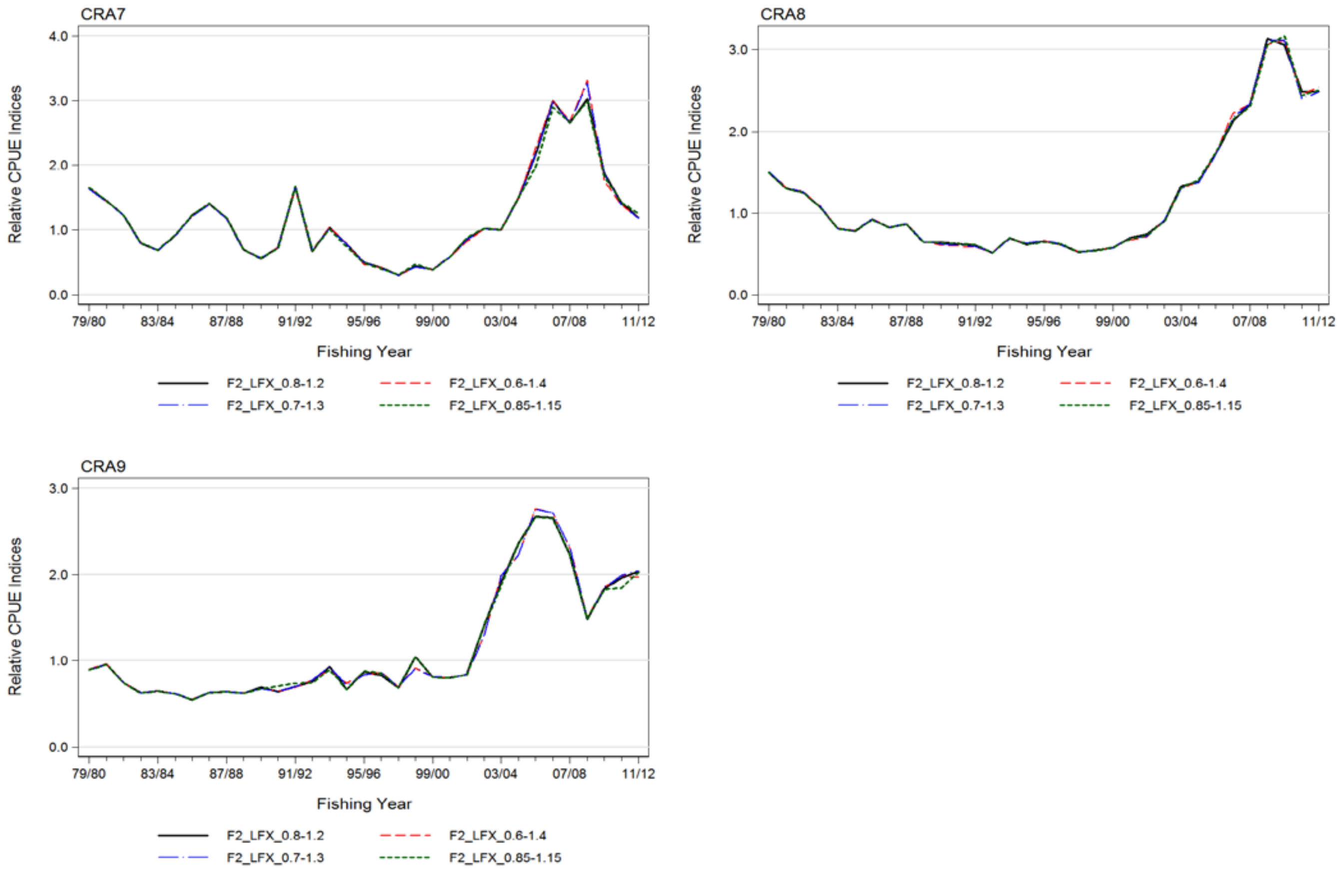

Figure B.3 (cont.): Comparison of year indices from standardised GLM analyses based on four variants of the F2 algorithm (Analyses 1 to 4 in the above text table), each defined by the width of the bounds used to exclude vessel corrections factors (*vcf*), for CRA 7 to CRA 9.

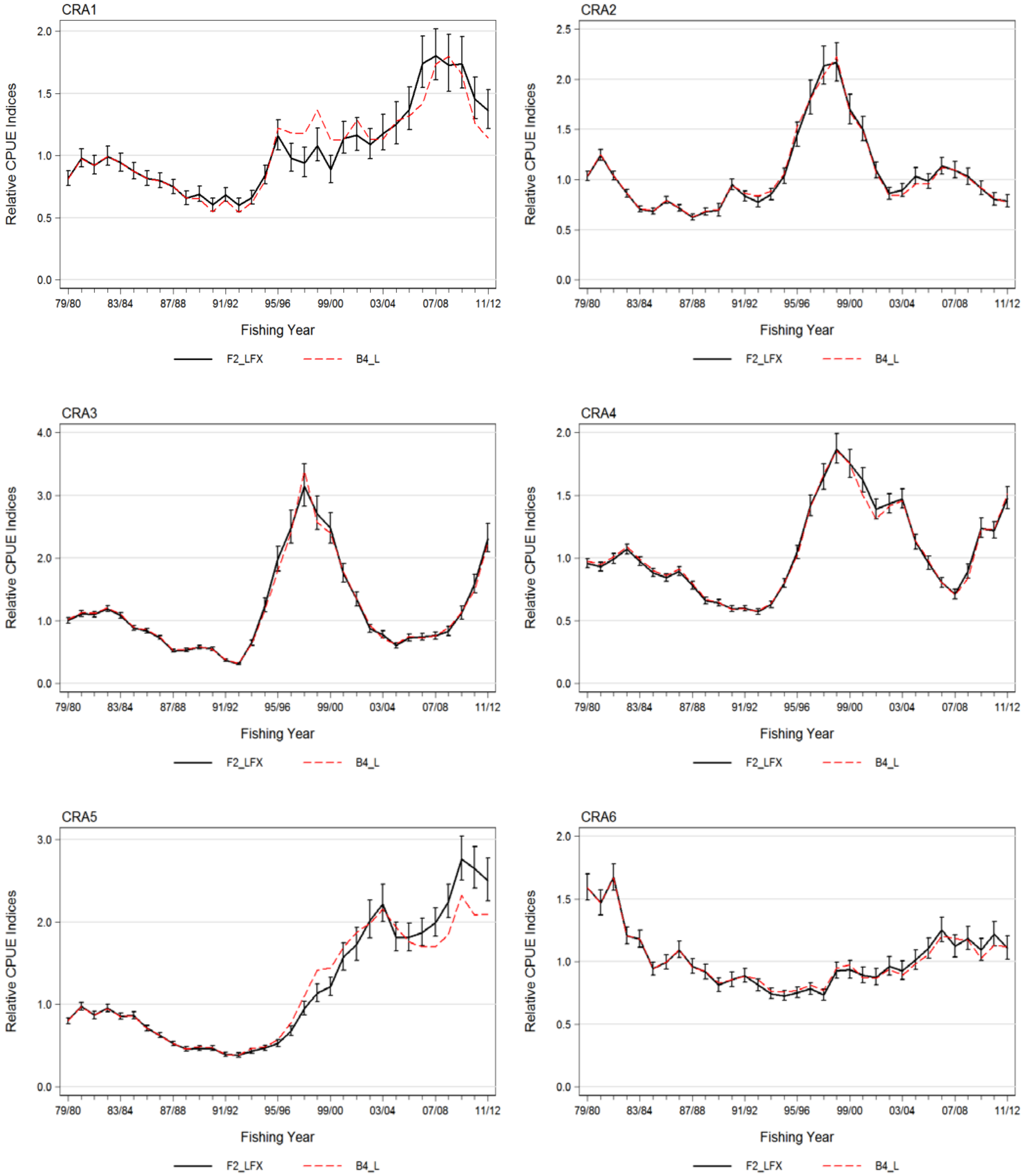

Figure B.4. Comparisons for CRA 1 to CRA 6 of year indices from standardised GLM analyses based on the F2 algorithm scaled to the combined "LFX" destination codes (*vcf* bounds 0.8–1.2) (F2_LFX) with the B4 algorithm scaled to the "L" destination code (B4_L). Confidence bounds: ±2*s.e.

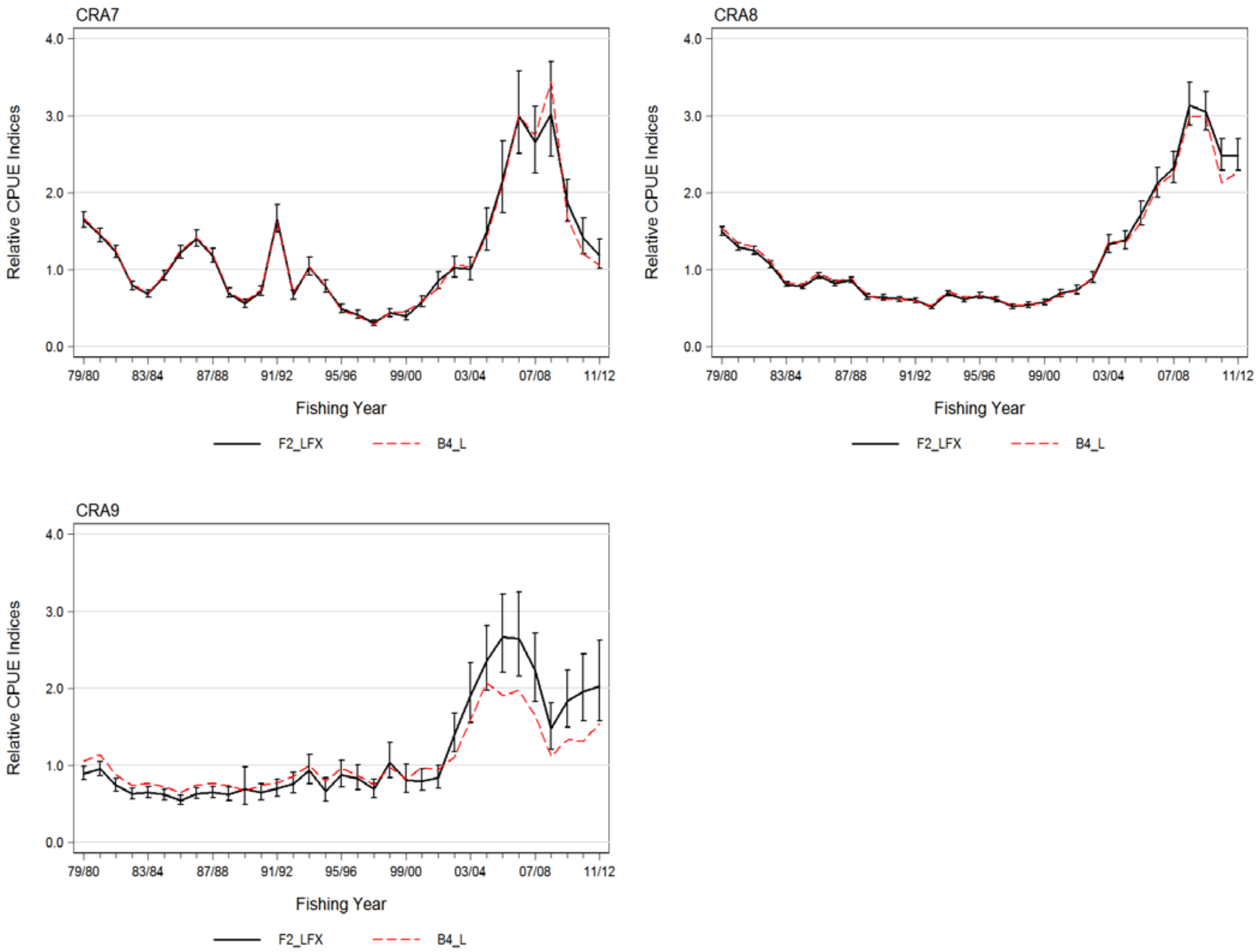

Figure B.4 (cont.): Comparisons for CRA 7 to CRA 9 of year indices from standardised GLM analyses based on the F2 algorithm scaled to the combined "LFX" destination codes (*vcf* bounds 0.8–1.2) (F2_LFX) with the B4 algorithm scaled to the "L" destination code (B4_L). Confidence bounds: ±2*s.e.

C. DOCUMENTATION FOR THE B4 CATCH CORRECTION ALGORITHM

Note: the following algorithm is performed on records where the error code is ≤ 1 (Bentley et al. 2005). There are seven active error fields (Bentley et al 2005) in CRACE: three in the [landings] table and two each in the [fishing_event] and [estimated_subcatch] tables.

Step 1: aggregate all landings by vessel (i) and month (m) within a fishing year (y):

Eq. C.1 $$L_{imy} = \sum_{g=1}^{n_{imy}^{l}} L_{giy}$$

where L_{giy} = landed weight in record g for vessel i in month m and year y; there are n_{imy}^{l} such records;

L_{giy} can be composed of "L" or "L+F+X" destination codes.

Step 2:

A. Create a list of vessels V_{my} that are active in month (m) within a fishing year , based on the [fishing event] table.

B. if $L_{V_{my}my} = 0$ then $L_{V_{(m+1)y}(m+1)y} = 0$

note that the pointer array V_{my} evaluates to a vessel subscript i.

Step 3: aggregate all estimated catch weight by vessel (i) and month (m) within a fishing year (y):

Eq. C.2 $$C_{imy} = \sum_{h=1}^{n_{imy}^{c}} C_{hiy}$$

where C_{hiy} = estimated catch weight in record h for vessel i in month m and year y; there are n_{imy}^{c} such records;

Step 4: aggregate all estimated catch weight and potlifts by vessel (i), month (m) and statistical area (a) within a fishing year (y):

Eq. C.3 $$C_{iamy} = \sum_{j=1}^{n_{iamy}^{c}} C_{jiy}$$

where C_{jiy} = estimated catch weight in record j for vessel i in month m, statistical area (a) and year y; there are n_{iamy}^{c} such records;

Eq. C.4 $$P_{iamy} = \sum_{j=1}^{n_{iamy}^{c}} P_{jiy}$$

where P_{jiy} = number potlifts in record j for vessel i in month m, statistical area (a) and year y; there are n_{iamy}^{c} such records;

Step 5: estimate landed catch weight by vessel (i), month (m) and statistical area (a) within a fishing year (y):

Eq. C.5 $$\hat{L}_{iamy} = \frac{C_{iamy}}{C_{imy}} L_{imy}$$

where $\hat{L}_{imay}$ = estimated landed weight in area a for vessel i in month m and year y;

note that $\hat{L}_{imay} = 0$ for the month/vessel strata identified in Step 2

Step 6: obtain the QMA $\left(Q^{c}_{iamy}\right)$ based on the statistical area in stratum *iamy* (use associations in Table D.1)

Note that the nominal arithmetic CPUE $\left(I_{iamy}\right)$ in stratum *iamy* is defined in Eq. D.5.

D. DOCUMENTATION FOR THE 3 VARIANTS OF "F" CATCH CORRECTION ALGORITHM

Note 1: this algorithm is labelled "F" because "E" is the final algorithm described in Bentley et al. (2005)

Note 2: the algorithm uses records where the error code is ≤ 1 (Bentley et al 2005). There are seven active error fields (Bentley et al 2005) in CRACE: three in the [landings] table and two each in the [fishing_event] and [estimated_subcatch] tables.

Step 1: calculate vessel correction factors (*vcf*) $\left(v_{iy}\right)$ for each vessel and fishing year :

Eq. D.1 $$v_{iy} = \frac{\sum_{g=1}^{n_{iy}^{l}} L_{giy}}{\sum_{h=1}^{n_{iy}^{c}} C_{hiy}}$$

where L_{giy} = landed weight in record *g* for vessel *i* in year *y*; there are n_{iy}^{l} such records;

C_{hiy} = estimated catch weight in record *h* for vessel *i* in year *y*; there are n_{iy}^{c} such records;

note that L_{giy} can be composed of "L" or "L+F+X" destination codes.

Step 2: truncate *vcf* by setting lower lb_{iy} and upper ub_{iy} bounds:

A. variant algorithm F1: replace $\begin{matrix} v_{iy} = 1.0 \text{ if } v_{iy} < lb_{iy} \\ v_{iy} = 1.0 \text{ if } v_{iy} > ub_{iy} \end{matrix};$

B. variant algorithm F2: replace $\begin{matrix} v_{iy} = \text{NULL if } v_{iy} < lb_{iy} \\ v_{iy} = \text{NULL if } v_{iy} > ub_{iy} \end{matrix};$

C. variant algorithm F3: replace $\begin{matrix} v_{iy} = lb_{iy} \text{ if } v_{iy} < lb_{iy} \\ v_{iy} = ub_{iy} \text{ if } v_{iy} > ub_{iy} \end{matrix};$

Note 3: data for vessels outside the bounds are dropped in F2, but retained in F1 using the estimated catch and retained in F3 using the upper or lower bound for v_{iy}.

Step 3: Apply the *vcf* to every estimated catch record for vessel *i* in fishing year *y*:

Eq. D.2 $$\hat{L}_{hiy} = v_{iy} C_{hiy}$$

where $\hat{L}_{hiy}$ = estimated landed weight for record *h* associated with estimated catch weight C_{hiy}.

Step 4: determine the QMA for each $\hat{L}_{hiy}$ using the following procedure:

A. link the effort data for record *h* with the associated landing *g* using the [trip] field;

B. obtain the QMA $\left(Q_g^l\right)$ from the landing record *g* and determine the QMA $\left(Q_h^c\right)$ from the statistical area (based on the associations in Table D.1) for effort record *h*;

C. if $Q_g^l = Q_h^c$, then $Q_{hiy} = Q_h^c = Q_g^l$;

D. if $Q_g^l <> Q_h^c$, then $Q_{hiy} = Q_h^l$.

E. if $Q_g^l = \text{NULL}$, then $Q_{hiy} = Q_h^c$.

Note 4: there can only be one QMA per trip for the procedure in Step 4 to work unambiguously; this information can be obtained either from the fishing event data or from the landing data, with the landing data being the preferred source

Step 5: aggregate the data set to vessel (*i*) /month (*m*) /statistical_area (*a*) /year (*y*) strata, summing the estimated landed weights and associated pot lifts:

Eq. D.3 $$\hat{L}_{iamy} = \sum_{j=1}^{n_{iamy}^c} \hat{L}_{jiy}$$

where $\hat{L}_{jiy}$ = estimated landed weight for record *j* in stratum *iamy*; there are n_{iamy}^c such records;

Eq. D.4 $$P_{iamy} = \sum_{j=1}^{n_{iamy}^c} P_{jiy}$$

where P_{jiy} = number potlifts in record *j* for stratum *iamy*; there are n_{iamy}^c such records;

Note 5: nominal arithmetic CPUE $\left(I_{iamy}\right)$ in stratum *iamy* is (this is not part of the F algorithm):

Eq. D.5 $$I_{iamy} = \frac{\hat{L}_{iamy}}{P_{iamy}}$$

Table D.1. Assignment table for QMAs derived from rock lobster statistical areas (Figure 1).

QMA	1	2	3	4	5	6	7
CRA 1	901	902	903	904	939		
CRA 2	905[1]	906	907	908			
CRA 3	909[1]	910	911				
CRA 4	912	913	914	915	934		
CRA 5	916	917	918	919	932	933	
CRA 6	940	941	942	943			
CRA 7	920	921					
CRA 8	922[1]	923	924	925	926	927	928
CRA 9	929[1]	930	931	935	936	937	938

[1] straddling statistical area: the assignment rules in this table ignore this status

E. DIAGNOSTICS FOR CRA 3 OFFSET YEAR (1 OCTOBER–30 SEPTEMBER) STANDARDISED CPUE ANALYSIS

The data set for this analysis was prepared using the B4 catch correction algorithm scaled to the L destination code.

Table E.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 3 CPUE time series.

7.

	CRA 3 Statistical Area			
Offset year	909	910	911	Total
1979–80	75	361	245	681
1980–81	90	352	267	709
1981–82	101	359	252	712
1982–83	121	392	245	758
1983–84	97	405	291	793
1984–85	116	380	287	783
1985–86	97	322	243	662
1986–87	89	359	244	692
1987–88	84	277	196	557
1988–89	64	289	179	532
1989–90	67	346	210	623
1990–91	67	276	243	586
1991–92	75	265	306	646
1992–93	57	210	275	542
1993–94	34	90	74	198
1994–95	17	61	55	133
1995–96	20	58	49	127
1996–97	19	54	38	111
1997–98	18	67	35	120
1998–99	23	68	41	132
1999–00	19	94	57	170
2000–01	21	85	57	163
2001–02	30	106	77	213
2002–03	24	125	126	275
2003–04	29	103	136	268
2004–05	26	82	114	222
2005–06	24	109	109	242
2006–07	22	109	109	240
2007–08	15	86	104	205
2008–09	24	65	71	160
2009–10	14	66	71	151
2010–11	13	56	52	121
2011–12	14	53	34	101

Table E.2. Total deviance (R^2) explained by each variable in the CRA 3 standardised offset year CPUE analysis.

8. Variable	9. 1	10. 2	11. 3
Offset Year	0.3635		
Month	0.0739	0.4487	
Statistical Area	0.0130	0.3800	0.4650
Additional deviance explained	0.0000	0.0853	0.0162

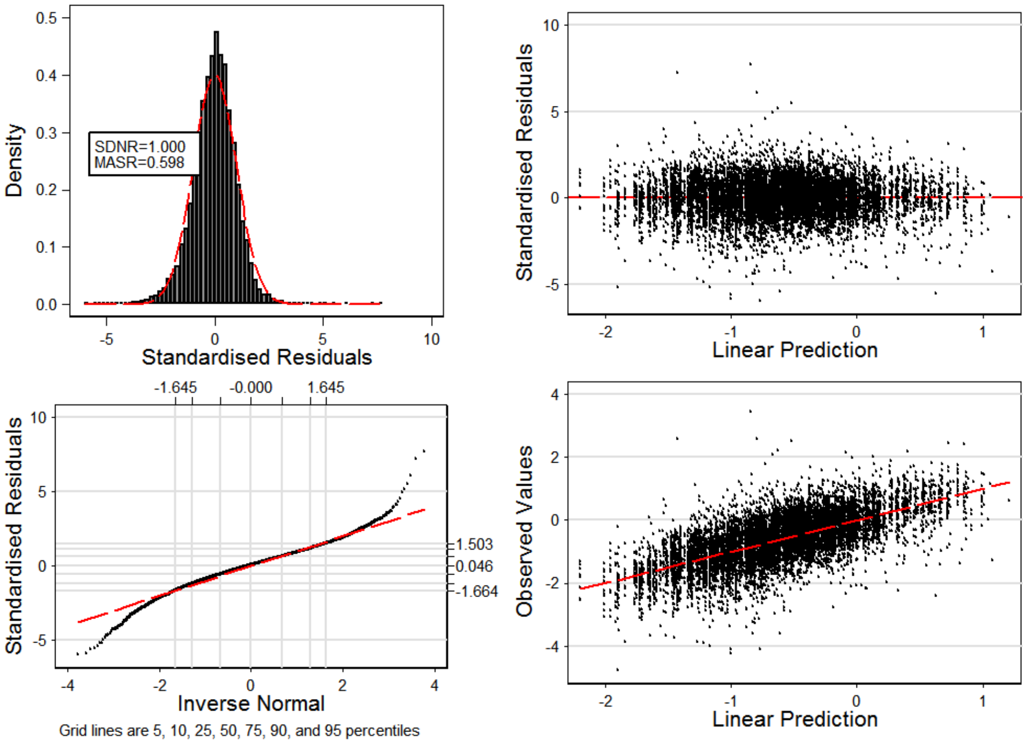

Figure E.1. Standardised residual plots for the CRA 3 standardised offset year CPUE analysis.

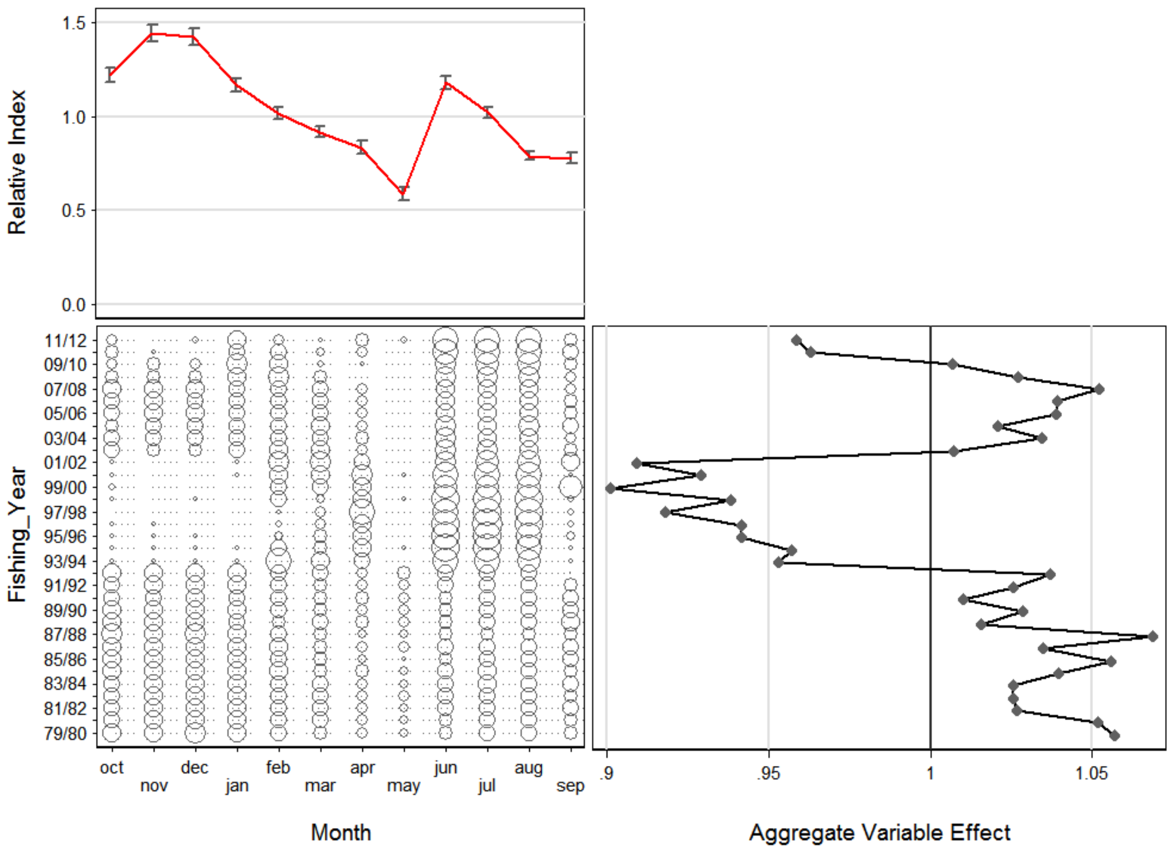

Figure E.2. The effect of the month categorical variable in the offset year CRA 3 lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

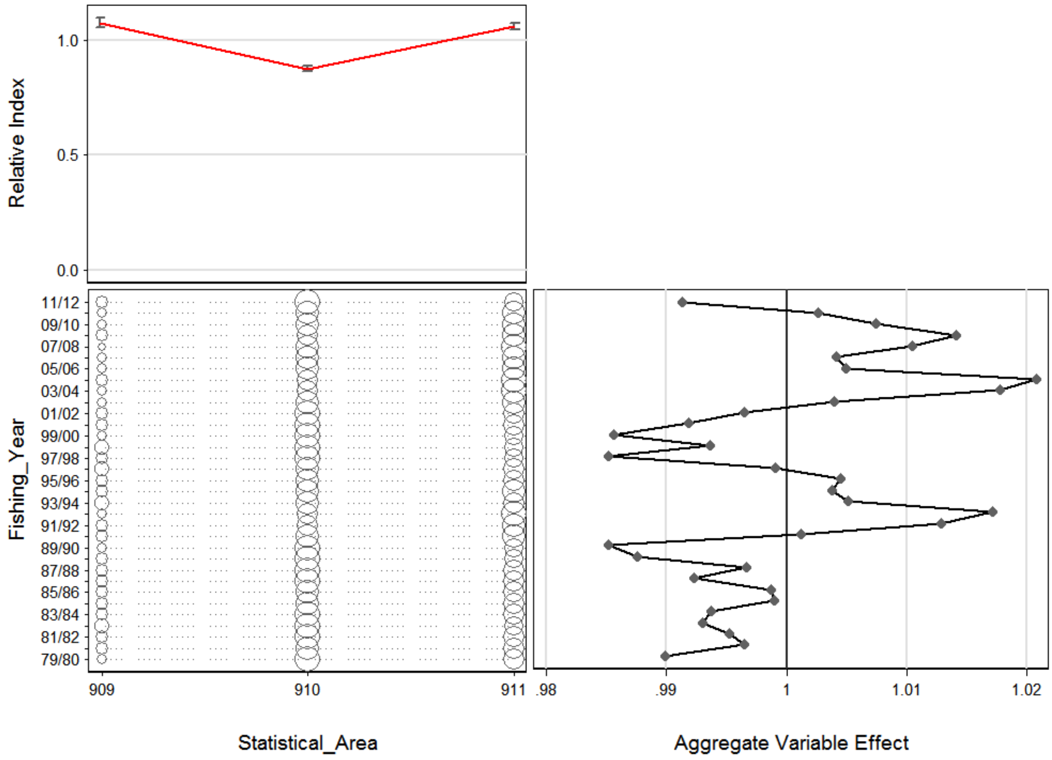

Figure E.3. The effect of the statistical area categorical variable in the offset year CRA 3 lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

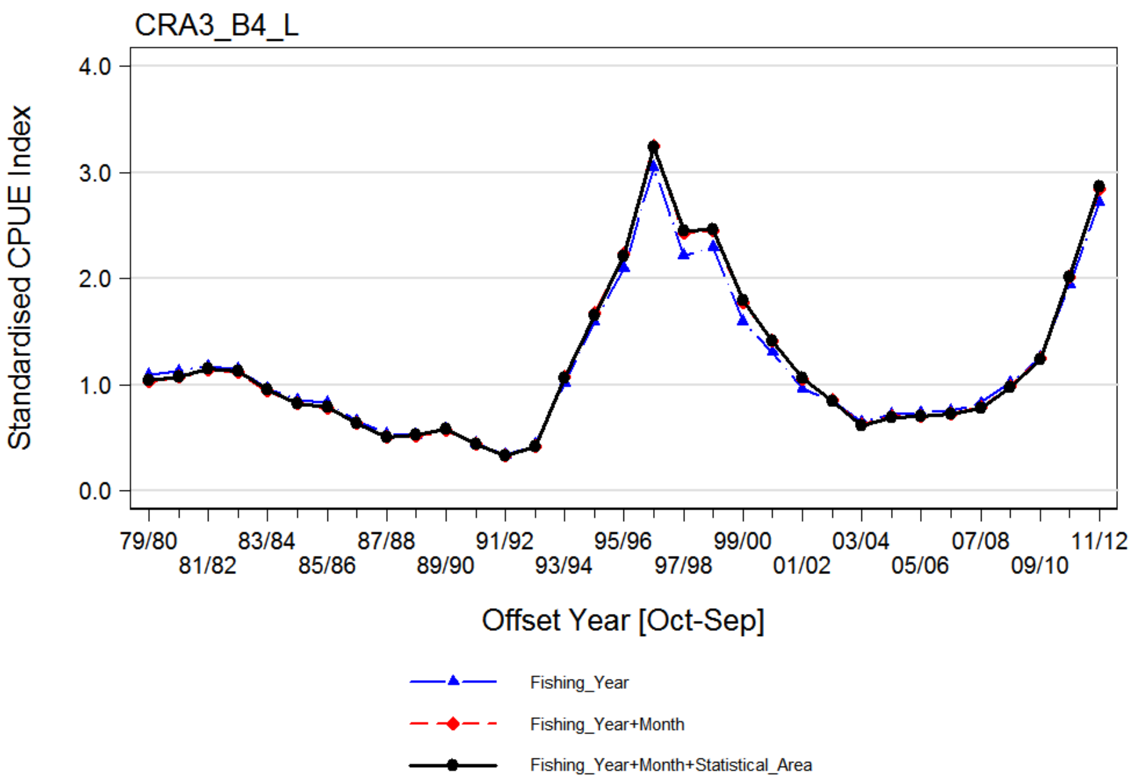

Figure E.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 3 lognormal regression model. The final model is shown by a thick heavy line.

F. DIAGNOSTICS FOR CRA 4 OFFSET YEAR (1 OCTOBER–30 SEPTEMBER) STANDARDISED CPUE ANALYSIS

The data set for this analysis was prepared using the B4 catch correction algorithm scaled to the L destination code.

Table F.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 4 CPUE time series. '–': no data for indicated cell.

12.

	CRA 4 Statistical Area					
Offset year	912	913	914	915	934	Total
1979–80	237	193	238	157	2	827
1980–81	258	162	238	165	7	830
1981–82	268	142	239	161	2	812
1982–83	256	182	278	182	5	903
1983–84	236	202	294	174	8	914
1984–85	230	173	283	162	6	854
1985–86	235	164	289	164	8	860
1986–87	225	183	277	138	6	829
1987–88	215	165	287	133	5	805
1988–89	204	185	275	113	2	779
1989–90	218	197	283	125	8	831
1990–91	232	201	297	126	6	862
1991–92	267	216	270	113	7	873
1992–93	282	221	258	119	14	894
1993–94	195	205	250	111	21	782
1994–95	135	170	224	85	24	638
1995–96	131	120	192	84	5	532
1996–97	114	67	165	54	–	400
1997–98	110	49	157	56	–	372
1998–99	112	67	157	66	4	406
1999–00	129	48	122	56	13	368
2000–01	123	76	131	71	15	416
2001–02	119	106	140	62	4	431
2002–03	102	107	158	65	–	432
2003–04	107	104	161	72	5	449
2004–05	113	100	161	65	9	448
2005–06	86	97	189	85	13	470
2006–07	93	95	196	96	27	507
2007–08	85	81	151	75	17	409
2008–09	76	77	107	51	5	316
2009–10	94	69	111	79	5	358
2010–11	91	82	155	72	5	405
2011–12	70	52	135	46	6	309

Table F.2. Total deviance (R^2) explained by each variable in the CRA 4 standardised offset year CPUE analysis.

13. Variable	14. 1	15. 2	16. 3
Offset Year	0.1673		
Month	0.0486	0.2386	
Statistical Area	0.0146	0.1856	0.2562
Additional deviance explained	0.0000	0.0713	0.0176

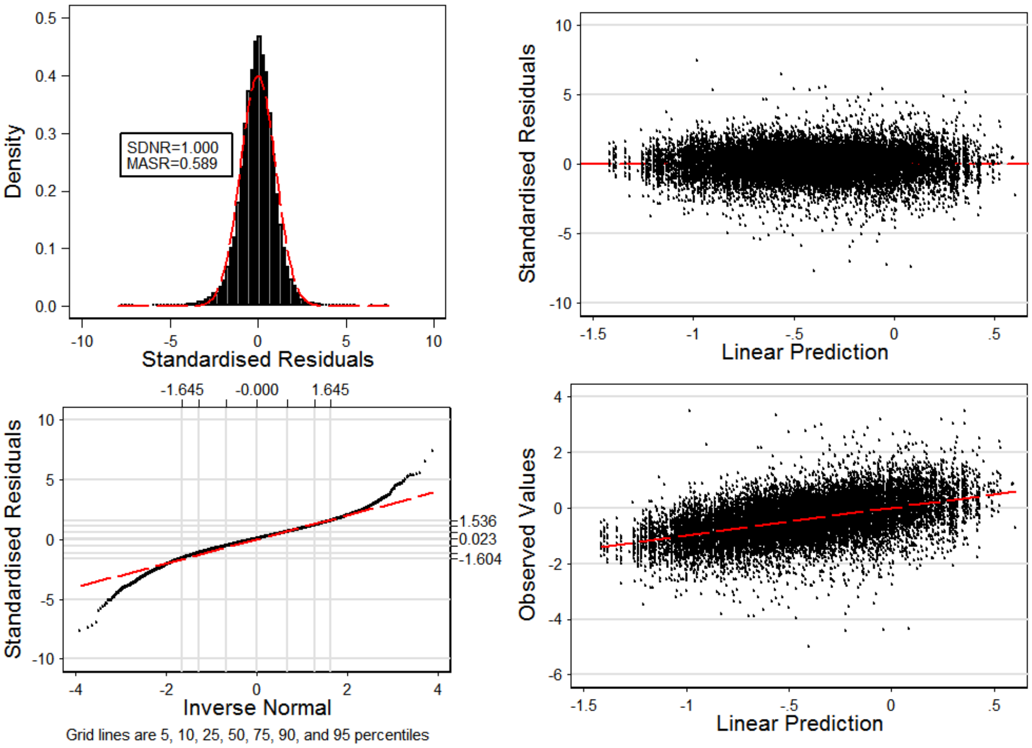

Figure F.1. Standardised residual plots for the CRA 4 standardised offset year CPUE analysis.

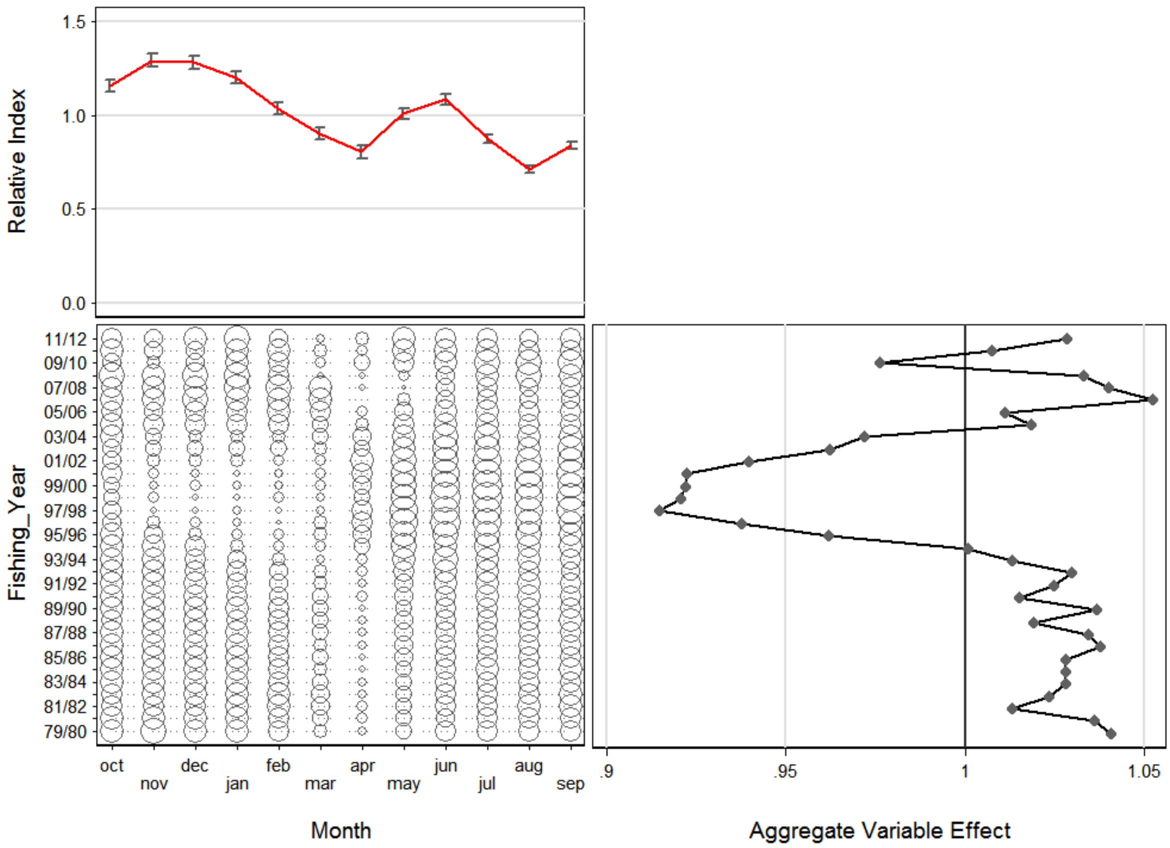

Figure F.2. The effect of the month categorical variable in the offset year CRA 4 lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

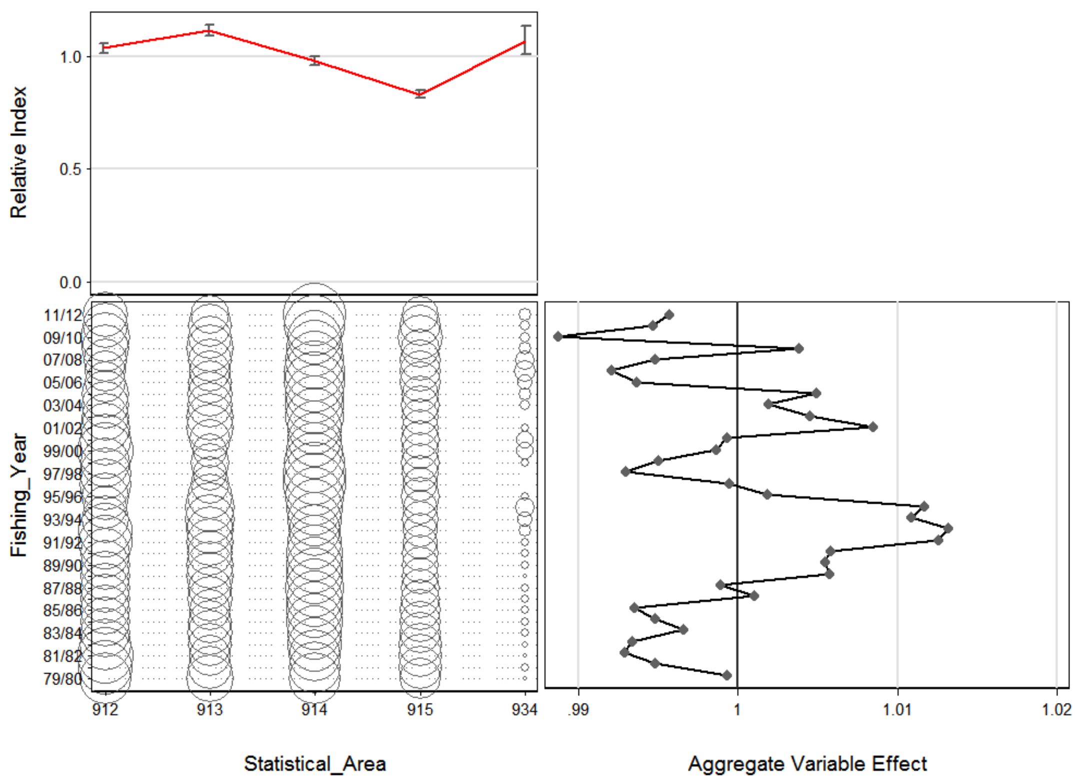

Figure F.3. The effect of the statistical area categorical variable in the offset year CRA 4 lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

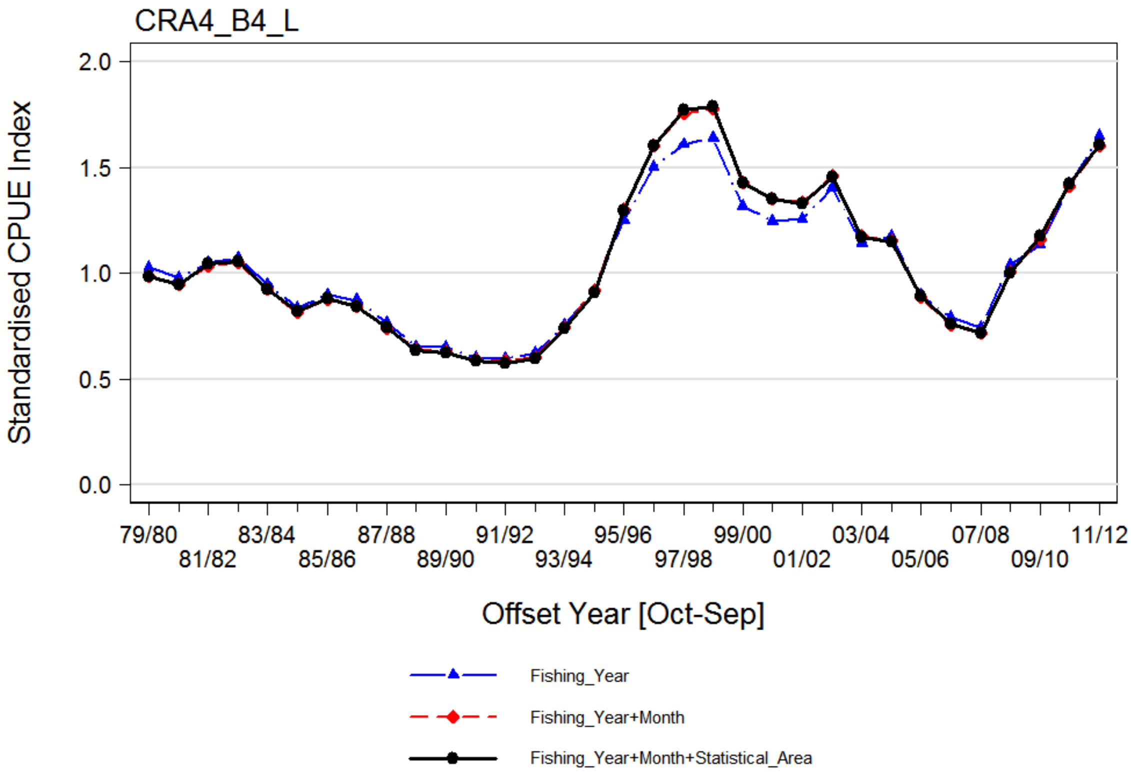

Figure F.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 4 lognormal regression model. The final model is shown by a thick heavy line.

G. DIAGNOSTICS FOR CRA 5 OFFSET YEAR (1 OCTOBER–30 SEPTEMBER) STANDARDISED CPUE ANALYSIS

The data set for this analysis was prepared using the B4 catch correction algorithm scaled to the L destination code.

Table G.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 5 CPUE time series. '–': no data for indicated cell.

17.

	CRA 5 Statistical Area						
Offset year	916	917	918	919	932	933	Total
1979–80	131	578	93	11	9	83	905
1980–81	115	422	75	2	3	89	706
1981–82	108	502	83	9	13	97	812
1982–83	99	506	83	21	4	122	835
1983–84	93	501	89	14	4	129	830
1984–85	98	470	78	15	11	123	795
1985–86	91	502	81	22	13	108	817
1986–87	96	457	74	16	17	95	755
1987–88	73	453	64	15	9	81	695
1988–89	52	365	63	9	5	65	559
1989–90	97	356	72	–	6	57	588
1990–91	99	392	91	1	7	98	688
1991–92	109	403	114	1	3	101	731
1992–93	101	367	91	2	1	107	669
1993–94	78	302	88	–	3	89	560
1994–95	78	268	61	–	3	79	489
1995–96	69	260	60	2	7	98	496
1996–97	45	203	44	2	8	82	384
1997–98	41	172	46	–	8	67	334
1998–99	35	166	43	–	8	61	313
1999–00	41	146	33	1	–	54	275
2000–01	51	120	16	–	–	42	229
2001–02	43	89	9	–	1	40	182
2002–03	62	91	7	–	–	52	212
2003–04	61	87	5	–	1	49	203
2004–05	61	119	5	–	2	47	234
2005–06	58	109	9	–	–	51	227
2006–07	49	102	2	–	1	48	202
2007–08	42	103	17	1	5	50	218
2008–09	36	79	10	–	–	47	172
2009–10	40	82	5	–	1	48	176
2010–11	28	63	10	–	–	38	139
2011–12	32	73	9	–	–	47	161

Table G.2. Total deviance (R^2) explained by each variable in the CRA 5 standardised offset year CPUE analysis.

18. Variable	19. 1	20. 2	21. 3
Offset Year	0.2814		
Month	0.0253	0.3292	
Statistical Area	0.0268	0.3047	0.3523
Additional deviance explained	0.0000	0.0478	0.0231

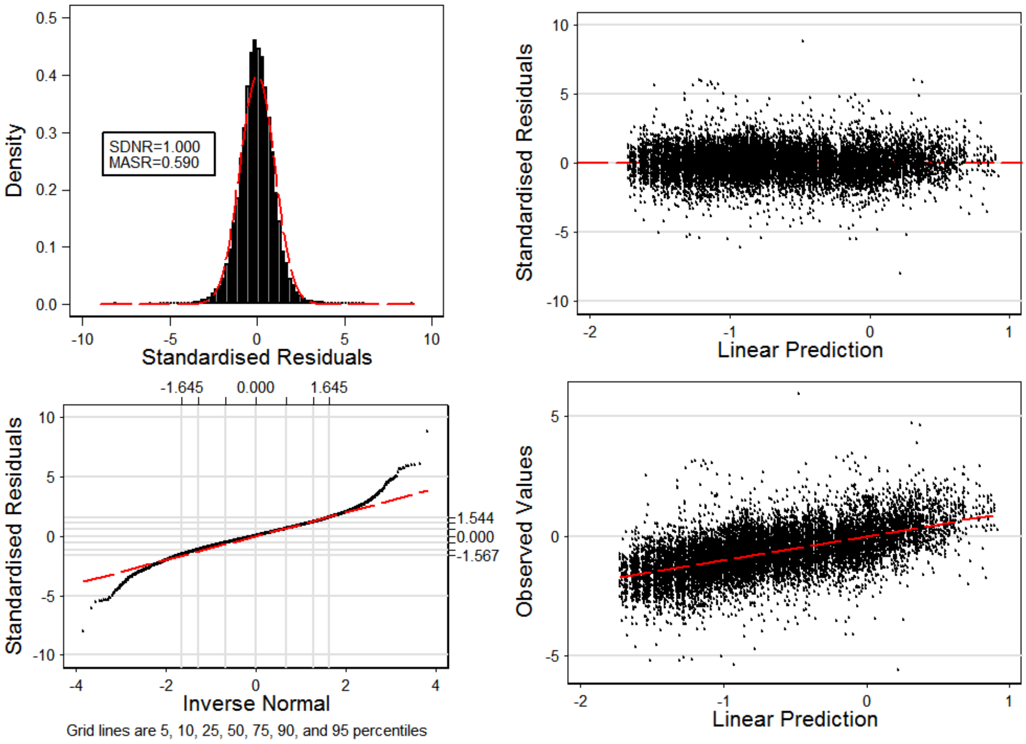

Figure G.1. Standardised residual plots for the CRA 5 standardised offset year CPUE analysis.

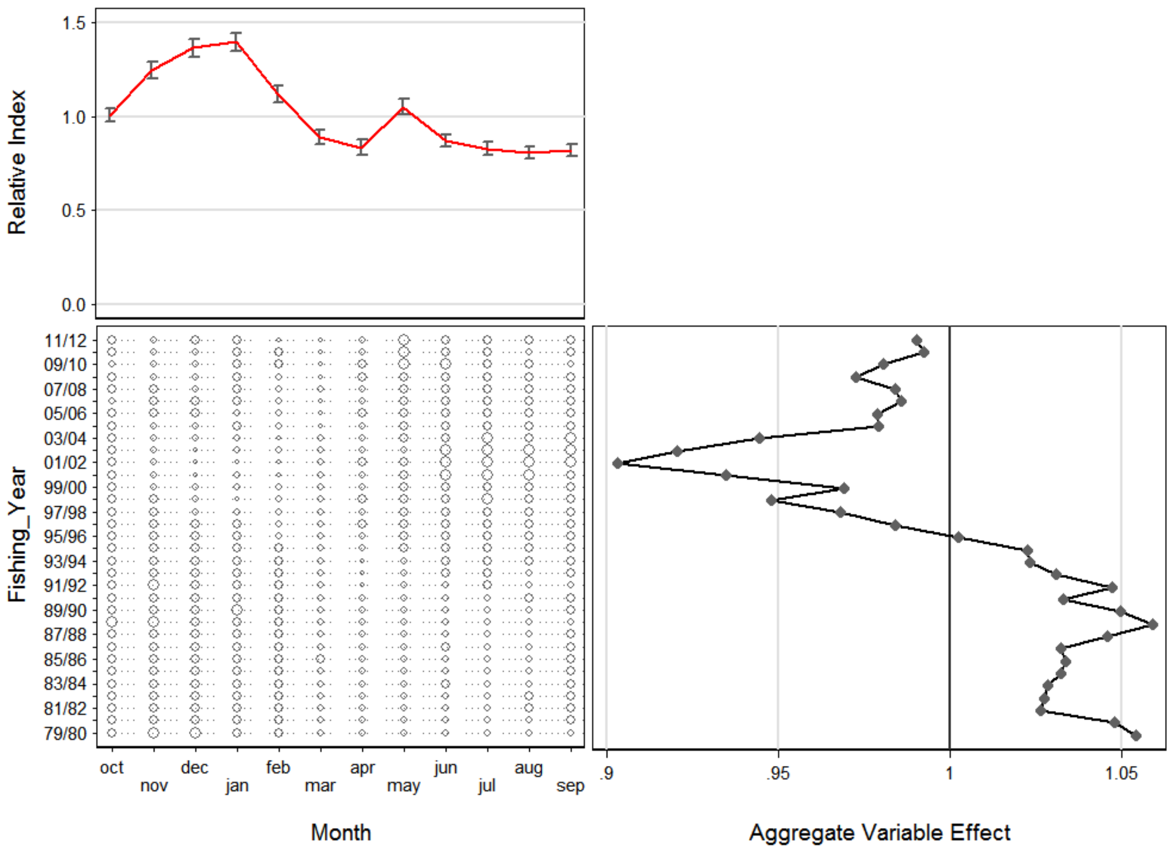

Figure G.2. The effect of the month categorical variable in the offset year CRA 5 lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

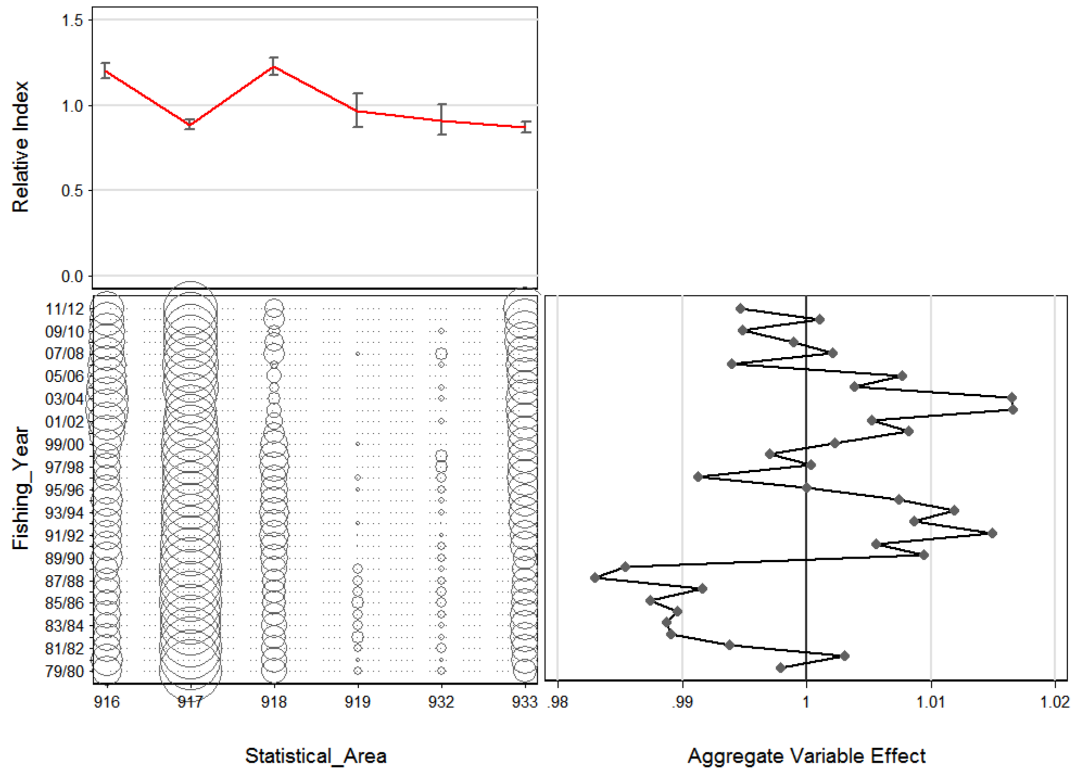

Figure G.3. The effect of the statistical area categorical variable in the offset year CRA 5 lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

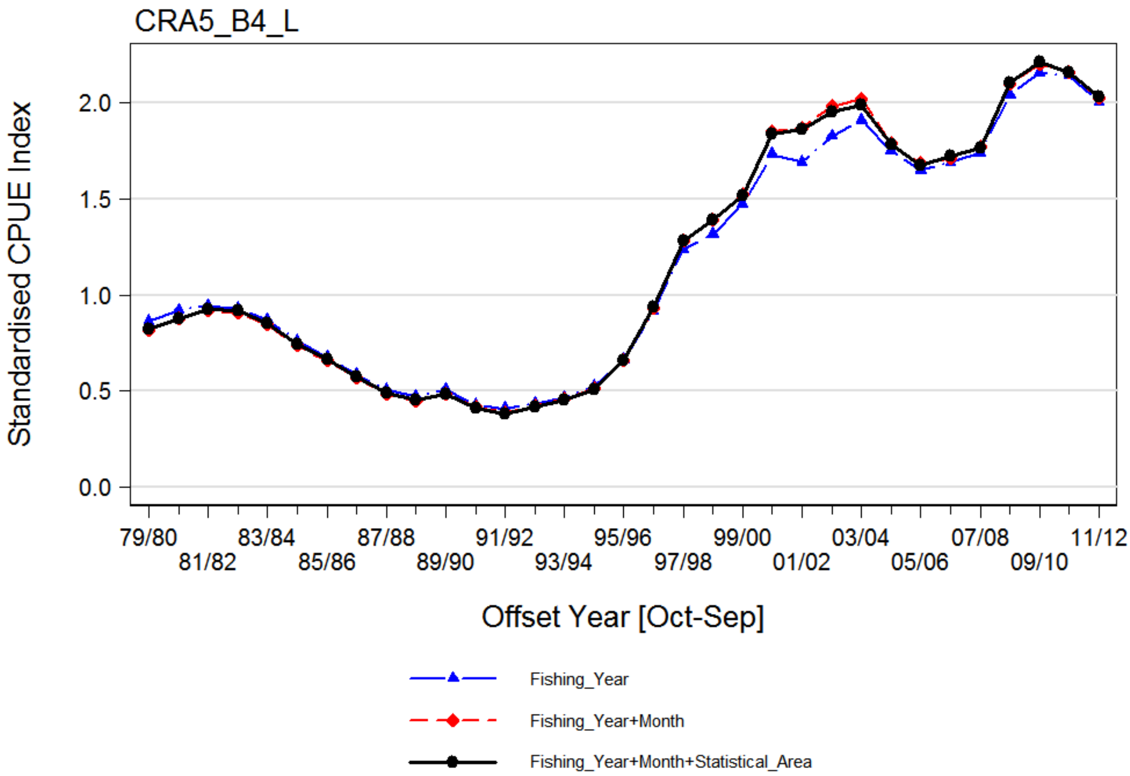

Figure G.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 5 lognormal regression model. The final model is shown by a thick heavy line.

H. DIAGNOSTICS FOR CRA 7 OFFSET YEAR (1 OCTOBER–30 SEPTEMBER) STANDARDISED CPUE ANALYSIS

The data set for this analysis was prepared using the F2 catch correction algorithm scaled to the combined LFX destination codes.

Table H.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 7 CPUE time series.

22.

	CRA 7 Statistical Area		
Offset year	920	921	Total
1979–80	405	213	618
1980–81	402	196	598
1981–82	330	157	487
1982–83	276	145	421
1983–84	299	142	441
1984–85	304	132	436
1985–86	299	131	430
1986–87	263	112	375
1987–88	229	112	341
1988–89	184	62	246
1989–90	253	52	305
1990–91	242	81	323
1991–92	135	28	163
1992–93	205	41	246
1993–94	135	33	168
1994–95	144	44	188
1995–96	117	23	140
1996–97	111	31	142
1997–98	92	41	133
1998–99	89	24	113
1999–00	97	35	132
2000–01	88	45	133
2001–02	105	28	133
2002–03	80	14	94
2003–04	64	16	80
2004–05	34	18	52
2005–06	34	25	59
2006–07	50	22	72
2007–08	33	25	58
2008–09	44	29	73
2009–10	57	35	92
2010–11	52	35	87
2011–12	37	22	59

Table H.2. Total deviance (R^2) explained by each variable in the CRA 7 standardised offset year CPUE analysis.

23. Variable	24. 1	25. 2	26. 3
Offset year	0.2416		
Statistical Area	0.0625	0.2871	
Month	0.0054	0.2515	0.2960
Additional deviance explained	0.0000	0.0455	0.0089

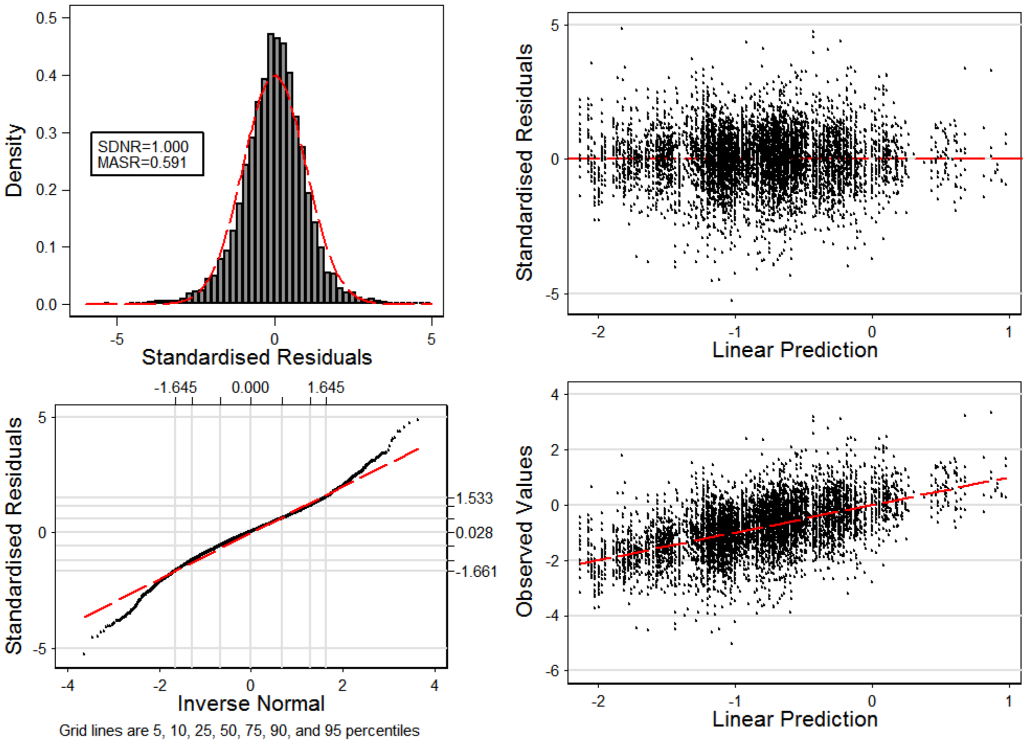

Figure H.1. Standardised residual plots for the CRA 7 standardised offset year CPUE analysis.

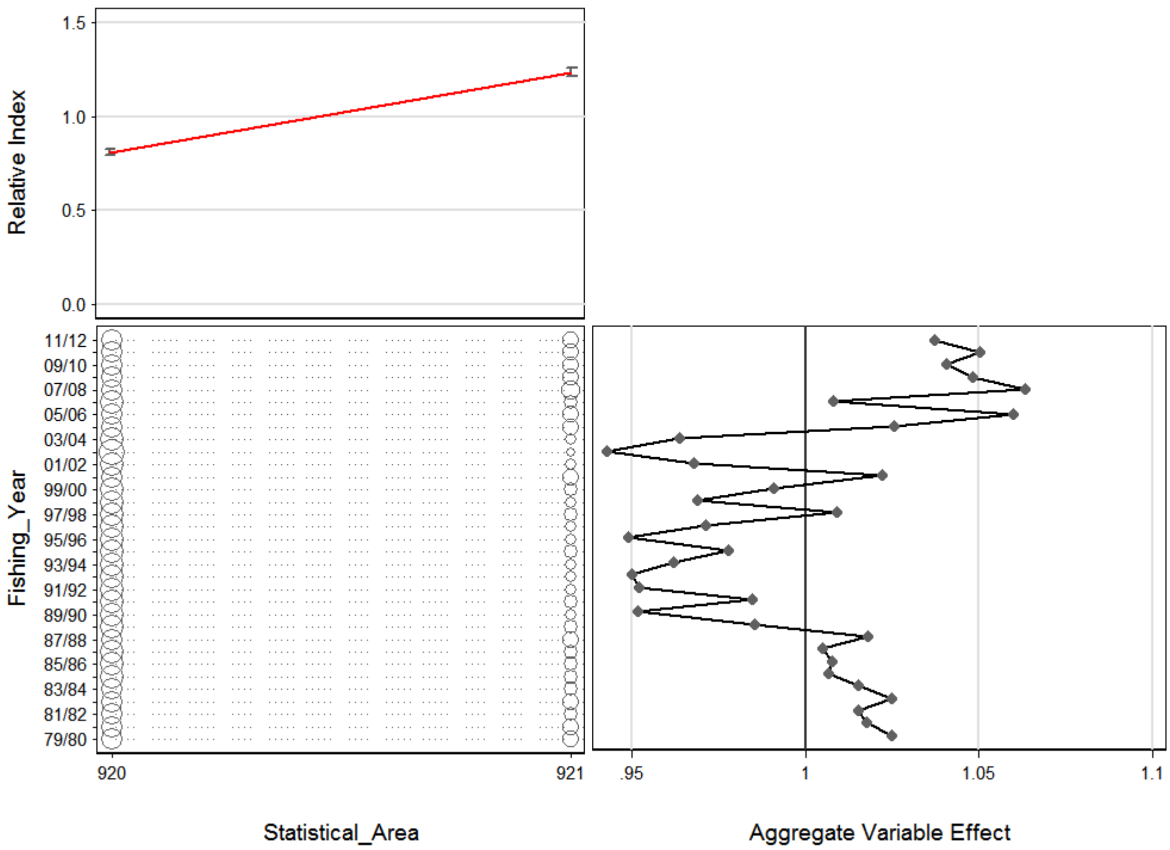

Figure H.2. The effect of the statistical area categorical variable in the offset year CRA 7 lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

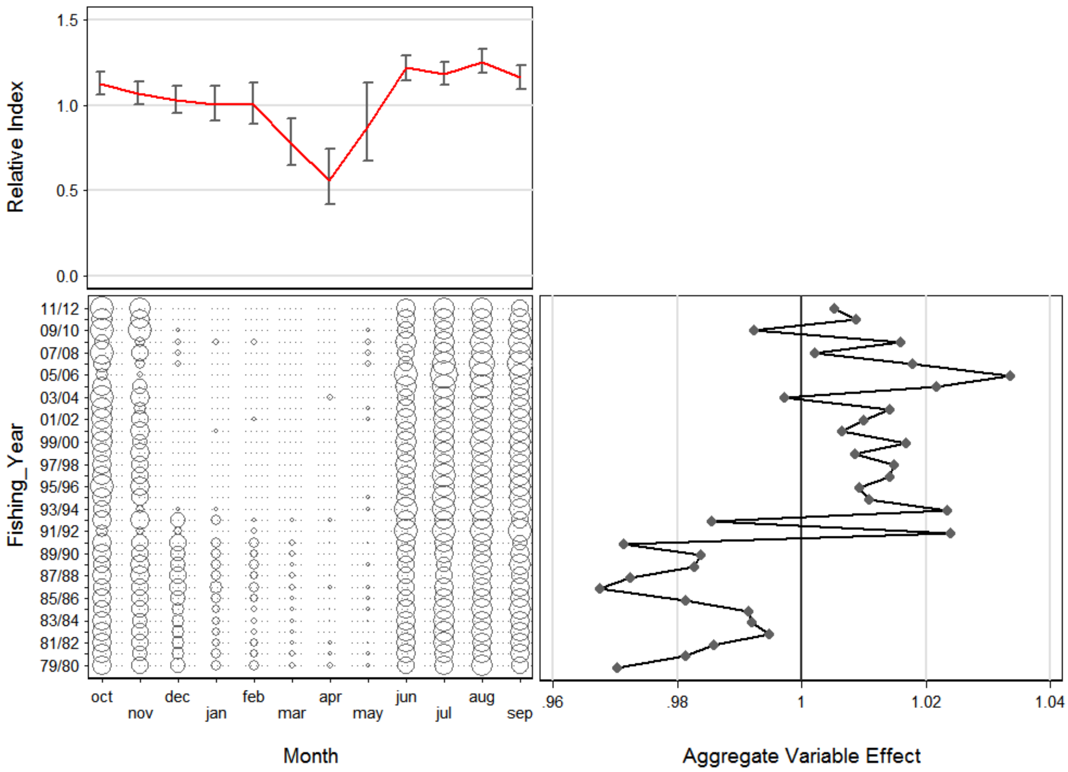

Figure H.3. The effect of the month categorical variable in the offset year CRA 7 lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

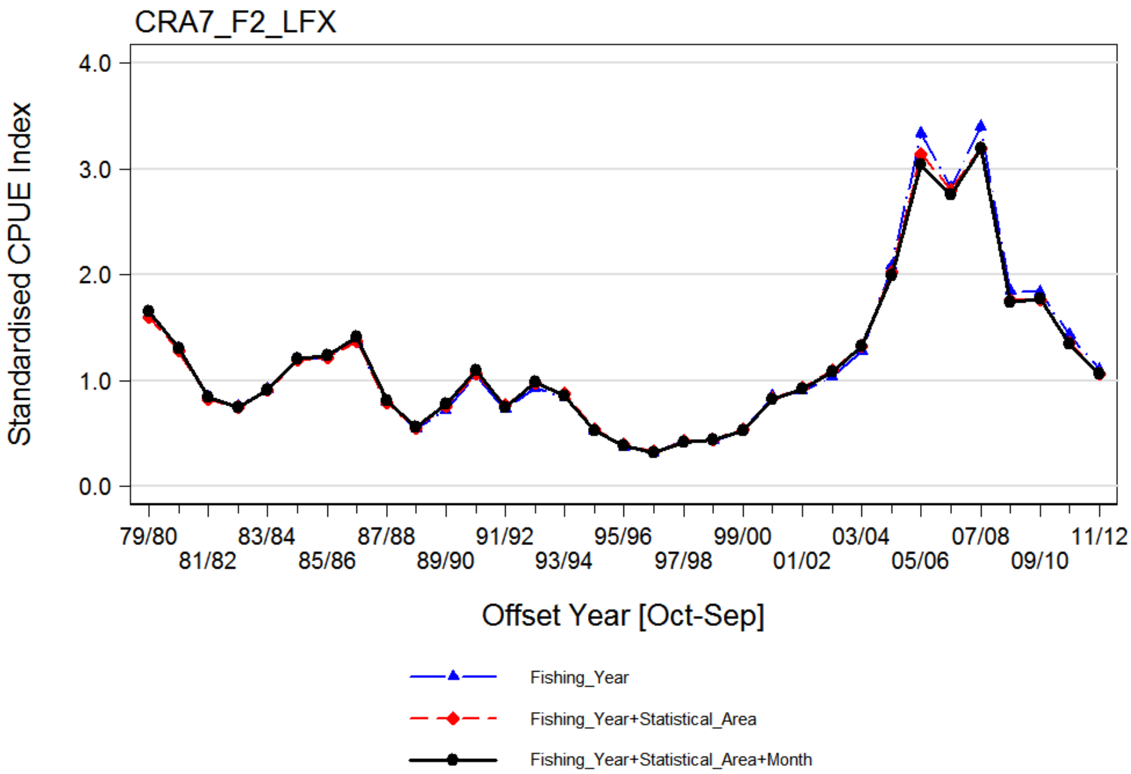

Figure H.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 7 lognormal regression model. The final model is shown by a thick heavy line.

I. DIAGNOSTICS FOR CRA 8 OFFSET YEAR (1 OCTOBER–30 SEPTEMBER) STANDARDISED CPUE ANALYSIS

The data set for this analysis was prepared using the F2 catch correction algorithm scaled to the combined LFX destination codes.

Table I.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 8 CPUE time series. '–': no data for indicated cell.

27.

	CRA 8 Statistical Area							
Offset year	922	923	924	925	926	927	928	Total
1979–80	33	254	442	6	291	317	295	1,638
1980–81	42	222	422	9	293	234	247	1,469
1981–82	35	179	379	16	343	196	219	1,367
1982–83	40	170	338	15	381	281	217	1,442
1983–84	44	194	375	16	419	271	228	1,547
1984–85	19	175	334	22	405	347	249	1,551
1985–86	19	160	292	20	318	331	230	1,370
1986–87	30	173	307	5	329	262	215	1,321
1987–88	26	162	262	4	308	201	172	1,135
1988–89	20	133	210	14	231	142	117	867
1989–90	8	78	177	16	259	194	64	796
1990–91	21	81	194	21	295	194	130	936
1991–92	19	59	164	17	308	206	183	956
1992–93	15	68	160	21	309	203	216	992
1993–94	15	32	110	31	240	167	209	804
1994–95	8	44	98	48	197	172	176	743
1995–96	4	38	85	33	188	148	159	655
1996–97	7	47	84	22	203	156	206	725
1997–98	4	50	74	16	179	134	228	685
1998–99	–	50	77	17	168	122	187	621
1999–00	1	38	59	13	166	124	119	520
2000–01	–	19	53	9	159	110	93	443
2001–02	2	11	45	4	134	72	82	350
2002–03	3	10	38	4	141	58	75	329
2003–04	3	13	28	1	125	50	69	289
2004–05	3	24	28	4	113	43	62	277
2005–06	6	11	25	–	108	63	52	265
2006–07	6	8	33	2	109	54	51	263
2007–08	6	12	53	4	101	63	65	304
2008–09	4	8	42	–	77	52	81	264
2009–10	4	5	56	2	116	68	97	348
2010–11	1	1	56	1	139	54	81	333
2011–12	–	–	53	3	139	50	85	330

Table I.2. Total deviance (R^2) explained by each variable in the CRA 8 standardised offset year CPUE analysis.

28. Variable	29. 1	30. 2	31. 3
Offset Year	0.1987		
Month	0.0402	0.2575	
Statistical Area	0.0310	0.2293	0.2848
Additional deviance explained	0.0000	0.0589	0.0273

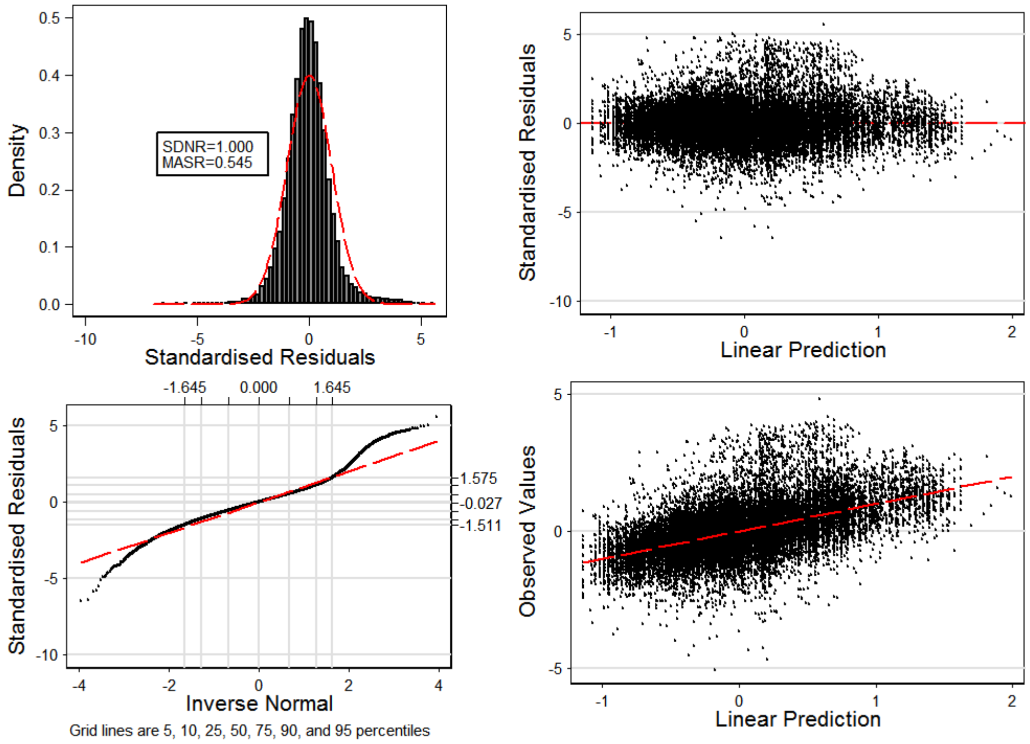

Figure I.1. Standardised residual plots for the CRA 8 standardised offset year CPUE analysis.

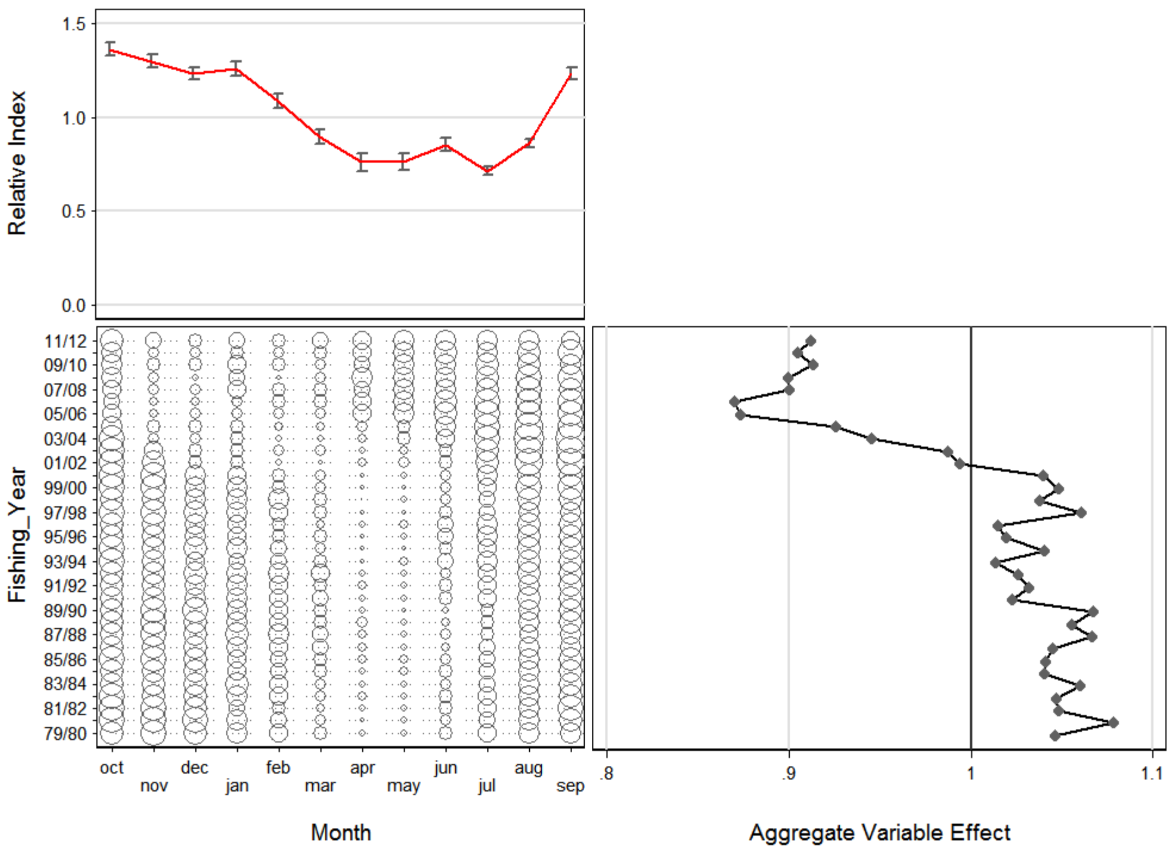

Figure I.2. The effect of the month categorical variable in the offset year CRA 8 lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

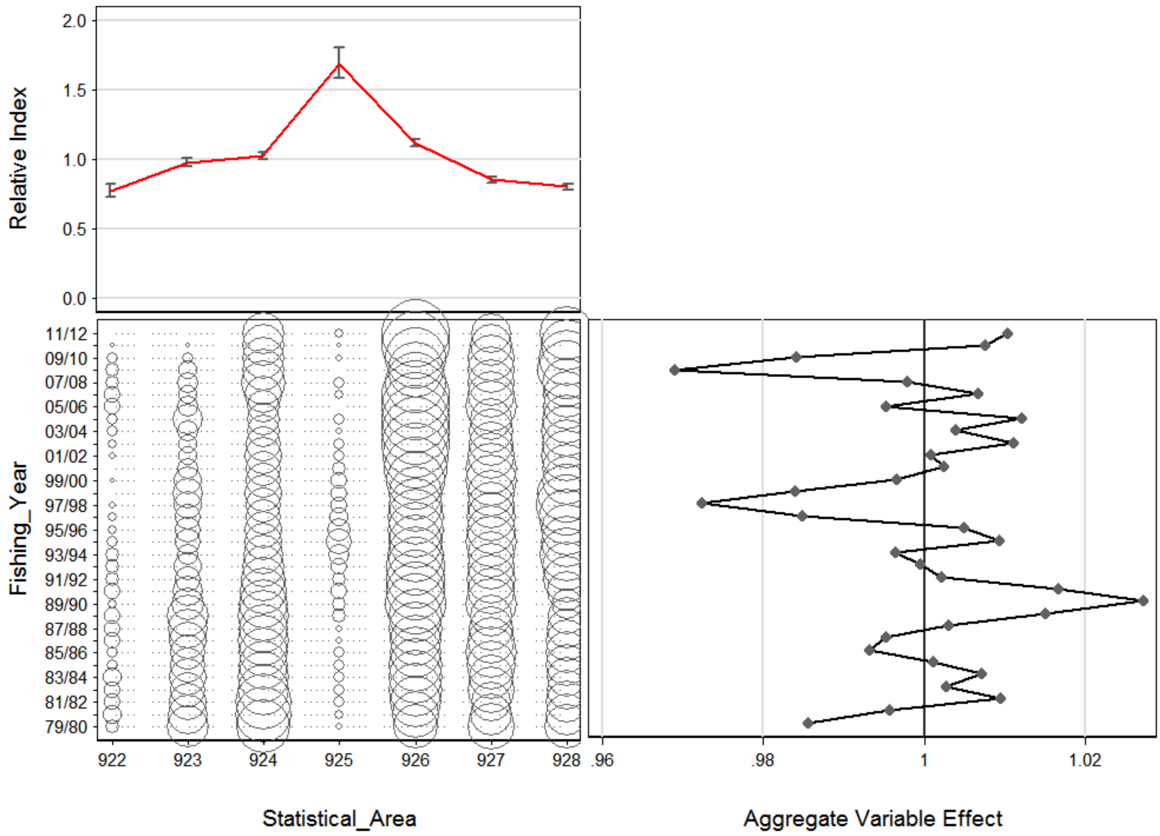

Figure I.3. The effect of the statistical area categorical variable in the offset year CRA 8 lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

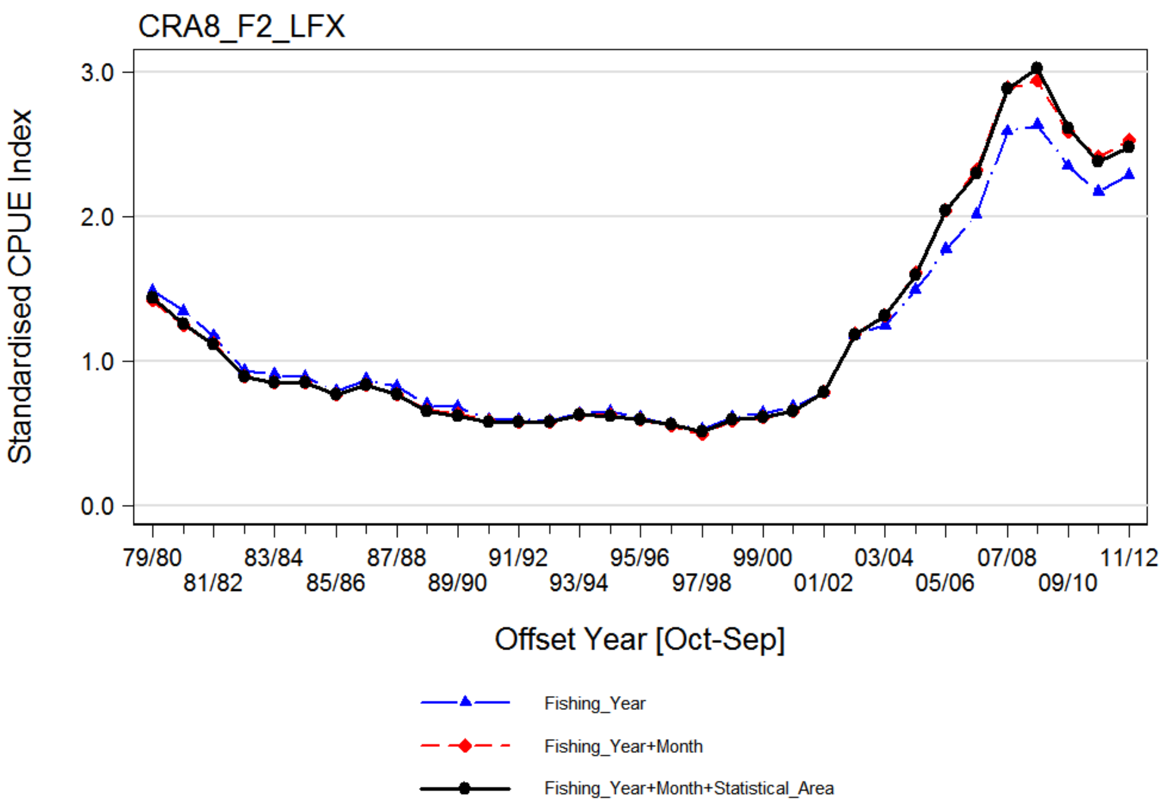

Figure I.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 8 lognormal regression model. The final model is shown by a thick heavy line.