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Rock lobster catch and effort data: summaries and CPUE standardisations, 1979–80 to 2016–17

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EXECUTIVE SUMMARY

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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 2016–17, 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") and which were used as input to management procedures (decision rules or MPs) that form the basis for TAC or TACC changes, are provided for CRA 1, CRA 2, CRA 3, CRA 4, CRA 5, CRA 7 and CRA 8.

This document presents information on the spatial distribution of landings and effort (potlifts) and the monthly distribution of landings for each fishing year in nine rock lobster QMAs. It also presents information on the number of participating vessels in each QMA by fishing year and statistical area. CPUE estimates by statistical area and fishing year are also presented for each QMA.

The standardisation procedure applied to each QMA did not usually result in much change relative to the arithmetic or the unstandardised annual indices of CPUE. However, there was a general tendency for the standardisation procedure to adjust the 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.

See Appendix A for definitions of the abbreviations used in this document.

1. INTRODUCTION

Commercial catch and effort data, collected through a compulsory programme administered and enforced by Fisheries New Zealand (formerly MPI and the Ministry of Fisheries), are an important source of information for stock assessments of rock lobster. They are used to provide indices 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 2016a) and the way in which standardised indices of vulnerable biomass are calculated from them (Maunder & Starr 1995, Starr 2012b, Starr 2017). Earlier versions of this report have been published by Starr & Bentley (2005) and Starr (2006, 2007, 2009a, 2009b, 2010, 2011, 2012a, 2013, 2014, 2015, 2016, 2017).

While the primary use of catch and effort data in stock assessments is to estimate 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 used to interpret changes in catch distribution among statistical areas and seasons within a QMA (see Figure 1). They can also provide information for monitoring the fishery. For example, the proportions of catch by month and statistical area are used as guidelines for the allocation of catch sampling effort.

Abundance indices generated from these data are used to assess and manage seven of the nine QMAs that support active commercial and non-commercial fisheries (CRA 1: Webber & Starr 2015, CRA 2: Starr et al. 2014, CRA 3: Haist et al. 2015, CRA 4: Breen et al. 2017, CRA 5: Starr & Webber 2016, CRA 7&8: Haist et al. 2016). These index series are also used as input to management procedures (MPs) that set TACC levels (Breen 2017). 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 2016–17 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 documents annual CPUE standardisations based on a 1 October–30 September year ("offset year") for CRA 1, CRA 2, CRA 3, CRA 4, CRA 5, CRA 7 and CRA 8 which are used as inputs to management (CRA 1: Webber & Starr 2015, CRA 2: Starr et al. 2014, CRA 3: Haist et al. 2015, CRA 4: Breen et al. 2017, CRA 5: Starr & Webber 2016, CRA 7&8: Haist et al. 2016, see also: Breen 2017) to set the TACC in the following fishing year. CRA 6 has never been formally assessed, nor has a management procedure been established. An MP was developed for CRA 9 in 2013 (Breen 2014) but was abandoned in 2016 because the underlying CPUE series was considered unreliable (MPI 2016b), given the large spatial extent of this QMA and the small number of participating fishers.

The standardised indices of CPUE are assumed to reflect changes in vulnerable biomass within stock assessments and management procedures (except the CPUE used for the CRA 8 MP, which is based on landed lobster only – see Section 2.3). 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 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 are not comparable across the entire series if regulation changes have altered the component of the stock that is vulnerable to commercial fishing. Such adjustments are made explicitly in the stock assessments to account for the effect of such regulation changes on the vulnerable biomass.

As indicated in the previous paragraph, the definition of the vulnerable biomass will change as a result of management actions taken and these changes need to be considered when interpreting the CPUE index series. For example, significant management changes were made to the CRA 3 fishery in 1993–94, including a change in the commercial size limit for males in the winter. The resulting CPUE indices will reflect these changes in the definition of the vulnerable biomass caused by this management initiative. Consequently, it is not possible to draw conclusions directly about the status of the stock based solely on the CPUE series presented in this report, primarily 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 using the information in the CPUE indices regarding 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 2017 were obtained from the

WAREHOU database (Fisheries New Zealand replog 11340). These data sources have been 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 (Fisheries New Zealand replog 11437), covering the period 1 April 2017 to 30 September 2017, was used to extend the offset-year CPUE analyses for an additional one-half year for use in management procedures. A third extract, covering the same 1 April 2017 to 30 September 2017 period (replog 11514) was obtained a month after receiving replog 11437 because some CRA 7 operators were concerned that key data had been omitted from the initial 6-month extract. Past management procedure evaluations (e.g.: Breen et al. 2008, Breen et al. 2009) found that adding an additional half year of data greatly improved the capacity of a 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 greater than “1” were excluded from this analysis. These error designations, including how they were defined and applied, were described by Bentley et al. (2005) and are summarised in Appendix B. There are seven error codes used in CRACE for the Fisheries New Zealand 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; Appendix B).

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. Data originating from vessels which had landed less than 1000 kg of CRA in a year (after combining the “L”, “F”, and “X” destination codes – Appendix A and Appendix C and final paragraph in Section 2.3) were dropped from the CRA 9 CPUE analyses. 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 lobster 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 considered 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 based on observer and logbook data and which were compiled at different levels of data amalgamation (individual potlifts, daily records and monthly records). He 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 used to proportionately correct the information from the bottom part of the form (which reports the landings). This is done to account for likely differences in estimation methodology between fishers across years, 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 no corresponding landings.

A procedure (known as "B4": described in Bentley et al. 2005 and in Appendix C.1) was developed in 2003 that identified vessel/month/statistical area strata with no landings and then 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 following months.

Consequently, a new procedure family was developed (known as "F": described in Appendix C.2) 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* [Eq. C.6]: the ratio of landed to estimated catch for single vessel in a fishing year) was calculated, using the sum of landings divided by the estimated catches from the entire fishing year for each vessel in the fishery. The *vcf* was then applied to every estimated catch reported by the vessel in the year, on the assumption that the *vcf* was an estimate of the estimation process for that vessel in that year. This procedure eliminated the "holding pot problem" because it was based on estimated catches and assumed 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 suggested data collection or estimation problems. Initially, three variants of the "F" algorithm were investigated (F1, F2 and F3: see Appendix C.2), 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, along with supporting analyses and comparisons with the "B4" algorithm are presented in Appendix B of Starr (2013).

Most landings are recorded with the destination code "L" (landed to a licensed fish receiver), the route required for all catch that is sold commercially. However, as abundances 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 based on each vessel's annual *vcf*. 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 appendix B in Starr 2013 and Appendix C.2). 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 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 indicated that the F2 procedure was not substantially different from the B4 procedure in QMAs where holding pot activity was less prevalent. The RLFAWG initially agreed to continue with the B4 algorithm for CRA 5 because there was a long period in the 1990s, possibly extending into the early 2000s, when non-legal discards were included in the estimated catch estimates. However, when CRA 5 was re-evaluated in 2015 (Starr & Webber 2016), it was noted that the difference in the CPUE trends calculated by the B4 and F2 algorithms during the 1990s and early 2000s was not great, but that the trends differed in years after 2010. Consequently, the RLFAWG agreed in 2015 to bring CRA 5 into alignment with the other CRA QMAs with the revised MP evaluated using the F2_LFX algorithm. Similarly for CRA 4, the MP developed in 2012 was based on B4_L and the replacement MP evaluated in 2016 was based on the F2_LFX algorithm.

The MPs for the remaining QMAs are presented using the CPUE series that were evaluated at the time that the MP was adopted.

An additional data preparation step was required for the CRA 9 CPUE analyses. Preliminary inspection of the data indicated that there were a number of vessels that reported small amounts of Destination F (Section 111: for personal use) landings without associated commercial landings. Furthermore, the values obtained for kg/potlift from these records appeared to be inconsistent with the other commercial data from the same stratum, leading to the conclusion that these minor catches and associated effort were not being reported accurately. This problem was resolved by dropping all vessels which landed less than 1 t of CRA 9 lobster annually before proceeding with the F2 truncation step (Appendix C.2: Step 2B). A special audit of the CRA 9 catch and effort data was conducted in late 2015 (Webber: unpublished report). This analysis found that the CRA 9 CPUE trend was extremely sensitive to the criteria used for including/excluding vessels because of the much smaller size of the CRA 9 data set. It also discovered that there was inconsistent reporting of Destination Code “X” in this QMA. Consequently the CRA 9 results reported here should be interpreted with caution and the MP based on these data has been abandoned.

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 (Appendix C.1), not the “F2” algorithm (Appendix C.2), because the latter algorithm drops vessels that did not meet the *vcf* cut-off criteria and will therefore give a biased 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 a QMA 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 QMAs, 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 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 C.2).

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 assumes the same log-normal error distribution 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 before adding 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 $I_i = C_i / P_i$, C_i is the summed scaled "LFX" catch prepared using the F2 algorithm (Appendix C.2), 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. As well, including a vessel effect into the CPUE standardisations will most likely lead to the creation of separate series, given the lack of correspondence in vessel codes between the FSU and CELR data sets (see Section 2.4) and the likely lack of continuity in skippers from the same vessel between 1979–80 to the present.

It became apparent while conducting the 2017 CRA 2 stock assessment that the estimated CPUE series was not proportional to stock abundance, with fits to the data improving by estimating an additional parameter which relaxed the assumption that CPUE was strictly proportional to vulnerable biomass. But this additional parameter became unnecessary when a CPUE series, which included a *vessel* explanatory variable, was used instead of the standardisation model which omitted this variable. Examination of the standardisation model diagnostics showed that the apparent efficiency improvement occurred because vessels with lower catch rates were leaving the fishery while those with higher catch rates remained, leading to an observed increase in CPUE that was independent of a biomass increase (see Appendix D in Starr & Webber, in prep.). The lack of continuity in vessel codes between the FSU and Warehou databases was overcome by keeping the two CPUE series separate and estimating a *q*-scaling parameter for each series. While the FSU standardisation model did not include a *vessel* variable, the Warehou model was constrained to use vessels with at least five years of experience in the fishery, to allow for sufficient time series observations to estimate a vessel coefficient that was not unduly confounded with the time series coefficient. Two other experience levels were investigated (three and ten years) without much affecting the resulting time series sequence: the primary difference among the estimated series being in the use or non-use of a *vessel* explanatory variable (see Appendices C and D in Starr & Webber, in prep.).

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 unstandardised indices and the standardised year coefficients were multiplied by the geometric mean of the corresponding arithmetic CPUE index (Eq. 1) so that all three sets of indices were scaled to the same mean. It is important to note that these index series (arithmetic, unstandardised and standardised) are still relative indices, even though they are expressed in terms of kg/potlift.

Annual CPUE standardisations based on the offset year definition (1 October to 30 September) were prepared for CRA 1, CRA 2, 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 2017 (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 D (CRA 1, F2_LFX), Appendix E (CRA 2, F2_LFX-no vessel explanatory variable), Appendix F (CRA 2, F2_LFX-with vessel explanatory variable), (CRA 3, F2_LFX), Appendix G (CRA 3, F2_LFX), Appendix H (CRA 4, F2_LFX), Appendix I (CRA 5, F2_LFX), Appendix J (CRA 7, F2_LFX) and Appendix K (CRA 8, F2_LF).

2.6 Annual QMA catch and potlift totals by statistical area

Scaled annual catch totals (Eq. 4) 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. 4 $$\hat{Q}_{a,y} = Q_y \frac{\sum_{i \in k_{a,y}} L_{i,y}}{\sum_{i=1}^{n_y} L_{i,y}}$$

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. 5:

Eq. 5 $$\hat{P}_y = \sum_{i=1}^{n_y} P_{i,y} \frac{Q_y}{\sum_{i=1}^{n_y} L_{i,y}} \quad ; \quad \hat{P}_{a,y} = \sum_{i \in k_{a,y}} P_{i,y} \frac{Q_y}{\sum_{i=1}^{n_y} L_{i,y}}$$

where $P_{i,y}$ and $k_{a,y}$ are as defined for Eq. 1; Q_y and $L_{i,y}$ are as defined for Eq. 4.

3. RESULTS

3.1 Landed catch and TACC

After three successive years above 2 800 t, total NZ landings of rock lobster in 2016–17 dropped below 2 800 t to 2 747 t, which was 80 t, 81 t and 94 t less than the 2015–16, 2014–15 and the 2013–14 total landings respectively (Table 1). Commercial landings have been greater than 2 700 t since 2010–11, a seven-year period of sustained high catch. Changes in QMA totals between 2015–16 and 2016–17 included an increase of 7 t in CRA 6 and drops of 33 t and 55 t occurring in CRA 2 and CRA 4. CRA 2 voluntarily shelved 50 t of quota and the CRA 4 TACC was dropped by 70 t through the operation of a MP adopted from the 2016 stock assessment. Smaller changes of ±1 t occurred in CRA 1, CRA 3, CRA 5, CRA 7 and CRA 8 (Table 1).

The operation of MPs for the 2017–18 fishing year resulted in TACC decreases for CRA 3 and CRA 4 and an increase in CRA 7. Three of the remaining four QMAs under this management regime (CRA 1, CRA 5 and CRA 8) did not change TACCs (Table 1). The TAC and TACC for CRA 2 is presently under review following a new stock assessment in 2017 (Webber et al. 2018).

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 when averaged over all years, with all but two (CRA 6 and CRA 8) of the QMAs averaging greater than 90% of the QMR/MHR landings (Table 2A). Overall, since 1990–91, CELR landings have averaged 93% of the QMR/MHR catches after processing through the B4 procedure. In the most recent five years, this average has been 89%, with all but one of the QMAs recording shortfalls in landings relative to MHR catches in 2016–17 from –5% (for CRA 3) to –14% (for CRA 6). CRA 9 shows a 3% overage in 2016–17. The shortfalls were most likely due to the B4 data grooming procedure which excludes some landings. It is not known why there is an overage in CRA 9. The catch included in the F2_LFX procedure (Table 2B) is more difficult to interpret, given the inclusion of the X and F destination codes, which are not reported to the QMR/MHR systems and the dropping of vessels with a *vcf* less than 0.8 or greater than 1.2. Table 2B reports the ratio of the F2_LFX catch included in the CPUE calculations relative to the total (F0_LFX) catch in the data set, which does not truncate any vessels. This ratio is a measure of the level of catch dropped when truncating the data set to only include vessels with *vcf* values between 0.8 and 1.2. This proportion varies between -2% (CRA 2) and –41% (CRA 9) in 2016–17 and between –7% (CRA 6) and –28% (CRA 5) when averaged over the entire data set.

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 even greater in all QMAs during the 1980s before entry of lobsters into the QMS (there was a 64% drop in vessel numbers between the first five years and the most recent five years). 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 1990–91 to 1992–93 (the first three years of the lobster QMS) to 2014–15 to 2016–17 (the most recent three years) (see Table 3).

3.2 CRA 1

The number of vessels reporting landings from CRA 1 has varied between 13 and 14 since 2006–07 (Table 4). Fewer than 20 vessels have 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 (Three Kings Islands) increased during the late 1990s while the proportion of landings from Areas 902 and 903 dropped (Table 5). This pattern changed in 2003–04, when 47% 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 between 2005–06 and 2012–13 (Table 5). The two east coast statistical areas (903 and 904) generally account for less than 20% of the landings while Area 939 (west coast) is more variable but often greater than 20% of the landings. Potlifts tended to be more evenly distributed across the statistical areas, reflecting the high CPUE in Areas 901 and 902 while Area 904 has a low CPUE and consequently carries proportionately more potlifts than catch (Table 6).

Cumulative monthly landings by fishing year were relatively stable in the early 1980s, with most landings taken from late winter to early summer (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 from 1995–96 to 2010–11, up from 25–45% before that fishing year. However, the July–October percentage of landings dropped to 58% in 2011–12, to the mid-40% in 2012–13 and 2013–14, then to less than 40% in 2014–15 but then rose to 48% and 46% in 2015–16 and 2016–17 respectively (Table 7). There was also a noticeable shift in the accumulation of landings to later in the year starting in 2011–12 and becoming more pronounced in 2012–13 and 2013–14 (Figure 2). The distribution of landings between the AW and SS seasons in 2016–17 was 47%–53% (Table 8). This near equal split of catch between the two seasons continues a trend that has been observed since 2010–11.

Arithmetic CPUE trajectories have been variable between areas, although there has been a generally increasing trend in CPUE in Area 901, peaking in 2009–10 and then declining to 2.1 kg/potlift in 2015–16 before rising to 2.4 kg/potlift 2016–17 (the highest among the statistical areas). Area 939 increased steadily from 2005–06, peaked in 2012–13 and has since dropped to around 2.0 kg/potlift (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 above 1.0 kg/potlift (Table 9). CPUE in Area 904 (East Northland) has consistently been near to or below 0.5 kg/potlift since the late 1980s. These values are similar to those observed in CRA 2 (see Section 3.3 below). Surprisingly, Area 903 CPUE rose above 1.0 kg/potlift starting in 2012–13 and was the statistical area with the highest CPUE in 2014–15 (at 2.4 kg/potlift) but has dropped to just below 1.0 kg/potlift in 2015–16 and 2016–17. Standardised (Eq. 3) CRA 1 CPUE had a broad peak from 1980–81 to 1983–84 followed by a long steady decline to 1992–93 when catch rates were around 0.6 kg/potlift (Table 10, Figure 4). Catch rates increased after that, rising above 1.0 kg/potlift in 1995–96. Catch rates increased steadily from that level to above 1.7 kg/potlift in 2007–08, but have since declined to 1.20 in 2016–17 (Table 10). All three CPUE series show similar trends, although the standardised series currently sits below the geometric series after lying above it in the mid-1990s (Figure 4).

3.3 CRA 2

The number of vessels reporting at least 1 tonne of landings from CRA 2 has fluctuated between 29 and 39 since the late 1990s, except for 2012–13 which increased by 5 vessels to 40 relative to 2011–12 (Table 11). The number of vessels dropped to 36 in 2013–14, to 33 in 2014–15 and 2015–16 and to below 30 vessels for the first time in 2016–17. This compares to the 70–90 vessels which reported from this fishery through most of the 1980s. Area 906 (western Bay of Plenty) has been the predominant statistical area in terms of landings in most years, accounting for about one-third of the annual landings since 2002–03 (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 been near 50% since 2004–05, 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 mid-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 87–89% 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 to March, beginning in 2002–03 and exceeding 50% in 2011–12, dropping to below 50% from 2012–13 to 2014–15, returning to near 60% in 2015–16 and 52% in 2016–17 (Table 14). In 2016–17, 72% of the landings were taken between October and the end of the fishing year, spread between the four statistical areas (Table 15), which continues the reversion to the seasonal landing pattern seen in the 1980s.

Arithmetic CPUE increased in all areas from the mid-1990s, most strongly in Area 907, where there was an enormous increase that was corroborated by larger-sized lobsters (see Webber et al. 2018) (Table 16, Figure 6). CPUE has since dropped back to levels below 0.5 kg/potlift in all statistical areas, even Area 907, where CPUE remained above 0.5 kg/potlift until 2014–15 (Table 16). Arithmetic CPUE dropped to below 0.4 kg/potlift in all four QMAs in 2014–15 and has since remained there. Arithmetic CPUE for the QMA increased from the early 1990s to a peak in 1997–98 and 1998–99, then declined to below 0.5 kg/potlift in 2002–03 where it has remained except for a small excursion to 0.53 kg/potlift from 2006–07 to 2008–09 (Table 17, Figure 7). Arithmetic CPUE dropped to below 0.4 kg/potlift after 2012–13, giving this QMA the distinction of having the lowest CPUE among the nine QMAs. Arithmetic and standardised CPUE were similar, except that the standardised analysis estimated a higher peak for 1997–98 and 1998–99. This was caused by the shift in effort towards the winter months; with lower catch rates for those months adjusted upward by the standardisation procedure. The standardised indices reached minor peaks of 0.55 and 0.56 kg/potlift in 2006–07 and 2007–08 but have since declined to near 0.3 kg/potlift in 2014–15 to 2016–17.

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 2002/03–2003/04 but then dropped to fewer than 30 by 2005–06 and are currently in the mid- to high- 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 distribution of annual landings remained consistent among the three statistical areas until 2000–01, with Area 910 (Gisborne) being the most important, accounting for about 50% of the landings up to 2000–01 (Table 19). Area 911 (Mahia Peninsula) had 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 2007–08 when the proportion of landings from Area 911 dropped into the 30–40% range and dropped to below 30% from 2011–12 to 2013–14 (911=36% in 2016–17; 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% and has been between 12–16% from 2009–10 to 2016–17. The distribution of potlifts is similar, with 63% and 57% of the effort in Area 910 taking 55% and 50% of the catch in each of 2015–16 and 2016–17 (Table 20).

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 (Figure 8). 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, closing the fishery in May to provide a buffer between regulatory changes in MLS and closing the fishery from the beginning of September to the end of November to provide opportunities for recreational fishing (MPI 2016a). 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 (April–August) dropping to 66% in 2000–01 and then fluctuating around 50% until 2007–08. However, there has been a return to a winter fishery along with a renewed increase in abundance, with the April-August landings accounting for 60–70% of the landings since 2010–11 (Table 21). 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 reduced considerably from 2010–11 with the voluntary closure described below. May landings reappeared in 2014–15 after MPI dropped the May closure regulation on 1 October 2013 (MPI 2016a). June, July, and August have remained important months for landings, especially in Area 910, with 23% of the 2016–17 CRA 3 landings coming from Area 910 in June, July or August (Table 22). This percentage increases to 40% for the same months when all three statistical areas are combined. Since 2008–09, 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 (MPI 2016a). The effect of this voluntary commercial closure can be seen in Table 22, with only 2% of the 2016–17 landings reported from these statistical 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 then 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) showed increasing arithmetic CPUE after 2006–07 (Table 23), peaking in 2012–13. Standardised 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 arithmetic, unstandardised and standardised CPUE trends were all similar, except that the standardised analysis estimated a higher peak for 1997–98 than the unstandardised series (Table 24, Figure 10) because of the shift in effort towards winter months which reduced the average CPUE in the unstandardised series. All three sets of indices increased from about 0.6 in 2007–08 to a peak of 2.39 kg/potlift in 2012–13, which is the second highest of the series and only slightly below the 1997–98 peak of 2.43 kg/potlift (Table 24, Figure 10). The standardised CPUE index decreased by 13% relative to 2014–15 to 1.78 kg/potlift in 2015–16 and has remained at that level in 2016–17.

3.5 CRA 4

The relative decrease in the number of vessels reporting at least 1 t of landings in CRA 4 since the 1979–80 fishing year has been less than that observed for CRA 1, CRA 2, and CRA 3, with the number of vessels remaining at 80 or above almost up to the end of the 1990s before dropping to below 70 (Table 25; see also Table 3). Vessel numbers then dropped to the mid-60s through to 2006–07, then dropped to 42 and 43 in 2008–09 and 2009–10 respectively but have since risen to nearly 50 for the six years from 2010–11 to 2015–16, before dropping to 45 in 2016–17. 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 terms of annual landings in this QMA has been reasonably consistent over time, with Area 914 (South Wairarapa) being the most important in terms of total landings, generally accounting for around 40% of the annual catch up to 2009–10 (Table 26). The importance of the southern statistical areas increased after 2010–11, with Area 914 nearing 60% of the CRA 4 catch in 2013–14 and 2014–15, but dropped to 47% in 2015–16 and to 44% in 2016–17. Area 915 (Palliser) is more variable, with less than 10% of the landings in 2012–13 and 2013–14 but rising to 18% and 16% in 2014–15 and 2015–16 respectively but then dropping to 11% in 2016–17. The increase in Area 914 and 915 catches came with a commensurate decrease in Area 912 (Hawke's Bay) while Area 913 (North Wairarapa) has fluctuated between 16% and 31% between 2011–12 and 2016–17. The distribution of effort was similar to the distribution of catch, but with a slightly lower proportion of potlifts in Areas 913 and 914 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 then 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 20% (and below) for these same five months from 2006–07 to 2008–09. However, the 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. Landings after 2013–14 show a sharp drop in the relative importance of the winter months, with the April–August percentage dropping to below 40% in 2014–15, to 22% in 2015–16 and 13% in 2016–17 while the November–March percentage rose to 50% in 2014–15 and to over 60% in 2015–16 and 2016–17. Only 14% of the total landings in 2016–17 were taken between April and September in Areas 913, 914, and 915 while these statistical areas made up 41% of the landings between December 2016 and March 2017 (Table 29).

Arithmetic CPUE increased in most 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 in all statistical areas, but then rose to near to or above 1.5 kg/potlift, peaking in 2012–13. Notably, Area 912 CPUE has not responded similarly, with CPUE in this statistical area remaining below 1.0 kg/potlift. This pattern is dissimilar to the equivalent pattern for Area 911 (immediately to the north, Figure 9) and Area 913 (immediately to the south, Figure 12) and may be due to extensive local damage to the coast from storms which hit in April 2011 (D. Sykes NZRLIC, pers. comm.). The high catch rate in Area 915 dropped sharply in 2015–16 and then again in 2016–17. Catch rates dropped in both Area 913 and Area 914 in 2016–17 while catch rates seem to be recovering in Area 912 to levels similar to those in the areas further south (Table 30). The patterns of increase and the peak year in the 1990s 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). Areas 914 and 915 did not show peaks in the 1990s while these statistical areas share the recent increase in CPUE observed in the early 2010s, which is also seen in the three CRA 3 statistical areas.

The pattern in the CPUE indices for all of 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 the standardised and unstandardised series for CRA 4 were similar, except that the standardised analysis estimated a higher peak for 1998–99 (Table 31, Figure 13), because of the shift in effort towards winter months which caused a reduction in average CPUE in the arithmetic and unstandardised series. The standardised CPUE index for CRA 4 most recently peaked at 1.41 kg/potlift in 2012–13 and has since dropped by 54% to 0.65 kg/potlift in 2016–17 (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 1999–2000, compared to 80 to 90 vessels during the 1980s (Table 32). The number of vessels continued to decline, dropping to below 30 in 2006–07 and fluctuated in the mid 20’s up to 2014–15 when the numbers increased to 30 and then 35 in 2015–16 and 2016–17 respectively. There are six statistical areas in this QMA, but over 80% of landings were reported from Area 916 (Cape Campbell) and Area 917 (Kaikoura-Motunau) beginning in 2001–02, with the balance coming from Area 933 (Marlborough Sounds; Table 33). The relative proportion of landings between these three statistical 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 30% or less of the total annual landings from 2008–09 onwards and has dropped to below 15% in 2015–16 and 2016–17 (Table 33). There has been a corresponding increase in the importance of Area 917, which exceeded 50% of the total landings from 2009–10 and accounted for over 60% of landings from 2013–14 (Table 33). The remaining 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 40-47% of the potlifts taking over 60% of the landings in Area 917 from 2013–14 while the potlifts exceed the landings percentage in Area 916 for the same years (Table 34). Area 933 was much less efficient, using around 30% of the effort to take less than 15% of the landings in the same four fishing years.

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 first exceeded 50% (Table 35, Figure 14). Also, unlike the more northerly QMAs, the relative proportion of the landings taken in the winter months has continued to stay relatively high, exceeding 80% in the AW (April–September) up to 2003–04. Since then, the AW has accounted for 61% to 76% of the annual landings, with the 2016–17 AW percentage at 65% (Table 35). Forty-seven percent of landings were taken between April and July in Areas 916 and 917 in 2016–17, 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 30% in May 2016–17, 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 the other CRA 5 statistical areas, peaking at 3.0 kg/potlift 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 1.05 and 2.05 kg/potlift. The Area 916 arithmetic CPUE (Eq. 1) for 2016–17 was 1.07, about half of the recent peak of 2.05 in 2010–11. CPUE in Area 917 has been near to or above 2 kg/potlift from 2009–10. The Area 917 arithmetic CPUE (Eq. 1) for 2016–17 was 2.31, a 14% drop from the 2015–16 CPUE value which was the highest observed for that statistical area. Arithmetic CPUE was high in Areas 917 and 918 in 2016–17 while CPUE was low in the same year for Areas 916 and 933, with CPUE observations similar to those in the 1990s. Standardised CPUE for CRA 5 increased until 2003–04, then dropped over three successive fishing years before rising to another peak in 2009–10 (Table 38, Figure 16). The unstandardised and standardised CPUE trends were nearly identical throughout the period, while the arithmetic CPUE lies below both of these series from the early 2000s (Table 38, Figure 16). The CRA 5 2016–17 standardised CPUE index was 1.74 kg/potlift, representing an 11% increase relative to 2015–16 but 17% below 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. By 1999–2000, vessel numbers dropped to 34 and have since fluctuated near 35, including in 2016–17 when the number was 36 (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 but rose to 21% in 2014–15 and 2015–16 and dropped slightly to 19% in 2016–17 (Table 40). The two northern statistical areas (940 and 941) have accounted for about 40% of the annual landings in recent years, with 2016–17 at 40%. There was an increase in the proportion of landings in Area 942 to nearly 50% in 2012–13 and 2013–14, but this dropped to below 45% after that year. The distribution of potlifts by statistical area is very 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). Surprisingly, Figure 17 shows a shift to a somewhat earlier fishery in 2016–17 compared to previous years. Table 42 corroborates this observation, with 30% of the catch taken in September-October 2016 compared to 12% for the same months in 2015. The average percentage of landed catch taken from

May to September is 26% and has ranged from 14–38% over the 37 years of available data. In 2016–17, 68% of the landings were taken between October and February, with 31% of the annual landings coming from Area 942 during these months (Table 43). The fishery is closed by regulation from 01 March to 30 April in each year (MPI 2016a), accounting for the lack of data in these months (Table 42).

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 most likely accounts for the high proportion of catches from this area (Table 44). Mean catch rates in all four statistical areas, although variable, stabilised during the mid to late 1990s and now appear to be increasing at a slow rate in all statistical areas, with variability between years. In a reversal of previous observations, Area 942 has had the lowest arithmetic CPUE of the four CRA 6 statistical areas from 2012–13 onward, although the difference among the statistical areas is small. Standardised CPUE for CRA 6 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, then dropped to a recent low of 1.41 kg/potlift in 2014–15 but rose in 2016–17 to the highest value since 1981–82 at 1.87 kg/potlift.

3.8 CRA 7

The number of vessels reporting in CRA 7 dropped very quickly at the beginning of the period of record, with 79 to 90 vessels participating in the first three years compared to 38 to 58 by the end of the 1980s (the 1989–90 count should not be trusted – see Section 2.4; Table 46). The number of vessels dropped to 25 in 2000–01, and then ranged between 14 and 22 vessels between 2001–02 and 2010–11. Numbers dropped to 9 vessels in 2011–12, coinciding with a drop in total annual landings to 46 t, the third lowest annual total since 1990–91 (see Table 1). Vessel numbers have remained low since that year, ranging from 9 to 12 vessels. The number of participating vessels in this QMA has shown more year-to-year variation than in the other 8 QMAs. There are only two statistical areas in this QMA, with Area 920 contributing from 45% to 78% of the annual CRA 7 landings between 1979–80 and 2016–17 (Table 47). The percentage of landings contributed by Area 921 has been variable, but has never exceeded 55% and is usually less than 40% of the landings (27 of 38 years; Table 47). The distribution of potlifts has tended to be more skewed towards Area 920 than for landings, implying lower catch rates in this statistical area (Table 48).

The seasonal distribution of landings in this fishery has been strongly affected by the regulations which control the taking of lobsters at the “concession MLS” (set at 127 mm tail length, equivalent to 47 mm TW for males and 49 mm TW for females), a much smaller size at capture than is used in other parts of New Zealand. These regulations restricted this period from 01 June (the beginning of the season was shifted from 20 June to 01 June beginning with the 2010–11 fishing year, Ministry of Fisheries 2010) to 19 November and have been in place from the first fishing year in the data set (1979–80: Table 49, Figure 20). Before 1993–94, commercial fishing was allowed outside of this period using standard New Zealand MLS regulations (54 mm TW for males and 58 or 60 mm TW for females, depending on the year). Beginning with 1993–94, the commercial fishery was closed outside of the “concession period” (June to mid-November). This fishery closure was dropped from 1 October 2013, allowing fishing throughout the year under the lower tail length regulation MLS of 127 mm (MPI 2016a). The effect of these regulations can be seen in Table 49 and Figure 20. There are almost no landings in April or May from 1980 to 2013 and post-November landings begin in December 2013. The accumulation of landings from June onward was dependent on the annual abundance, with years of high abundance (such as 2004–05 to 2006–07) showing high percentages of landings in July and August and very low contributions in October and November. Conversely, low abundance years (e.g., 2009–10 and 2010–11) have high proportions of landings occurring in October and November. The distribution of landings in 2016–17 reflects the revised regulations, with a much broader distribution of landings extending from April to March. For this fishing year, 2.5% of landings occurred in April/May and 14% of landings occurred from December to March (Table 50).

Arithmetic CPUE declined in the early 1980s and then was variable, declining to a low in 1999–2000 (Table 51, Figure 21). Area 921 consistently had higher mean absolute catch rates, but they also tended to be more variable. Notably, the arithmetic CPUE in Area 920 matched or exceeded the Area 921 CPUE in 2011–12 and 2013–14, but was again lower than Area 921 after 2014–15. Both areas have very similar CPUE trends, with each showing a recent strong increasing trend from a nadir in 2012–13 (Figure 21). Unsurprisingly, the overall arithmetic CPUE for this QMA closely resembles the trends in the two statistical areas (Figure 21). The standardised CPUE (at 1.79 kg/potlift) for this QMA does not show as strong a peak in 2008–09 as was seen in the arithmetic CPUE (at 2.38 kg/potlift). The standardised analysis interprets the rise in CPUE after 2012–13 as being much stronger than in the earlier peak (Table 52, Figure 22) with index values just above 2 kg/potlift in 2013–14, 2014–15 and 2015–15. The 2016–17 index value is 2.78 kg/potlift, the highest value in the series and 56% higher than the previous 2008–09 peak. Note that the index values reported in Table 52 are lower than the equivalent index values reported in Starr (2016). The CRA 7 standardised series was corrected after the publication of Starr (2016) when it was noted that the estimated month effects for December to May after 1 October 2013 were not equivalent to the month effects estimated before 1992–93 due to the differences in the applicable size limits in the two periods (see above). This change in the MLS regulations between the two periods violates the stationarity assumption made by the model defined in Eq. 3 and was corrected by dropping the December to May data after 1 October 2013.

3.9 CRA 8

Historically, CRA 8 had more vessels fishing than any other QMA (Table 53, see Table 3) and the proportional 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 from 2008–09. Seven statistical areas make up this QMA, with 73–87% of the landings reported from the combined Areas 926 to 928 (Fiordland) from 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 has since increased to about one-third (or more) of the annual landings (41% in 2016–17: Table 54). With the drop in the importance of Area 926, there were increases in the proportion of the landings in Areas 927 and 928. Area 924 (Stewart Island) contributed between 12 and 23% of the annual landings, with levels below 15% from 2001–02 (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 remained relatively consistent from year to year up to 2005–06, with about 60–80% of catch taken in every year from August to November (Table 56, Figure 23). In some years during this period, over 15% of the annual landings were taken in December and up to 16% in January, probably reflecting poor landings during years of low abundance (Table 56). Starting in 2003–04, the seasonal distribution of landings began to shift, with an increasing percentage of the landings coming from the winter months of June–August. This shift towards a winter fishery was similar to the seasonal shift observed in the east coast QMAs, resulting from increased abundance. Landings in these three winter months accounted for over 40% of the annual landings in 2003–04, peaked at 47% in 2006–07, and dropped to 12% by 2015–16 and 2016–17 (Table 56). Another important seasonal shift in landing distribution began in 2006–07, with a strong increase in the percentage of landings coming in April. Before 2005–06, less than 1% of landings came from April. This percentage increased to 3% in April 2005 and has since ranged from 9% (in 2014–15) to 15% (in 2008–09). This early season fishery apparently consists of a higher proportion of smaller males, reducing the discard issues that have been associated with high abundance in CRA 8. Finally, there has been an increase in the percentage of landings coming from February and March, the final two months of the fishing year, with 25% of the landings attributed to these months in 2015–16 and dropping to 17% in 2016–17 (Table 56). The net effect of these shifts in the temporal distribution of landing has resulted in a recent nearly uniform accumulation of landings, as can be seen in the final panel of Figure 23. Thirty-one percent of the total annual landings for CRA 8 were taken in Areas 926 to 928 (Fiordland) between August and November 2016 and an additional 13% came from those months in the remaining CRA 8 statistical areas (primarily in Area 924 – Stewart Island, Table 57).

Arithmetic CPUE by statistical area showed a gradual decline during the 1980s and early 1990s (Table 58, Figure 24). CPUE was then 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 improved quickly from the early 2000s, with increases in all statistical areas up to 2008–09 or 2009–10, depending on the statistical area (Table 58). CPUE has remained strong in all seven statistical areas since then. The CPUE series for total CRA 8 dropped from the early 1980s to the early 1990s, and 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 (Table 59, Figure 25). CPUE peaked for all three series (arithmetic [Eq. 1], unstandardised [Eq. 2] and standardised [Eq. 3]) in 2008–09 and only dropped marginally for 2009–10. The lowest CPUE value was recorded in 1992–93 while 1997–98 was nearly as low (Table 59). The three CPUE series all show similar trajectories, with the standardised index rising the most steeply of the three (Table 59, Figure 25). Standardised CPUE has varied around a mean of 3.46 kg/potlift after 2009–10, with the 2016–17 index showing a 12% rise from 3.45 to 3.86 kg/potlift.

3.10 CRA 9

The number of vessels reporting lobster landings in CRA 9 has reduced considerably, from greater than 20 in the early 1980s to fewer than 10 after 2002–03. Only four vessels participated from 2012–13 to 2014–15 and seven vessels reducing to six reported more than 1 t in landings in 2015–16 and 2016–17 (Table 60). Many of the statistical area or month cells in this QMA have no vessels reporting landings or had fewer than the Fisheries New Zealand criterion of 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, with lower proportions of landings in Areas 930, 936, and 937 (Table 61). The proportions of annual landings among statistical areas have fluctuated widely, but Area 935, up to 2007–08, consistently had the highest proportion of landings, possibly reflecting the distribution of effort rather than underlying differences in relative abundance between statistical areas (Table 61). However, beginning in 2008–09, Area 931 began to predominate and, in 2012–13, there was another shift with the percentage of landings coming from Area 930 increasing substantially from the previous year. Table 60 shows that the number of contributing vessels in Area 930 only increased from 1 to 2, demonstrating the volatility of these calculations. The shift to Area 930 reversed from 2013–14, with landings once again concentrated in Areas 931 and 935. The distribution of effort is similar to the distribution of catch, except for 2012–13, when the number of declared potlifts in Area 935 showed a strong drop compared to the preceding years (Table 62). The proportion of potlifts in Area 931 has exceeded the proportion of landings from 2012–13 to 2016–17, signalling a drop in relative CPUE in Area 931.

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 91–93% between 2005–06 and 2007–08 (Table 63). This trend has reversed, with the total percentage of landings taken from April to September ranging from 48% to 79% from 2008–09 to 2012–13. The April-September percentage jumped to 70% in 2013–14 and 82% in 2014–15. Fifty-nine percent of total annual landings were taken in Areas 931 and 935 from April to September 2016. Note that none of the cells in Table 64 satisfy the Fisheries New Zealand criterion of at least three vessels reporting.

Arithmetic CPUE trajectories by statistical area from 1979–80 to 2016–17 are difficult to present because many of the year/statistical area combinations cannot be reported because of Fisheries New Zealand reporting restrictions (Table 65, Figure 27). Areas 931 and 935 have shown the highest catch rates in most years, particularly in Area 935 from 2012–13 (Table 65) when there was an exceptionally strong increase in the arithmetic CPUE associated with the drop in effort in this statistical area

(Table 62). Standardised CPUE for this QMA increased from below 1.0 kg/potlift in 1999–2000 to over 2.0 kg/potlift in 2004–05. CPUE stayed at this level to 2006–07, and then dropped to 1.3 kg/potlift over the next two years (Table 66, Figure 28). All three series (arithmetic, unstandardised and standardised) show an overall increasing trend from 2009–10 to 2012–13, although there is divergence between the three series due to the effect of standardisation, which was accentuated by the sudden shifts in the distribution of catch and effort described above. The arithmetic series increased from 2011–12 to 2013–14 and then dropped slightly in 2014–15 while the unstandardised series (Eq. 2) peaked in 2014–15, rising nearly 0.7 kg/potlift between 2013–14 and 2014–15. The standardised series peaked in 2012–13, dropped 0.7 kg/potlift in 2013–14, rose slightly in 2014–15 and dropped to below 2.0 kg/potlift in both 2015–16 and 2016–17. Although vessels reporting less than 1 t of CRA 9 landings in a year have been dropped before calculating these CPUE indices (see final paragraph in Section 2.3), these series must be interpreted cautiously, recognising that they are generated from small amounts of data and are consequently subject to considerable uncertainty and variability.

3.11 CRA 1 standardised CPUE: offset year

Annual standardised indices for CRA 1 were calculated for the 1 October–30 September offset year (Table 67, Figure 29), using data up to 30 September 2017 (see Section 2.1). The annual standardised indices provided input to the management procedure decision rule developed in 2014 for CRA 1 (Webber & Starr 2015). 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. This series climbed from about 1.0 kg/potlift in the late 1990s/early 2000s to about 1.7–1.8 kg/potlift by the mid-2000s (Table 67, Figure 29). CPUE has since declined to near 1.3 kg/potlift from 2014–15.

The total deviance explained by the standardisation analysis was 43% (Table D.2), with most of the explanatory power lying with the *statistical_area* and *offset_year* variables and relatively less deviance explained by 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 over 95% of the distribution (Figure D.1). There was contrast in the *statistical_area* variable, with high relative coefficients for Areas 901 and 902, low coefficients for Areas 903 and 904, and average coefficient for Area 939 (Figure D.2). The CDI (influence) plot shows that the model captured a shift away from Areas 904 and 939 in the late 1990s towards Areas 901 and 902 in the 2000s. There is less contrast in the month variable but the model has captured the shift to a winter/spring fishery that occurred in the late 1990s and through much of the 2000s (Table D.2, Figure D.3). Figure D.4 shows the effect of the standardisation procedure, with a reduction of the relative CPUE in the late 2000s and a lifting of the CPUE in the latter half of the 1990s when the *statistical_area* variable is added to the model.

3.12 CRA 2 standardised CPUE: offset year

Annual standardised indices for CRA 2 were calculated for the 1 October–30 September offset year with data up to 30 September 2017 (see Section 2.1). Two CRA 2 analyses were prepared in 2017, one which emulated the analysis which was used by the management procedure decision rule developed in 2013 for CRA 2 (Starr et al. 2014). This series did not include a *vessel* explanatory variable in the standardisation model, with the diagnostics for this model presented in Appendix E and the index values tabulated in Table 68 and plotted in Figure 30. A second series, which included a *vessel* explanatory variable, was developed to be consistent with the CPUE series used in the 2017 CRA 2 stock assessment (see Starr & Webber, in prep., for data documentation and Webber et al. 2018, for the stock assessment analysis). The diagnostics for this series are presented in Appendix F, with the index values tabulated in Table 69 and plotted in Figure 31. Both series were 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. CRA 2 offset year CPUE peaked just above 1.1 kg/potlift in 1997–98 and 1998–99 for both series and then rapidly declined to less than 500 grams/potlift. There followed a minor rise which peaked in 2007–08 at 581 grams/potlift for the series without a *vessel* variable and at 523 grams/potlift for the series which included the *vessel* variable. Both series show a subsequent decline in CPUE, dropping by 2016–17 to 289 grams/potlift for the series without a *vessel* variable and to 252 grams/potlift for the series which included the *vessel* variable. The two series differ by the vessel series having higher index values at the beginning of the series (up to 1999–00) followed by lower indices (from 8 to 14% lower over the period 2011–12 to 2016–17).

The total deviance explained by the standardisation analysis which excluded the *vessel* variable was 22% (Table E.2) while it was 49% for the analysis which included the *vessel* variable (Table F.2). The addition of the vessel variable clearly increased the explanatory power of the model and was the cause of the shift in the relative nature of the annual indices between models (Figure F.5). The deviance comparison between the two models is not entirely apt, given that there are ten additional year indices in the "exclude *vessel*" model because it includes the FSU data while the "include *vessel*" model does not. However, even though there are fewer indices in the "include *vessel*" model, there is more explanatory power in the *offset_year* variable in this model (18%; Table F.2) than in the "exclude *vessel*" model (only 13%, Table E.2. The *vessel* explanatory variable has a large amount of explanatory power and is the primary reason the "include *vessel*" model has considerably more explanatory power than the "exclude *vessel*" model. The reason for this improved explanatory power in the "include *vessel*" model can be seen in the vessel CDI plot (Figure F.2), showing a clear trend among the vessels participating in the fishery. There is a disappearance after about 1999–00 of the vessels with low CPUE *vessel* coefficients while the vessels with higher CPUE coefficients have remained in the fishery.

Both models accept the *month* variable ahead of the *statistical area* variable, with the latter having little explanatory power in either model. The standardised residuals for both models showed similar patterns, with some deviation away from the model lognormal assumption at the tails of the residual distribution and were more peaked in the centre than would be expected for a normal distribution, but were generally acceptable (Figure E.1; Figure F.1). There was good contrast in the *month* variable, with quite high relative coefficients for October to January and low coefficients for April to June (Figure E.2; Figure F.3). The CDI (influence) plots show that the model adjusted for the six to seven years between 1995–96 and 2000–01 when there was a strong shift to winter fishing by raising the annual coefficients during that period. All four CRA 2 statistical areas have similar relative catch rates, resulting in little explanatory power in this variable (compare Table E.2 with Table F.2, and Figure E.3 with Figure F.4). Figure E.4 shows that the main effect from the "exclude *vessel*" standardisation procedure was to lift the peak CPUEs in the latter part of the 1990s to account for the predominance of the winter fishery and its lower expected CPUE while Figure F.5 shows that the addition of the *vessel* explanatory variable caused the CPUE series to tilt, with the earlier indices (up to 1999–2000) being higher than the "exclude *vessel*" indices while the opposite occurred with the post-1999–00 indices.

3.13 CRA 3 standardised CPUE: offset year

Annual standardised indices for CRA 3 were calculated for the 1 October–30 September offset year (Table 70, Figure 32), using data up to 30 September 2017 (see Section 2.1). This series provided input to an updated management procedure decision rule developed in 2014 for CRA 3 (Haist et al. 2015). 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. CPUE climbed strongly from a low of 254 grams/potlift in 1991–92 to a peak in 1996–97 of 2.5 kg/potlift (Table 70, Figure 32). CPUE then dropped precipitously to 474 grams/potlift in 2003–04, but then rose again to a peak of 2.3 kg/potlift in 2011–12. CPUE has since dropped to 1.79 kg/potlift in 2016–17.

The total deviance explained by the standardisation analysis was 52% (Table G.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 the central 95% of the distribution (Figure G.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 G.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. 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 G.3). Figure G.4 shows that the main effect from the standardisation procedure was to lift the peak CPUEs during the two periods of high abundance (late 1990s and early 2010s) to account for the predominance of the winter fishery and its lower expected CPUE.

3.14 CRA 4 standardised CPUE: offset year

Annual standardised indices for CRA 4 were calculated for the 1 October–30 September offset year (Table 71; Figure 33), using data up to 30 September 2017 (see Section 2.1). This series provided input to a new CRA 4 management procedure decision rule developed in 2016 (Breen et al. 2017) and adopted by the Minister for Primary Industries in April 2017. 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. These results are presented, with associated model diagnostics, in Appendix H.

CRA 4 CPUE peaked in 1997–98 and 1998–99 above 1.5 kg/potlift, a year behind CRA 3 (Table 71; Figure 33). CPUE then declined, reaching a low point of just over 600 grams/potlift in 2006–07 and 2007–08, four years later than the nadir for CRA 3. CPUE climbed again to 1.4 kg/potlift in 2011–12, the same year that CRA 3 peaked. CPUE has since declined to near 700 grams/potlift in 2015–16 and 2016–17. It is not known if the 12% upturn between 2015–16 and 2016–17 is a signal that the series will increase in the future or is oscillating at a steady level.

The total deviance explained by the standardisation analysis was acceptable but not as strong as for the CRA 3 analysis (29%, Table H.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 the central 95% of the distribution (Figure H.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 H.2). The *statistical_area* variable had little explanatory power with almost no contrast between the five statistical areas that make up this QMA (Figure H.3). As seen in CRA 2 and CRA 3, Figure H.4 shows that the main effect from the standardisation procedure was to lift the peak CPUE during the period of high abundance in the late 1990s to account for the predominance of the winter fishery and its lower expected CPUE.

3.15 CRA 5 standardised CPUE: offset year

Annual standardised indices for CRA 5 were calculated for the 1 October–30 September offset year (Table 72, Figure 34), using data up to 30 September 2017 (see Section 2.1). This series provided input to an updated management procedure decision rule developed in 2015 for CRA 5 (Starr & Webber, 2016). 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, showing a minor peak at 1.6 kg/potlift in 2002–03 followed by the highest point in the series in 2009–10 at 2.07 kg/potlift (Figure 34). Offset year CPUE rose 23% relative to 2015–16 to reach 2.05 kg/potlift in 2016–17, the second highest index value in the series.

The total deviance explained by the standardisation analysis was 41% (Table I.2), with most of the explanatory power in the analysis lying with the *offset_year* variable and lesser amounts with the *month* and *statistical_area* variables. The standardised residuals showed deviation from the model lognormal assumption at the extreme tails of the residual distribution, but were acceptable for the central 95% of the distribution (Figure I.1). There was contrast in the *month* variable, with high relative coefficients estimated from November to February, but there was relatively little explanatory power in this variable (Figure I.2). None of the winter months had coefficients greater than 1.0 except May, which is slightly above 1.0. As with the analysis presented in Section 3.6, Areas 916 and 918 had higher relative catch rates than the other statistical areas in this QMA, with the remainder all having coefficients less than 1.0 (Figure I.3). The main effect from the standardisation procedure was to lift the peak CPUEs during the two periods of high abundance (late 1990s and late 2000s) to account for the predominance of the winter fishery and the corresponding lower expected CPUE (Figure I.4).

3.16 CRA 7 standardised CPUE: offset year

Annual standardised indices for CRA 7 were calculated for the 1 October–30 September offset year (Table 73, Figure 35), using data up to 30 September 2017 (see Section 2.1). The analysis presented here used replog 11514 for the final 6-month period, unlike the other offset-year analyses presented in Sections 3.11 to 3.15 and Section 3.17, which used replog 11437 for the final 6-month period. This series formed the input for the management procedure decision rule developed for CRA 7 in 2012 (Haist et al. 2013) and 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. This series is characterised by high CPUE values in the mid-2000s followed by a drop to low CPUE, reaching its lowest point in 2011–12 (Table 73, Figure 35). CPUE has risen strongly since then, peaking in 2015–16 at 2.86 kg/potlift and then dropping by 19% to 2.33 kg/potlift in 2016–17. As with the annual CPUE indices presented in Section 3.8, the recent index values reported in Table 73 are lower than the equivalent index values reported in Starr (2016). The CRA 7 offset year standardised series was corrected after the publication of Starr (2016) when it was noted that the estimated month effects for December to May after 1 October 2013 were not equivalent to the month effects estimated before 1992–93 due to the differences in the applicable size limits in the two periods (see first paragraph, Section 3.8). This change in size limits violates the stationarity assumption made by the model defined in Eq. 3 and was corrected by dropping the December to May data after 1 October 2013.

The total deviance explained by the standardisation analysis was acceptable (32%, Table J.2), with most of the explanatory power lying with the *offset_year* variable, followed by *statistical_area*. There was little explanatory power in the *month* variable, which is understandable given that most of the data were collected in an abbreviated set of months. The standardised residuals showed deviation from the model lognormal assumption at the tails of the residual distribution with some clumping, but were acceptable for the central 95% of the distribution (Figure J.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, resulting in variable influence on the annual coefficients (Figure J.2). There was almost no contrast in the *month* variable, except for the March and April relative coefficients which have little fishing during those months and only before 1992–93 (Figure J.3). There is very little effect on the CPUE trend from the standardisation procedure (Figure J.4).

3.17 CRA 8 standardised CPUE: offset year

Annual standardised indices for CRA 8 were calculated for the 1 October–30 September offset year (Table 74, Figure 36), using data up to 30 September 2017 (see Section 2.1). This series formed the input for the management procedure decision rule developed for CRA 8 in 2015 and 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 “LF” destination codes (Haist et al. 2016). At the request of the CRA 8 industry, the legal “X” discards were not included in this MP. This series climbs in the early 2000s, peaks in 2007–08 at 3.74 kg/potlift for the LF series, and then drops to 2.8 kg/potlift in 2011–12. The series ends at 3.7 kg/potlift in 2016–17, the second highest index value in the series and a 20% rise from 3.1 kg/potlift in 2015–16.

The total deviance explained by the standardisation analysis was 31% (Table K.2), 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 offset year analyses from the lognormal assumption, primarily in the upper tail of the residual distribution, but were acceptable in the central 90–95% of the distribution (Figure K.1). The peak catching months in terms of CPUE extended from September to February, with considerably lower relative catch rates in the winter months (Figure K.2). The CDI (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 catching lobster. Area 925 (Snares) had the highest relative catch rate, but little catch has been taken from there (Figure K.3). The relative catch rates for the other four important statistical areas (Area 924: Stewart Island; Areas 926 to 928: Fiordland) show some contrast, with Areas 924 and 926 being above 1.0 while Areas 927 and 928 were less than 1.0, but appear to have little explanatory power (Figure K.3). The standardisation procedure raises the unstandardised analysis (Eq. 2) with the addition of the *month* explanatory variable (Figure K.4). This occurs because of the predominance of the winter fishery in the six most recent fishing years resulting in lower overall unstandardised catch rates (Figure K.2). The standardisation procedure exerts an effect on recent indices (starting at 2005–06), lifting these with the addition of the *month* explanatory variable (Figure K.4). However, the strong rise observed between 2015–16 and 2016–17 is also present in the unstandardised data.

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Table 1: Reported commercial landings, TACC and TAC (tonnes) of *Jasus edwardsii* by QMA for each fishing year since the species was included in 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 2016–17).

	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	157.0	–	229.7	241.3	–	268.8	411.9	–	530.5	545.7	–
1992–93	110.5	138.0	–	190.3	216.6	–	191.5	330.9	–	495.7	506.7	–
1993–94	127.4	130.5	–	214.9	214.6	–	179.5	163.9	–	492.0	495.7	–
1994–95	130.0	130.5	–	212.8	214.6	–	160.7	163.9	–	490.4	495.7	–
1995–96	126.7	130.5	–	212.5	214.6	–	156.9	163.9	–	487.2	495.7	–
1996–97	129.4	130.5	–	213.2	214.6	–	203.5	204.9	–	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	130.5	–	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	–	226.5	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	130.9	131.1	–	234.3	236.1	452.6	193.3	193.3	322.3	466.3	466.9	661.9
2013–14	130.3	131.1	–	235.7	236.1	452.6	225.5	225.5	354.5	499.4	499.7	694.7
2014–15	130.2	131.1	–	198.6	200.0	416.5	260.4	261.0	390.0	465.5	467.0	662.0
2015–16	129.4	131.1	273.1	174.7	200.0	416.5	260.8	261.0	390.0	438.1	467.0	662.0
2016–17	130.6	131.1	273.1	142.3	200.0	416.5	260.9	261.0	390.0	382.8	397.0	592.0
2017–18	–	131.1	273.1	–	200.0	416.5	–	237.9	366.9	–	289.0	484.0

	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	503.0	–	133.4	179.4	–	834.5	1 152.4	–
1991–92	287.4	433.7	–	388.3	539.6	–	177.7	166.8	–	962.7	1 077.0	–
1992–93	258.8	337.7	–	329.4	539.6	–	131.6	154.5	–	876.5	993.7	–
1993–94	311.0	303.7	–	341.8	530.6	–	138.1	138.9	–	896.1	888.1	–
1994–95	293.9	303.7	–	312.5	530.6	–	120.3	138.9	–	855.6	888.1	–
1995–96	297.6	303.7	–	315.3	530.6	–	81.3	138.9	–	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	1 053.0
2009–10	349.9	350.0	467.0	345.2	360.0	370.0	136.5	189.0	209.0	1 018.3	1 019.0	1 110.0
2010–11	350.0	350.0	467.0	357.4	360.0	370.0	74.8	84.5	104.5	1 018.3	1 019.0	1 110.0
2011–12	350.0	350.0	467.0	359.7	360.0	370.0	45.7	75.7	95.7	961.2	962.0	1 053.0
2012–13	350.0	350.0	467.0	355.9	360.0	370.0	53.8	63.9	83.9	960.8	962.0	1 053.0
2013–14	350.0	350.0	467.0	343.6	360.0	370.0	44.0	44.0	64.0	964.6	962.0	1 053.0
2014–15	349.2	350.0	467.0	334.5	360.0	370.0	66.0	66.0	86.0	962.0	962.0	1 053.0
2015–16	350.1	350.0	467.0	353.3	360.0	370.0	97.6	97.7	117.7	961.8	962.0	1 053.0
2016–17	350.0	350.0	514.0	359.5	360.0	370.0	97.6	97.7	117.7	962.1	962.0	1 053.0
2017–18	–	350.0	514.0	–	360.0	370.0	–	112.5	132.5	–	962.0	1 053.0

Table 1 (continued):

Fishing year	CRA 9 Catch	TACC	TAC	Total Catch[1]	TACC[2]	TAC[3]
1990–91	45.3	54.7	–	2 907.4	3 777.8	–
1991–92	47.5	51.5	–	3 020.9	3 624.5	–
1992–93	45.7	47.1	–	2 629.9	3 264.9	–
1993–94	45.5	47.0	–	2 746.2	2 913.0	–
1994–95	45.2	47.0	–	2 621.5	2 913.0	–
1995–96	45.4	47.0	–	2 548.6	2 913.0	–
1996–97	46.9	47.0	–	2 690.5	2 953.3	–
1997–98	46.7	47.0	–	2 584.2	2 864.1	1 312.0
1998–99	46.9	47.0	–	2 726.0	2 926.2	1 275.6
1999–00	47.0	47.0	–	2 748.5	2 850.2	3 442.6
2000–01	47.0	47.0	–	2 795.9	2 850.2	3 442.6
2001-02	46.8	47.0	–	2 593.0	2 685.2	3 277.6
2002–03	47.0	47.0	–	2 591.1	2 685.2	3 277.6
2003–04	45.9	47.0	–	2 451.5	2 685.2	3 277.6
2004–05	47.0	47.0	–	2 472.3	2 726.4	3 318.8
2005–06	46.6	47.0	–	2 475.8	2 589.4	3 184.8
2006–07	47.0	47.0	–	2 604.6	2 766.6	3 362.0
2007–08	47.0	47.0	–	2 472.5	2 766.6	3 362.0
2008–09	47.0	47.0	–	2 640.7	2 981.0	3 576.5
2009–10	46.6	47.0	–	2 688.8	2 762.2	3 362.6
2010–11	47.0	47.0	–	2 781.7	2 807.3	3 407.7
2011–12	47.0	47.0	–	2 753.0	2 792.8	3 393.2
2012–13	47.0	47.0	–	2 792.2	2 810.3	3 410.7
2013–14	47.1	47.0	–	2 840.1	2 855.4	3 455.8
2014–15	60.8	60.8	115.8	2 827.2	2 857.8	3 560.3
2015–16	60.6	60.8	115.8	2 826.5	2 889.5	3 865.0
2016–17	60.8	60.8	115.8	2 746.5	2 819.5	3 842.0
2017–18	–	60.8	115.8	–	2 703.2	3 725.7

[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 annual 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 C.1), 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	0.88	0.89	0.81
2012–13	0.81	0.94	0.97	0.87	0.97	0.87	0.88	0.87	0.63
2013–14	0.89	0.91	1.00	0.88	0.95	0.91	0.94	0.89	0.73
2014–15	0.75	0.93	0.94	0.93	0.94	0.87	0.93	0.90	0.72
2015–16	0.91	0.94	0.95	0.92	0.99	0.85	0.86	0.86	0.76
2016–17	0.89	0.99	0.98	0.87	0.97	0.88	0.91	0.84	0.72
Mean	0.94	0.93	0.95	0.93	0.94	0.86	0.92	0.87	1.03

Table 2B: Annual ratio of the sum of landed catch used to estimate CPUE relative to the sum of the total landed catch by QMA. Landed catches used to estimate CPUE include only records with error ratings less than or equal to one and records not excluded by the F2 algorithm (Appendix C.2), scaled to the combined "LFX" destination codes and only accepting vessels with a *vcf* lying between 0.8 and 1.2. The total landed catch is determined by the "F0" algorithm applied to records with error ratings less than or equal to one, where all vessels are accepted ,regardless of the *vcf* value, scaled to the combined "LFX" destination codes.

Fishing Year	CRA 1	CRA 2	CRA 3	CRA 4	CRA 5	CRA 6	CRA 7	CRA 8	CRA 9
1990–91	0.89	0.90	0.96	0.98	0.89	0.94	0.86	0.85	0.96
1991–92	0.86	0.86	0.94	0.98	0.61	0.93	0.94	0.84	1.00
1992–93	0.82	0.78	0.92	0.98	0.45	0.92	0.89	0.82	0.96
1993–94	0.98	0.84	0.98	1.00	0.43	0.93	0.90	0.84	0.86
1994–95	0.99	0.84	0.95	0.98	0.48	0.96	0.91	0.84	0.60
1995–96	0.81	0.83	0.98	0.97	0.43	0.94	0.85	0.80	0.92
1996–97	0.59	0.79	0.88	0.85	0.49	0.88	0.77	0.77	0.85
1997–98	0.65	0.91	0.93	0.89	0.63	0.97	0.97	0.84	1.00
1998–99	0.71	0.90	0.93	0.91	0.54	0.84	0.78	0.69	0.80
1999–00	0.72	0.87	0.93	0.77	0.63	0.83	0.68	0.83	0.89
2000–01	0.97	0.91	0.85	0.90	0.66	0.95	0.79	0.92	1.00
2001–02	0.99	0.95	0.88	0.89	0.64	0.84	0.95	0.85	0.95
2002–03	0.93	0.92	0.80	0.93	0.59	0.80	0.97	0.86	0.94
2003–04	0.93	0.97	0.82	0.94	0.85	0.91	1.00	0.97	0.83
2004–05	0.78	0.78	0.87	0.92	0.80	0.90	0.92	0.93	0.93
2005–06	0.91	0.84	0.91	0.84	0.85	0.98	0.87	0.87	0.92
2006–07	0.95	0.91	0.96	0.92	0.96	0.91	1.00	0.91	0.95
2007–08	0.96	0.95	0.86	0.89	0.99	0.97	0.92	0.95	0.92
2008–09	0.85	0.93	0.89	0.90	0.99	1.00	0.75	0.87	1.00
2009–10	0.99	0.99	0.94	0.91	0.88	0.95	0.90	0.82	1.00
2010–11	0.93	0.97	0.97	0.94	0.93	0.90	0.86	0.82	0.99
2011–12	0.96	0.98	1.00	0.94	0.96	0.98	0.91	0.85	0.70
2012–13	0.99	0.96	0.88	0.96	0.79	0.92	0.93	0.83	0.62
2013–14	0.87	0.97	0.82	0.84	0.80	0.97	0.75	0.73	0.66
2014–15	0.82	0.92	0.95	0.84	0.77	0.98	0.62	0.72	0.58
2015–16	0.81	0.91	1.00	0.91	0.79	0.97	0.54	0.86	0.54
2016–17	0.76	0.98	0.97	0.95	0.68	0.98	0.84	0.80	0.59
Mean	0.87	0.90	0.92	0.92	0.72	0.93	0.85	0.84	0.85

Table 3: Summary table showing the number of vessels by QMA reporting at least 1 t landings in that QMA and for all of New Zealand, 1979–80 to 2016–17. Vessels catching less than 1 t in a year for a 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	CRA1	CRA2	CRA3	CRA4	CRA5	CRA6	CRA7	CRA8	CRA9	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
2012–13	14	40	23	49	27	37	12	64	4	268
2013–14	14	36	26	47	27	34	10	63	4	259
2014–15	14	33	25	49	29	35	9	64	4	260
2015–16	13	33	27	47	30	35	11	64	7	263
2016–17	13	29	25	45	32	36	11	66	6	261
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: 2012–13 to 2016–17	13.6	34.2	25.2	47.4	29.0	35.4	10.6	64.2	5.0	262.2
Percent drop	-59%	-59%	-69%	-46%	-67%	-23%	-84%	-72%	-77%	-64%

Table 4: Number of vessels by statistical area from CRA 1, 1979–80 to 2016–17. Vessels landing less than 1 t in a year for the 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
2012–13	5	5	2	3	3	14
2013–14	4	4	2	3	3	14
2014–15	4	2	3	3	3	14
2015–16	4	2	2	2	3	13
2016–17	4	3	2	2	3	13

Table 5: Distribution and annual landings by statistical area from CRA 1, 1979–80 to 2016–17. 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	19.0	30.6	18.0	21.0	20.9	24.6	39.6	23.2	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	45.0	18.9	6.2	9.0	20.9	58.7	24.7	8.1	11.7	27.3	130.4
2012–13	41.5	22.2	8.8	7.4	20.1	54.3	29.1	11.5	9.6	26.4	130.9
2013–14	30.9	23.0	7.0	12.3	26.9	40.3	29.9	9.1	16.0	35.0	130.3
2014–15	31.7	x	11.2	12.7	18.8	41.3	x	14.6	16.5	24.5	130.2
2015–16	38.6	x	10.3	x	25.4	49.9	x	13.4	x	32.9	129.4
2016–17	31.4	22.1	10.0	7.9	28.6	41.1	28.8	13.1	10.3	37.4	130.6

Table 6: Distribution and annual potlifts by statistical area from CRA 1, 1979–80 to 2016–17. 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	13.5	8.7	20.3	29.6	59.9	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	x	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	x	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	x	48.8	114.5
2006–07	20.5	x	15.7	x	26.4	20.3	x	15.6	x	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	x	16.1	83.4
2009–10	20.3	13.3	19.2	x	19.1	16.3	10.7	15.4	x	15.3	80.2
2010–11	23.5	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	24.2	18.6	11.2	26.7	13.4	94.0
2012–13	26.2	26.7	11.0	24.3	11.8	21.1	21.5	8.9	19.6	9.5	80.6
2013–14	23.6	16.3	7.9	37.5	14.7	22.0	15.1	7.4	34.9	13.7	93.1
2014–15	18.5	x	16.3	39.9	10.3	20.0	x	17.7	43.1	11.2	108.1
2015–16	26.7	x	16.2	x	18.8	23.5	x	14.3	x	16.5	87.8
2016–17	18.4	16.3	15.1	30.7	19.5	17.1	15.2	14.1	28.6	18.2	93.1

Table 7: Percentage of annual landings by month from CRA 1, 1979–80 to 2016–17. 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	0.1	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	0.1	0.3	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	0.0	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	18.8	15.7	12.2	5.9	2.2	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	0.2	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	0.3	0.4
2002–03	4.1	5.0	2.5	15.5	19.0	16.9	21.0	8.4	4.0	3.0	0.2	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	2.5	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	0.3
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	22.8	14.1	5.5	5.8	2.5	1.1
2012–13	11.1	0.1	1.0	4.8	11.3	13.4	16.4	13.3	11.5	7.3	4.6	5.3
2013–14	12.1	5.5	1.1	10.5	9.6	12.1	16.3	10.0	5.8	7.1	4.9	5.0
2014–15	15.9	5.5	3.0	4.4	9.0	8.1	17.3	8.6	10.7	8.2	5.4	3.9
2015–16	10.9	6.3	0.7	5.0	11.0	16.4	15.7	12.9	8.7	4.7	3.6	4.2
2016–17	12.2	3.4	0.6	4.3	10.9	15.8	14.5	12.4	9.9	5.5	4.1	6.3

Table 8: Percentage of landings from CRA 1 by statistical area and month for 2016–17. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (38 instances representing 58% 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	1.9	–	x	–	x
May	x	–	x	–	x
Jun	x	x	–	–	–
Jul	x	x	x	x	–
Aug	x	x	x	x	2.9
Sep	3.9	x	x	1.2	7.0
Oct	7.2	x	x	x	x
Nov	7.4	x	x	x	x
Dec	2.7	3.5	x	x	x
Jan	x	x	x	x	–
Feb	x	x	x	x	–
Mar	x	x	1.0	–	3.2

Table 9: Arithmetic CPUE (kg/potlift) for CRA 1 by fishing year and statistical area, 1979–80 to 2016–17. 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	1.16	0.84	0.54	0.48	0.60
1991–92	1.42	1.24	0.42	0.41	0.65
1992–93	1.59	1.27	0.46	0.30	0.49
1993–94	1.85	1.41	0.42	0.32	0.50
1994–95	1.76	1.50	0.62	0.49	0.69
1995–96	1.74	1.34	0.88	0.59	1.02
1996–97	x	x	0.77	0.53	x
1997–98	x	x	0.74	0.45	x
1998–99	x	x	0.77	0.43	0.86
1999–00	2.37	x	0.56	0.30	0.90
2000–01	2.88	x	0.75	0.40	0.89
2001–02	2.96	2.77	0.82	0.45	0.87
2002–03	2.06	3.01	0.77	0.36	0.97
2003–04	2.79	3.16	x	0.36	0.82
2004–05	3.44	2.00	x	x	1.24
2005–06	3.07	2.20	0.90	x	0.90
2006–07	2.92	x	1.17	x	0.83
2007–08	3.32	2.04	1.22	0.57	1.08
2008–09	3.51	1.97	0.95	x	1.29
2009–10	3.48	1.99	1.06	x	1.77
2010–11	2.67	1.61	0.87	x	1.51
2011–12	2.61	1.38	0.75	0.46	1.92
2012–13	2.63	1.48	1.31	0.55	3.02
2013–14	1.90	1.78	1.09	0.50	2.47
2014–15	2.16	x	2.41	0.40	2.08
2015–16	2.13	x	0.98	x	x
2016–17	2.41	x	x	0.35	x

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	0.76	0.82	0.037
1980–81	1.01	0.88	0.99	0.039
1981–82	1.09	0.89	0.92	0.042
1982–83	1.12	0.93	1.00	0.040
1983–84	1.11	0.97	0.95	0.040
1984–85	0.96	0.91	0.88	0.039
1985–86	0.89	0.82	0.82	0.038
1986–87	0.75	0.78	0.81	0.038
1987–88	0.74	0.73	0.75	0.038
1988–89	0.80	0.67	0.66	0.044
1989–90	0.80	0.75	0.69	0.047
1990–91	0.70	0.67	0.60	0.044
1991–92	0.62	0.64	0.68	0.042
1992–93	0.58	0.57	0.60	0.047
1993–94	0.69	0.64	0.67	0.043
1994–95	0.81	0.83	0.85	0.045
1995–96	0.94	1.03	1.17	0.053
1996–97	0.82	0.82	1.00	0.059
1997–98	0.83	0.77	0.98	0.065
1998–99	0.89	0.84	1.06	0.063
1999–00	0.95	0.79	0.90	0.065
2000–01	1.21	1.05	1.16	0.058
2001–02	1.28	1.14	1.19	0.059
2002–03	1.23	1.21	1.12	0.058
2003–04	1.18	1.03	1.06	0.060
2004–05	1.53	1.53	1.34	0.069
2005–06	1.44	1.50	1.36	0.064
2006–07	1.37	1.79	1.71	0.061
2007–08	1.66	1.97	1.78	0.058
2008–09	1.57	1.94	1.72	0.067
2009–10	1.74	1.92	1.72	0.062
2010–11	1.42	1.76	1.52	0.059
2011–12	1.39	1.59	1.50	0.057
2012–13	1.65	1.86	1.70	0.056
2013–14	1.38	1.54	1.48	0.058
2014–15	1.31	1.53	1.34	0.062
2015–16	1.34	1.52	1.35	0.063
2016–17	1.29	1.32	1.19	0.073

Table 11: Number of vessels by statistical area from CRA 2, 1979–80 to 2016–17. Vessels catching less than 1 t in a year for the 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
2012–13	12	16	6	10	40
2013–14	11	15	4	9	36
2014–15	9	15	5	8	33
2015–16	12	14	4	9	33
2016–17	9	14	5	8	29

Table 12: Distribution and annual landings by statistical area from CRA 2, 1979–80 to 2016–17. 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	12.7	45.8	17.8	23.8	32.0	115.7	44.9	60.0	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	48.5	56.6	226.5
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
2012–13	17.0	35.8	22.8	24.4	39.9	83.9	53.4	57.2	234.3
2013–14	18.1	35.1	23.9	22.8	42.8	82.8	56.4	53.8	235.7
2014–15	18.3	34.7	23.7	23.4	36.3	68.9	47.0	46.4	198.6
2015–16	20.1	29.0	21.6	29.4	35.1	50.6	37.7	51.3	174.7
2016–17	19.7	33.4	23.0	23.9	28.1	47.6	32.7	34.0	142.3

Table 13: Distribution and annual potlifts by statistical area from CRA 2, 1979–80 to 2016–17. 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	46.5	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	57.7	169.1	87.1	102.1	416.0
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
2012–13	17.0	40.3	19.3	23.4	93.5	221.1	105.9	128.6	549.1
2013–14	18.7	41.1	17.9	22.3	115.0	252.6	110.1	137.2	614.9
2014–15	15.5	41.7	19.5	23.3	83.2	223.4	104.5	125.2	536.3
2015–16	20.0	34.1	19.2	26.8	112.8	192.3	108.1	151.0	564.2
2016–17	18.8	36.2	21.2	23.9	86.2	165.8	97.0	109.3	458.4

Table 14: Percentage of annual landings by month from CRA 2, 1979–80 to 2016–17. 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
2012–13	0.3	0.2	1.8	10.1	10.2	15.4	18.7	16.2	13.0	8.8	3.8	1.5
2013–14	0.6	0.9	1.5	9.9	9.0	13.2	20.1	17.8	10.6	8.9	4.5	3.1
2014–15	0.4	x	1.1	10.0	7.3	11.8	22.2	15.7	15.1	10.1	4.1	2.2
2015–16	0.5	0.5	1.1	7.2	10.7	6.9	14.6	18.4	16.9	13.0	6.8	3.4
2016–17	0.6	0.3	0.7	5.4	8.7	11.8	20.0	16.9	16.3	12.4	5.0	1.7

Table 15: Percentage of landings from CRA 2 by statistical area and month for 2016–17. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (6 instances representing 2.6% 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	0.3	–	x	–
May	0.1	–	x	–
Jun	–	0.1	0.6	x
Jul	0.6	2.4	1.6	x
Aug	1.5	3.2	1.9	2.0
Sep	2.9	3.8	2.3	2.9
Oct	3.7	6.3	5.1	4.9
Nov	3.7	5.5	3.8	3.9
Dec	3.2	5.2	3.6	4.3
Jan	1.8	4.7	2.4	3.5
Feb	1.2	1.9	x	1.1
Mar	0.7	0.4	x	0.3

Table 16: Arithmetic CPUE (kg/potlift) for CRA 2 by fishing year and statistical area, 1979–80 to 2016–17. 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	0.31
1990–91	0.48	0.47	0.49	0.51
1991–92	0.46	0.43	0.44	0.41
1992–93	0.46	0.39	0.29	0.35
1993–94	0.49	0.45	0.50	0.31
1994–95	0.50	0.55	0.84	0.36
1995–96	0.73	0.68	1.31	0.44
1996–97	0.84	0.74	1.96	0.67
1997–98	0.93	0.80	1.88	0.64
1998–99	0.95	0.83	1.85	0.63
1999–00	0.77	0.67	1.12	0.49
2000–01	0.63	0.65	0.90	0.68
2001–02	0.58	0.47	0.64	0.67
2002–03	0.44	0.36	0.54	0.52
2003–04	0.55	0.36	0.46	0.44
2004–05	0.66	0.39	0.44	0.43
2005–06	0.54	0.48	0.44	0.41
2006–07	0.55	0.51	0.52	0.56
2007–08	0.57	0.54	0.64	0.43
2008–09	0.60	0.45	0.82	0.49
2009–10	0.52	0.40	0.70	0.45
2010–11	0.41	0.39	0.61	0.42
2011–12	0.38	0.37	0.57	0.49
2012–13	0.43	0.38	0.51	0.45
2013–14	0.39	0.32	0.52	0.40
2014–15	0.41	0.30	0.45	0.37
2015–16	0.31	0.27	0.34	0.33
2016–17	0.31	0.29	0.34	0.32

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	0.022
1980–81	0.61	0.63	0.62	0.021
1981–82	0.55	0.53	0.52	0.021
1982–83	0.45	0.44	0.43	0.021
1983–84	0.39	0.36	0.35	0.022
1984–85	0.37	0.35	0.34	0.022
1985–86	0.43	0.41	0.40	0.022
1986–87	0.37	0.37	0.36	0.023
1987–88	0.34	0.32	0.31	0.024
1988–89	0.36	0.35	0.34	0.026
1989–90	0.35	0.33	0.35	0.046
1990–91	0.48	0.49	0.47	0.029
1991–92	0.43	0.43	0.42	0.029
1992–93	0.38	0.39	0.39	0.033
1993–94	0.42	0.43	0.43	0.033
1994–95	0.52	0.52	0.52	0.036
1995–96	0.66	0.68	0.73	0.040
1996–97	0.82	0.83	0.94	0.046
1997–98	0.88	0.99	1.09	0.044
1998–99	0.91	1.02	1.10	0.044
1999–00	0.70	0.80	0.85	0.043
2000–01	0.69	0.74	0.76	0.038
2001–02	0.55	0.55	0.55	0.035
2002–03	0.44	0.44	0.43	0.034
2003–04	0.42	0.44	0.44	0.034
2004–05	0.44	0.51	0.51	0.037
2005–06	0.46	0.49	0.48	0.035
2006–07	0.53	0.56	0.56	0.034
2007–08	0.53	0.56	0.56	0.036
2008–09	0.55	0.52	0.51	0.038
2009–10	0.49	0.45	0.44	0.034
2010–11	0.45	0.41	0.40	0.035
2011–12	0.44	0.40	0.38	0.035
2012–13	0.43	0.42	0.41	0.035
2013–14	0.38	0.37	0.36	0.034
2014–15	0.36	0.33	0.33	0.037
2015–16	0.31	0.28	0.28	0.036
2016–17	0.31	0.31	0.30	0.038

Table 18: Number of vessels by statistical area from CRA 3, 1979–80 to 2016–17. Vessels catching less than 1 t in a year for the 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
2012–13	3	14	7	23
2013–14	3	15	9	26
2014–15	3	15	11	25
2015–16	4	14	11	27
2016–17	4	14	9	25

Table 19: Distribution and annual landings by statistical area from CRA 3, 1979–80 to 2016–17. 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	CRA3
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
2012–13	15.2	57.0	27.7	29.4	110.3	53.6	193.3
2013–14	13.9	56.6	29.5	31.4	127.5	66.5	225.5
2014–15	14.1	51.3	34.6	36.8	133.6	90.0	260.4
2015–16	11.7	55.2	33.1	30.5	144.0	86.4	260.8
2016–17	14.5	49.6	35.9	37.9	129.3	93.7	260.9

Table 20: Distribution and annual potlifts by statistical area from CRA 3, 1979–80 to 2016–17. 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	CRA3
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
2012–13	12.8	58.9	28.2	12.6	58.1	27.8	98.5
2013–14	11.1	62.2	26.7	13.4	75.3	32.4	121.1
2014–15	12.8	59.7	27.5	20.2	94.2	43.3	157.7
2015–16	13.3	62.6	24.1	25.6	120.3	46.4	192.3
2016–17	17.6	56.8	25.6	33.9	109.6	49.3	192.7

Table 21: Percentage of annual landings by month from CRA 3, 1979–80 to 2016–17. 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
2012–13	5.2	x	19.0	21.8	24.5	5.0	1.7	x	1.3	13.3	3.4	2.7
2013–14	17.1	–	10.1	30.8	14.9	5.2	2.3	0.4	x	7.6	7.2	4.3
2014–15	20.5	2.7	5.2	17.8	17.6	4.9	x	x	4.1	8.9	11.1	5.2
2015–16	18.3	4.5	14.1	22.4	12.6	2.5	1.3	1.0	1.2	8.5	10.2	3.5
2016–17	20.8	5.8	16.5	14.3	8.7	5.6	1.1	1.6	x	15.4	5.4	4.0

Table 22: Percentage of landings from CRA 3 by statistical area and month for 2016–17. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (7 instances representing 4.7% 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	1.7	8.7	10.4
May	–	3.6	2.2
Jun	2.3	11.7	2.5
Jul	4.0	7.1	3.2
Aug	1.2	4.0	3.5
Sep	–	–	5.6
Oct	x	–	0.9
Nov	x	–	x
Dec	x	–	x
Jan	2.1	8.9	4.4
Feb	x	3.9	0.9
Mar	x	1.7	0.9

Table 23: Arithmetic CPUE (kg/potlift) for CRA 3 by fishing year and statistical area, 1979–80 to 2016–17. 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	0.48	0.43	0.51
1991–92	0.33	0.28	0.38
1992–93	0.35	0.27	0.27
1993–94	0.65	0.46	0.46
1994–95	1.58	0.85	0.84
1995–96	2.21	1.56	1.02
1996–97	2.53	1.82	1.50
1997–98	2.79	1.99	2.12
1998–99	1.96	1.62	1.81
1999–00	2.34	1.53	1.66
2000–01	x	0.93	1.49
2001–02	0.95	0.71	1.24
2002–03	0.87	0.54	0.92
2003–04	0.82	0.60	0.62
2004–05	0.82	0.56	0.41
2005–06	0.86	0.57	0.58
2006–07	x	0.48	0.62
2007–08	1.04	0.60	0.48
2008–09	1.14	0.76	0.58
2009–10	1.13	0.95	0.73
2010–11	1.26	1.14	0.99
2011–12	1.54	1.54	1.58
2012–13	x	1.88	2.33
2013–14	2.38	1.69	2.14
2014–15	1.83	1.47	2.19
2015–16	1.77	1.23	1.90
2016–17	1.61	1.16	1.98

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	0.83	0.77	0.021
1980–81	0.93	0.90	0.86	0.021
1981–82	0.93	0.89	0.85	0.021
1982–83	0.96	0.95	0.91	0.020
1983–84	0.86	0.86	0.84	0.020
1984–85	0.75	0.71	0.68	0.019
1985–86	0.73	0.68	0.65	0.020
1986–87	0.67	0.59	0.56	0.021
1987–88	0.44	0.41	0.40	0.021
1988–89	0.45	0.43	0.41	0.024
1989–90	0.51	0.45	0.45	0.022
1990–91	0.46	0.43	0.42	0.024
1991–92	0.33	0.30	0.28	0.022
1992–93	0.28	0.25	0.24	0.023
1993–94	0.48	0.44	0.49	0.033
1994–95	0.91	0.92	0.96	0.045
1995–96	1.36	1.48	1.53	0.049
1996–97	1.77	1.85	1.92	0.054
1997–98	2.13	2.32	2.43	0.053
1998–99	1.70	1.89	2.05	0.049
1999–00	1.64	1.77	1.93	0.049
2000–01	1.14	1.20	1.34	0.042
2001–02	0.92	0.95	1.02	0.042
2002–03	0.70	0.67	0.67	0.034
2003–04	0.64	0.59	0.55	0.034
2004–05	0.51	0.47	0.44	0.036
2005–06	0.60	0.58	0.55	0.036
2006–07	0.57	0.58	0.56	0.034
2007–08	0.60	0.61	0.58	0.038
2008–09	0.72	0.69	0.66	0.042
2009–10	0.87	0.91	0.87	0.044
2010–11	1.10	1.20	1.19	0.046
2011–12	1.55	1.68	1.72	0.048
2012–13	2.05	2.32	2.39	0.050
2013–14	1.89	2.09	2.24	0.050
2014–15	1.73	1.90	2.05	0.040
2015–16	1.46	1.63	1.78	0.039
2016–17	1.45	1.67	1.78	0.040

Table 25: Number of vessels by statistical area from CRA 4, 1979–80 to 2016–17. Vessels catching less than 1 t in a year for the 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	CRA4
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
2012–13	10	15	24	8	1	49
2013–14	9	13	23	8	1	47
2014–15	9	15	26	13	1	49
2015–16	9	11	25	12	2	47
2016–17	10	13	23	7	2	45

Table 26: Distribution and annual landings by statistical area from CRA 4, 1979–80 to 2016–17. 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	912	913	914	915	934	912	913	914	915	934	CRA4
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	36.2	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	29.4	49.1	11.2	x	45.2	137.0	228.8	52.1	x	466.2
2012–13	9.9	31.8	48.3	9.3	x	46.4	148.5	225.0	43.5	x	466.3
2013–14	8.7	27.3	57.3	6.6	x	43.3	136.2	286.4	32.8	x	499.4
2014–15	7.3	16.2	58.5	17.8	x	34.2	75.5	272.5	82.7	x	465.5
2015–16	11.6	23.2	46.7	16.4	x	50.8	101.7	204.5	71.8	x	438.1
2016–17	13.6	28.9	43.5	10.5	x	52.0	110.5	166.5	40.3	x	382.8

Table 27: Distribution and annual potlifts by statistical area from CRA 4, 1979–80 to 2016–17. 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 (‘000s)					
Year	912	913	914	915	934	912	913	914	915	934	CRA4
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	1039.5
1984–85	22.6	23.8	36.9	16.3	x	252.4	265.5	412.0	182.1	x	1116.5
1985–86	24.7	20.0	37.1	17.7	0.4	288.6	232.8	433.2	206.6	5.0	1166.3
1986–87	21.6	26.8	35.8	15.5	x	243.8	302.5	403.2	174.2	x	1127.0
1987–88	21.6	23.3	40.8	14.2	x	275.0	297.2	520.5	181.4	x	1274.3
1988–89	21.4	26.4	40.7	11.6	x	264.7	327.3	503.7	143.1	x	1238.9
1989–90	21.2	28.1	39.2	11.5	x	271.4	359.3	500.6	146.5	x	1278.5
1990–91	18.7	27.9	40.0	13.3	x	197.2	293.9	421.9	140.1	x	1054.0
1991–92	21.3	27.3	39.6	11.6	x	226.2	289.7	419.7	122.8	x	1061.2
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	352.8
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	48.6	11.9	x	53.6	87.7	176.3	43.0	x	362.5
2012–13	19.0	23.0	47.1	10.4	x	58.6	71.1	145.4	32.1	x	308.9
2013–14	15.8	25.8	51.9	6.3	x	57.7	94.1	188.9	22.8	x	364.3
2014–15	13.3	18.9	56.6	11.1	x	56.2	80.1	239.4	47.1	x	423.1
2015–16	11.9	19.0	55.1	13.1	x	67.6	108.5	314.5	74.4	x	570.3
2016–17	12.7	23.3	50.2	11.9	x	69.7	128.2	275.9	65.5	x	549.3

Table 28: Percentage of annual landings by month from CRA 4, 1979–80 to 2016–17. 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	7.4	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	9.4	8.1	8.3	4.9	4.0	10.9	16.5	4.1	0.4
2012–13	2.3	19.2	9.0	6.6	3.1	8.9	4.3	8.8	10.9	21.3	4.9	0.6
2013–14	8.0	16.8	11.3	6.3	3.1	4.4	6.0	3.5	5.7	22.7	10.1	2.0
2014–15	2.8	8.1	14.5	5.2	5.4	6.4	7.8	7.5	14.4	16.2	8.4	3.2
2015–16	0.5	1.2	7.8	9.0	3.1	3.2	8.3	15.0	16.0	18.4	13.9	3.6
2016–17	0.2	1.5	6.7	2.8	2.2	5.4	16.8	18.7	16.7	16.5	8.3	4.1

Table 29: Percentage of landings from CRA 4 by statistical area and month for 2016–17. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (17 instances representing 4.0% 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	x	x	x	x	–
May	0.3	0.5	0.7	x	–
Jun	0.8	1.6	3.1	0.9	x
Jul	0.4	0.4	0.9	0.6	x
Aug	0.4	0.3	0.6	0.4	x
Sep	1.1	x	2.3	1.4	x
Oct	2.4	4.3	7.1	2.2	x
Nov	3.6	6.1	7.6	1.1	x
Dec	2.2	5.6	7.5	1.0	x
Jan	1.9	5.5	7.5	1.4	x
Feb	0.2	2.6	4.3	1.2	x
Mar	x	1.8	1.9	0.3	x

Table 30: Arithmetic CPUE (kg/potlift) for CRA 4 by fishing year and statistical area, 1979–80 to 2016–17. 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	0.75	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	x
1993–94	0.55	0.65	0.62	0.42	x
1994–95	0.81	0.69	0.76	0.49	x
1995–96	0.96	0.87	0.91	0.67	x
1996–97	1.34	1.05	0.98	0.67	x
1997–98	1.83	1.47	1.08	0.83	–
1998–99	1.82	2.65	1.01	0.73	–
1999–00	1.54	1.97	1.11	0.76	x
2000–01	1.29	2.07	1.14	0.91	x
2001–02	1.06	1.30	1.13	0.79	x
2002–03	1.12	1.28	1.02	0.75	x
2003–04	1.10	1.41	1.11	0.78	–
2004–05	0.77	1.25	1.02	0.72	–
2005–06	0.61	0.95	0.94	0.68	–
2006–07	0.59	0.77	0.60	0.74	1.59
2007–08	0.66	0.77	0.45	0.82	0.84
2008–09	0.71	0.86	0.56	0.84	x
2009–10	0.76	1.10	1.02	1.25	x
2010–11	0.74	1.21	1.06	0.93	x
2011–12	0.85	1.57	1.30	1.30	1.67
2012–13	0.89	1.93	1.58	1.40	x
2013–14	0.67	1.47	1.53	1.53	x
2014–15	0.61	0.94	1.10	1.78	x
2015–16	0.76	0.92	0.66	0.97	x
2016–17	0.78	0.86	0.61	0.67	x

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	0.86	0.83	0.020
1980–81	0.83	0.82	0.80	0.019
1981–82	0.83	0.87	0.86	0.020
1982–83	0.92	0.94	0.93	0.019
1983–84	0.90	0.86	0.84	0.019
1984–85	0.77	0.78	0.76	0.019
1985–86	0.73	0.74	0.73	0.019
1986–87	0.84	0.79	0.77	0.019
1987–88	0.73	0.70	0.68	0.020
1988–89	0.62	0.58	0.57	0.020
1989–90	0.60	0.58	0.56	0.020
1990–91	0.52	0.53	0.52	0.020
1991–92	0.52	0.54	0.52	0.020
1992–93	0.53	0.52	0.50	0.019
1993–94	0.58	0.56	0.54	0.020
1994–95	0.71	0.70	0.69	0.022
1995–96	0.89	0.89	0.91	0.025
1996–97	1.03	1.11	1.23	0.030
1997–98	1.25	1.30	1.43	0.032
1998–99	1.34	1.46	1.63	0.032
1999–00	1.32	1.34	1.47	0.032
2000–01	1.27	1.28	1.38	0.031
2001–02	1.09	1.10	1.18	0.029
2002–03	1.08	1.16	1.21	0.027
2003–04	1.16	1.22	1.25	0.026
2004–05	1.00	0.95	0.95	0.025
2005–06	0.85	0.83	0.82	0.026
2006–07	0.67	0.70	0.67	0.024
2007–08	0.60	0.61	0.59	0.027
2008–09	0.72	0.78	0.74	0.031
2009–10	1.03	1.05	1.04	0.031
2010–11	1.01	1.03	1.04	0.027
2011–12	1.31	1.29	1.25	0.028
2012–13	1.55	1.44	1.41	0.029
2013–14	1.39	1.21	1.20	0.030
2014–15	1.09	1.05	1.05	0.028
2015–16	0.77	0.78	0.75	0.027
2016–17	0.71	0.69	0.65	0.027

Table 32: Number of vessels by statistical area from CRA 5, 1979–80 to 2016–17. Vessels catching less than 1 t in a year for the 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
2012–13	7	12	1	–	–	7	27
2013–14	7	12	2	–	–	7	27
2014–15	7	15	2	–	–	7	29
2015–16	8	15	5	–	–	8	30
2016–17	7	17	3	–	–	5	32

Table 33: Distribution and annual landings by statistical area from CRA 5, 1979–80 to 2016–17. 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	43.3	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	25.2	56.7	x	–	–	15.9	88.1	198.3	x	–	–	55.6	350.0
2012–13	27.2	56.7	x	–	–	14.6	95.3	198.4	x	–	–	51.1	350.0
2013–14	18.4	65.1	x	–	–	14.2	64.5	227.7	x	–	–	49.8	350.0
2014–15	21.8	62.4	x	–	–	12.7	76.3	217.7	x	–	–	44.2	349.2
2015–16	13.8	67.0	6.9	–	–	12.3	48.2	234.6	24.3	–	–	43.0	350.1
2016–17	12.5	69.6	7.2	–	–	10.7	43.7	243.7	25.1	–	–	37.5	350.0

Table 34: Distribution and annual potlifts by statistical area from CRA 5, 1979–80 to 2016–17. 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	44.9	x	–	x	26.9	58.2	101.2	x	–	x	60.8	225.6
2011–12	21.1	39.6	x	–	–	36.3	46.1	86.7	x	–	–	79.6	219.0
2012–13	29.2	38.7	x	–	–	30.0	70.0	92.9	x	–	–	72.0	240.1
2013–14	21.1	43.0	x	–	–	34.5	53.0	108.1	x	–	–	86.6	251.3
2014–15	25.6	40.4	x	–	–	31.9	60.7	95.6	x	–	–	75.4	236.6
2015–16	22.7	40.3	2.4	–	–	34.5	55.1	97.8	5.9	–	–	83.6	242.3
2016–17	21.8	47.1	3.4	–	–	27.7	50.7	109.5	7.8	–	–	64.5	232.5

Table 35: Percentage of annual landings by month from CRA 5, 1979–80 to 2016–17. 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	5.8	37.2	4.4	3.6	4.0	14.6	7.2	4.7	4.0	12.2	1.8	0.5
2012–13	8.6	27.1	8.2	6.1	6.7	13.0	4.8	3.5	5.8	12.8	2.7	x
2013–14	6.9	28.6	14.0	12.1	4.9	4.6	4.9	2.9	5.2	13.5	2.0	0.3
2014–15	3.2	34.8	13.6	2.0	3.7	8.1	5.6	4.7	8.0	12.4	2.8	0.9
2015–16	3.4	32.0	16.2	7.4	2.6	3.7	5.8	6.5	8.0	11.9	1.9	0.5
2016–17	7.1	29.9	13.8	3.5	2.9	7.7	7.2	7.8	4.6	12.6	2.3	0.7

Table 36: Percentage of landings from CRA 5 by statistical area and month for 2016–17. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (14 instances representing 7.9% 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	1.1	4.4	x	–	–	–
May	4.5	22.8	x	–	–	0.6
Jun	0.4	11.4	x	–	–	0.8
Jul	x	1.9	x	–	–	0.6
Aug	x	2.0	x	–	–	x
Sep	0.8	5.7	x	–	–	0.9
Oct	1.3	2.8	–	–	–	3.1
Nov	1.0	4.1	–	–	–	2.7
Dec	x	3.3	–	–	–	1.0
Jan	1.9	9.9	–	–	–	0.7
Feb	1.1	0.9	x	–	–	x
Mar	0.2	x	x	–	–	–

Table 37: Arithmetic CPUE (kg/potlift) for CRA 5 by fishing year and statistical area, 1979–80 to 2016–17. 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	0.55	0.37	0.55	x	–	0.26
1990–91	0.43	0.43	0.46	x	0.48	0.37
1991–92	0.42	0.31	0.48	–	0.21	0.37
1992–93	0.42	0.32	0.46	–	–	0.30
1993–94	0.34	0.33	0.39	–	x	0.32
1994–95	0.57	0.34	0.37	–	x	0.57
1995–96	0.69	0.37	0.34	x	x	0.57
1996–97	0.88	0.41	0.62	x	–	0.59
1997–98	0.88	0.59	0.54	x	–	0.81
1998–99	0.82	0.71	0.72	–	–	0.77
1999–00	1.59	0.79	0.79	x	x	0.84
2000–01	3.03	0.79	1.37	–	–	1.10
2001–02	2.77	0.74	x	–	–	1.04
2002–03	2.76	0.89	1.31	–	–	0.97
2003–04	2.63	1.03	1.39	–	–	0.88
2004–05	2.34	0.96	x	–	x	0.88
2005–06	2.07	0.97	1.73	–	–	0.67
2006–07	1.71	1.10	x	–	–	0.71
2007–08	1.75	1.21	x	–	–	0.71
2008–09	1.97	1.38	1.66	x	–	0.73
2009–10	1.97	1.97	–	x	–	0.72
2010–11	2.06	2.13	x	x	–	0.78
2011–12	2.02	2.63	x	–	–	0.71
2012–13	1.34	2.32	x	–	–	0.72
2013–14	1.37	2.14	x	–	–	0.63
2014–15	1.52	2.21	x	–	–	0.61
2015–16	1.05	2.69	6.03	–	–	0.55
2016–17	1.07	2.31	x	–	–	0.50

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	0.65	0.60	0.024
1980–81	0.90	0.77	0.73	0.026
1981–82	0.79	0.70	0.66	0.027
1982–83	0.84	0.75	0.72	0.025
1983–84	0.75	0.67	0.65	0.025
1984–85	0.76	0.67	0.65	0.025
1985–86	0.68	0.55	0.54	0.025
1986–87	0.63	0.49	0.47	0.026
1987–88	0.47	0.41	0.40	0.026
1988–89	0.39	0.36	0.34	0.029
1989–90	0.42	0.38	0.35	0.033
1990–91	0.43	0.39	0.35	0.031
1991–92	0.37	0.32	0.30	0.031
1992–93	0.35	0.31	0.29	0.036
1993–94	0.34	0.34	0.33	0.037
1994–95	0.41	0.36	0.36	0.039
1995–96	0.44	0.40	0.40	0.045
1996–97	0.50	0.50	0.52	0.043
1997–98	0.68	0.70	0.73	0.044
1998–99	0.74	0.83	0.86	0.049
1999–00	0.91	0.92	0.94	0.046
2000–01	1.10	1.11	1.20	0.054
2001–02	1.17	1.25	1.40	0.061
2002–03	1.30	1.49	1.58	0.058
2003–04	1.37	1.60	1.75	0.053
2004–05	1.21	1.30	1.35	0.050
2005–06	1.11	1.33	1.36	0.048
2006–07	1.21	1.39	1.40	0.046
2007–08	1.22	1.43	1.44	0.045
2008–09	1.32	1.64	1.67	0.046
2009–10	1.54	2.02	2.10	0.049
2010–11	1.66	1.97	2.05	0.049
2011–12	1.75	1.88	1.90	0.051
2012–13	1.48	1.74	1.77	0.054
2013–14	1.46	1.58	1.64	0.053
2014–15	1.52	1.75	1.80	0.053
2015–16	1.61	1.51	1.56	0.054
2016–17	1.52	1.72	1.74	0.057

Table 39: Number of vessels by statistical area from CRA 6, 1979–80 to 2016–17. Vessels catching less than 1 t in a year for the 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
2012–13	11	7	20	7	37
2013–14	8	7	18	7	34
2014–15	10	6	18	7	35
2015–16	12	7	18	7	35
2016–17	12	9	20	7	36

Table 40: Distribution and annual landings by statistical area from CRA 6, 1979–80 to 2016–17. 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	19.2	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	71.0	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	63.1	142.9	63.7	357.4
2011–12	23.4	16.4	39.8	20.3	84.2	59.1	143.3	73.1	359.7
2012–13	19.9	16.0	48.7	15.5	70.7	56.9	173.3	55.1	355.9
2013–14	20.1	18.3	48.2	13.3	69.1	63.0	165.6	45.8	343.6
2014–15	23.0	20.8	44.3	11.9	76.9	69.6	148.1	39.9	334.5
2015–16	21.9	21.4	41.9	14.8	77.3	75.8	148.0	52.3	353.3
2016–17	21.2	19.1	44.0	15.7	76.1	68.5	158.3	56.6	359.5

Table 41: Distribution and annual potlifts by statistical area from CRA 6, 1979–80 to 2016–17. 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	24.0	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	28.7	37.4	10.1	63.6	76.9	100.0	27.1	267.6
1991–92	22.1	32.9	38.0	7.0	66.6	98.8	114.2	21.1	300.6
1992–93	28.0	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	27.0	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	26.2	17.5	39.6	16.7	65.8	44.0	99.7	42.1	251.6
2011–12	25.9	18.5	36.9	18.7	60.9	43.6	86.6	43.9	235.0
2012–13	19.7	16.7	50.5	13.1	43.5	36.8	111.5	28.9	220.6
2013–14	19.6	19.5	49.6	11.4	43.8	43.6	110.9	25.5	223.8
2014–15	21.2	20.5	47.3	11.1	51.0	49.3	113.7	26.6	240.6
2015–16	20.0	20.7	45.4	14.0	49.8	51.4	112.8	34.8	248.8
2016–17	19.8	19.4	45.8	15.0	40.2	39.6	93.3	30.6	203.6

Table 42: Percentage of annual landings by month from CRA 6, 1979–80 to 2016–17. 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	7.0	7.9	6.5	2.6	7.0	17.6	15.9	18.7	15.4	–
1984–85	–	4.1	6.0	5.0	3.2	2.0	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	13.0	19.1	14.8	19.2	–
1986–87	–	2.1	4.0	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	16.0	15.0	16.7	17.0	21.3	x
1991–92	–	1.4	5.9	4.0	1.8	2.1	10.7	9.6	17.4	30.9	13.5	2.8
1992–93	–	1.3	8.2	7.3	6.0	3.3	2.4	10.1	16.0	20.9	17.7	6.7
1993–94	–	1.6	8.7	8.2	4.8	3.2	8.8	15.7	13.1	14.0	21.9	–
1994–95	x	4.4	6.2	5.1	4.4	2.6	8.6	16.1	14.8	20.9	17.0	–
1995–96	–	4.2	6.8	3.8	5.9	6.7	23.7	11.9	10.0	12.2	14.6	0.3
1996–97	–	5.3	8.3	5.7	5.1	8.7	20.3	11.1	13.0	12.5	10.1	x
1997–98	x	8.0	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	12.0	x
2000–01	–	5.2	6.8	6.7	4.8	9.7	17.8	16.0	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	17.0	14.8	x
2002–03	–	2.2	6.2	9.5	5.9	5.7	8.0	15.9	11.1	18.4	17.0	x
2003–04	–	1.7	5.3	6.6	8.6	6.3	15.9	12.8	12.4	19.0	11.2	x
2004–05	–	3.9	7.1	10.1	3.9	4.8	10.3	15.1	12.4	17.0	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	7.0	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	15.0	9.0	15.8	14.9	–
2011–12	–	2.6	4.3	5.8	4.1	5.5	14.2	15.2	17.1	14.9	15.8	x
2012–13	–	1.0	3.2	6.0	4.0	4.1	10.0	16.6	15.2	20.6	19.1	x
2013–14	–	1.6	4.1	5.6	3.8	7.9	17.4	16.7	10.9	17.9	14.2	–
2014–15	–	1.3	5.2	5.8	5.0	7.8	11.4	10.5	17.2	17.1	18.7	–
2015–16	–	0.8	3.8	6.5	6.5	6.7	5.5	15.1	13.7	18.9	22.2	0.5
2016–17	–	2.2	6.7	6.7	5.2	11.5	18.3	17.0	13.4	11.2	7.6	x

Table 43: Percentage of landings from CRA 6 by statistical area and month for 2016–17. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (2 instances representing 0.2% 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	940	941	942	943
Apr	–	–	–	–
May	0.4	0.6	1.0	x
Jun	1.7	1.3	2.9	0.8
Jul	2.1	1.9	1.9	0.7
Aug	1.4	0.9	2.3	0.7
Sep	2.7	2.5	5.2	1.2
Oct	3.5	2.6	9.5	2.8
Nov	2.6	2.9	9.5	2.0
Dec	2.9	3.2	4.9	2.3
Jan	2.5	1.9	4.4	2.4
Feb	1.5	1.2	2.2	2.8
Mar	–	–	x	–

Table 44: Arithmetic CPUE (kg/potlift) for CRA 6 by fishing year and statistical area, 1979–80 to 2016–17. 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	1.46	1.07	1.49	0.94
1990–91	1.36	0.92	1.83	0.94
1991–92	1.22	0.86	1.80	0.84
1992–93	0.96	0.89	1.71	0.88
1993–94	0.96	0.89	1.37	0.79
1994–95	1.08	0.71	1.44	0.69
1995–96	0.92	0.74	1.46	0.82
1996–97	0.90	0.83	1.28	1.06
1997–98	0.73	0.75	1.09	0.94
1998–99	0.96	1.03	1.47	1.20
1999–00	0.92	1.00	1.63	0.80
2000–01	0.94	0.92	1.58	0.84
2001–02	1.00	0.85	1.61	1.21
2002–03	1.13	1.00	1.55	1.12
2003–04	1.12	0.76	1.56	0.99
2004–05	1.18	0.89	1.83	1.02
2005–06	1.28	0.92	1.80	1.50
2006–07	1.29	1.03	2.06	1.91
2007–08	1.36	1.14	1.99	1.35
2008–09	1.43	1.39	1.72	1.57
2009–10	1.16	1.28	1.81	1.31
2010–11	1.41	1.39	1.39	1.50
2011–12	1.36	1.41	1.69	1.58
2012–13	1.78	1.67	1.59	2.04
2013–14	1.57	1.54	1.49	1.85
2014–15	1.59	1.46	1.37	1.51
2015–16	1.58	1.57	1.41	1.55
2016–17	1.97	1.86	1.78	1.90

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	2.19	0.032
1980–81	2.18	2.05	2.02	0.033
1981–82	2.19	2.29	2.30	0.031
1982–83	1.78	1.63	1.66	0.028
1983–84	1.73	1.64	1.63	0.028
1984–85	1.35	1.31	1.30	0.028
1985–86	1.41	1.38	1.37	0.028
1986–87	1.66	1.52	1.50	0.029
1987–88	1.48	1.35	1.32	0.030
1988–89	1.40	1.29	1.27	0.032
1989–90	1.30	1.17	1.13	0.033
1990–91	1.36	1.20	1.18	0.033
1991–92	1.28	1.25	1.23	0.030
1992–93	1.19	1.16	1.13	0.029
1993–94	1.08	1.04	1.03	0.027
1994–95	1.06	1.02	1.01	0.026
1995–96	1.06	1.03	1.05	0.027
1996–97	1.03	1.07	1.08	0.028
1997–98	0.87	1.02	1.04	0.028
1998–99	1.15	1.22	1.28	0.034
1999–00	1.22	1.27	1.28	0.036
2000–01	1.17	1.19	1.22	0.034
2001–02	1.17	1.16	1.20	0.036
2002–03	1.22	1.27	1.31	0.037
2003–04	1.14	1.24	1.26	0.035
2004–05	1.29	1.42	1.44	0.034
2005–06	1.37	1.47	1.51	0.031
2006–07	1.52	1.71	1.76	0.034
2007–08	1.48	1.50	1.55	0.033
2008–09	1.55	1.67	1.69	0.033
2009–10	1.44	1.50	1.48	0.034
2010–11	1.41	1.55	1.55	0.034
2011–12	1.53	1.55	1.53	0.032
2012–13	1.70	1.61	1.54	0.033
2013–14	1.55	1.58	1.50	0.033
2014–15	1.45	1.45	1.41	0.032
2015–16	1.50	1.50	1.46	0.032
2016–17	1.85	1.92	1.87	0.033

Table 46: Number of vessels by statistical area from CRA 7, 1979–80 to 2016–17. 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
2012–13	9	4	12
2013–14	9	3	10
2014–15	7	3	9
2015–16	10	5	11
2016–17	10	6	11

Table 47: Distribution and annual landings by statistical area from CRA 7, 1979–80 to 2016–17. 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	63.3	36.7	28.9	16.8	45.7
2012–13	64.5	35.5	34.7	19.1	53.8
2013–14	77.9	22.1	34.3	9.7	44.0
2014–15	77.7	22.3	51.2	14.7	66.0
2015–16	73.5	26.5	71.7	25.9	97.6
2016–17	62.9	37.1	61.4	36.2	97.6

Table 48: Distribution and annual potlifts by statistical area from CRA 7, 1979–80 to 2016–17. 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	62.7	37.3	46.2	27.5	73.7
2012–13	68.7	31.3	66.9	30.5	97.4
2013–14	74.5	25.5	27.1	9.3	36.3
2014–15	84.1	15.9	50.0	9.4	59.4
2015–16	80.6	19.4	66.6	16.0	82.7
2016–17	75.5	24.5	58.3	18.9	77.1

Table 49: Percentage of annual landings by month from CRA 7, 1979–80 to 2016–17. 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	–	–	6.8	24.1	30.4	18.6	13.7	6.3	–	x	–	–
2012–13	–	–	7.8	16.7	21.0	23.9	17.3	13.5	–	–	–	–
2013–14	–	x	14.7	41.6	19.1	21.0	x	x	x	x	x	x
2014–15	0.2	1.5	5.1	9.5	29.2	26.0	13.1	6.7	2.5	2.4	2.8	0.8
2015–16	4.2	3.0	6.3	13.6	20.1	21.4	16.2	4.9	3.0	2.8	3.7	0.7
2016–17	1.5	1.0	3.6	6.5	26.3	24.0	14.1	9.3	3.7	5.2	2.4	2.4

Table 50: Percentage of landings from CRA 7 by statistical area and month for 2016–17. An 'x' indicates fewer than 3 vessels, and a '–' indicates no fishing in the month/ statistical area cell (10 instances representing 21.2% of the annual catch). This table generated from data prepared using the B4 algorithm scaled to the "L" destination code.

Month	920	921
Apr	1.3	x
May	0.8	x
Jun	3.5	0.1
Jul	5.6	x
Aug	21.4	x
Sep	14.7	9.3
Oct	6.6	7.4
Nov	3.9	x
Dec	1.1	x
Jan	2.2	x
Feb	0.8	x
Mar	x	x

Table 51: Arithmetic CPUE (kg/potlift) for CRA 7 by fishing year and statistical area, 1979–80 to 2016–17. 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	0.99
1992–93	0.34	0.82
1993–94	0.52	1.37
1994–95	0.38	1.13
1995–96	0.26	0.53
1996–97	0.22	0.45
1997–98	0.18	0.41
1998–99	0.23	0.40
1999–00	0.20	0.30
2000–01	0.27	0.52
2001–02	0.46	0.55
2002–03	0.45	1.09
2003–04	0.45	1.86
2004–05	0.55	1.63
2005–06	0.82	1.84
2006–07	1.27	2.03
2007–08	1.18	2.04
2008–09	2.26	2.62
2009–10	1.00	1.79
2010–11	0.68	1.10
2011–12	0.74	0.66
2012–13	0.62	0.62
2013–14	1.84	1.05
2014–15	1.73	2.26
2015–16	1.64	2.51
2016–17	2.26	3.18

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	0.96	0.96	0.031
1980–81	0.89	0.84	0.85	0.033
1981–82	0.79	0.72	0.72	0.033
1982–83	0.50	0.47	0.46	0.037
1983–84	0.40	0.40	0.40	0.038
1984–85	0.59	0.54	0.54	0.037
1985–86	0.75	0.71	0.72	0.036
1986–87	0.81	0.81	0.82	0.038
1987–88	0.73	0.67	0.69	0.040
1988–89	0.45	0.41	0.41	0.046
1989–90	0.33	0.31	0.33	0.047
1990–91	0.40	0.40	0.42	0.042
1991–92	0.81	0.97	0.98	0.054
1992–93	0.39	0.37	0.39	0.048
1993–94	0.63	0.60	0.62	0.058
1994–95	0.48	0.44	0.45	0.055
1995–96	0.32	0.29	0.29	0.056
1996–97	0.25	0.23	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	0.21	0.22	0.22	0.071
2000–01	0.33	0.34	0.34	0.063
2001–02	0.48	0.51	0.50	0.066
2002–03	0.51	0.58	0.60	0.069
2003–04	0.58	0.56	0.60	0.075
2004–05	0.77	0.89	0.88	0.094
2005–06	1.12	1.33	1.28	0.110
2006–07	1.55	1.87	1.75	0.092
2007–08	1.39	1.61	1.55	0.084
2008–09	2.38	1.88	1.79	0.107
2009–10	1.23	1.12	1.08	0.075
2010–11	0.83	0.81	0.80	0.084
2011–12	0.71	0.74	0.69	0.081
2012–13	0.62	0.70	0.68	0.092
2013–14	1.57	2.15	2.06	0.130
2014–15	1.85	2.10	2.09	0.126
2015–16	1.80	2.07	2.06	0.118
2016–17	2.68	2.79	2.78	0.102

Table 53: Number of vessels by statistical area from CRA 8, 1979–80 to 2016–17. Vessels catching less than 1 t in a year for the 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
2012–13	1	2	15	4	29	15	17	64
2013–14	–	2	13	1	25	15	18	63
2014–15	1	4	14	3	27	14	15	64
2015–16	1	5	14	3	32	16	11	64
2016–17	1	5	18	1	38	17	10	66

Table 54: Distribution and annual landings by statistical area from CRA 8, 1979–80 to 2016–17. 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	1725.6
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	1463.4
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	1395.7
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	1502.4
1983–84	1.1	10.2	22.3	1.5	35.8	17.3	11.9	16.1	154.9	339.8	22.5	546.6	263.0	182.0	1524.9
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	1549.3
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	1865.6
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	1600.1
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	1665.3
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	1047.7
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	1250.2
1990–91	0.9	6.7	23.1	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	11.7	1.3	35.1	20.1	25.4	x	48.3	94.5	10.7	283.9	162.3	205.4	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	1018.3
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	1018.3
2011–12	x	x	12.4	x	38.8	25.1	23.4	x	x	118.9	x	372.6	240.8	224.5	961.2
2012–13	x	x	14.3	0.5	37.2	21.4	26.1	x	x	137.5	4.6	357.4	205.6	250.9	960.8
2013–14	–	0.2	12.6	x	37.3	25.0	24.9	–	1.5	121.1	x	360.0	241.3	240.5	964.6
2014–15	x	2.3	11.3	0.2	36.5	26.0	23.7	x	21.8	108.7	2.2	351.2	249.9	228.1	962.0
2015–16	x	1.2	11.2	0.7	39.4	29.8	17.4	x	12.0	107.7	7.2	379.1	286.3	167.4	961.8
2016–17	x	0.9	14.5	x	41.3	26.5	16.3	x	8.6	139.3	x	397.5	254.7	157.1	962.1

Table 55: Distribution and annual potlifts by statistical area from CRA 8, 1979–80 to 2016–17. 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	1222.8
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	1267.3
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	1376.8
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	1392.7
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	1339.6
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	1133.9
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	1408.5
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	14.4	0.5	31.7	25.6	20.1	23.5	67.4	168.5	6.3	371.6	300.4	236.3	1174.1
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	1289.0
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	1086.5
1998–99	x	6.4	13.0	1.2	27.6	18.4	32.9	x	66.0	133.2	12.1	282.2	188.7	337.2	1023.4
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	9.2	x	35.2	32.5	22.4	x	x	37.5	x	144.5	133.4	92.0	410.1
2012–13	x	x	11.7	0.5	41.2	23.7	22.4	x	x	45.1	1.8	158.8	91.2	86.5	385.5
2013–14	–	0.2	10.6	x	37.8	24.7	26.6	–	0.8	37.1	x	132.5	86.8	93.4	350.6
2014–15	x	1.7	8.4	0.2	35.8	27.6	26.3	x	5.7	28.3	0.6	120.0	92.3	88.0	335.1
2015–16	x	1.1	8.2	0.6	37.8	29.7	22.4	x	3.9	29.3	2.2	135.4	106.3	80.0	357.8
2016–17	x	1.2	12.6	x	39.3	26.5	20.0	x	4.1	43.3	x	134.9	91.0	68.5	343.3

Table 56: Percentage of annual landings by month from CRA 8, 1979–80 to 2016–17. 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	7.7	17.5	16.2	22.5	13.2	10.4	6.4	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
2012–13	11.9	10.2	10.7	7.0	7.0	14.8	8.2	7.5	3.2	12.0	6.0	1.7
2013–14	12.1	9.5	7.8	4.2	7.6	25.5	4.6	4.9	0.3	14.2	5.7	3.4
2014–15	9.3	4.5	5.5	3.3	7.8	21.0	8.7	2.5	4.3	13.5	15.2	4.4
2015–16	11.0	5.9	5.7	2.2	4.2	15.6	10.2	7.0	2.1	11.2	13.6	11.3
2016–17	9.9	8.3	5.2	1.9	5.3	19.8	10.5	8.7	2.0	11.3	7.4	9.6

Table 57: Percentage of landings from CRA 8 by statistical area and month for 2016–17. An ‘x’ indicates fewer than 3 vessels in the month/statistical area cell (20 instances representing 3.7% 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	–	x	x	–	3.4	4.5	1.8
May	–	x	x	–	4.7	2.4	0.6
Jun	–	x	–	–	3.2	0.7	1.2
Jul	–	–	x	–	1.2	x	0.3
Aug	–	x	1.7	x	2.4	0.7	0.3
Sep	–	0.2	4.7	x	7.4	4.9	2.4
Oct	x	x	3.6	–	3.6	1.8	1.6
Nov	–	x	2.6	–	2.9	2.0	x
Dec	–	–	0.7	x	1.0	x	x
Jan	–	x	0.3	x	4.1	4.8	2.1
Feb	–	–	0.4	–	2.8	2.0	2.3
Mar	–	–	x	–	4.6	2.3	2.3

Table 58: Arithmetic CPUE (kg/potlift) for CRA 8 by fishing year and statistical area, 1979–80 to 2016–17. 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	0.56	0.94	1.34	0.37	0.99	0.72	0.71
1990–91	0.59	1.02	1.30	1.36	0.96	0.76	0.60
1991–92	0.42	0.86	1.20	2.09	0.86	0.75	0.69
1992–93	0.49	0.81	1.07	0.87	0.69	0.53	0.58
1993–94	0.91	1.34	1.72	1.72	0.91	0.68	0.71
1994–95	0.42	0.84	1.28	1.31	0.89	0.74	0.65
1995–96	x	0.74	1.21	1.35	1.07	0.82	0.67
1996–97	x	0.66	1.06	1.16	0.94	0.80	0.66
1997–98	x	0.65	1.01	0.90	0.72	0.67	0.64
1998–99	–	0.78	0.74	0.73	0.92	0.78	0.58
1999–00	x	0.74	1.10	1.19	1.06	0.80	0.53
2000–01	–	1.13	1.27	2.18	1.23	0.76	0.66
2001–02	x	1.58	1.32	1.62	1.10	0.79	0.66
2002–03	x	x	1.28	x	1.29	0.85	0.75
2003–04	x	2.30	2.30	0.57	1.87	1.31	0.99
2004–05	x	2.38	2.34	1.80	1.71	1.43	1.15
2005–06	x	3.20	3.51	x	1.88	1.22	1.51
2006–07	x	1.57	4.12	–	2.33	1.64	2.13
2007–08	x	2.63	3.11	4.15	2.24	2.15	3.85
2008–09	x	3.38	3.43	x	2.64	2.97	5.22
2009–10	x	x	3.82	x	2.65	3.29	4.47
2010–11	x	x	3.35	x	2.54	1.90	3.21
2011–12	–	–	3.51	x	3.03	2.00	3.46
2012–13	–	x	3.36	2.69	2.91	2.77	4.05
2013–14	–	2.39	3.13	x	3.56	3.11	3.73
2014–15	x	4.48	3.83	x	3.43	3.04	3.85
2015–16	–	3.52	4.26	3.63	3.37	3.46	3.01
2016–17	–	2.97	4.62	x	4.07	3.39	3.07

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	2.02	1.96	0.019
1980–81	1.72	1.79	1.71	0.020
1981–82	1.79	1.78	1.64	0.021
1982–83	1.57	1.48	1.41	0.020
1983–84	1.25	1.13	1.06	0.020
1984–85	1.22	1.09	1.03	0.020
1985–86	1.36	1.26	1.21	0.020
1986–87	1.15	1.12	1.08	0.021
1987–88	1.24	1.19	1.13	0.022
1988–89	0.92	0.91	0.85	0.026
1989–90	0.92	0.91	0.83	0.026
1990–91	0.91	0.88	0.81	0.026
1991–92	0.84	0.82	0.79	0.024
1992–93	0.68	0.69	0.67	0.024
1993–94	0.93	0.91	0.90	0.026
1994–95	0.86	0.82	0.80	0.026
1995–96	0.91	0.88	0.86	0.029
1996–97	0.84	0.83	0.81	0.029
1997–98	0.71	0.69	0.69	0.027
1998–99	0.74	0.71	0.70	0.030
1999–00	0.85	0.78	0.75	0.032
2000–01	0.99	0.95	0.92	0.034
2001–02	0.97	1.01	0.99	0.041
2002–03	1.08	1.13	1.15	0.038
2003–04	1.62	1.69	1.72	0.042
2004–05	1.62	1.83	1.89	0.042
2005–06	1.79	2.11	2.31	0.045
2006–07	2.18	2.46	2.79	0.045
2007–08	2.58	2.82	3.06	0.042
2008–09	3.43	3.58	4.10	0.044
2009–10	3.48	3.63	3.94	0.040
2010–11	2.63	2.88	3.23	0.041
2011–12	2.87	3.00	3.18	0.038
2012–13	3.20	3.10	3.31	0.037
2013–14	3.43	3.19	3.42	0.041
2014–15	3.50	3.13	3.25	0.041
2015–16	3.41	3.43	3.45	0.038
2016–17	3.71	3.73	3.86	0.040

Table 60: Number of vessels by statistical area from CRA 9, 1979–80 to 2016–17. Vessels catching less than 1 t in a year for the 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
2012–13	–	2	1	1	0	–	–	4
2013–14	–	1	2	1	0	–	–	4
2014–15	–	1	2	1	0	–	–	4
2015–16	–	1	3	1	2	–	–	7
2016–17	–	1	2	2	1	0	–	6

Table 61: Distribution and annual landings by statistical area from CRA 9, 1979–80 to 2016–17. 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	9.1	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	27.6	x	43.3	x	x	–	2.6	12.6	x	19.7	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
2012–13	–	x	x	34.0	x	–	–	–	x	x	16.0	x	–	–	47.0
2013–14	–	x	x	x	x	–	–	–	x	x	x	x	–	–	47.1
2014–15	–	x	x	x	x	–	–	–	x	x	x	x	–	–	60.8
2015–16															
2016–17	–	8.3	42.2	29.8	x	–	–	–	5.0	25.6	18.1	x	–	–	60.6

Table 62: Distribution and annual potlifts by statistical area from CRA 9, 1979–80 to 2016–17. 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	23.0	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	23.0	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	14.0	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	3.0	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	23.0	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	–	46.4
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	25.0	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	19.0	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	33.0	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
2012–13	–	x	x	12.3	x	–	–	–	x	x	2.5	x	–	–	20.5
2013–14	–	x	x	x	x	–	–	–	x	x	x	x	–	–	19.0
2014–15	–	x	x	x	x	–	–	–	x	x	x	x	–	–	30.7
2015–16															
2016–17	–	10.8	51.4	19.8	x	–	–	–	3.4	16.3	6.3	x	–	–	31.7

Table 63: Percentage of annual landings by month from CRA 9, 1979–80 to 2016–17. 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	24.2	24.0	13.2	4.8	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
2012–13	x	x	4.8	13.8	6.6	35.9	14.0	x	x	–	x	x
2013–14	x	x	x	16.6	23.9	29.0	3.2	8.0	x	–	–	x
2014–15	5.1	4.2	9.2	24.2	26.1	13.4	12.0	x	x	–	–	–
2015–16	x	x	4.2	28.6	21.8	9.4	11.5	13.9	2.4	–	x	–
2016–17	8.8	4.3	0.7	11.7	23.4	18.4	19.9	6.0	6.3	–	–	x

Table 64: Percentage of landings from CRA 9 by statistical area and month for 2016–17. An 'x' indicates fewer than 3 vessels in the month/statistical area cell (31 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	x	x	–	–	–
May	–	x	x	x	–	–	–
Jun	–	x	x	x	–	–	–
Jul	–	x	x	x	x	–	–
Aug	–	x	x	x	x	–	–
Sep	–	x	x	x	x	–	–
Oct	–	x	x	x	x	–	–
Nov	–	–	x	x	x	–	–
Dec	–	–	x	–	x	–	–
Jan	–	–	–	–	–	–	–
Feb	–	–	–	–	–	–	–
Mar	–	–	–	–	–	x	–

Table 65: Arithmetic CPUE (kg/potlift) for CRA 9 by fishing year and statistical area, 1979–80 to 2016–17. 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	–	x	–	1.15	0.45	x	–
1990–91	–	x	1.32	0.85	x	–	–
1991–92	–	x	1.43	0.84	–	x	–
1992–93	–	x	1.44	0.75	–	x	–
1993–94	–	x	x	1.42	–	–	–
1994–95	–	–	x	x	–	x	–
1995–96	–	–	x	1.27	x	x	–
1996–97	–	x	x	1.26	x	x	–
1997–98	–	0.38	x	1.03	1.01	x	–
1998–99	–	x	x	0.85	x	x	x
1999–00	–	x	1.69	0.73	–	x	–
2000–01	–	0.84	x	0.74	0.45	x	–
2001–02	–	x	x	0.66	x	0.99	–
2002–03	–	–	x	1.23	x	x	–
2003–04	–	–	x	2.01	x	x	–
2004–05	–	x	x	2.16	x	x	–
2005–06	–	–	x	2.16	x	x	–
2006–07	–	–	x	1.71	–	x	–
2007–08	–	–	x	1.77	x	x	–
2008–09	–	x	x	2.12	x	x	–
2009–10	–	x	x	x	x	x	–
2010–11	–	x	2.95	2.53	x	–	–
2011–12	–	x	x	x	–	–	–
2012–13	–	x	–	x	x	–	–
2013–14	–	x	x	x	x	–	–
2014–15	–	–	x	x	x	–	–
2015–16	–	x	x	x	x	–	–
2016–17	–	x	x	x	x	–	–

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 after excluding vessels with <1.0 t combined landings (see Section 2.3); '–': no data.

Fishing year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	1.11	1.11	1.27	0.047
1980–81	1.14	1.16	1.38	0.046
1981–82	0.98	0.95	1.05	0.053
1982–83	0.86	0.83	0.87	0.052
1983–84	0.94	0.91	0.90	0.053
1984–85	0.89	0.84	0.86	0.052
1985–86	0.74	0.73	0.76	0.052
1986–87	0.87	0.86	0.88	0.053
1987–88	0.85	0.91	0.90	0.056
1988–89	0.81	0.79	0.89	0.068
1989–90	–	–	–	–
1990–91	0.97	0.93	0.84	0.078
1991–92	0.94	1.01	0.87	0.077
1992–93	0.98	1.10	0.95	0.080
1993–94	1.40	1.38	1.19	0.101
1994–95	1.25	1.23	0.95	0.126
1995–96	1.35	1.40	1.37	0.102
1996–97	1.12	1.07	1.16	0.093
1997–98	0.91	0.95	1.08	0.083
1998–99	1.08	1.37	1.43	0.091
1999–00	1.01	1.14	0.97	0.106
2000–01	0.95	1.22	1.21	0.086
2001–02	0.85	1.16	1.15	0.087
2002–03	1.25	1.55	1.50	0.084
2003–04	1.51	1.91	1.74	0.106
2004–05	2.08	2.19	2.16	0.106
2005–06	2.30	2.27	2.11	0.116
2006–07	1.99	2.34	2.19	0.128
2007–08	1.87	1.97	1.78	0.122
2008–09	1.75	1.33	1.33	0.102
2009–10	2.07	1.64	1.59	0.101
2010–11	2.49	2.29	2.33	0.110
2011–12	2.19	1.90	2.00	0.135
2012–13	2.49	2.14	2.98	0.139
2013–14	2.94	2.03	2.22	0.133
2014–15	2.86	2.71	2.33	0.144
2015–16	2.38	1.81	1.98	0.136
2016–17	1.92	1.81	1.97	0.113

Table 67: Offset year standardised CPUE analysis, with standard errors, used to operate the 2017–18 CRA 1 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	0.795	0.769	0.868	0.0369
1980–81	1.008	0.868	0.920	0.0395
1981–82	1.044	0.898	0.972	0.0406
1982–83	1.144	0.953	0.995	0.0400
1983–84	1.104	0.999	0.947	0.0392
1984–85	0.926	0.830	0.845	0.0371
1985–86	0.844	0.828	0.832	0.0383
1986–87	0.737	0.728	0.754	0.0369
1987–88	0.765	0.764	0.780	0.0410
1988–89	0.799	0.656	0.623	0.0437
1989–90	0.784	0.737	0.681	0.0451
1990–91	0.660	0.667	0.633	0.0425
1991–92	0.594	0.602	0.661	0.0426
1992–93	0.573	0.563	0.599	0.0444
1993–94	0.769	0.735	0.756	0.0436
1994–95	0.897	0.938	0.987	0.0456
1995–96	0.911	0.957	1.117	0.0565
1996–97	0.882	0.845	1.009	0.0586
1997–98	0.878	0.801	1.026	0.0622
1998–99	0.924	0.850	0.989	0.0646
1999–00	1.109	0.864	0.974	0.0603
2000–01	1.272	1.166	1.243	0.0572
2001–02	1.239	1.198	1.177	0.0598
2002–03	1.133	1.020	1.023	0.0608
2003–04	1.365	1.265	1.193	0.0627
2004–05	1.473	1.485	1.325	0.0659
2005–06	1.354	1.597	1.512	0.0605
2006–07	1.512	1.920	1.762	0.0598
2007–08	1.712	1.944	1.742	0.0581
2008–09	1.688	1.991	1.781	0.0647
2009–10	1.501	1.745	1.550	0.0643
2010–11	1.398	1.774	1.611	0.0563
2011–12	1.488	1.725	1.689	0.0580
2012–13	1.534	1.673	1.523	0.0559
2013–14	1.435	1.618	1.508	0.0602
2014–15	1.274	1.442	1.312	0.0606
2015–16	1.331	1.524	1.335	0.0670
2016–17	1.413	1.438	1.279	0.0771

Table 68: Offset year standardised CPUE analysis, with standard errors, used to operate the 2017–18 CRA 2 decision rule under the existing MP based on the 2013 CRA 2 stock assessment (Starr et al. 2014). This table generated from data prepared using the F2 algorithm scaled to combined "LFX" destination codes and does not include a [vessel] explanatory variable.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.572	0.604	0.603	0.0211
1980–81	0.554	0.540	0.534	0.0213
1981–82	0.535	0.510	0.504	0.0208
1982–83	0.420	0.397	0.391	0.0215
1983–84	0.394	0.373	0.367	0.0217
1984–85	0.375	0.353	0.346	0.0221
1985–86	0.420	0.411	0.397	0.0229
1986–87	0.359	0.335	0.328	0.0228
1987–88	0.366	0.348	0.333	0.0249
1988–89	0.352	0.336	0.324	0.0287
1989–90	0.466	0.465	0.483	0.0392
1990–91	0.446	0.461	0.450	0.0287
1991–92	0.427	0.431	0.418	0.0310
1992–93	0.396	0.409	0.412	0.0320
1993–94	0.453	0.468	0.470	0.0329
1994–95	0.632	0.628	0.639	0.0357
1995–96	0.803	0.784	0.851	0.0418
1996–97	0.866	1.002	1.128	0.0451
1997–98	0.924	1.019	1.126	0.0458
1998–99	0.669	0.777	0.851	0.0431
1999–00	0.682	0.772	0.821	0.0427
2000–01	0.609	0.613	0.626	0.0379
2001–02	0.485	0.454	0.451	0.0359
2002–03	0.439	0.478	0.471	0.0344
2003–04	0.440	0.471	0.464	0.0347
2004–05	0.436	0.490	0.490	0.0367
2005–06	0.491	0.506	0.503	0.0344
2006–07	0.538	0.585	0.581	0.0356
2007–08	0.545	0.547	0.540	0.0359
2008–09	0.507	0.482	0.481	0.0362
2009–10	0.476	0.434	0.421	0.0351
2010–11	0.427	0.389	0.374	0.0351
2011–12	0.457	0.436	0.424	0.0341
2012–13	0.394	0.384	0.376	0.0343
2013–14	0.374	0.358	0.350	0.0355
2014–15	0.334	0.298	0.300	0.0371
2015–16	0.315	0.308	0.296	0.0368
2016–17	0.315	0.300	0.289	0.0380

Table 69: Offset year standardised CPUE analysis, with standard errors, used to operate the proposed new 2017–18 CRA 2 decision rule. This table generated from data prepared using the F2 algorithm scaled to combined "LFX" destination codes and includes a [vessel] explanatory variable filtered to exclude vessels with less than five years experience in the fishery.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1989–90	0.478	0.455	0.563	0.0531
1990–91	0.475	0.469	0.540	0.0366
1991–92	0.426	0.420	0.485	0.0354
1992–93	0.392	0.407	0.480	0.0327
1993–94	0.446	0.462	0.554	0.0320
1994–95	0.633	0.632	0.769	0.0336
1995–96	0.793	0.773	0.932	0.0379
1996–97	0.859	0.986	1.168	0.0387
1997–98	0.924	1.003	1.175	0.0388
1998–99	0.673	0.784	0.889	0.0373
1999–00	0.682	0.760	0.801	0.0364
2000–01	0.615	0.602	0.605	0.0331
2001–02	0.485	0.451	0.413	0.0312
2002–03	0.435	0.467	0.423	0.0302
2003–04	0.440	0.459	0.415	0.0306
2004–05	0.437	0.482	0.446	0.0319
2005–06	0.494	0.512	0.467	0.0297
2006–07	0.538	0.572	0.523	0.0304
2007–08	0.545	0.523	0.474	0.0308
2008–09	0.507	0.481	0.439	0.0311
2009–10	0.479	0.448	0.396	0.0305
2010–11	0.430	0.390	0.344	0.0307
2011–12	0.457	0.426	0.380	0.0301
2012–13	0.393	0.377	0.339	0.0308
2013–14	0.374	0.355	0.317	0.0321
2014–15	0.337	0.295	0.264	0.0337
2015–16	0.312	0.303	0.255	0.0350
2016–17	0.312	0.287	0.252	0.0353

Table 70: Offset year standardised CPUE analysis, with standard errors, used to operate the 2017–18 CRA 3 decision rule. This table generated from data prepared using the F2 algorithm scaled to "LFX" destination codes.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.933	0.870	0.819	0.0211
1980–81	0.925	0.896	0.842	0.0207
1981–82	0.936	0.932	0.899	0.0206
1982–83	0.923	0.910	0.881	0.0201
1983–84	0.815	0.769	0.743	0.0196
1984–85	0.738	0.681	0.645	0.0198
1985–86	0.712	0.658	0.614	0.0214
1986–87	0.643	0.523	0.502	0.0209
1987–88	0.443	0.425	0.393	0.0232
1988–89	0.442	0.420	0.412	0.0237
1989–90	0.495	0.469	0.457	0.0228
1990–91	0.421	0.355	0.348	0.0235
1991–92	0.318	0.267	0.254	0.0226
1992–93	0.362	0.348	0.330	0.0245
1993–94	0.812	0.849	0.887	0.0400
1994–95	1.305	1.399	1.463	0.0485
1995–96	1.792	1.848	1.927	0.0528
1996–97	2.139	2.403	2.517	0.0539
1997–98	1.677	1.831	1.999	0.0514
1998–99	1.714	1.871	2.019	0.0518
1999–00	1.192	1.257	1.418	0.0440
2000–01	0.916	0.999	1.088	0.0447
2001–02	0.827	0.757	0.832	0.0400
2002–03	0.682	0.642	0.629	0.0347
2003–04	0.560	0.503	0.474	0.0345
2004–05	0.543	0.541	0.512	0.0370
2005–06	0.575	0.587	0.559	0.0357
2006–07	0.602	0.596	0.560	0.0355
2007–08	0.664	0.636	0.593	0.0393
2008–09	0.761	0.815	0.773	0.0436
2009–10	1.027	1.049	1.000	0.0432
2010–11	1.458	1.565	1.568	0.0453
2011–12	2.049	2.242	2.321	0.0549
2012–13	1.953	2.160	2.264	0.0500
2013–14	1.754	1.958	2.209	0.0439
2014–15	1.549	1.703	1.850	0.0397
2015–16	1.402	1.658	1.784	0.0406
2016–17	1.595	1.698	1.787	0.0421

Table 71: Offset year standardised CPUE analysis, with standard errors, used to operate the 2017–18 CRA 4 decision rule. This table generated from data prepared using the F2 algorithm scaled to "LFX" destination codes.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.887	0.878	0.849	0.0196
1980–81	0.822	0.837	0.816	0.0195
1981–82	0.854	0.898	0.900	0.0197
1982–83	0.925	0.920	0.909	0.0188
1983–84	0.839	0.812	0.796	0.0186
1984–85	0.716	0.716	0.703	0.0193
1985–86	0.754	0.770	0.756	0.0192
1986–87	0.810	0.747	0.722	0.0195
1987–88	0.691	0.656	0.638	0.0198
1988–89	0.611	0.566	0.555	0.0203
1989–90	0.586	0.568	0.549	0.0203
1990–91	0.508	0.529	0.521	0.0196
1991–92	0.534	0.527	0.511	0.0194
1992–93	0.549	0.541	0.520	0.0191
1993–94	0.648	0.657	0.641	0.0205
1994–95	0.836	0.830	0.825	0.0232
1995–96	1.039	1.107	1.153	0.0263
1996–97	1.243	1.307	1.437	0.0309
1997–98	1.330	1.401	1.587	0.0323
1998–99	1.334	1.377	1.530	0.0320
1999–00	1.232	1.217	1.338	0.0321
2000–01	1.103	1.141	1.247	0.0302
2001–02	1.027	1.096	1.174	0.0284
2002–03	1.148	1.202	1.261	0.0269
2003–04	1.014	1.021	1.048	0.0264
2004–05	1.045	1.006	0.987	0.0269
2005–06	0.741	0.729	0.729	0.0261
2006–07	0.675	0.679	0.640	0.0252
2007–08	0.626	0.667	0.636	0.0281
2008–09	0.836	0.912	0.879	0.0306
2009–10	0.995	1.010	1.025	0.0286
2010–11	1.198	1.181	1.174	0.0271
2011–12	1.493	1.412	1.370	0.0293
2012–13	1.463	1.340	1.308	0.0294
2013–14	1.241	1.147	1.154	0.0293
2014–15	0.945	0.880	0.866	0.0281
2015–16	0.735	0.706	0.675	0.0271
2016–17	0.752	0.810	0.755	0.0287

Table 72: Offset year standardised CPUE analysis, with standard errors, used to operate the 2017–18 CRA 5 decision rule. This table generated from data prepared using the F2 algorithm scaled to "LFX" destination codes.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	0.769	0.675	0.627	0.0243
1980–81	0.863	0.720	0.676	0.0272
1981–82	0.783	0.738	0.712	0.0255
1982–83	0.841	0.728	0.707	0.0252
1983–84	0.748	0.679	0.660	0.0252
1984–85	0.726	0.594	0.575	0.0257
1985–86	0.669	0.530	0.511	0.0255
1986–87	0.600	0.459	0.441	0.0264
1987–88	0.455	0.395	0.376	0.0274
1988–89	0.409	0.370	0.343	0.0308
1989–90	0.412	0.385	0.357	0.0329
1990–91	0.413	0.346	0.323	0.0305
1991–92	0.379	0.326	0.296	0.0335
1992–93	0.340	0.324	0.314	0.0350
1993–94	0.363	0.343	0.332	0.0377
1994–95	0.410	0.394	0.378	0.0420
1995–96	0.474	0.455	0.467	0.0412
1996–97	0.629	0.608	0.631	0.0442
1997–98	0.704	0.759	0.765	0.0467
1998–99	0.892	0.924	0.961	0.0474
1999–00	1.085	1.035	1.052	0.0490
2000–01	1.201	1.282	1.392	0.0564
2001–02	1.235	1.343	1.502	0.0653
2002–03	1.316	1.455	1.596	0.0535
2003–04	1.228	1.350	1.479	0.0549
2004–05	1.066	1.241	1.304	0.0491
2005–06	1.143	1.376	1.412	0.0464
2006–07	1.217	1.403	1.420	0.0466
2007–08	1.353	1.545	1.570	0.0453
2008–09	1.553	1.962	2.004	0.0486
2009–10	1.670	1.990	2.071	0.0493
2010–11	1.755	2.015	2.051	0.0507
2011–12	1.535	1.740	1.769	0.0525
2012–13	1.534	1.729	1.792	0.0535
2013–14	1.403	1.625	1.671	0.0531
2014–15	1.652	1.639	1.692	0.0535
2015–16	1.492	1.556	1.573	0.0563
2016–17	1.717	2.041	2.048	0.0580

Table 73: Offset year standardised CPUE analysis, with standard errors, used to operate the 2017–18 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	0.943	0.950	0.957	0.0323
1980–81	0.804	0.754	0.756	0.0326
1981–82	0.502	0.485	0.486	0.0356
1982–83	0.441	0.438	0.431	0.0380
1983–84	0.580	0.531	0.528	0.0372
1984–85	0.759	0.693	0.695	0.0374
1985–86	0.749	0.709	0.718	0.0377
1986–87	0.778	0.794	0.818	0.0402
1987–88	0.472	0.461	0.467	0.0420
1988–89	0.380	0.314	0.325	0.0487
1989–90	0.421	0.420	0.448	0.0440
1990–91	0.683	0.608	0.637	0.0430
1991–92	0.413	0.419	0.430	0.0590
1992–93	0.519	0.535	0.572	0.0487
1993–94	0.545	0.486	0.494	0.0581
1994–95	0.322	0.305	0.309	0.0549
1995–96	0.233	0.216	0.225	0.0635
1996–97	0.224	0.182	0.185	0.0633
1997–98	0.293	0.251	0.245	0.0651
1998–99	0.247	0.249	0.255	0.0704
1999–00	0.303	0.301	0.300	0.0658
2000–01	0.466	0.497	0.485	0.0653
2001–02	0.475	0.515	0.526	0.0648
2002–03	0.570	0.602	0.630	0.0770
2003–04	0.803	0.738	0.771	0.0833
2004–05	1.019	1.212	1.164	0.1029
2005–06	1.542	1.936	1.776	0.0968
2006–07	1.394	1.593	1.564	0.0884
2007–08	2.194	1.893	1.791	0.0968
2008–09	1.224	1.057	0.996	0.0872
2009–10	1.092	1.019	0.991	0.0779
2010–11	0.792	0.807	0.766	0.0795
2011–12	0.576	0.663	0.635	0.0889
2012–13	1.207	1.463	1.439	0.1071
2013–14	1.903	2.294	2.211	0.1424
2014–15	1.735	2.040	2.002	0.1186
2015–16	2.727	2.873	2.862	0.1105
2016–17	1.967	2.325	2.328	0.1144

Table 74: Offset year standardised CPUE analysis, with standard errors, used to operate the 2017–18 CRA 8 decision rule. This table generated from data prepared using the F2 algorithm scaled to combined "LF" destination codes.

Offset year	Arithmetic	Unstandardised	Standardised	s.e.
1979–80	1.844	1.988	1.912	0.0189
1980–81	1.779	1.806	1.669	0.0199
1981–82	1.602	1.576	1.482	0.0205
1982–83	1.411	1.256	1.187	0.0200
1983–84	1.316	1.214	1.128	0.0194
1984–85	1.348	1.192	1.136	0.0193
1985–86	1.167	1.068	1.025	0.0204
1986–87	1.203	1.168	1.112	0.0208
1987–88	1.136	1.102	1.020	0.0224
1988–89	0.967	0.938	0.869	0.0253
1989–90	0.917	0.901	0.815	0.0259
1990–91	0.811	0.805	0.773	0.0240
1991–92	0.826	0.802	0.774	0.0235
1992–93	0.799	0.780	0.755	0.0235
1993–94	0.878	0.838	0.831	0.0257
1994–95	0.883	0.864	0.822	0.0269
1995–96	0.832	0.815	0.792	0.0286
1996–97	0.768	0.743	0.741	0.0275
1997–98	0.748	0.709	0.684	0.0281
1998–99	0.824	0.809	0.788	0.0294
1999–00	0.945	0.856	0.814	0.0321
2000–01	0.893	0.913	0.871	0.0345
2001–02	1.012	1.015	1.036	0.0379
2002–03	1.484	1.570	1.571	0.0385
2003–04	1.576	1.659	1.735	0.0409
2004–05	1.782	2.105	2.202	0.0418
2005–06	2.122	2.370	2.727	0.0442
2006–07	2.488	2.657	3.033	0.0437
2007–08	3.230	3.355	3.740	0.0407
2008–09	2.956	3.140	3.565	0.0441
2009–10	2.465	2.803	3.126	0.0382
2010–11	2.356	2.566	2.762	0.0406
2011–12	2.550	2.619	2.799	0.0404
2012–13	2.897	2.727	2.889	0.0397
2013–14	2.899	2.795	3.000	0.0404
2014–15	3.004	2.974	3.038	0.0420
2015–16	2.889	3.054	3.091	0.0384
2016–17	3.484	3.607	3.711	0.0430

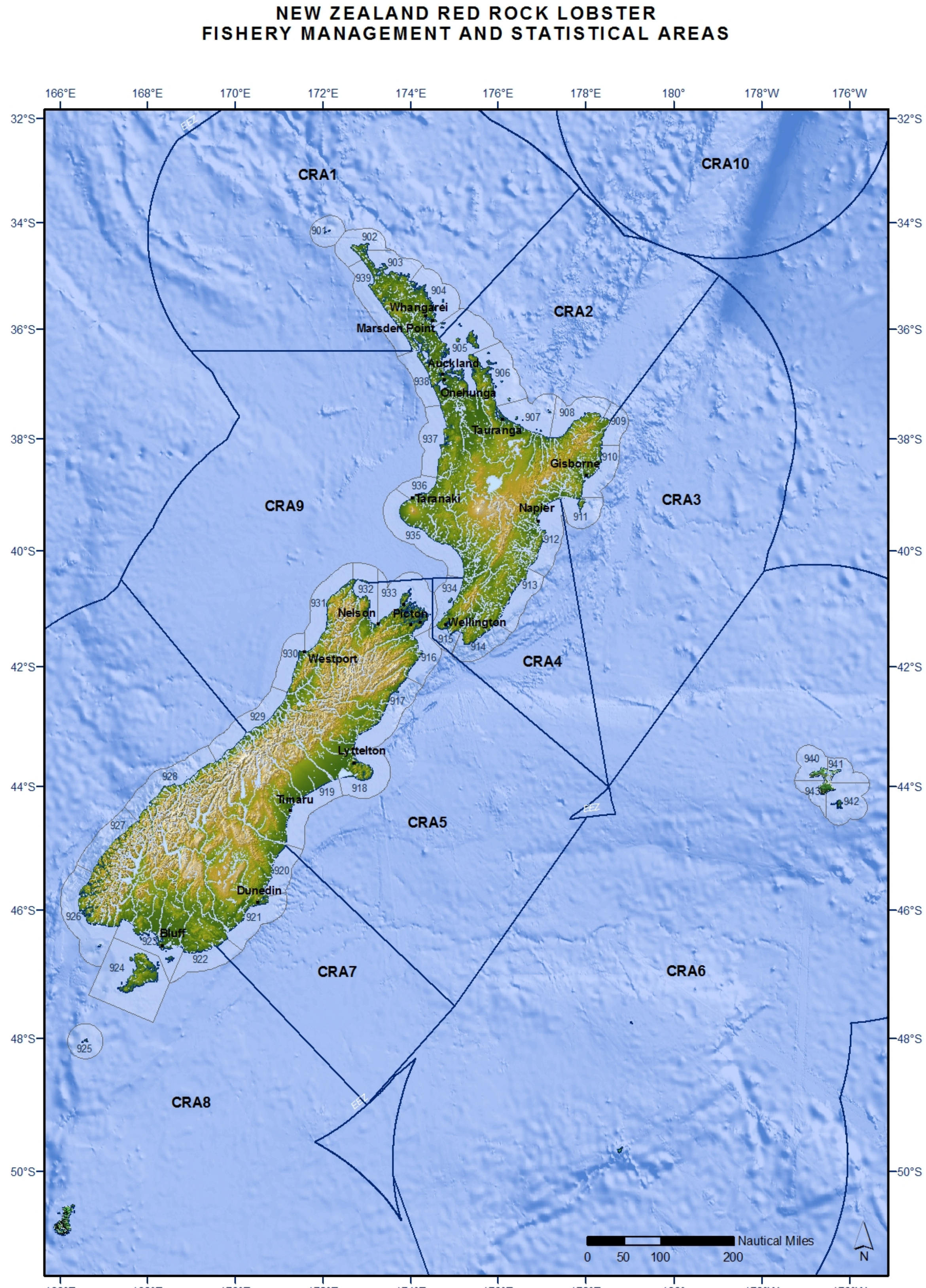

Figure 1: Map of rock lobster statistical areas and Quota Management Areas.

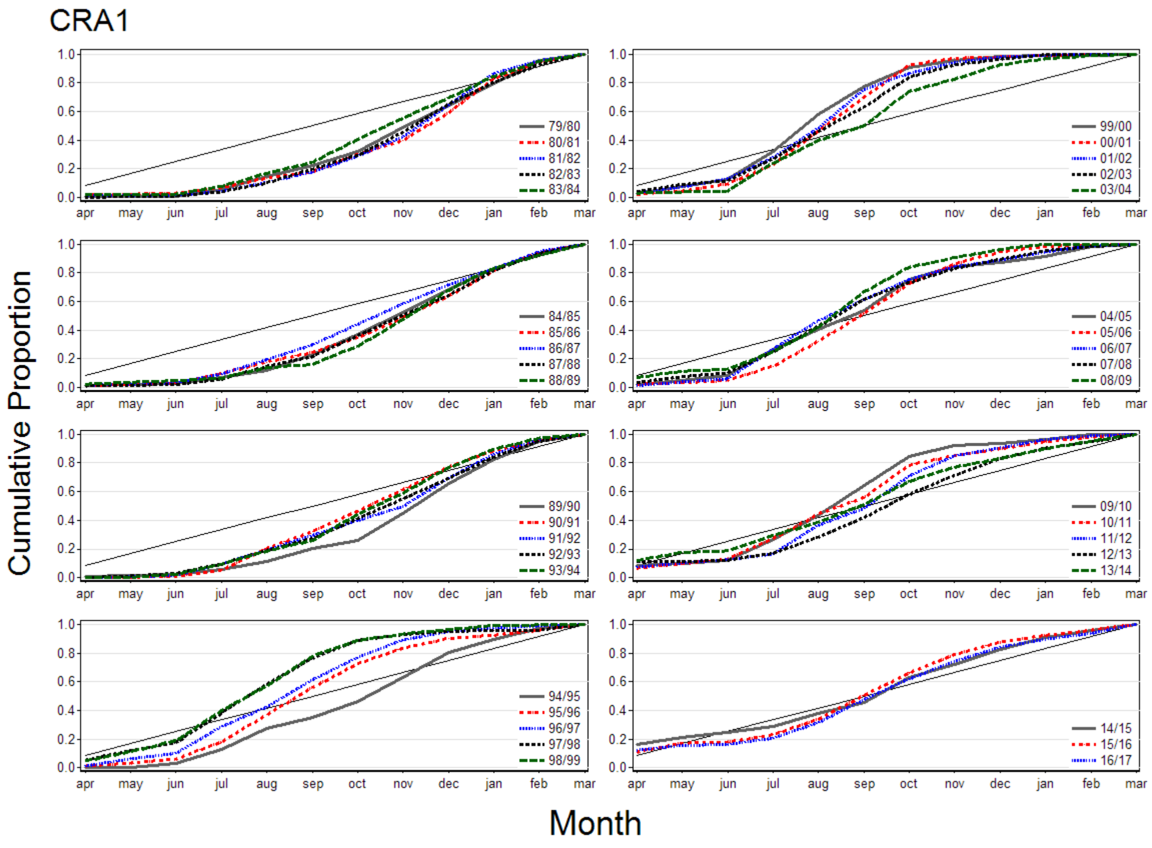

Figure 2: **Cumulative landing proportions by fishing month for CRA 1, 1979–80 to 2016–17. Thin black line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.**

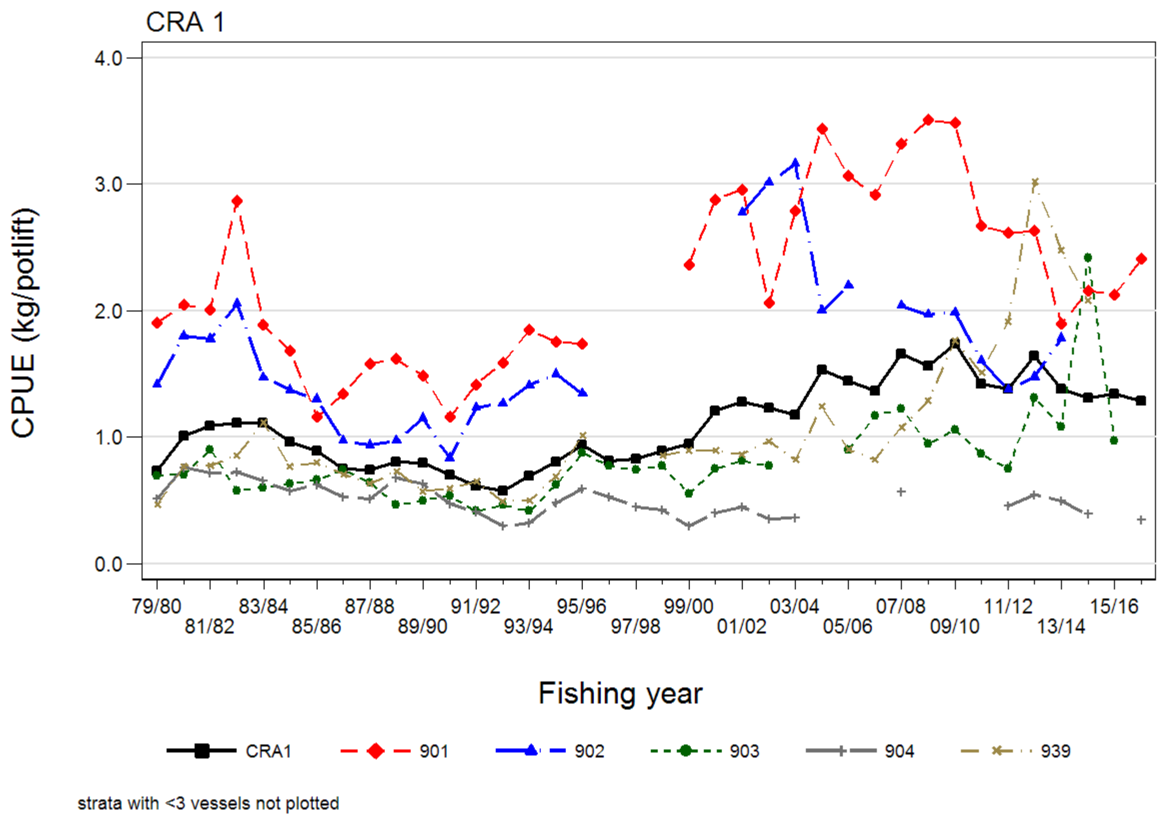

Figure 3: **Arithmetic CPUE for CRA 1 by fishing year and statistical area from 1979–80 to 2016–17. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.**

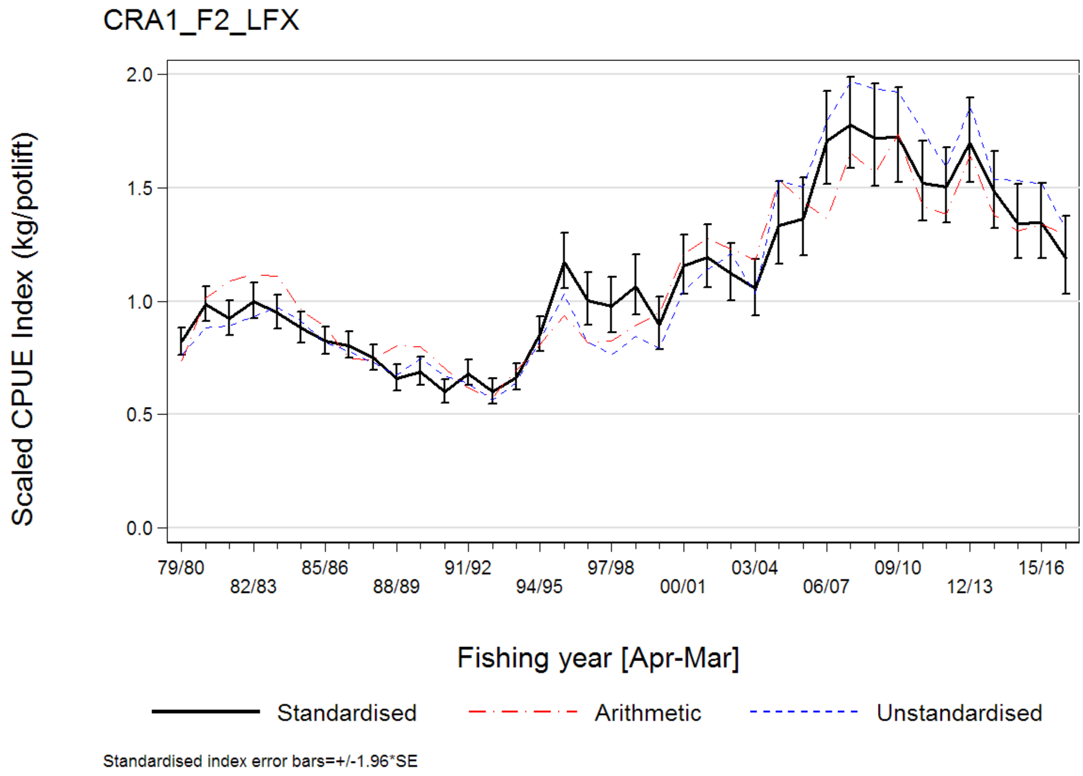

Figure 4: Annual CPUE indices for CRA 1: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 1.96 s.e. from 1979–80 to 2016–17. The geometric mean for each series = 1.05 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

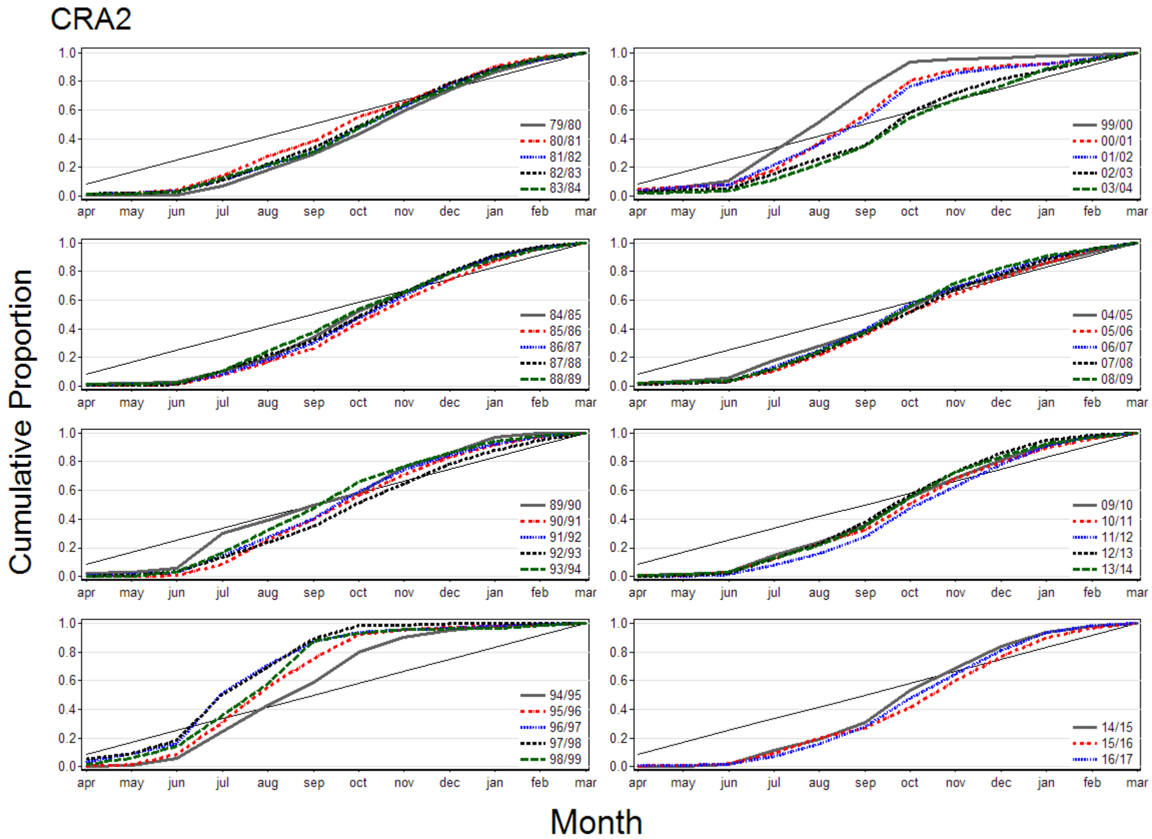

Figure 5: Cumulative landing proportions by fishing month for CRA 2, 1979–80 to 2016–17. Thin black line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

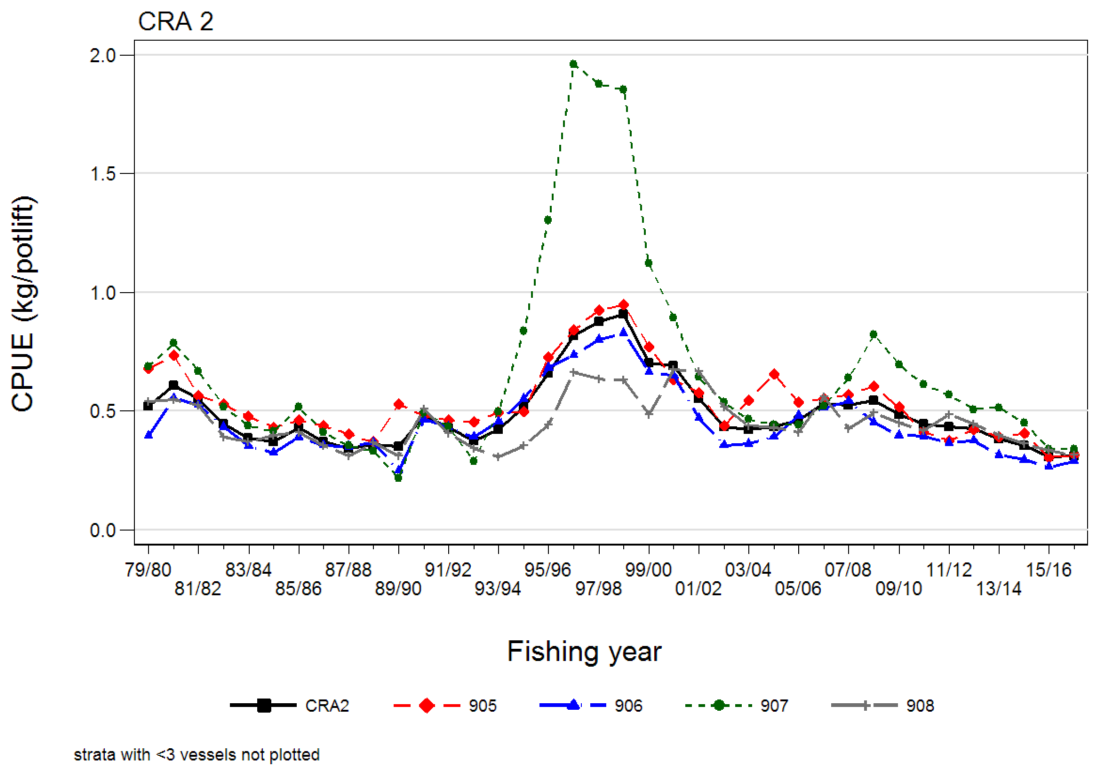

Figure 6: Arithmetic CPUE for CRA 2 by fishing year and statistical area from 1979–80 to 2016–17. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

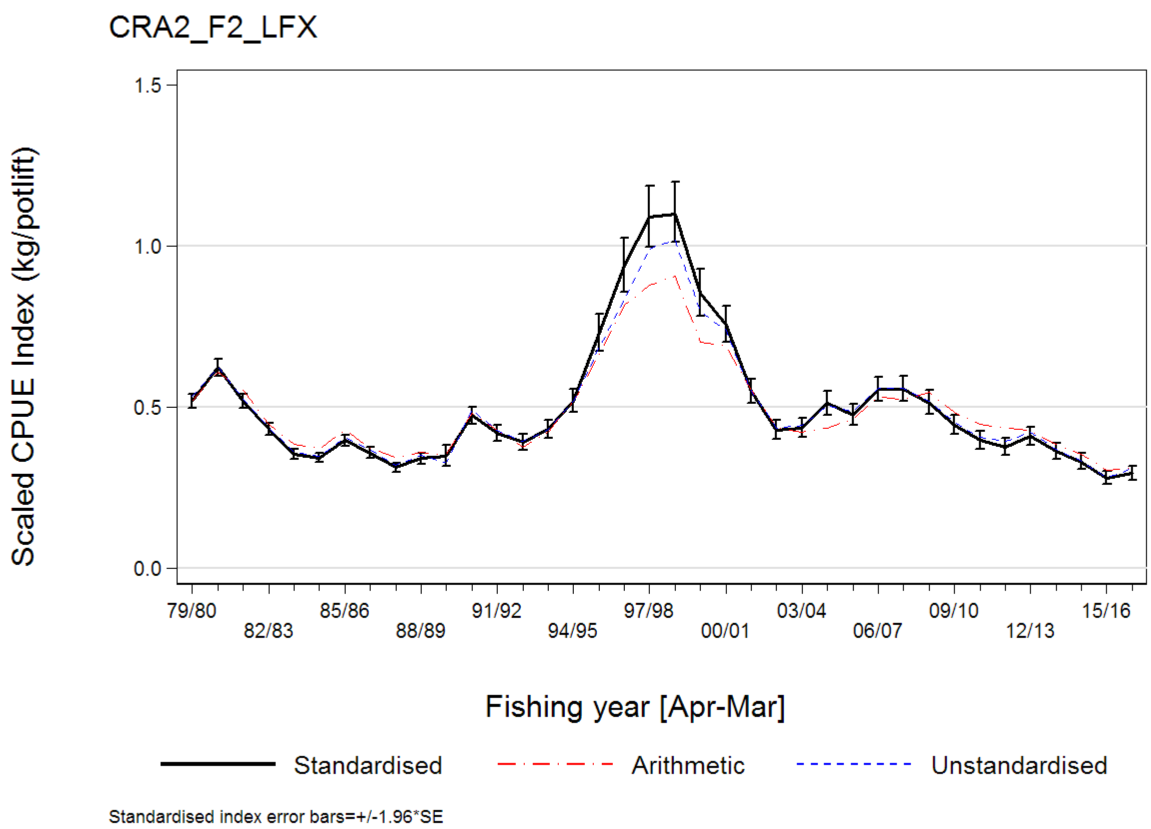

Figure 7: Annual CPUE indices for CRA 2: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 1.96 s.e. from 1979–80 to 2016–17. The geometric mean for each series = 0.47 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

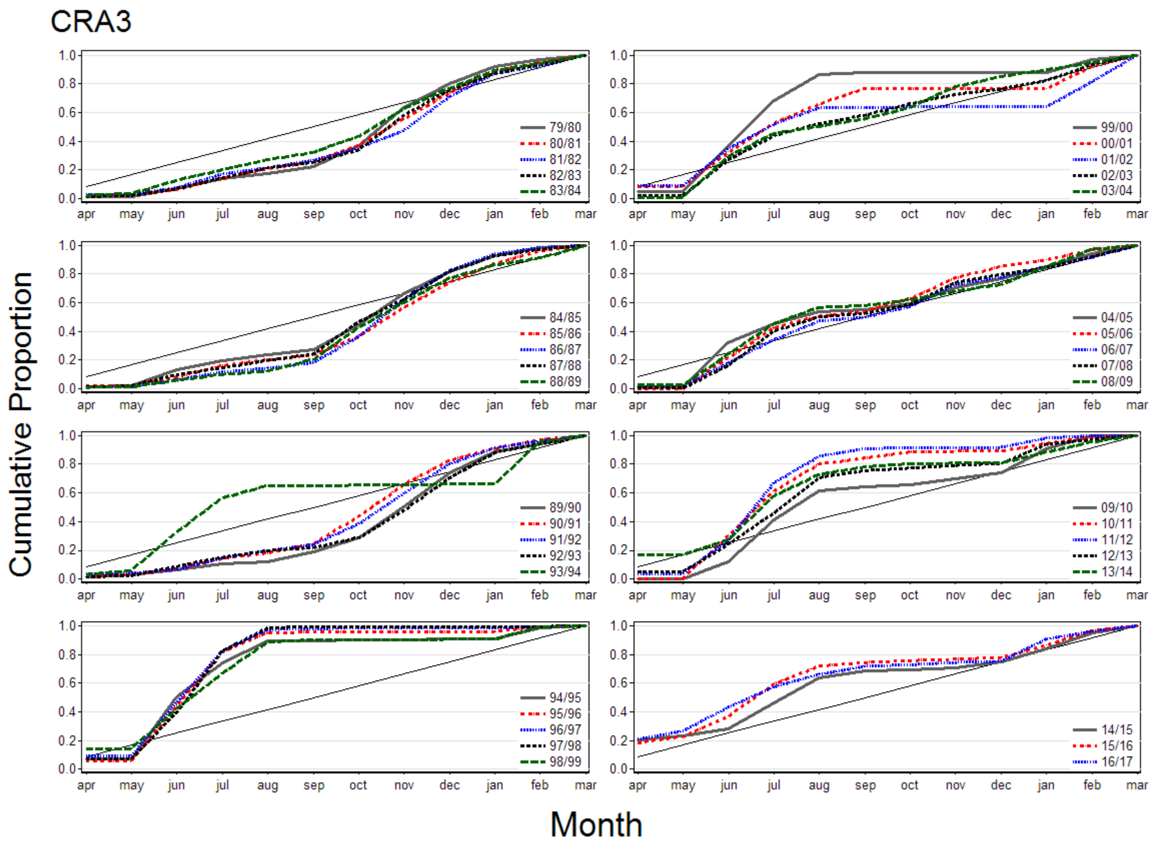

Figure 8: Cumulative landing proportions by fishing month for CRA 3, 1979–80 to 2016–17. Thin black line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

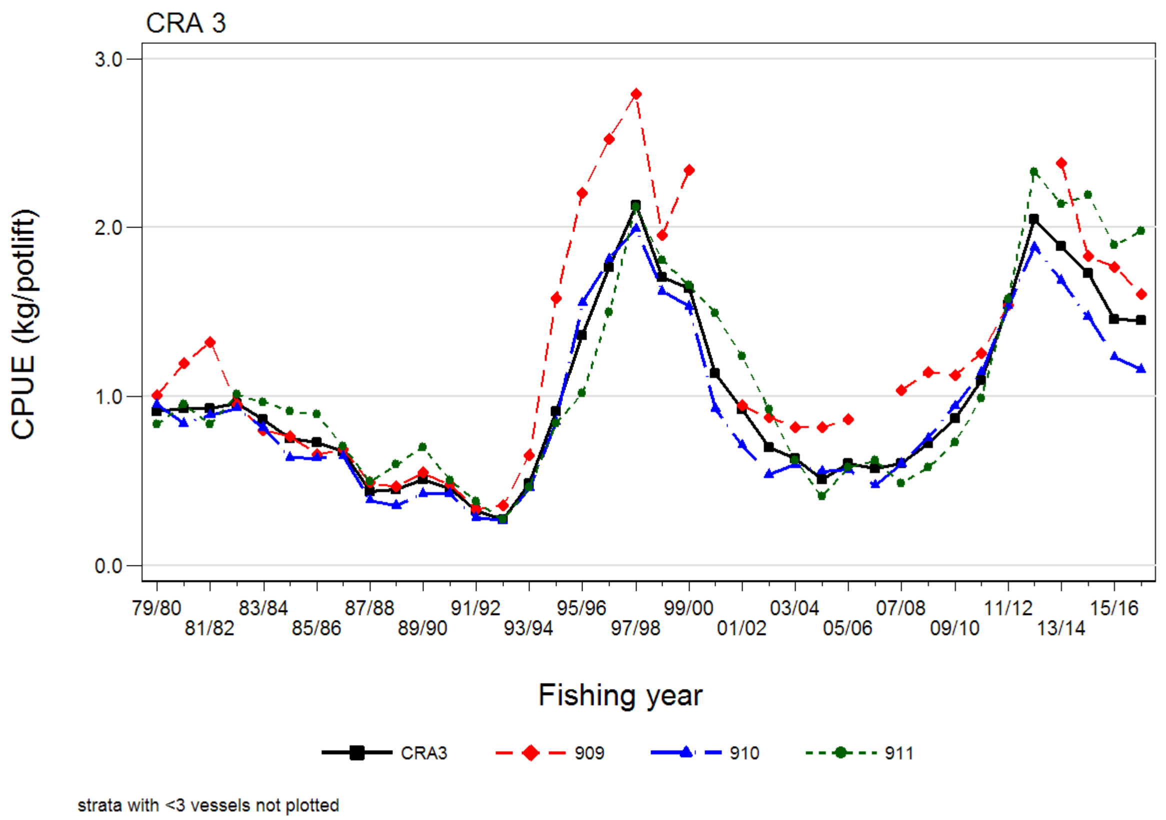

Figure 9: Arithmetic CPUE for CRA 3 by fishing year and statistical area from 1979–80 to 2016–17. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

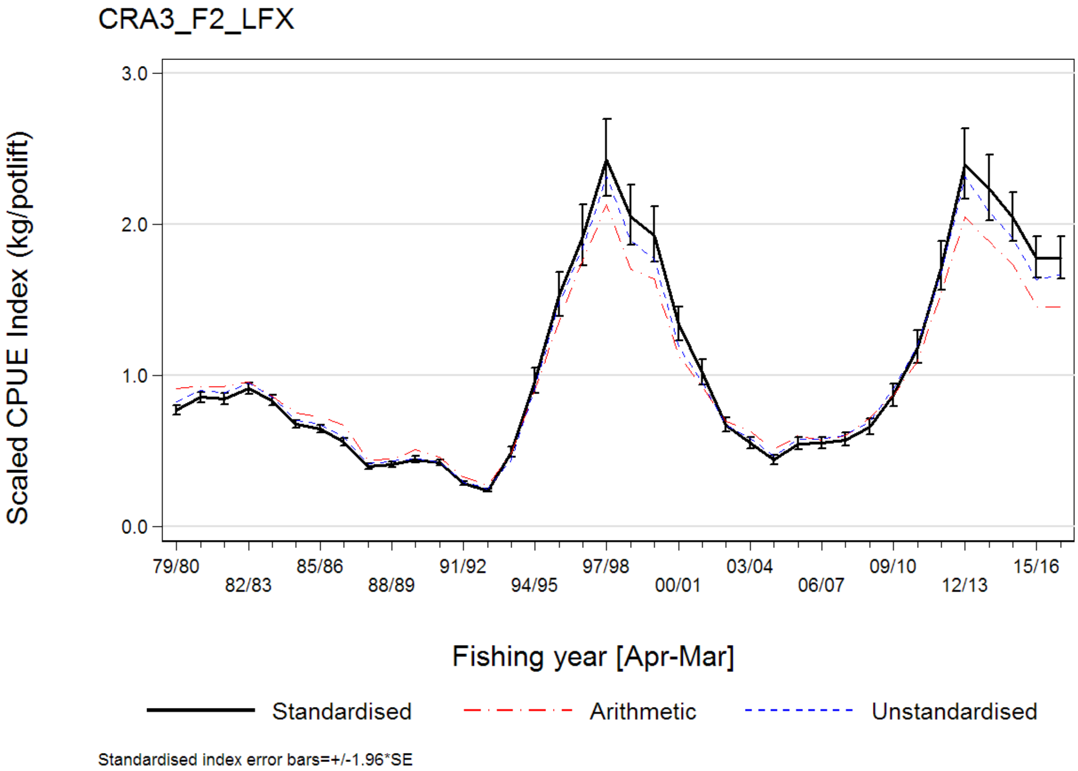

Figure 10: Annual CPUE indices for CRA 3: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 1.96 s.e. from 1979–80 to 2016–17. The geometric mean for each series = 0.87 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

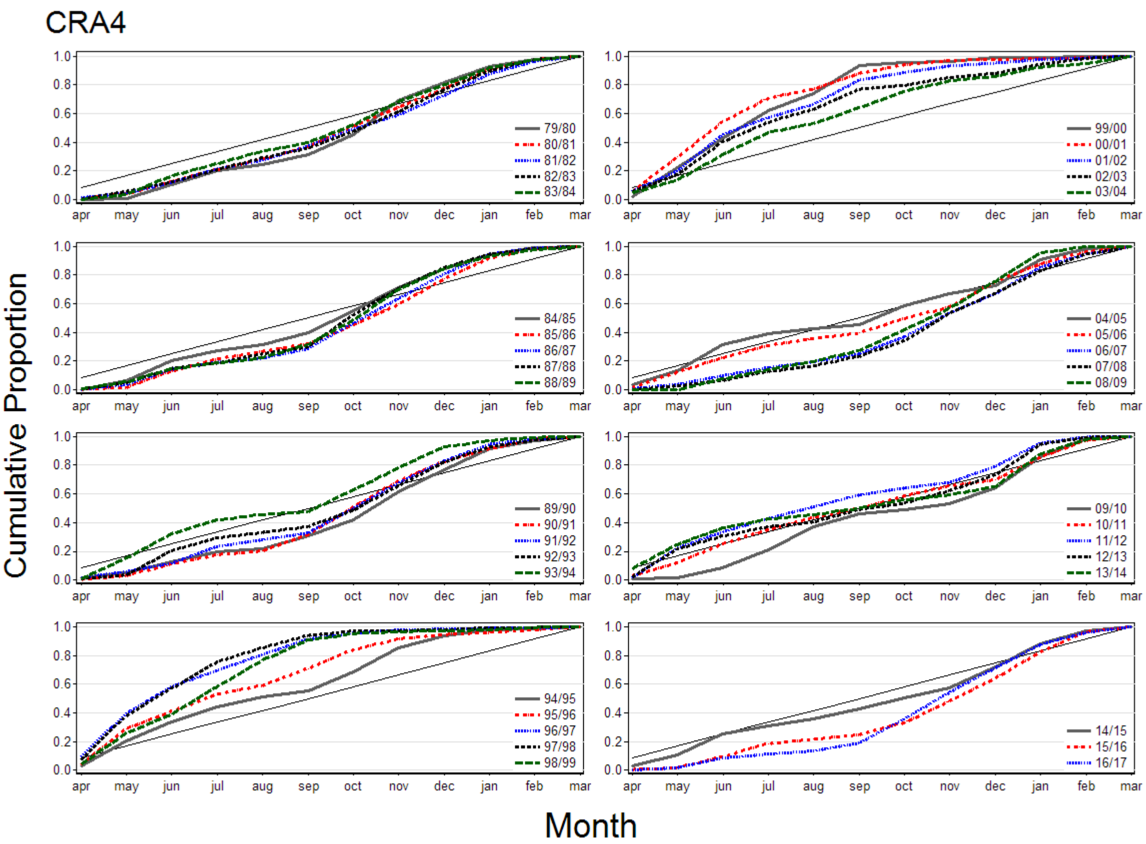

Figure 11: Cumulative landing proportions by fishing month for CRA 4, 1979–80 to 2016–17. Thin black line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

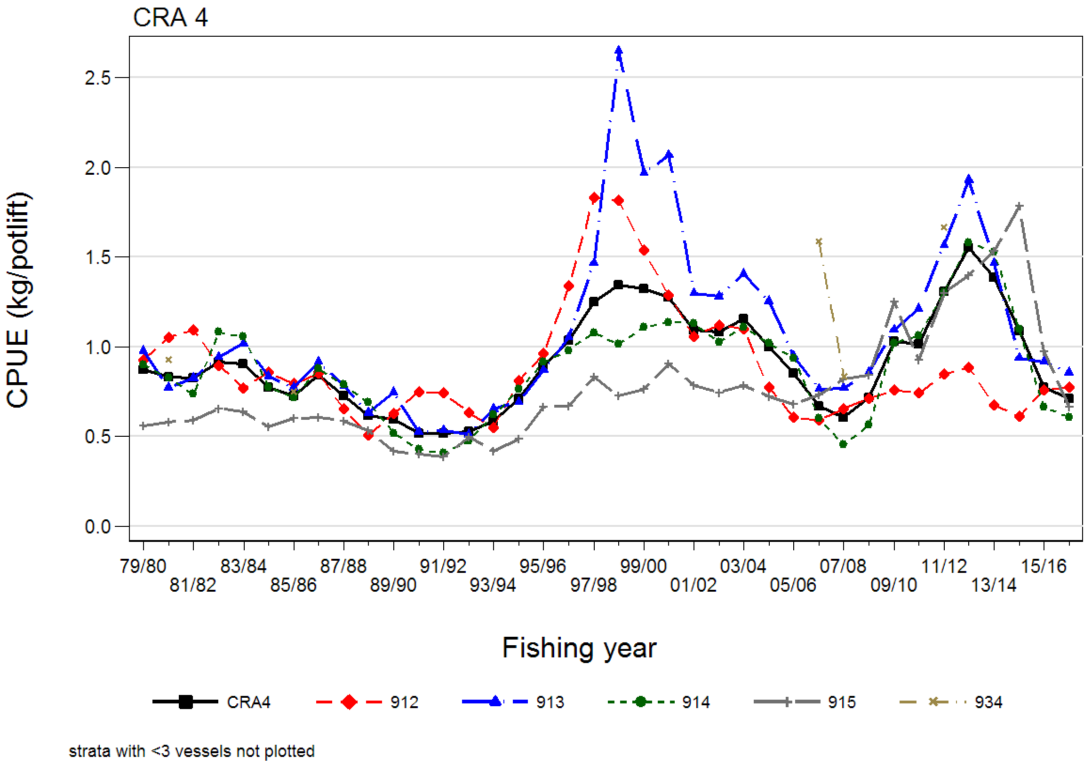

Figure 12: Arithmetic CPUE for CRA 4 by fishing year and statistical area from 1979–80 to 2016–17. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

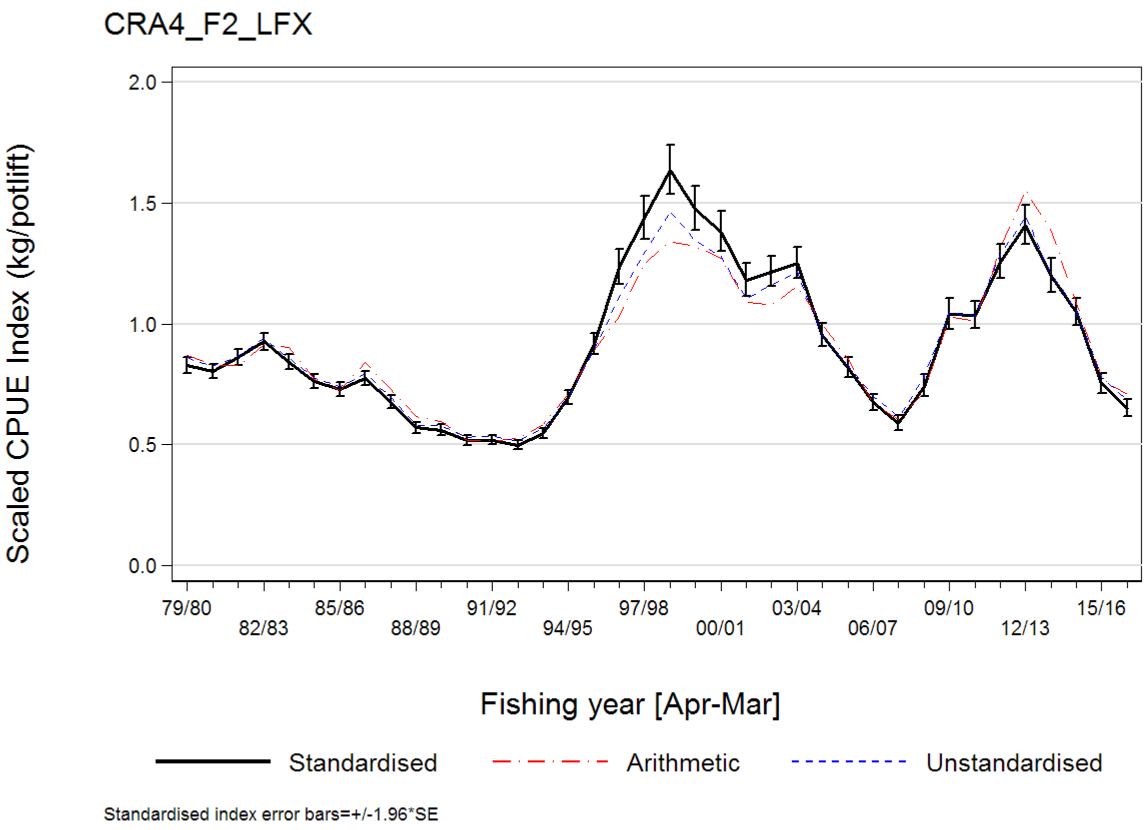

Figure 13: Annual CPUE indices for CRA 4: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 1.96 s.e. from 1979–80 to 2016–17. The geometric mean for each series = 0.87 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

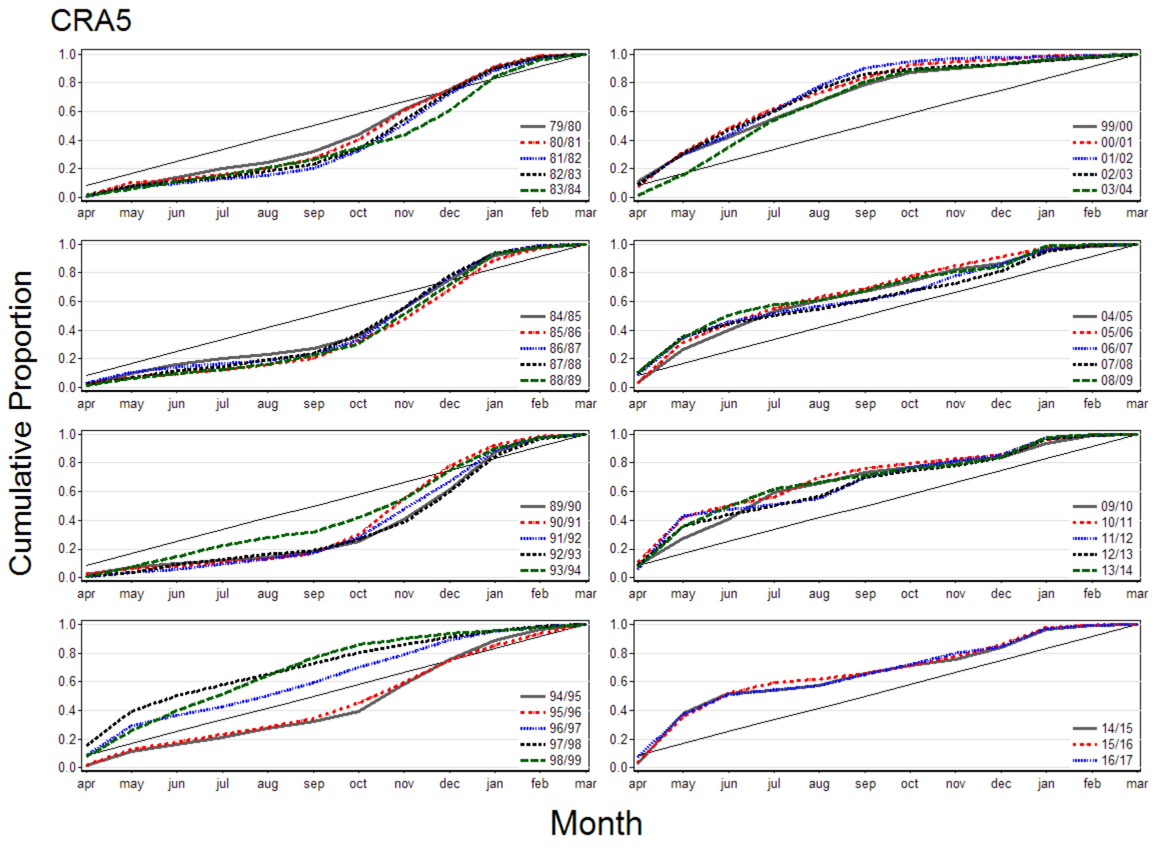

Figure 14: Cumulative landing proportions by fishing month for CRA 5, 1979–80 to 2016–17. Thin black line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

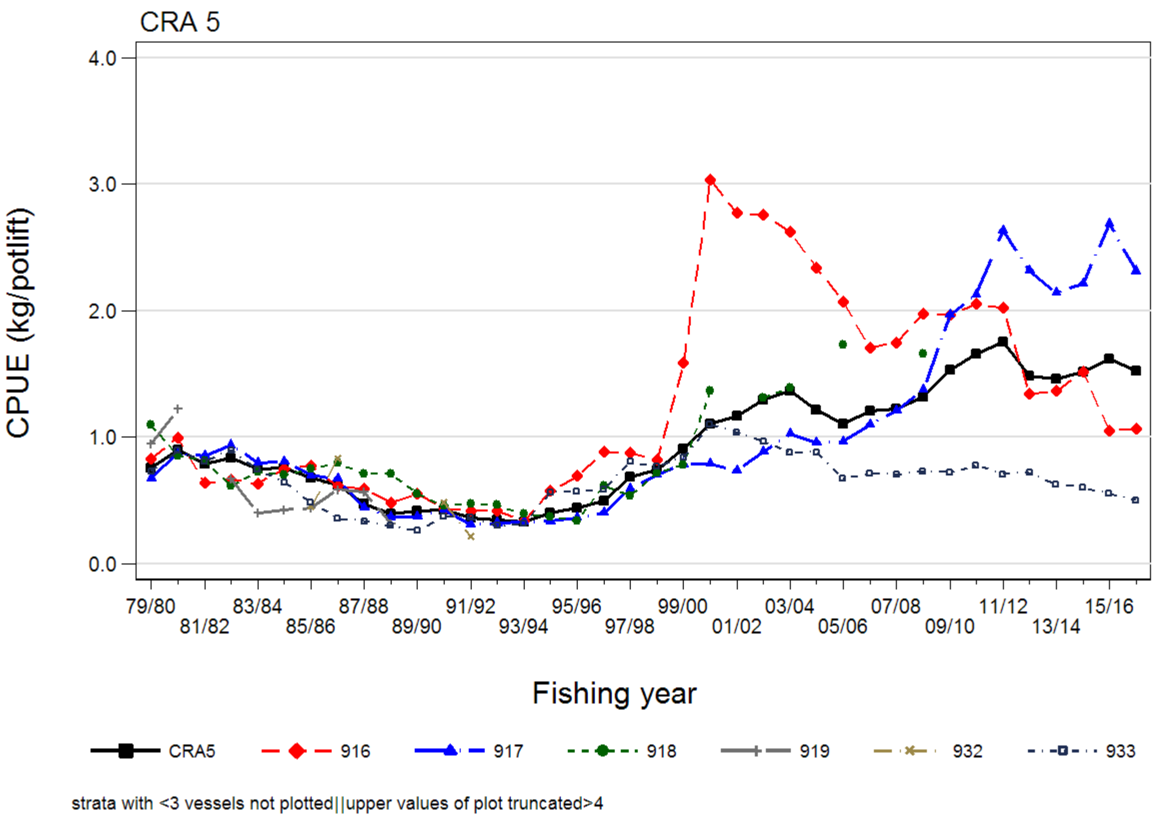

Figure 15: Arithmetic CPUE for CRA 5 by fishing year and statistical area from 1979–80 to 2016–17. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes. See Table 37 for truncated value for Area 918.

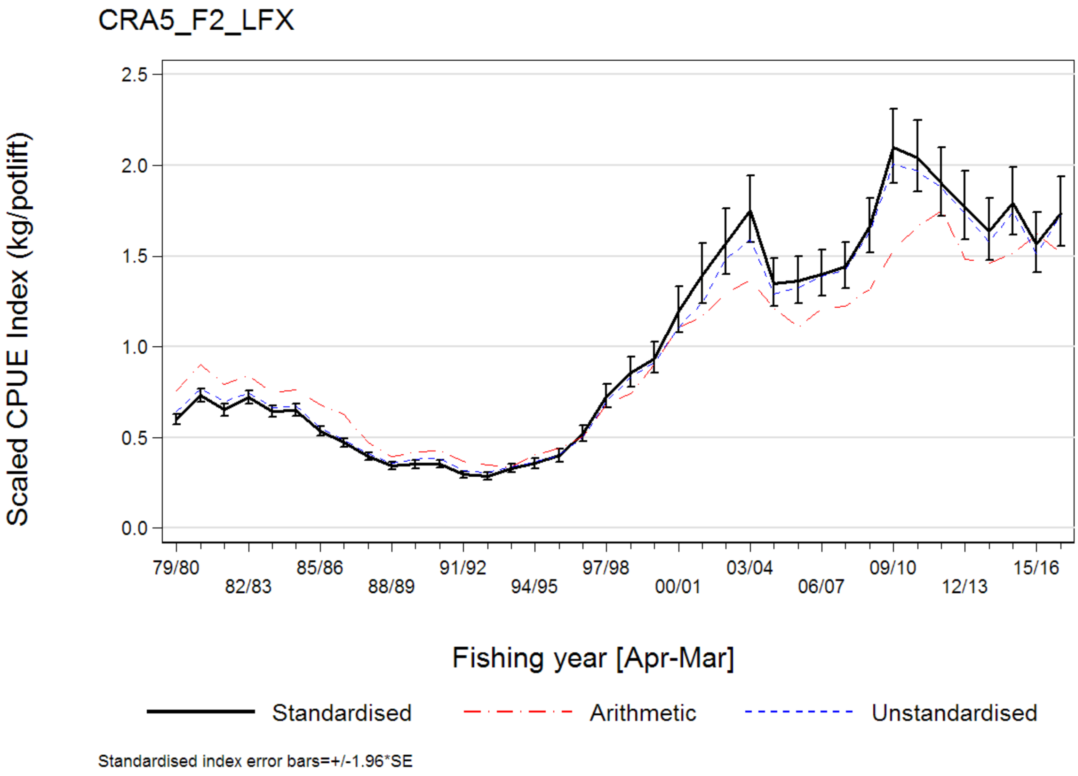

Figure 16: Annual CPUE indices for CRA 5: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 1.96 s.e. from 1979–80 to 2016–17. The geometric mean for each series = 0.84 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

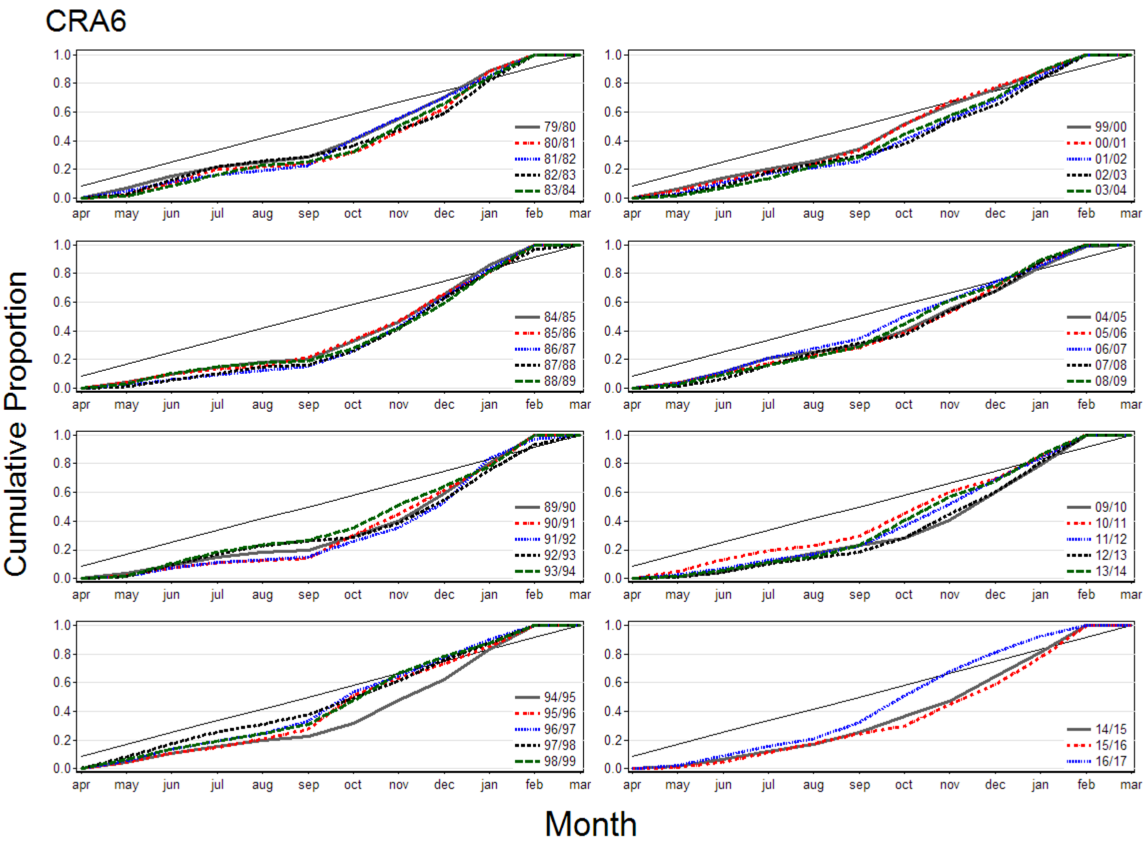

Figure 17: Cumulative landing proportions by fishing month for CRA 6, 1979–80 to 2016–17. Thin black line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

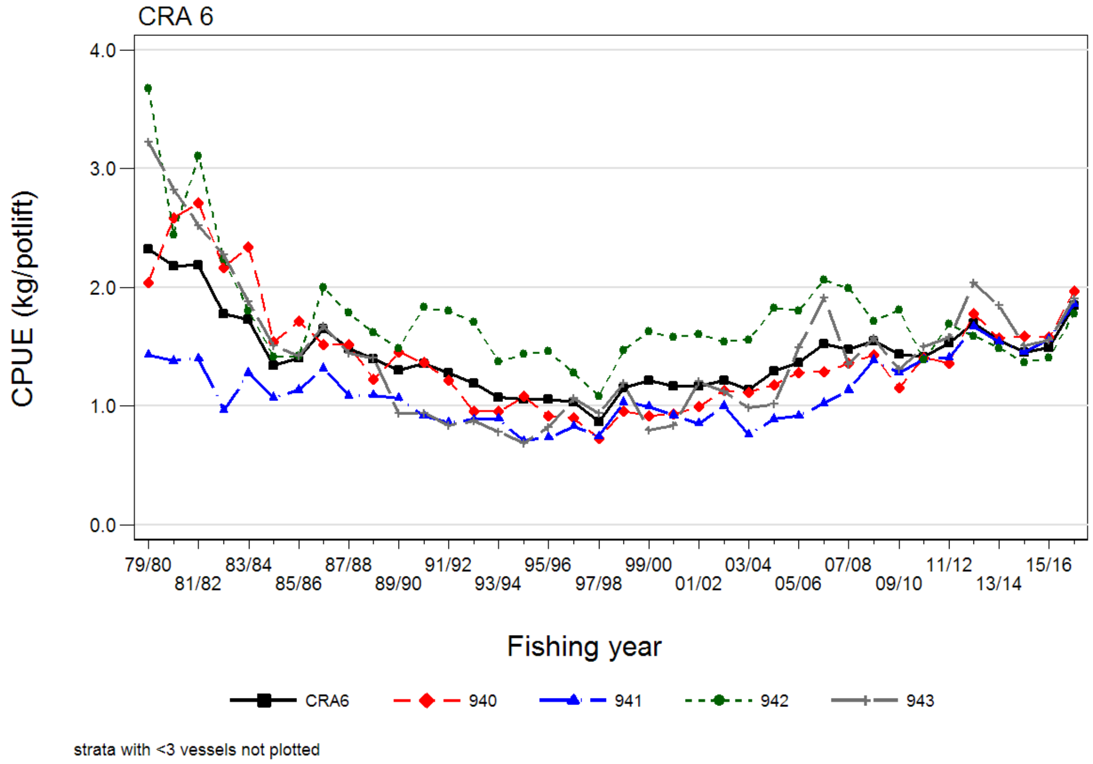

Figure 18: Arithmetic CPUE for CRA 6 by fishing year and statistical area from 1979–80 to 2016–17. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

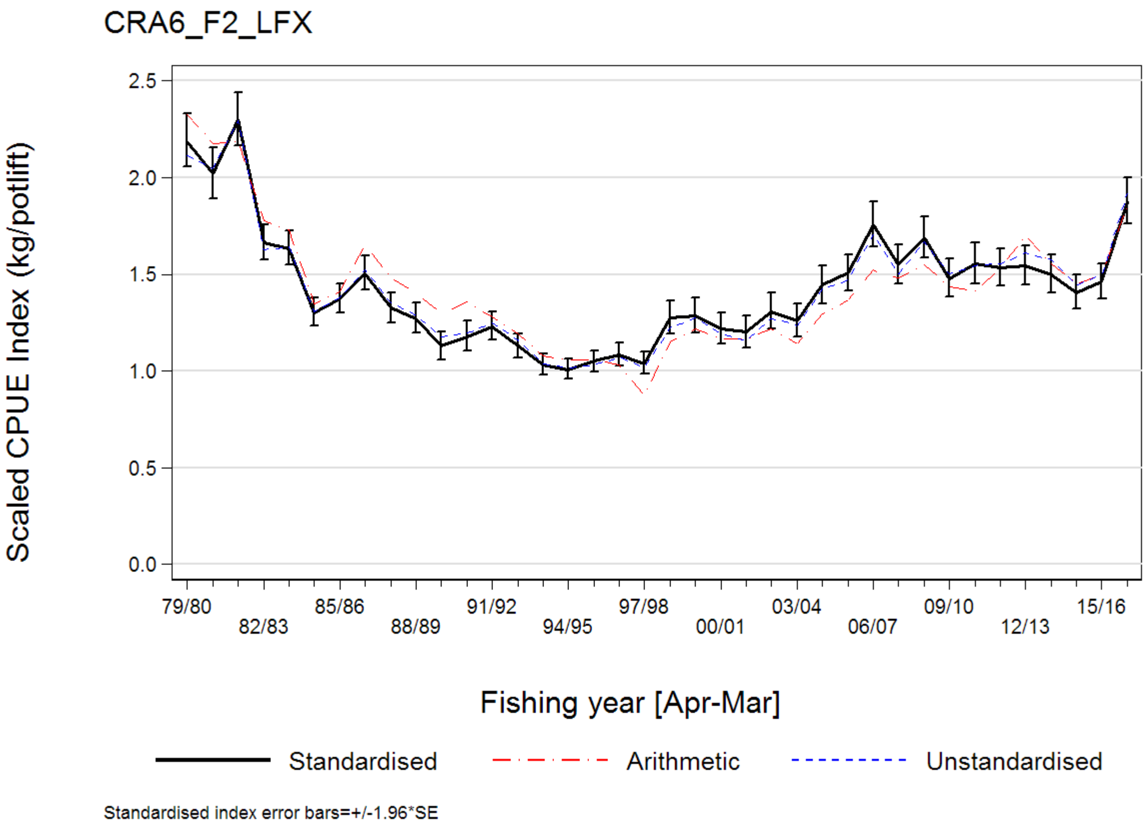

Figure 19: Annual CPUE indices for CRA 6: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 1.96 s.e. from 1979–80 to 2016–17. The geometric mean for each series = 1.40 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

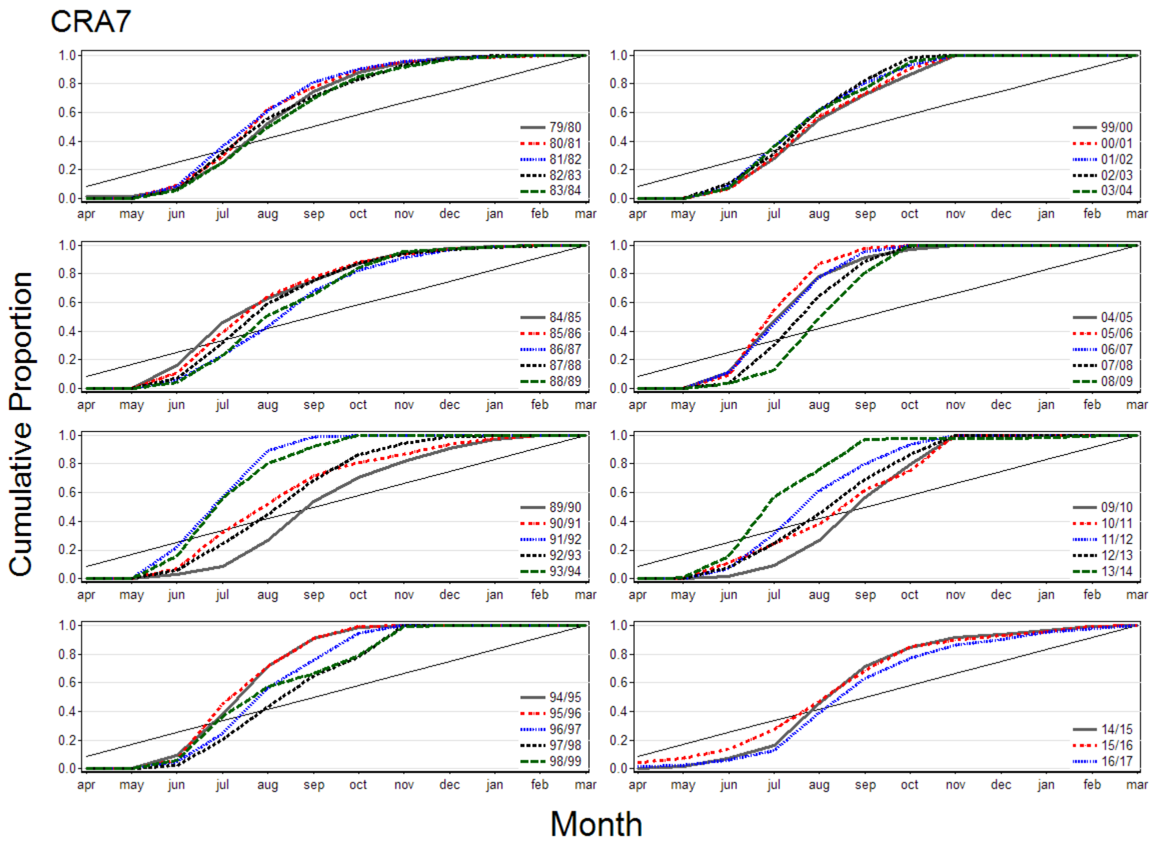

Figure 20: Cumulative landing proportions by fishing month for CRA 7, 1979–80 to 2016–17. Thin black line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

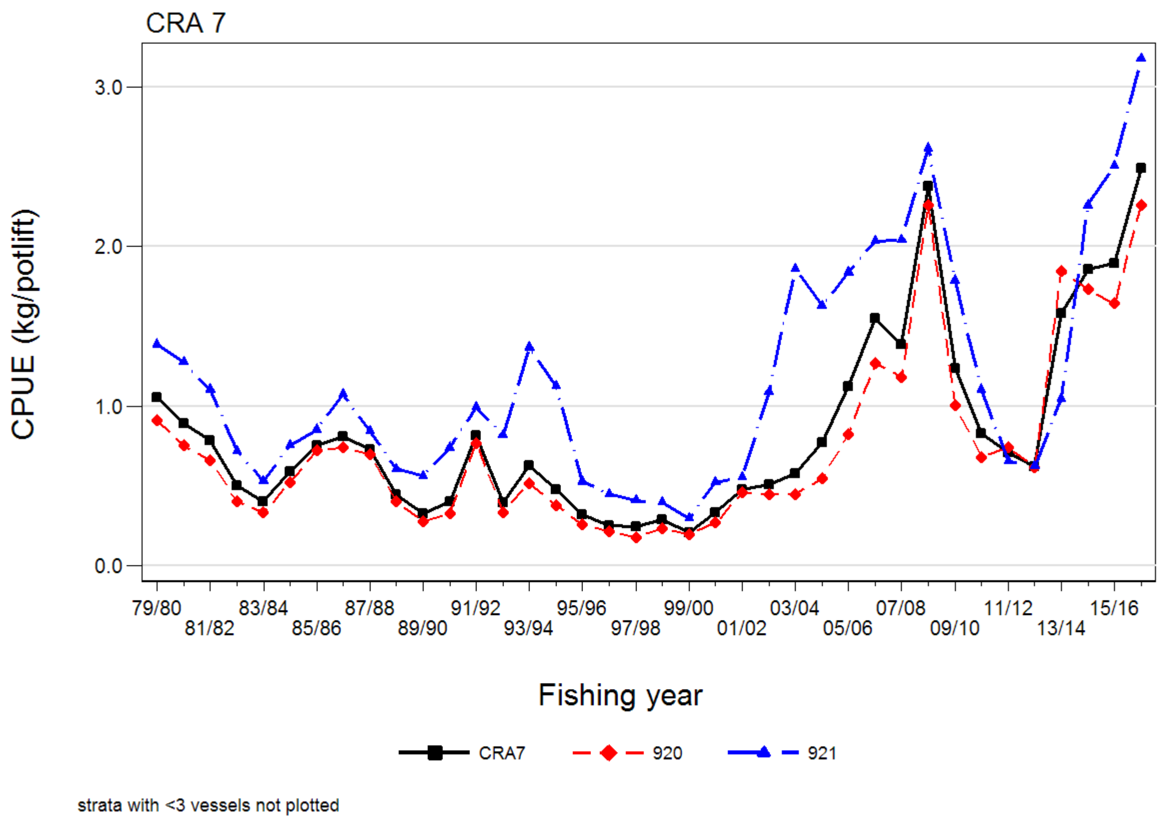

Figure 21: Arithmetic CPUE for CRA 7 by fishing year and statistical area from 1979–80 to 2016–17. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

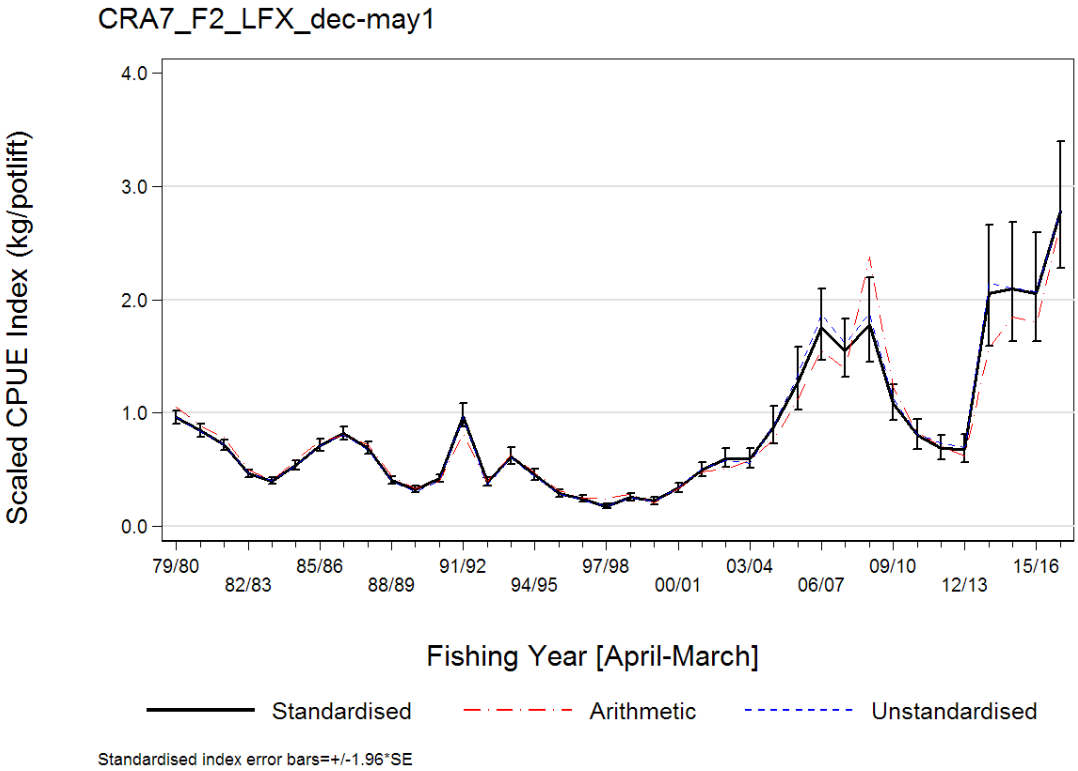

Figure 22: Annual CPUE indices for CRA 7: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 1.96 s.e. from 1979–80 to 2016–17. The geometric mean for each series = 0.68 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

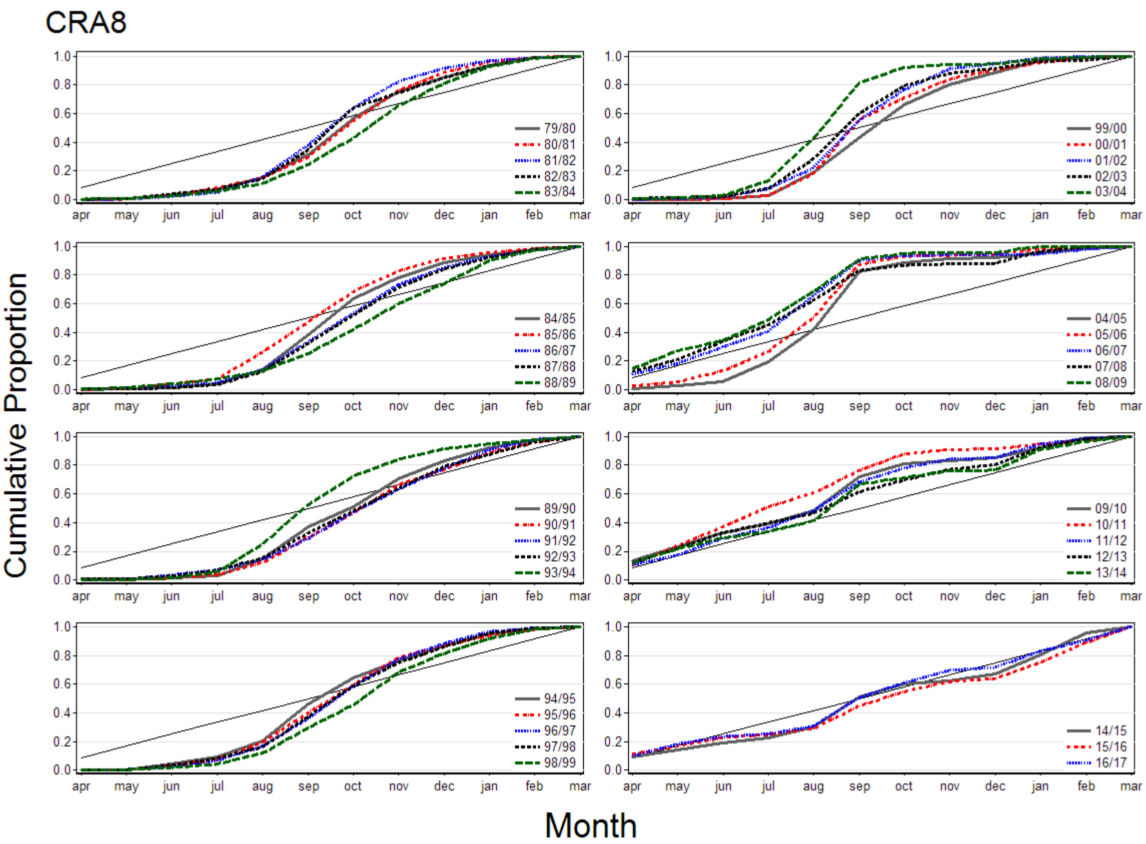

Figure 23: Cumulative landing proportions by fishing month for CRA 8, 1979–80 to 2016–17. Thin black line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

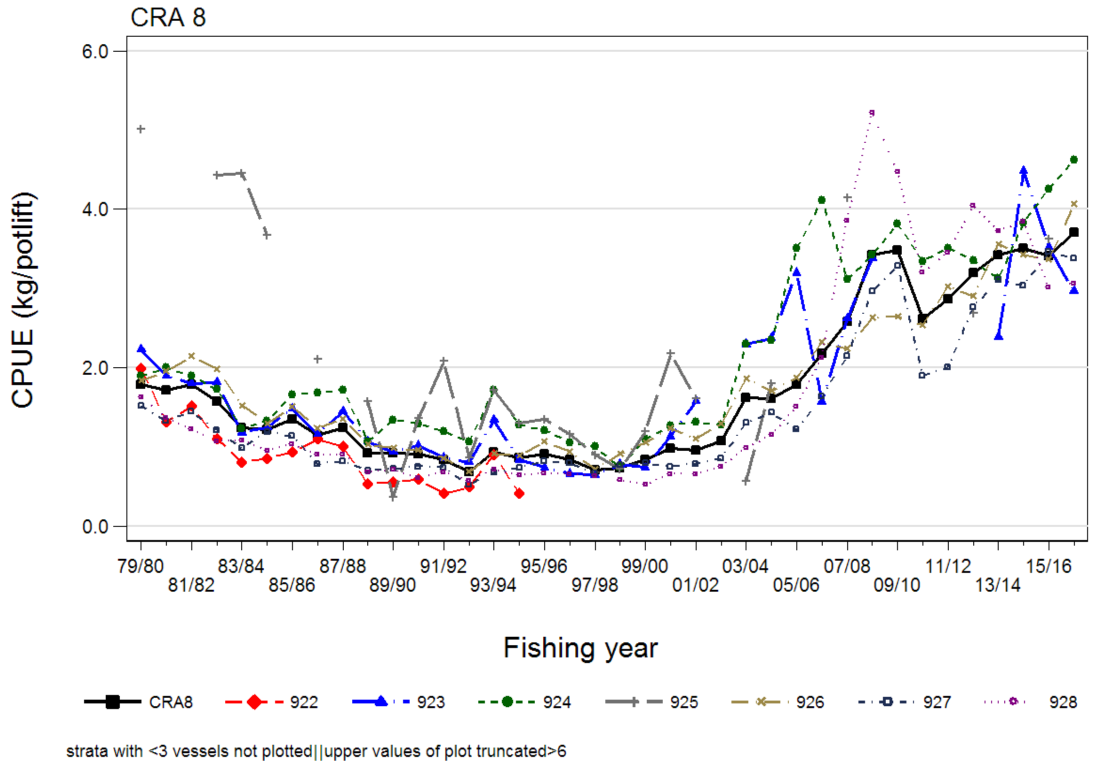

Figure 24: Arithmetic CPUE for CRA 8 by fishing year and statistical area from 1979–80 to 2016–17. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes. See Table 58 for truncated values for Area 925.

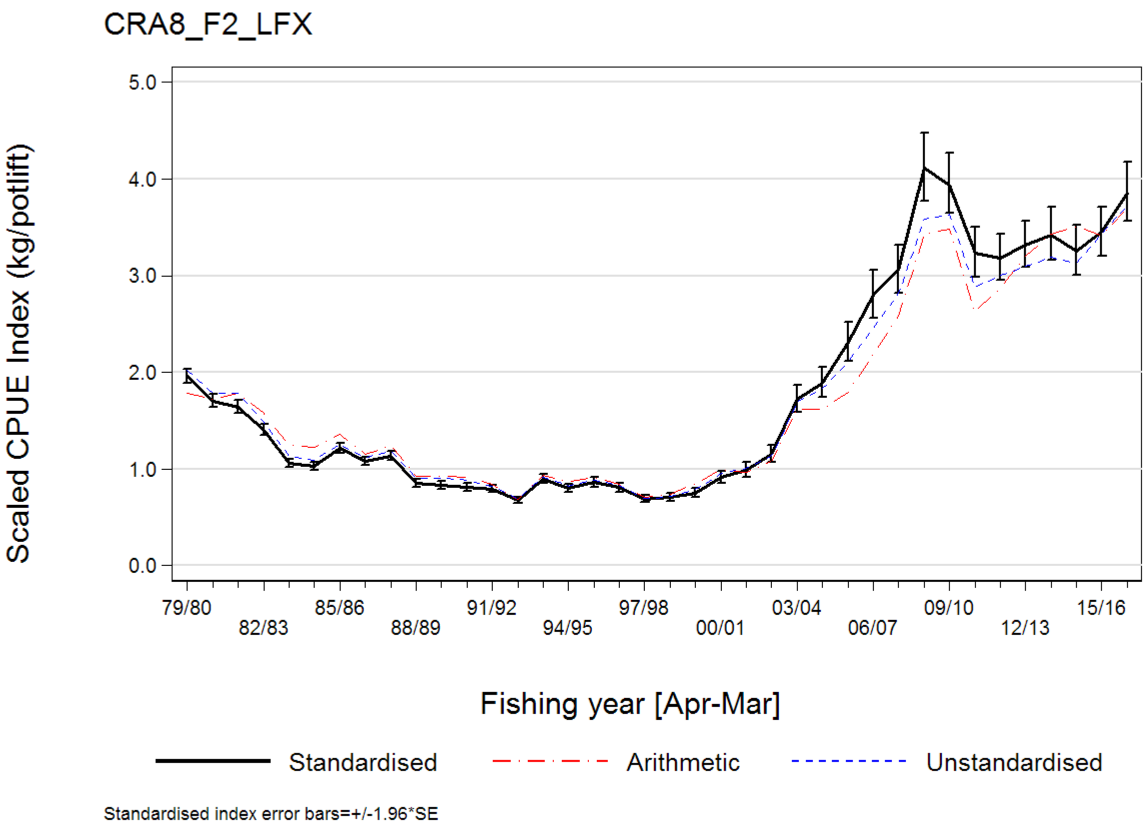

Figure 25: Annual CPUE indices for CRA 8. arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 1.96 s.e. 1979–80 to 2016–17. The geometric mean for each series = 1.49 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

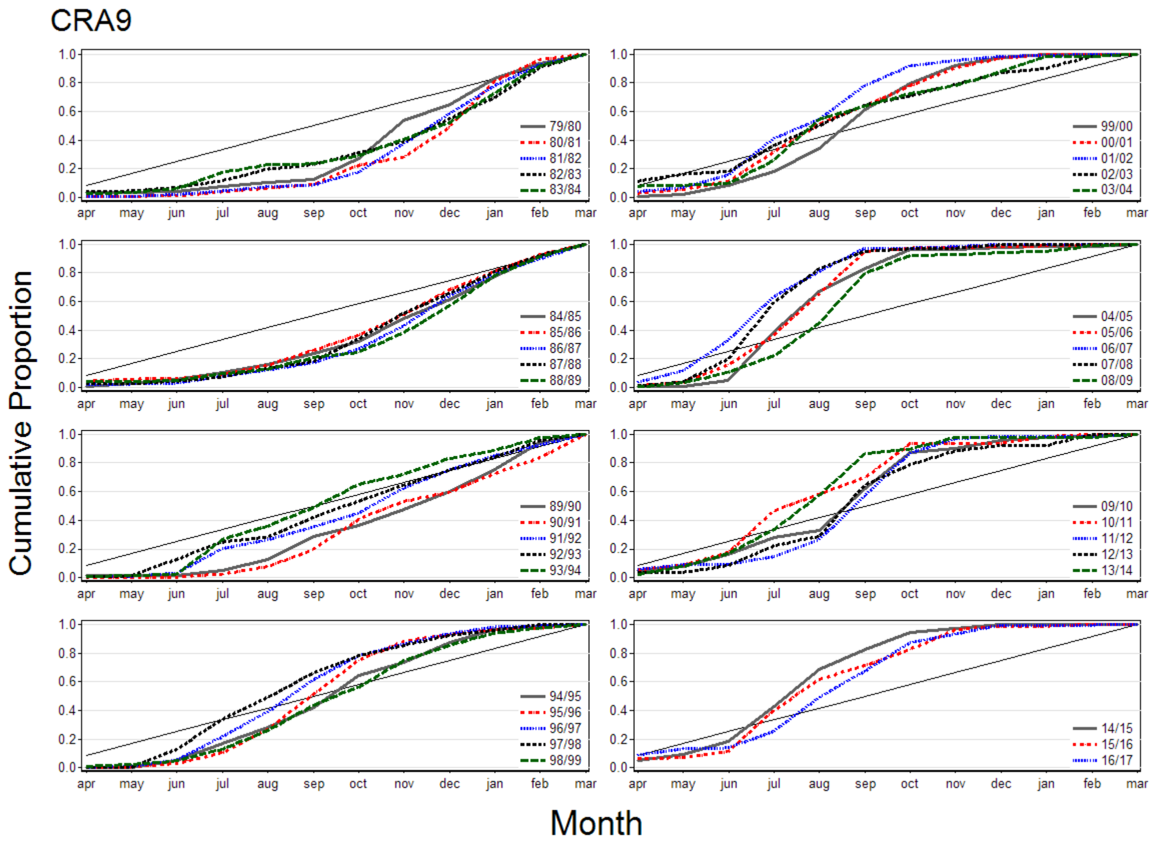

Figure 26: Cumulative landing proportions by fishing month for CRA 9, 1979–80 to 2016–17. Thin black line provides a reference equivalent to a uniform distribution of catch across all months. This figure generated from data prepared using the B4 algorithm scaled to the "L" destination code.

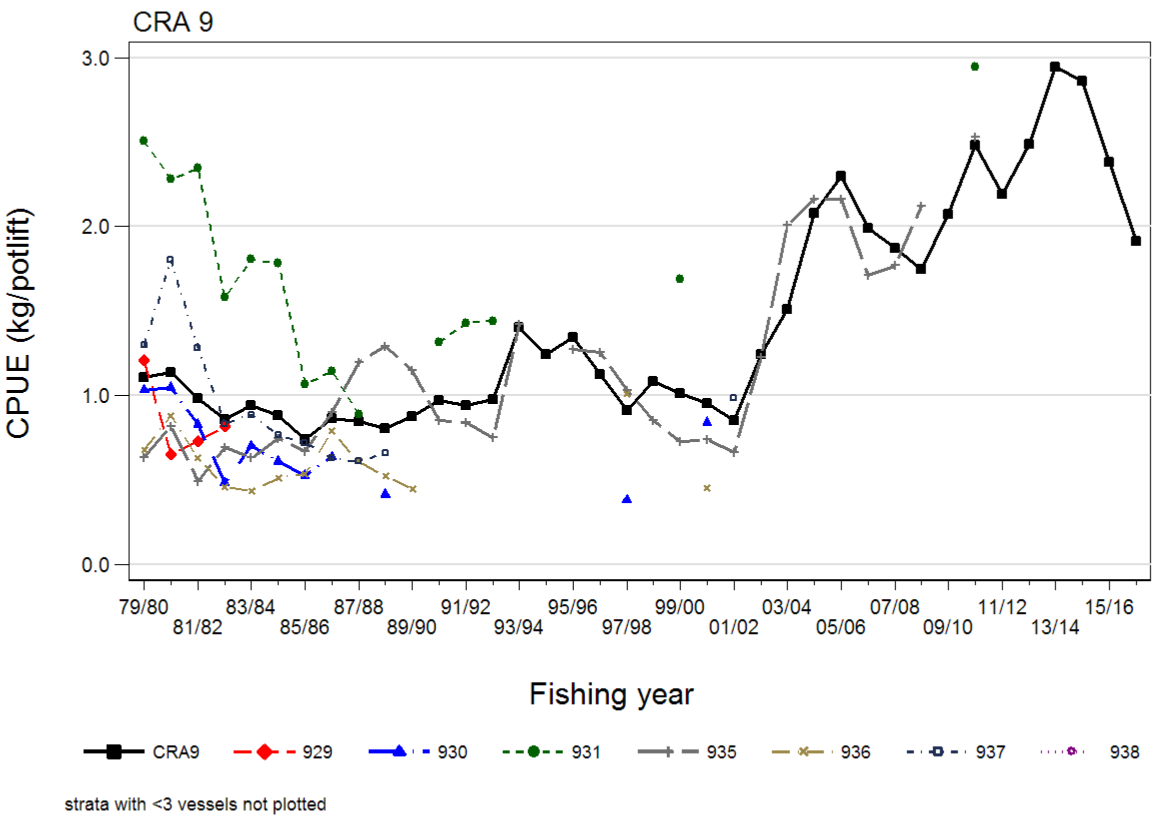

Figure 27: Arithmetic CPUE for CRA 9 by fishing year and statistical area from 1979–80 to 2016–17. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

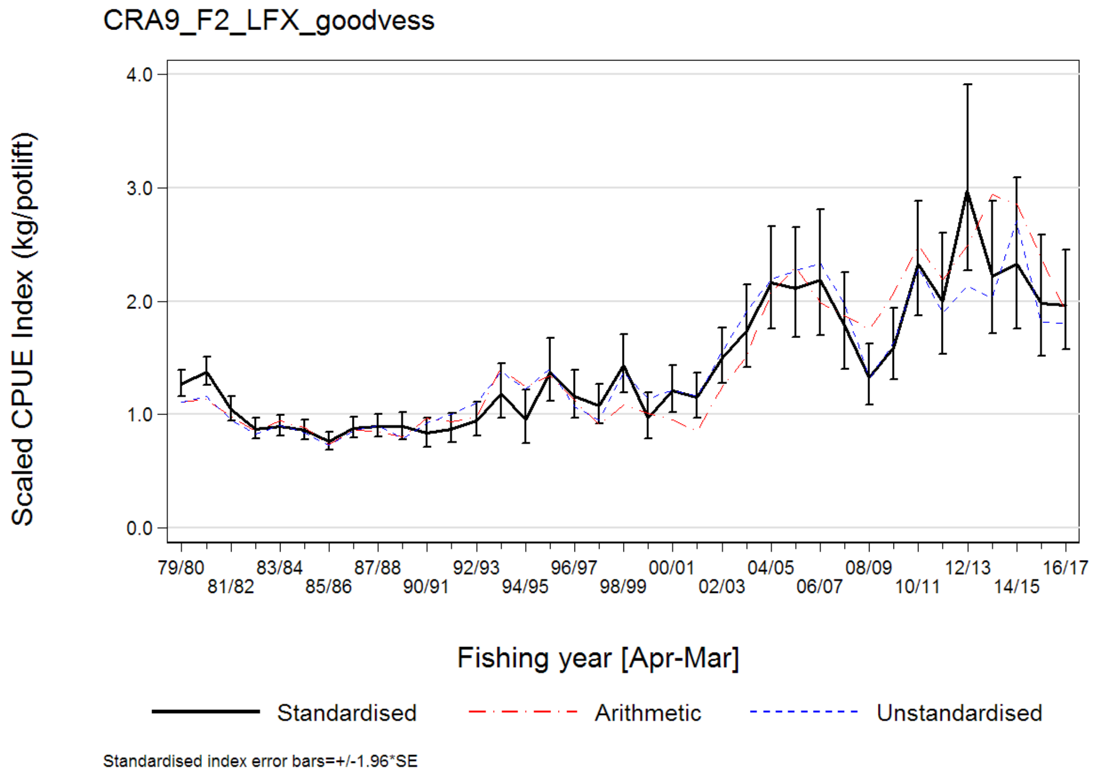

Figure 28: Annual CPUE indices for CRA 9: arithmetic (dashed line), unstandardised (dotted line), and standardised (bold line) ± 1.96 s.e. from 1979–80 to 2016–17. The geometric mean for each series = 1.34 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined “LFX” destination codes.

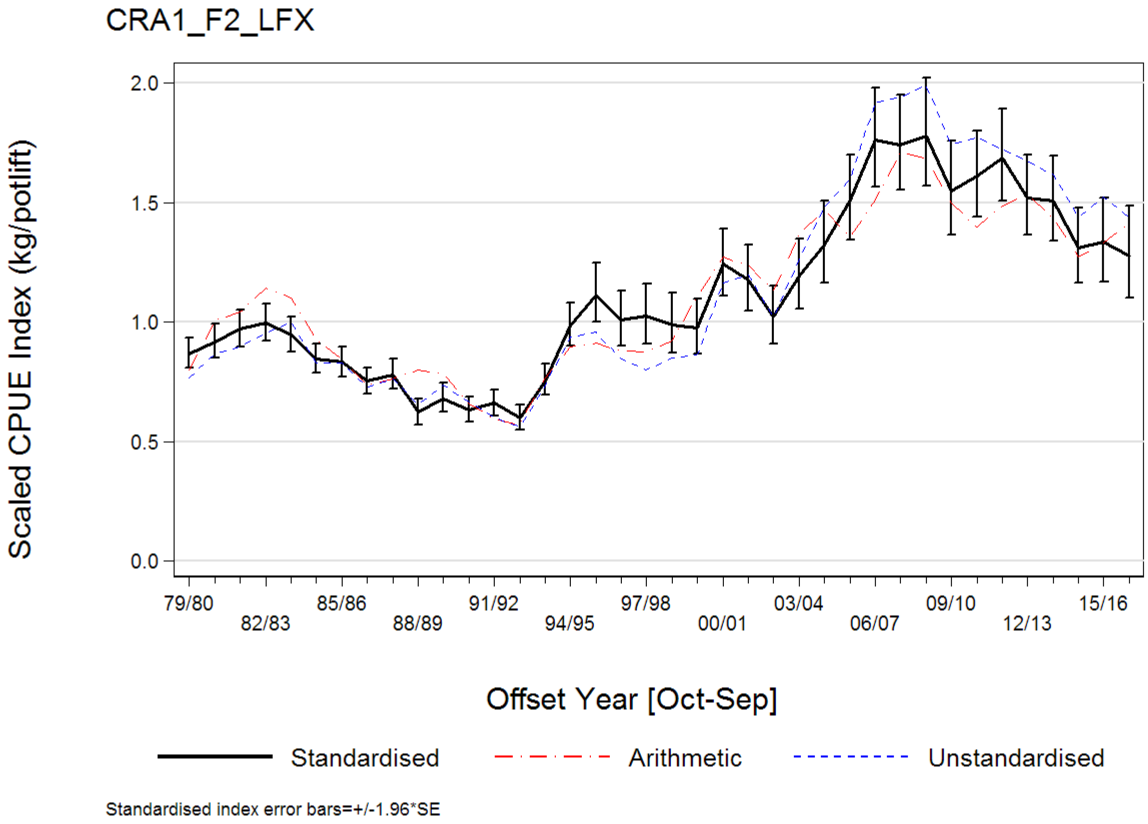

Figure 29: Standardised, unstandardised, and arithmetic offset year CPUE indices for CRA 1 from 1979–80 to 2016–17. Vertical bars are 95% confidence intervals. The geometric mean for all three series = 1.07 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the “LFX” destination code.

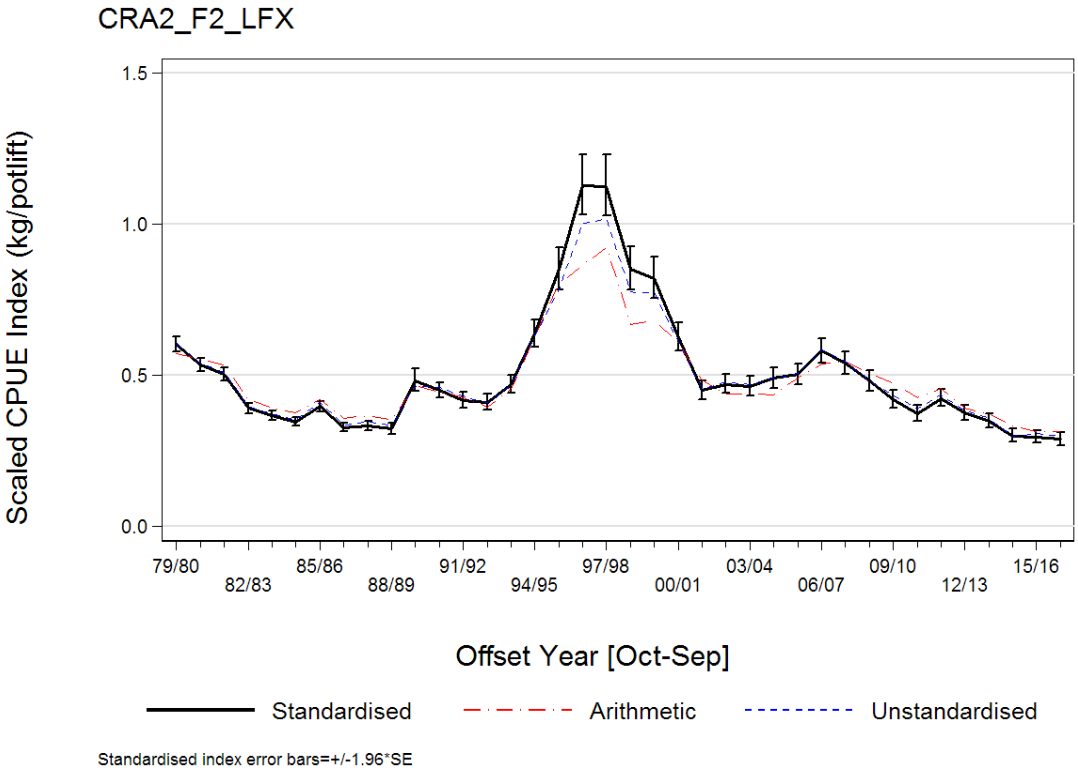

Figure 30: Standardised, unstandardised, and arithmetic offset year CPUE indices for CRA 2 from 1979–80 to 2016–17. Vertical bars are 95% confidence intervals. The geometric mean for all three series = 0.47 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the "LFX" destination code and does not include a [*vessel*] explanatory variable.

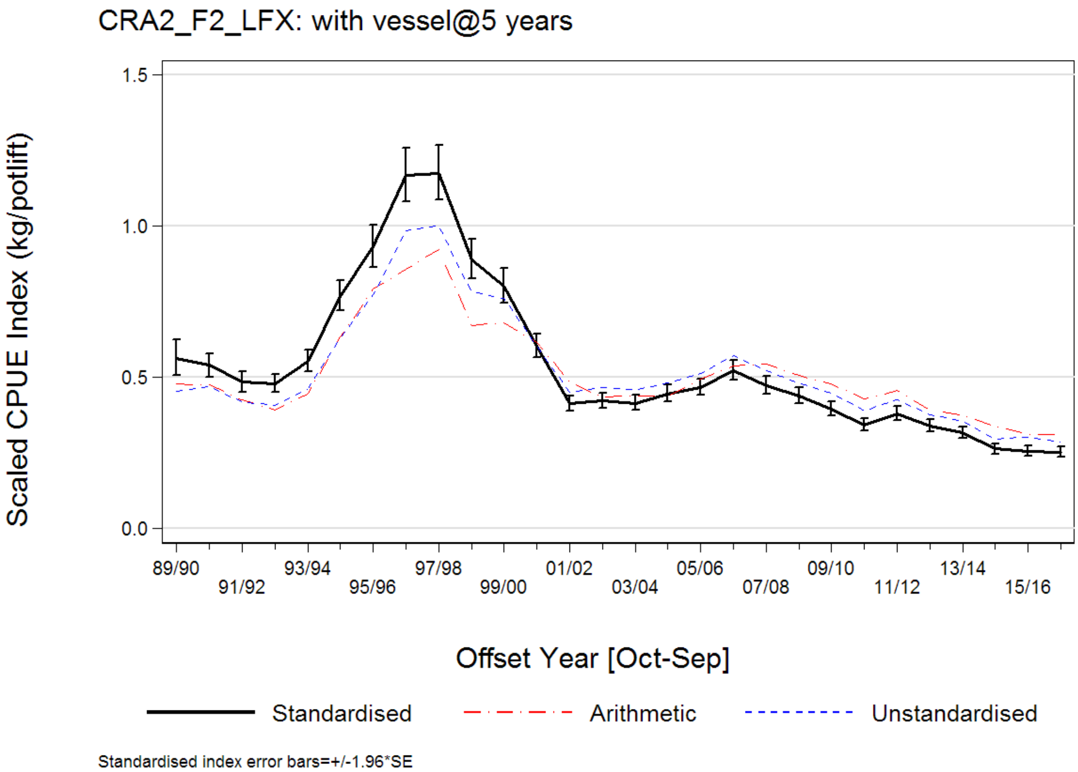

Figure 31: Standardised, unstandardised, and arithmetic offset year CPUE indices for CRA 2 from 1989–90 to 2016–17. Vertical bars are 95% confidence intervals. The geometric mean for all three series = 0.49 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the "LFX" destination code and includes a [*vessel*] explanatory variable filtered for vessels with at least five years experience in the fishery.

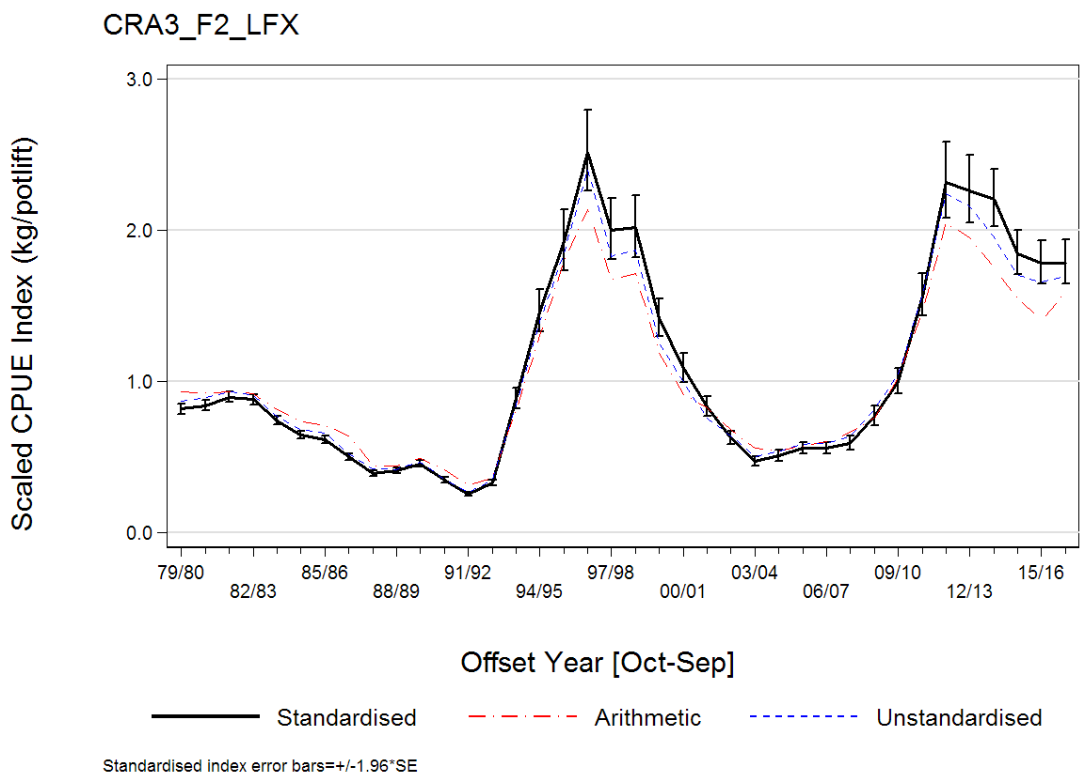

Figure 32: Standardised, unstandardised, and arithmetic offset year CPUE indices for CRA 3 from 1979–80 to 2016–17. Vertical bars are 95% confidence intervals. The geometric mean for all three series = 0.89 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the "LFX" destination codes.

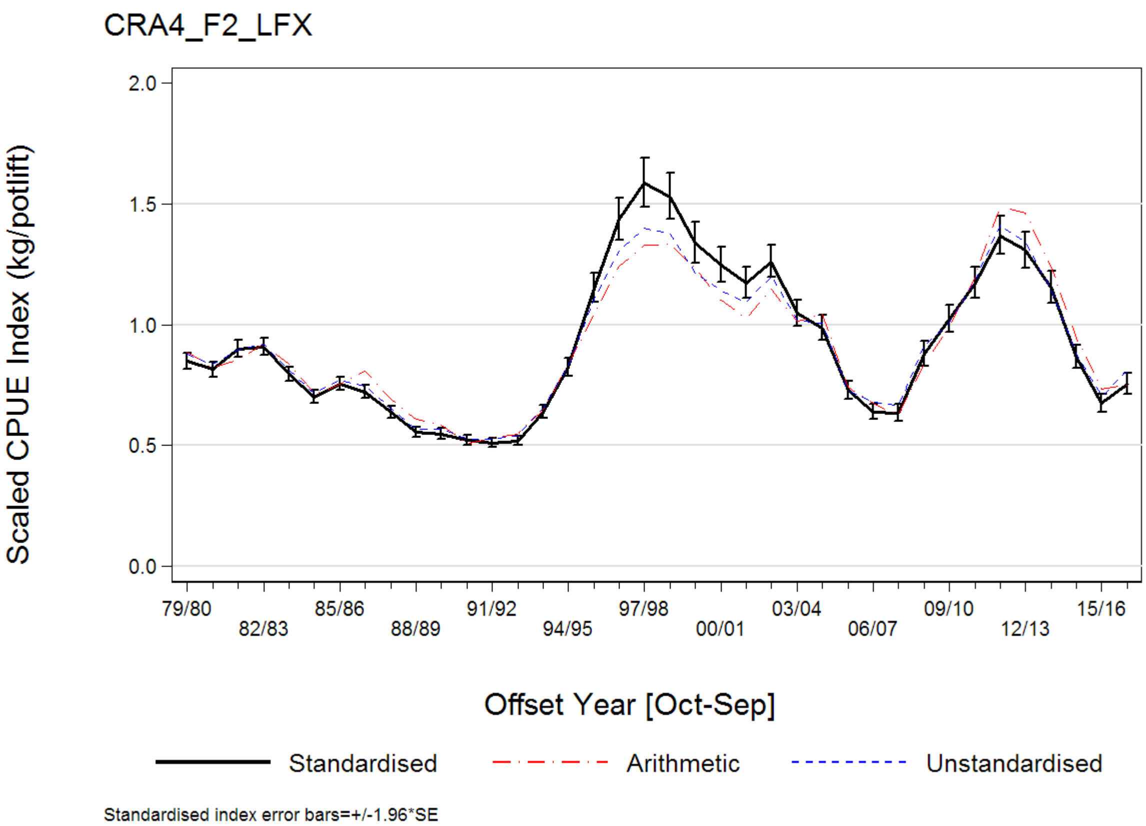

Figure 33: Standardised, unstandardised, and arithmetic offset year CPUE indices (kg/potlift) for CRA 4 from 1979–80 to 2016–17. Vertical bars are 95% confidence intervals. The geometric mean for all three series=0.88 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the "LFX" destination codes.

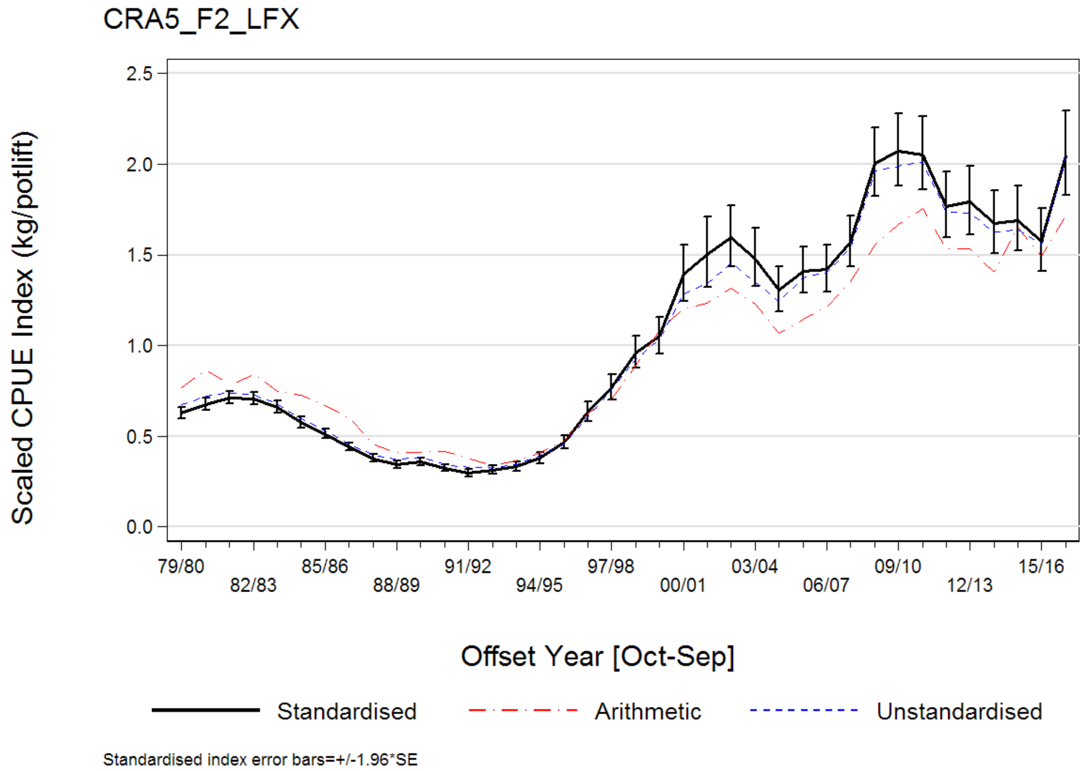

Figure 34: Standardised, unstandardised, and arithmetic offset year CPUE indices (kg/potlift) for CRA 5 from 1979–80 to 2016–17. Vertical bars are 95% confidence intervals. The geometric mean for all three series=0.86 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the "LFX" destination codes.

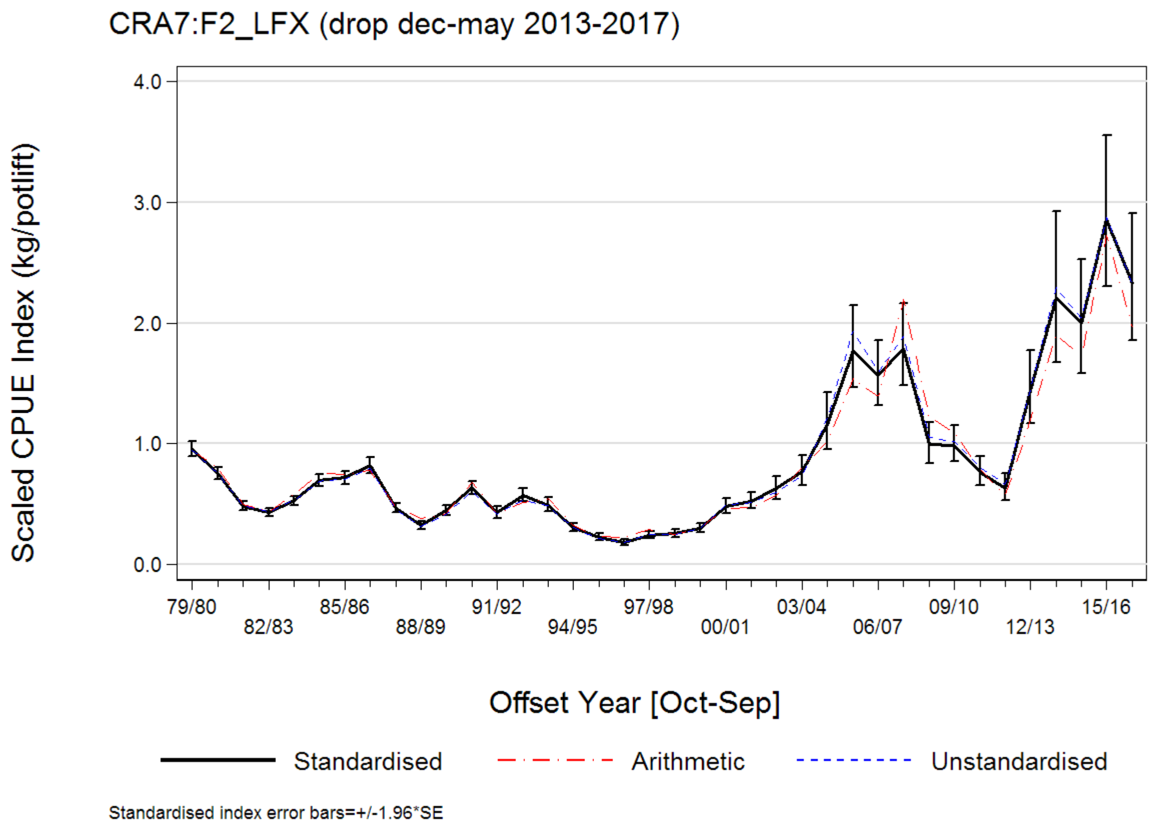

Figure 35: Standardised, unstandardised, and arithmetic offset year CPUE indices (kg/potlift) for CRA 7 from 1979–80 to 2016–17. Vertical bars are 95% confidence intervals. The geometric mean for all series=0.69 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LFX" destination codes.

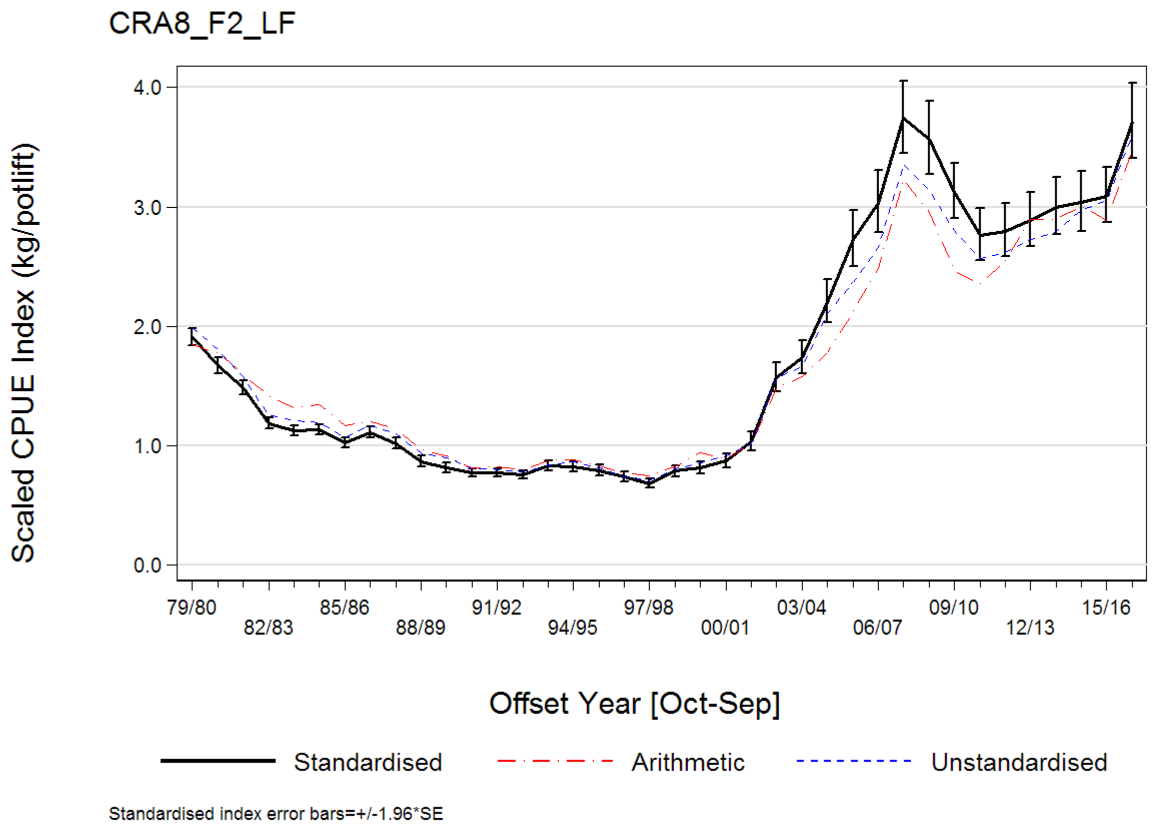

Figure 36: Standardised, unstandardised, and arithmetic offset year CPUE indices (kg/potlift) for CRA 8 from 1979–80 to 2016–17. Vertical bars are 95% confidence intervals. The geometric mean for all three series=1.47 kg/potlift. This figure generated from data prepared using the F2 algorithm scaled to the combined "LF" 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
CELR	Catch Effort Landing Return: Fisheries New Zealand reporting form for rock lobster fishermen since July 1989; these forms come in two parts: the upper or "effort" section of the form which reports potlifts and associated estimated **legal** catch for a day of fishing in a statistical area and the lower or "landing" section of the form which reports landings by QMA, identified by a destination code; the upper and lower sections of the form are linked through a [`trip`] field that is computer generated to be unique to the vessel and the dates of the [`trip`] for the data extract;
CDI plot	Coefficient-distribution-influence plot (e.g.: see Figure E.2) (Bentley et al. 2011)
CPUE	catch per unit of effort
CRA	acronym used to specify "rock lobster" (mainly used in WAREHOU database)
CRACE	name of shadow database holding groomed rock lobster catch and effort data
"concession" fisheries in CRA 3, CRA 7 and CRA 8	CRA 3: male MLS of 52 mm TW applies in the months of June, July and August CRA 7: beginning in 2014–15, the MLS for commercial fishing is a tail length (TL) of 127 mm, which applies to both sexes throughout the year. See the discussion in Section 3.8 (CRA 7) for a discussion of the historical application of this regulation. This measurement corresponds to 46 mm (males) and 47 mm (females) TW CRA 8: female MLS of 57 mm TW applies to the entire fishing year
destination code	code used to identify landings on the bottom part of the CELR form; these landings are linked through a common [`trip`] identifier; there can be multiple records with the same destination code within a [`trip`]; some destination codes are intermediate (for instance: "P"[Holding receptacle in water]) and are not used because the same catch can be reported again under another destination code; other destination codes are terminal and represent end use of the lobster; the most important of these are "L" [landed in NZ to LFR], "X" [QMS catch returned to sea], and "F" [Section 111 catch retained for personal use];
estimated catches	a fisher is required to estimate the total legal catch by weight for each day of fishing in a statistical area, including all legal discards; this information is recorded on the same line as the number of potlifts made in the day;
fishing year	1 April – 31 March period (statutory, defined by the QMS)
FNZ	Fisheries New Zealand, formed as a business unit within MPI on 1 May 2018 to "*provide increased focus on some of MPI's core responsibilities and align structure to Ministerial portfolios...*" (MPI press release 01 May 2018)
FSU	Fisheries Statistics Unit: format used to report rock lobster catches, January 1979 to June 1989
geometric mean CPUE	synonym for unstandardised CPUE (Eq. 2)
landed catch	fishers declare their landings on the lower part of the CELR form (see above), using destination codes to indicate the fate of the landing; the term "landings" is also used for catches reported using the QMR/MHR forms which should mirror the sum of landings using the "L" destination code;
LFR	Licensed Fish Receiver: processors legally allowed to receive commercially caught rock lobster
MP	Management Procedure
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: measurement below which rock lobster are required by law to be released. For most QMAs, the male size limit is 54 mm TW and the female size limit is 60 mm TW, except for CRA 3, CRA 7 and CRA 8 (described above)
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; reported as summed daily effort on the CELR form (e.g.: 100=100 daily potlifts);
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

Term/Abbreviation	Definition
	to Fisheries New Zealand; considered to be best estimates of commercial harvest and in use from 1986 to 2001; summed landings using the "L" destination code from the bottom of the CELR form should be similar to totals reported by the QMR for an equivalent period
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 (as reported in the catch/effort data)
raw CPUE	synonym for arithmetic CPUE (Eq. 1)
replog	unique identifier issued by Fisheries New Zealand data unit for every data extract
RLFAWG	Fisheries New Zealand Rock Lobster Fishery Assessment Working Group
scaled catches	Eq. 4: raw catches adjusted to sum to QMR/MHR totals
scaled potlifts	Eq. 5: 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
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 management.
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
target	before setting gear: this is the species with the primary intent to catch; declared in the upper ("effort") section of the CELR, associated with each record; the target species is rarely anything other than rock lobster (code CRA) for the rock lobster potting method;
TL	tail length (applies only to CRA 7 MLS)
TW	tail width measured between the second abdominal spines, a measurement used to define the MLS in all QMAs except CRA 7 (see above)
unstandardised CPUE	Eq. 2
WAREHOU	name of Fisheries New Zealand database holding all compulsory catch and effort data obtained from fishers (see Ministry of Fisheries 2010 for a description of this database)

B. ERROR CODES USED IN CRACE

The following tables describe the error fields that are active in CRACE (Bentley et al. 2005). There are seven error codes used in CRACE for the Fisheries New Zealand 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.

The following text table describes the three main data tables used in CRACE to contain components of the Fisheries New Zealand catch/effort data (see Ministry of Fisheries 2010):

Data table	Description
[estimated_subcatch]	contains the catch estimates by species for each reported [fishing_event]. The fisher is only required to report the top 5 species by weight
[fishing_event]	contains the date, effort and statistical area for the day of fishing. The fisher is required to report each day of fishing in a statistical area.
[landing]	contains the date of landing, the green weight of the landed lobsters and other auxiliary information. Landings can be reported in a number of categories, designated as "destination codes".

Error codes are applied to data fields present in the Fisheries New Zealand data obtained with each data extract. Error codes are labelled 0–3, ranked from "no error" (=0) to "fatal error" (=3). By convention, all rock lobster catch/effort analyses are based on records with error codes "0" or "1". Records with error codes "2" or "3" are discarded. The convention used in the tables below is to use indicated fonts to designate database [tables] and database [fields].

Table B.1. Error codes used in the[estimated_subcatch] table, showing the definitions for each error level and number of records in each error level summed over the period 1 Oct 1989 to 31 March 2017 (Fisheries New Zealand Replog 11340 [September 2017]).

Error Code	Definition	Number records
field: [catch_weight]		
0	no error	1 129 913
1	catch >2000 kg and catch<= 3000 kg	180
2	catch >3000 kg and catch <= 4000 kg	38
3	catch =Null or catch >4000	438
find duplicates		
0	no error	1 129 997
3	N([event_key] & [species]="CRA"]>1 and [estimated_catch]<>Max[estimated_catch]	572

Table B.2. Error codes used in the[fishing_event] table, showing the definitions for each error level and number of records in each error level summed over the period 1 Oct 1989 to 31 March 2017 (Fisheries New Zealand Replog 11340 [September 2017]).

Error Code	Definition	Number records
field: [pots_lifted]		
0	no error	853 028
2	A: 3*[mean] for vessel/month/year and lifts>60	
2	B: 3*[pots_overnight] and lifts>60	15 949
2	C: lifts <=10 and >30 kg/potlift	
3	A: lifts=Null	
3	B: lifts>500	5 289
3	C: lifts=0 and catch >0 kg	
field: [statistical_area]		
0	no error	853 151
1	>0 and <44[1]	18 242
1	49,50,52 or 51[1]	
2	outlier: if <5% of records for vessel/month and >2 statistical areas away from mode for that vessel	1 781
3	Null or >43 and not 49,50,52,51	1 092

[1] 900 is added to these fields because all rock lobster statistical areas are coded 901 and above.

Table B.3. Error codes used in the[landings] table, showing the definitions for each error level and number of records in each error level summed over the period 1 Oct 1989 to 31 March 2017 (Fisheries New Zealand Replog 11340 [September 2017]).

Error Code	Definition	Number records
field: [calc_error]		
0	no error	887 404
1	>(2*[unit_number]*[unit_weight]*[conv_factor]) and >200 kg	2 626
2	>(5*[unit_number]*[unit_weight]*[conv_factor]) and >500 kg	625
3	>(10*[unit_number]*[unit_weight]*[conv_factor]) and >1000 kg	323
field: [green_weight]		
0	no error	888 004
1	landing >2 000 kg and landing <=6 000 kg	541
2	landing>6 000 kg and landing <=10 000 kg	19
3	landing=Null or landing>10 000 kg	2 414
find duplicates		
0	no error	889 778
3	N([landing_datetime], [species_code], [fishstock_code], [state_code], [qrn_key], [vessel_key], [green_weight], [green_weight_type])>1 and [destination_type]= “L” and [green_weight]>100 kg	1 200

C. CATCH CORRECTION ALGORITHM DOCUMENTATION

C.1 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) (see Appendix B for a description of these error codes and the number of records in each error code category).

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 C.1)

Note that the nominal arithmetic CPUE $\left(I_{iamy}\right)$ in stratum *iamy* is defined in Eq. C.10.

C.2 DOCUMENTATION FOR THE 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) (see Appendix B for a description of these error codes and the number of records in each error code category)

Note 3: a detailed comparison of the "F1" to "F3" variants with the "B4" algorithm can be found in Appendix B in Starr (2013)

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

Eq. C.6 $$vcf_{iy} = \frac{\sum_{g=1}^{n_{iy}^{l}} L_{giy}}{\sum_{h=1}^{n_{iy}^{c}} C_{hiy}}$$

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" or "L+F+X" destination codes.

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

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

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

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

D. variant algorithm F0: do not drop any vessels, regardless of *vcf* value.

Note 4: 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 vcf_{iy}. By agreement within the RLFAWG: $lb_{iy} = 0.8$ and $ub_{iy} = 1.2$ for all CRA QMAs when operating the F2 algorithm.

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

Eq. C.7 $$\hat{L}_{hiy} = vcf_{iy} C_{hiy}$$

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 C.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 5: 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. C.8 $$\hat{L}_{iamy} = \sum_{j=1}^{n_{iamy}^c} \hat{L}_{jiy}$$

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

Eq. C.9 $$P_{iamy} = \sum_{j=1}^{n_{iamy}^c} P_{jiy}$$

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

Note 6: nominal arithmetic CPUE $\left(I_{iamy}\right)$ in stratum *iamy* is (this is not part of the F algorithm):

Eq. C.10 $$I_{iamy} = \frac{\hat{L}_{iamy}}{P_{iamy}}$$

Table C.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

D. DIAGNOSTICS FOR CRA 1 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 D.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 1 F2_LFX CPUE time series.

	CRA 1 Statistical Area					
Offset year	901	902	903	904	939	Total
1979–80	23	28	101	103	64	319
1980–81	19	45	80	79	53	276
1981–82	10	45	81	65	59	260
1982–83	16	52	68	70	61	267
1983–84	32	77	48	65	58	280
1984–85	30	78	55	93	57	313
1985–86	35	62	53	86	56	292
1986–87	24	65	74	83	70	316
1987–88	27	41	77	59	50	254
1988–89	31	45	61	41	43	221
1989–90	41	41	43	44	38	207
1990–91	40	42	45	51	56	234
1991–92	14	31	52	70	68	235
1992–93	22	34	31	66	61	214
1993–94	32	38	37	70	45	222
1994–95	29	30	37	63	43	202
1995–96	13	18	32	49	18	130
1996–97	11	18	39	46	7	121
1997–98	6	11	23	43	24	107
1998–99	14	8	15	37	25	99
1999–00	20	7	20	36	31	114
2000–01	26	11	23	36	31	127
2001–02	26	14	21	23	32	116
2002–03	18	17	11	28	38	112
2003–04	15	26	10	20	34	105
2004–05	19	22	15	10	29	95
2005–06	26	19	20	20	28	113
2006–07	31	18	35	13	19	116
2007–08	28	29	34	14	18	123
2008–09	24	26	19	12	18	99
2009–10	32	13	22	15	18	100
2010–11	34	24	38	18	17	131
2011–12	27	18	37	28	13	123
2012–13	39	19	28	28	19	133
2013–14	30	16	20	27	21	114
2014–15	40	11	18	28	16	113
2015–16	33	8	20	20	11	92
2016–17	22	10	11	15	11	69

Table D.2. Total deviance (R^2) explained by each variable in the CRA 1 F2_LFX standardised offset year CPUE analysis. The number of categories in each explanatory variable is given in parentheses.

Variable	1	2	3
Offset Year (38)	0.1595		
Statistical Area (5)	0.2930	0.4004	
Month (12)	0.0118	0.1829	0.4253
Additional deviance explained	0.0000	0.2409	0.0249

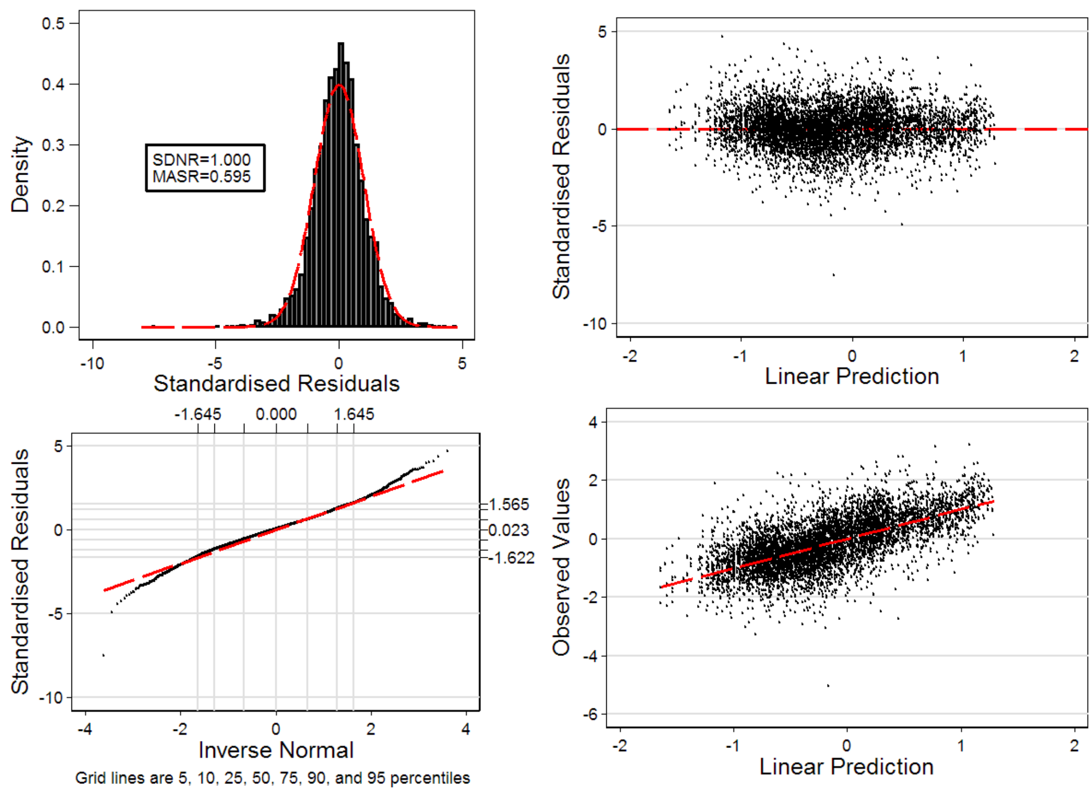

Figure D.1. Standardised residual plots for the CRA 1 F2_LFX standardised offset year CPUE analysis.

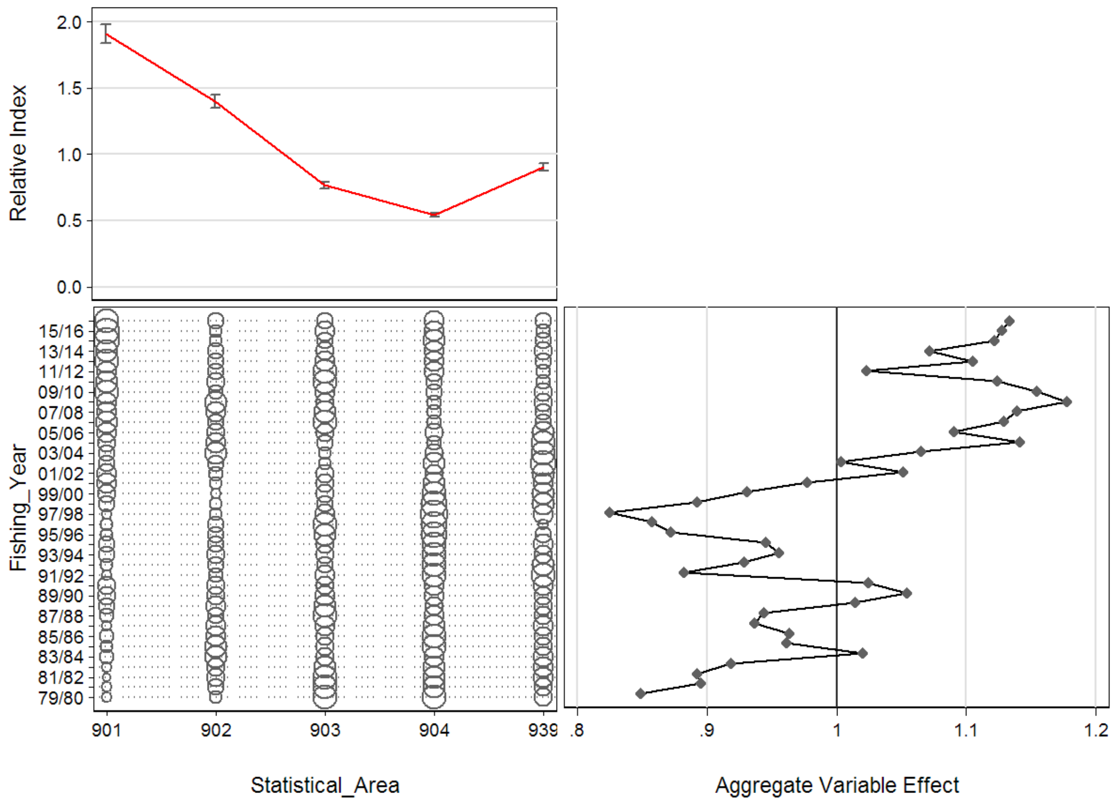

Figure D.2. The effect of the statistical area categorical variable in the offset year CRA 1 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

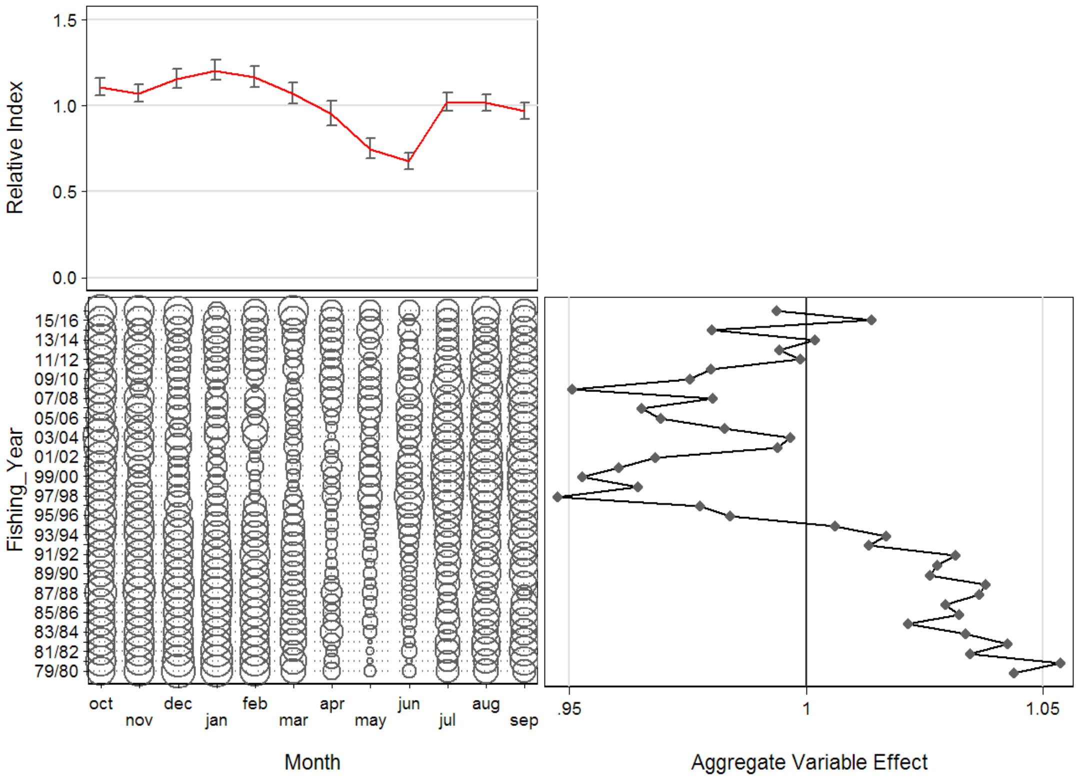

Figure D.3. The effect of the month categorical variable in the offset year CRA 1 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

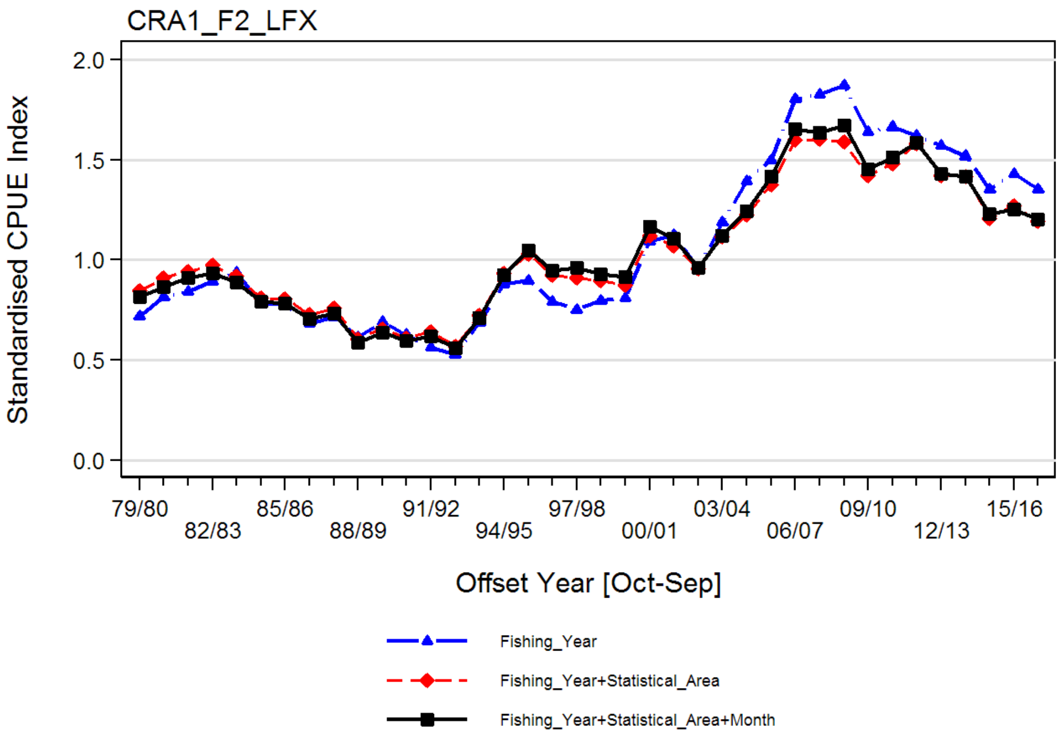

Figure D.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 1 F2_LFX lognormal regression model. The final model is shown by a thick heavy line.

E. DIAGNOSTICS FOR CRA 2 OFFSET YEAR (1 OCTOBER–30 SEPTEMBER) STANDARDISED CPUE ANALYSIS EXCLUDING A [*VESSEL*] EXPLANATORY VARIABLE

The data set for this analysis was prepared using the F2 catch correction algorithm scaled to the combined LFX destination codes. This analysis does not use a [*vessel*] explanatory variable, to be consistent with the offset-year CPUE analysis done for the 2013 CRA 2 stock assessment (Starr et al. 2014).

Table E.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 2 F2_LFX CPUE time series.

	CRA 2 Statistical Area				
Offset year	905	906	907	908	Total
1979–80	135	336	139	244	854
1980–81	145	328	143	220	836
1981–82	181	338	121	242	882
1982–83	180	301	123	216	820
1983–84	164	311	120	203	798
1984–85	134	310	126	202	772
1985–86	127	290	120	180	717
1986–87	108	286	126	201	721
1987–88	98	259	111	133	601
1988–89	87	199	78	83	447
1989–90	75	71	38	52	236
1990–91	67	193	84	102	446
1991–92	57	170	68	84	379
1992–93	56	183	34	81	354
1993–94	53	173	32	77	335
1994–95	44	123	43	73	283
1995–96	41	98	21	46	206
1996–97	33	92	22	30	177
1997–98	42	84	16	30	172
1998–99	49	89	24	32	194
1999–00	41	90	27	39	197
2000–01	64	107	41	39	251
2001–02	64	122	50	44	280
2002–03	76	122	51	57	306
2003–04	52	120	56	72	300
2004–05	53	100	41	73	267
2005–06	81	115	45	64	305
2006–07	72	119	29	65	285
2007–08	75	110	34	61	280
2008–09	87	105	30	53	275
2009–10	88	116	31	58	293
2010–11	88	109	33	64	294
2011–12	94	118	35	65	312
2012–13	88	121	33	65	307
2013–14	63	127	30	66	286
2014–15	53	120	29	60	262
2015–16	66	113	35	52	266
2016–17	78	92	31	49	250

Table E.2. Total deviance (R^2) explained by each variable in the CRA 2 F2_LFX standardised offset year CPUE analysis. The number of categories in each explanatory variable is given in parentheses.

Variable	1	2	3
Offset Year (38)	0.1389		
Month (12)	0.0505	0.2092	
Statistical Area (4)	0.0126	0.1524	0.2237
Additional deviance explained	0.0000	0.0703	0.0144

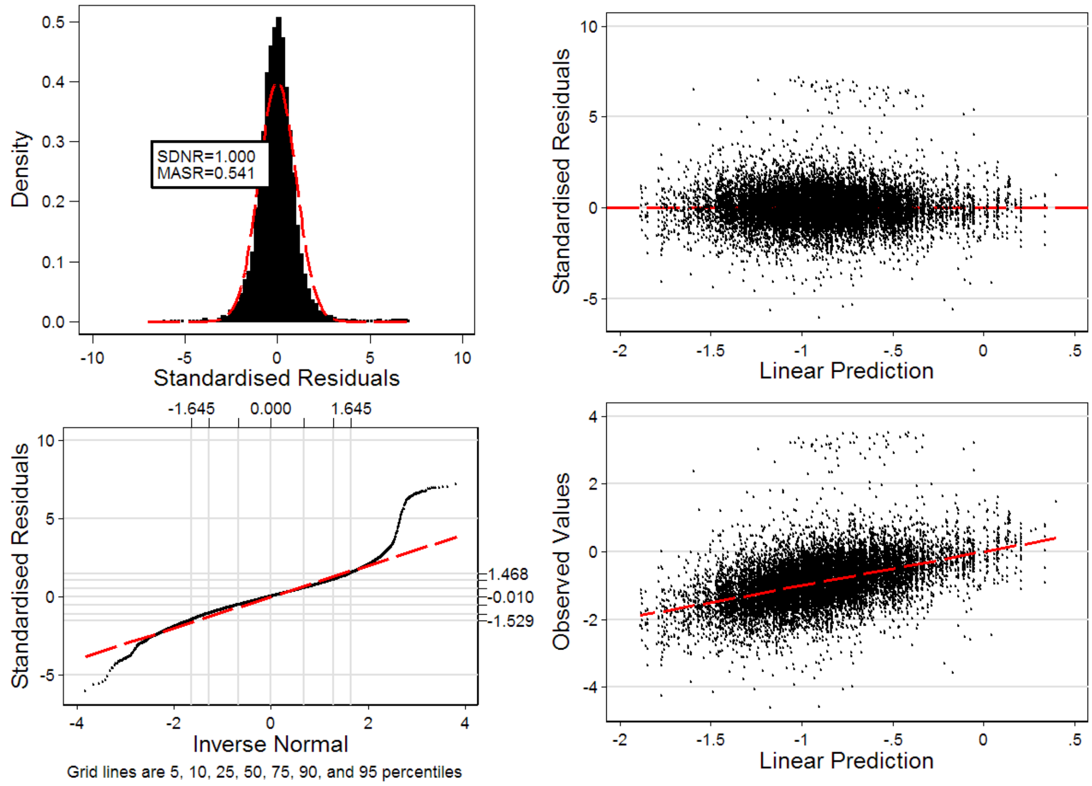

Figure E.1. Standardised residual plots for the CRA 2 standardised offset year CPUE analysis.

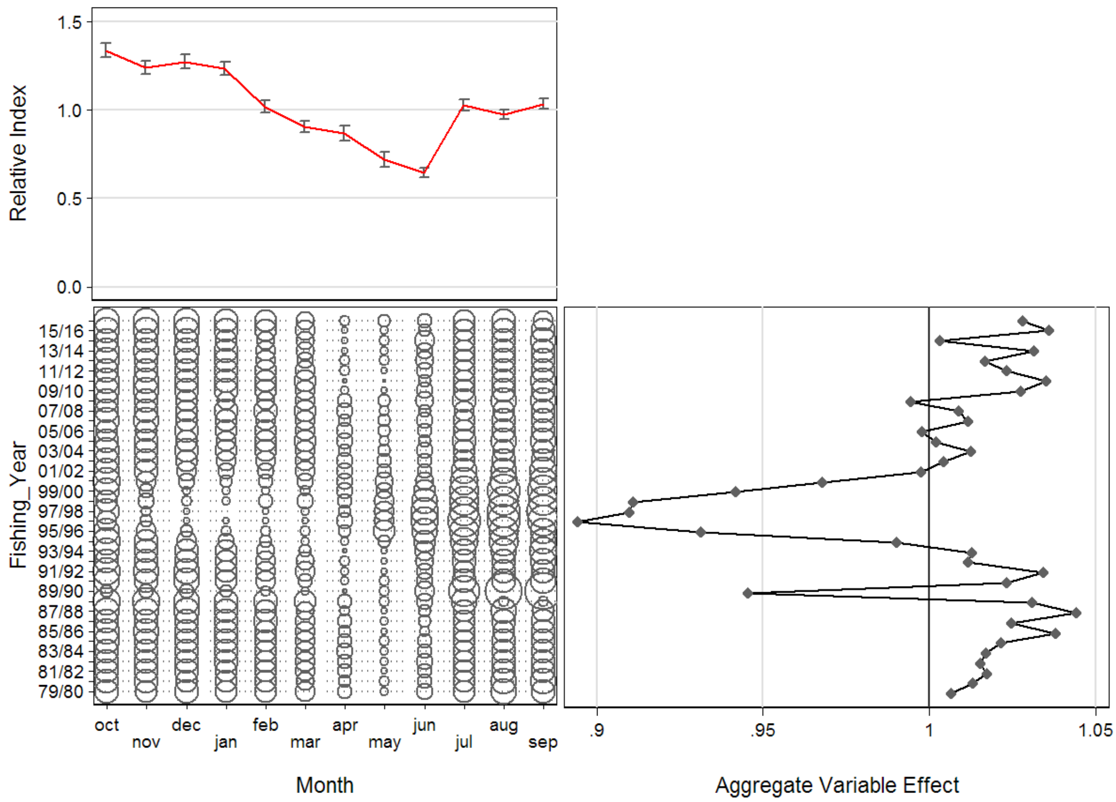

Figure E.2. The effect of the month categorical variable in the offset year CRA 2 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

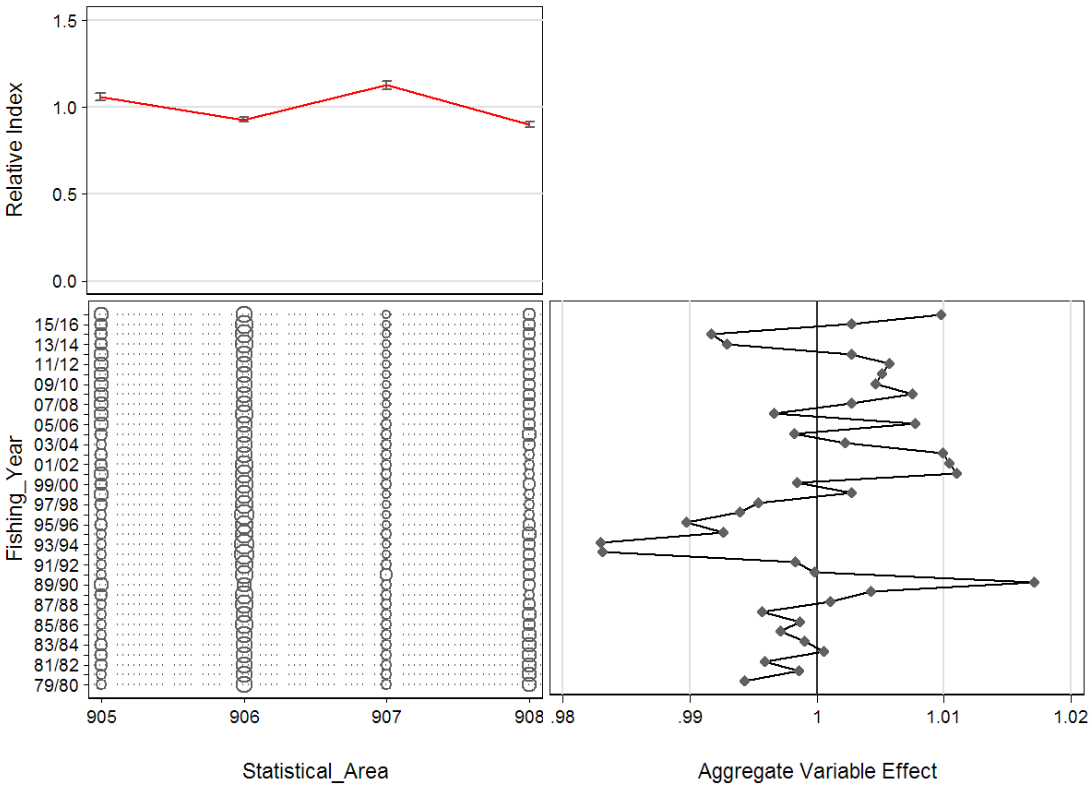

Figure E.3. The effect of the statistical area categorical variable in the offset year CRA 2 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

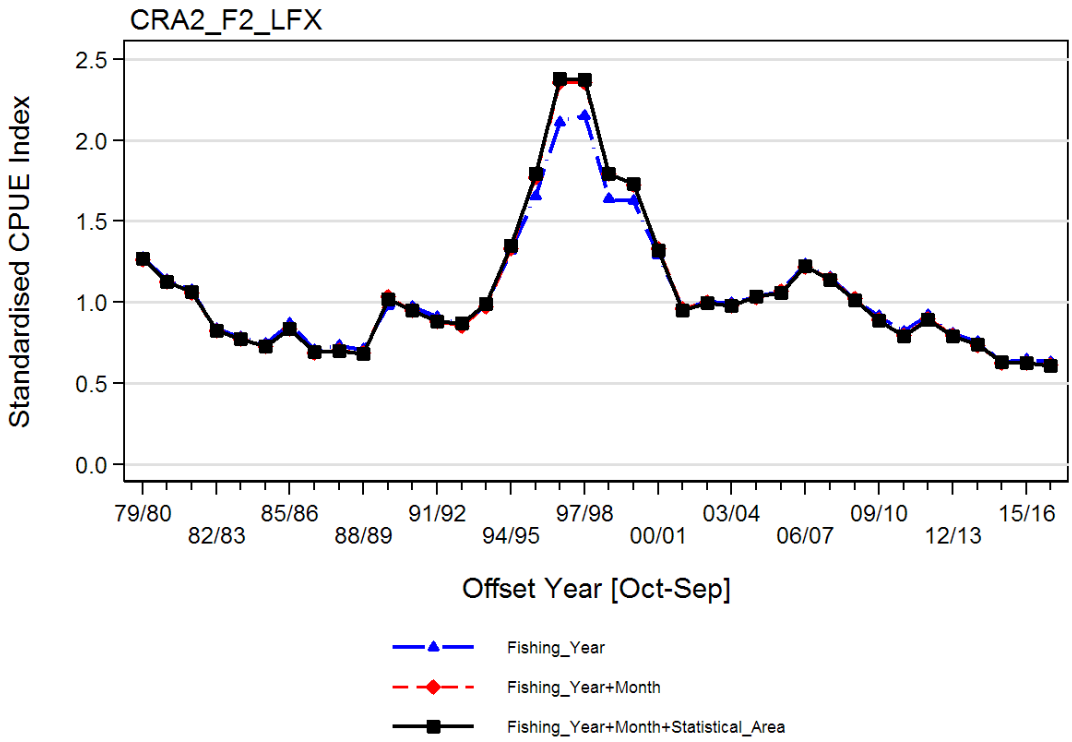

Figure E.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 2 F2_LFX lognormal regression model. The final model is shown by a thick heavy line.

F. DIAGNOSTICS FOR CRA 2 OFFSET YEAR (1 OCTOBER–30 SEPTEMBER) STANDARDISED CPUE ANALYSIS INCLUDING A [*VESSEL*] EXPLANATORY VARIABLE

The data set for this analysis was prepared using the F2 catch correction algorithm scaled to the combined LFX destination codes. A [*vessel*] explanatory variable was added to this model, selecting only those vessels with at least five years experience in the fishery. Unlike previous series which did not include a vessel explanatory variable, this series excluded the FSU data because the vessel codes in the FSU data base are not consistent with the current Fisheries New Zealand Warehou data base. Consequently, this series begins with the 1989–90 fishing year (beginning on 1 October 1989), the first complete offset fishing year in the Warehou data base.

Table F.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 2 F2_LFX CPUE time series after removal of vessels with less than five years experience in the fishery.

	CRA 2 Statistical Area				
Offset year	905	906	907	908	Total
1989–90	26	40	20	12	98
1990–91	39	124	43	39	245
1991–92	44	133	47	41	265
1992–93	56	162	31	58	307
1993–94	53	163	23	67	306
1994–95	44	121	30	62	257
1995–96	39	98	18	37	192
1996–97	33	92	21	28	174
1997–98	40	84	16	30	170
1998–99	46	87	24	28	185
1999–00	39	90	24	39	192
2000–01	52	104	36	37	229
2001–02	59	120	40	44	263
2002–03	73	122	34	57	286
2003–04	51	120	40	68	279
2004–05	53	100	37	67	257
2005–06	81	115	38	64	298
2006–07	72	119	28	65	284
2007–08	74	109	31	61	275
2008–09	85	104	30	52	271
2009–10	87	107	31	58	283
2010–11	80	103	33	64	280
2011–12	79	117	33	65	294
2012–13	77	114	33	65	289
2013–14	58	117	30	66	271
2014–15	52	113	29	52	246
2015–16	52	103	35	36	226
2016–17	73	83	31	34	221

Table F.2. Total deviance (R^2) explained by each variable in the CRA 2 F2_LFX standardised offset year CPUE analysis. The number of categories in each explanatory variable is given in parentheses.

Variable	1	2		3
Offset Year (28)	0.1819			
Vessel (93)	0.2448	0.3724		
Month (12)	0.0714	0.2876	0.4867	
Statistical Area (4)	0.0121	0.1967	0.3739	0.4882
Additional deviance explained	0.0000	0.1905	0.1143	0.0015

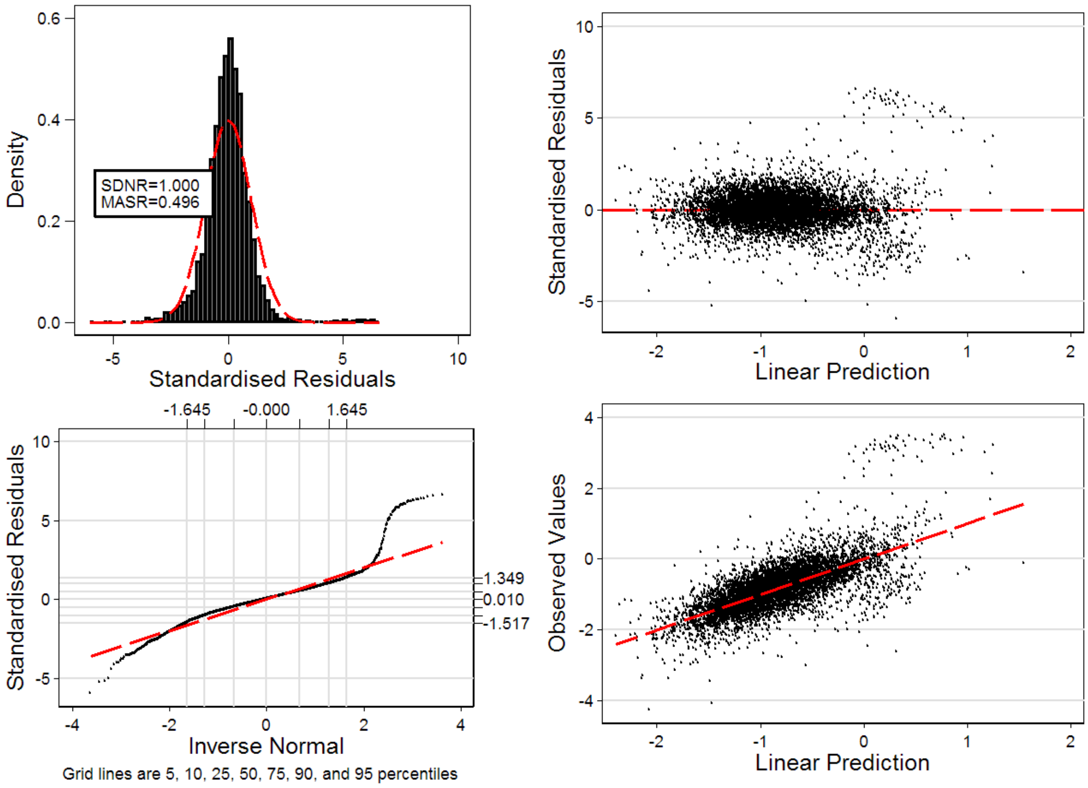

Figure F.1. Standardised residual plots for the CRA 2 standardised offset year CPUE analysis.

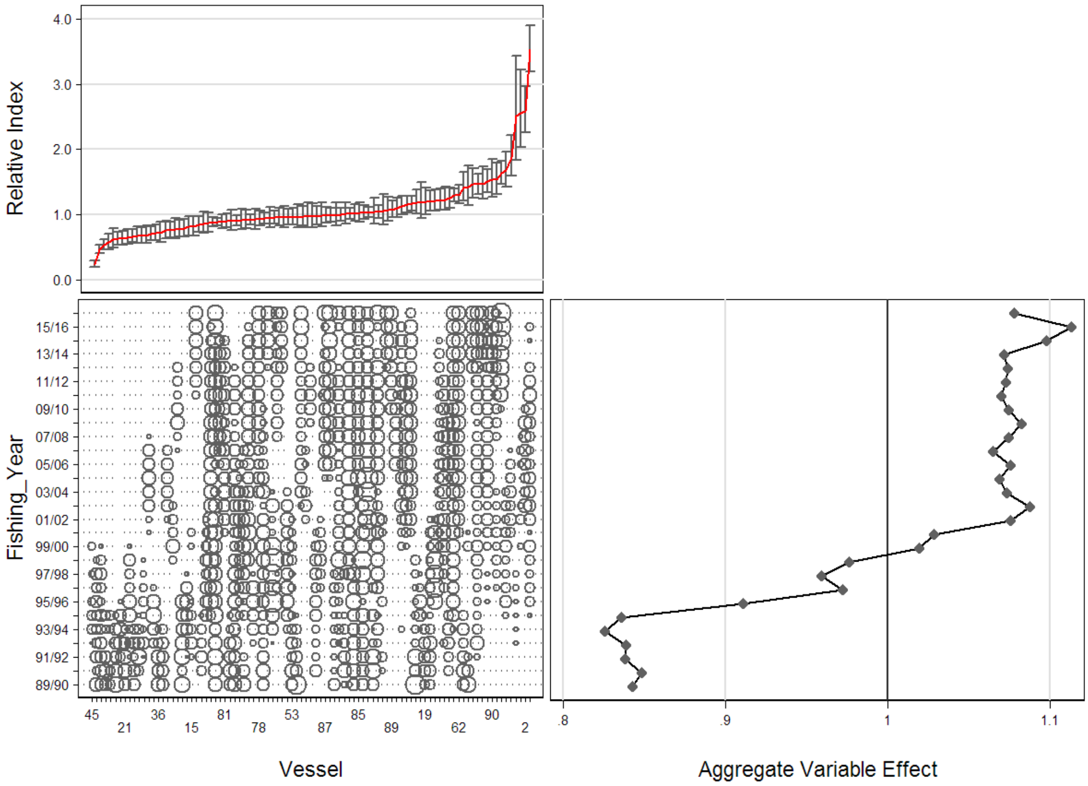

Figure F.2. The effect of the vessel categorical variable in the offset year CRA 2 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

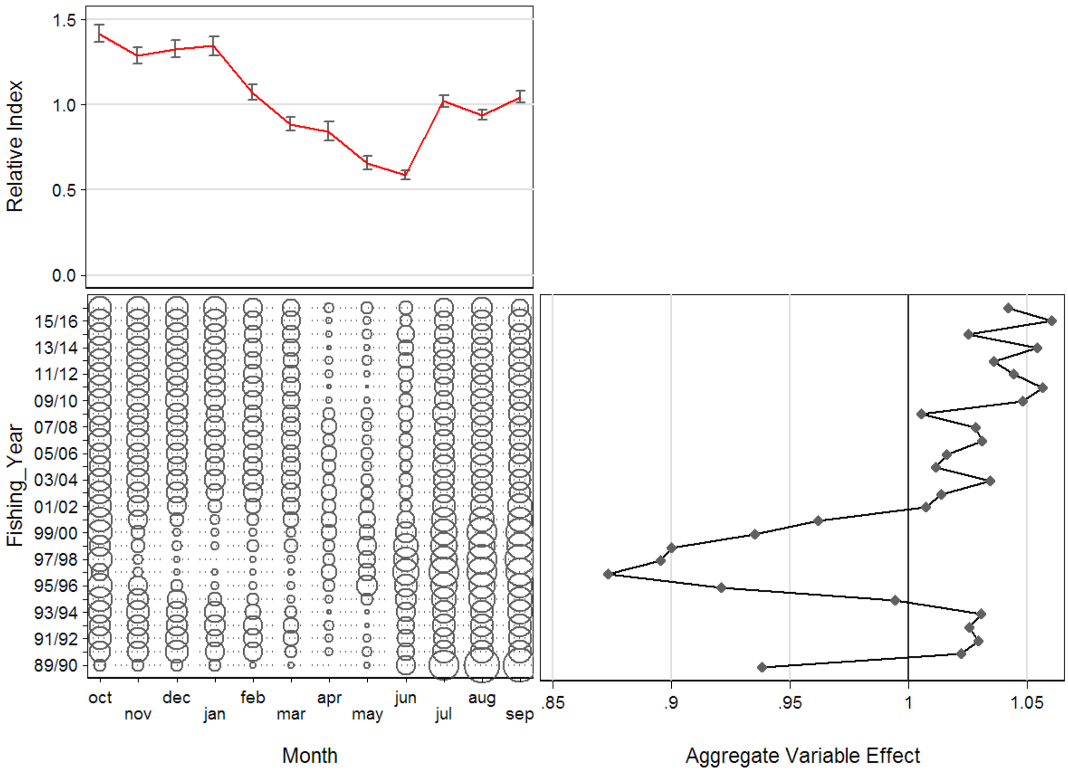

Figure F.3. The effect of the month categorical variable in the offset year CRA 2 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

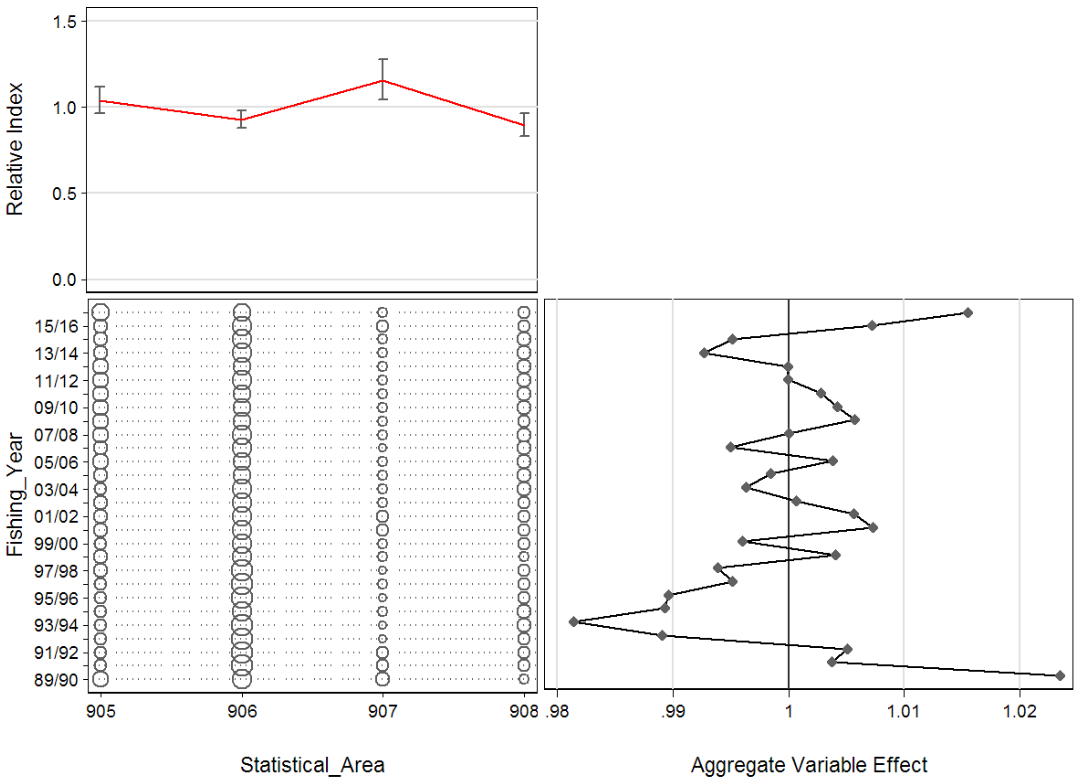

Figure F.4. The effect of the statistical area categorical variable in the offset year CRA 2 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

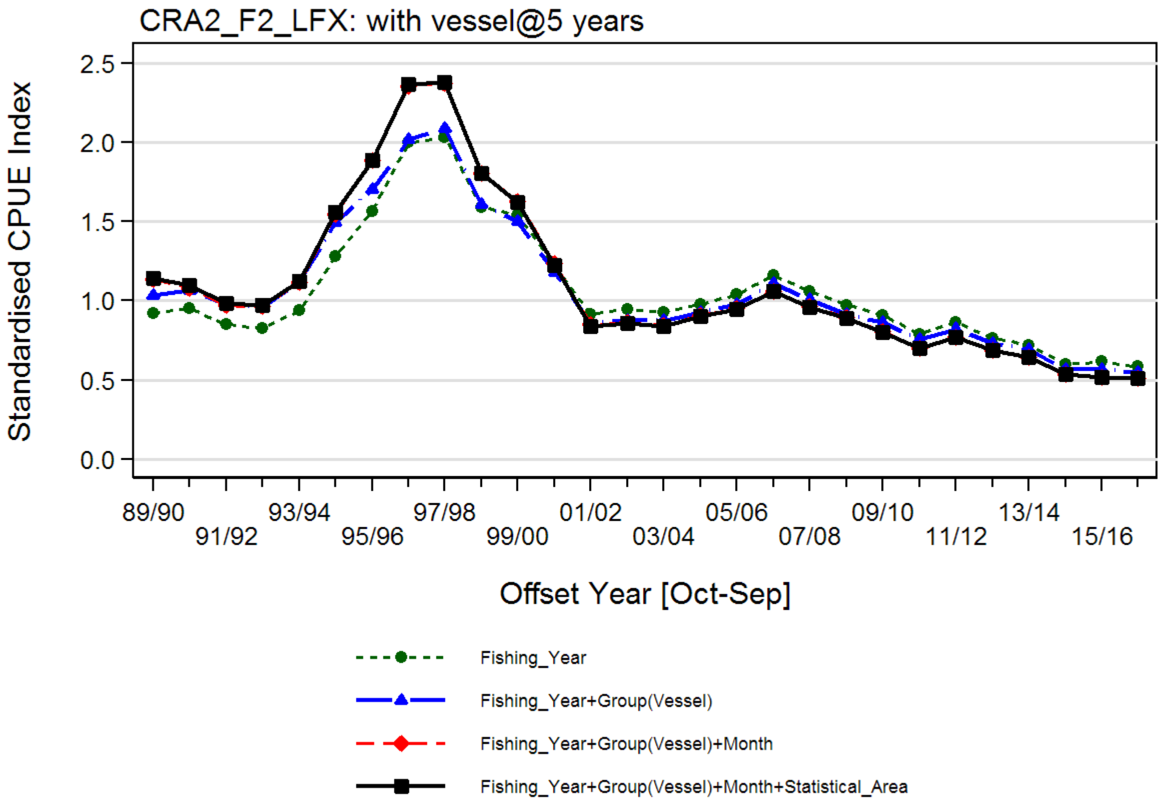

Figure F.5. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 2 F2_LFX lognormal regression model. The final model is shown by a thick heavy line.

G. DIAGNOSTICS FOR CRA 3 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 LFX destination codes.

Table G.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 3 F2_LFX CPUE time series.

	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	284	179	527
1989–90	51	328	195	574
1990–91	41	255	237	533
1991–92	58	244	282	584
1992–93	48	203	242	493
1993–94	20	87	69	176
1994–95	8	59	52	119
1995–96	11	45	44	100
1996–97	11	48	37	96
1997–98	15	62	29	106
1998–99	9	62	33	104
1999–00	7	93	45	145
2000–01	11	84	45	140
2001–02	20	100	56	176
2002–03	21	123	90	234
2003–04	22	92	124	238
2004–05	19	76	111	206
2005–06	14	102	105	221
2006–07	15	105	104	224
2007–08	15	79	88	182
2008–09	15	54	78	147
2009–10	14	61	75	150
2010–11	12	58	66	136
2011–12	8	50	34	92
2012–13	9	61	41	111
2013–14	12	72	61	145
2014–15	17	84	77	178
2015–16	14	79	77	170
2016–17	15	75	68	158

Table G.2. Total deviance (R^2) explained by each variable in the CRA 3 F2_LFX standardised offset year CPUE analysis. The number of categories in each explanatory variable is given in parentheses.

Variable	1	2	3
Offset Year (38)	0.4163		
Month (12)	0.0642	0.5036	
Statistical Area (3)	0.0144	0.4353	0.5221
Additional deviance explained	0.0000	0.0873	0.0186

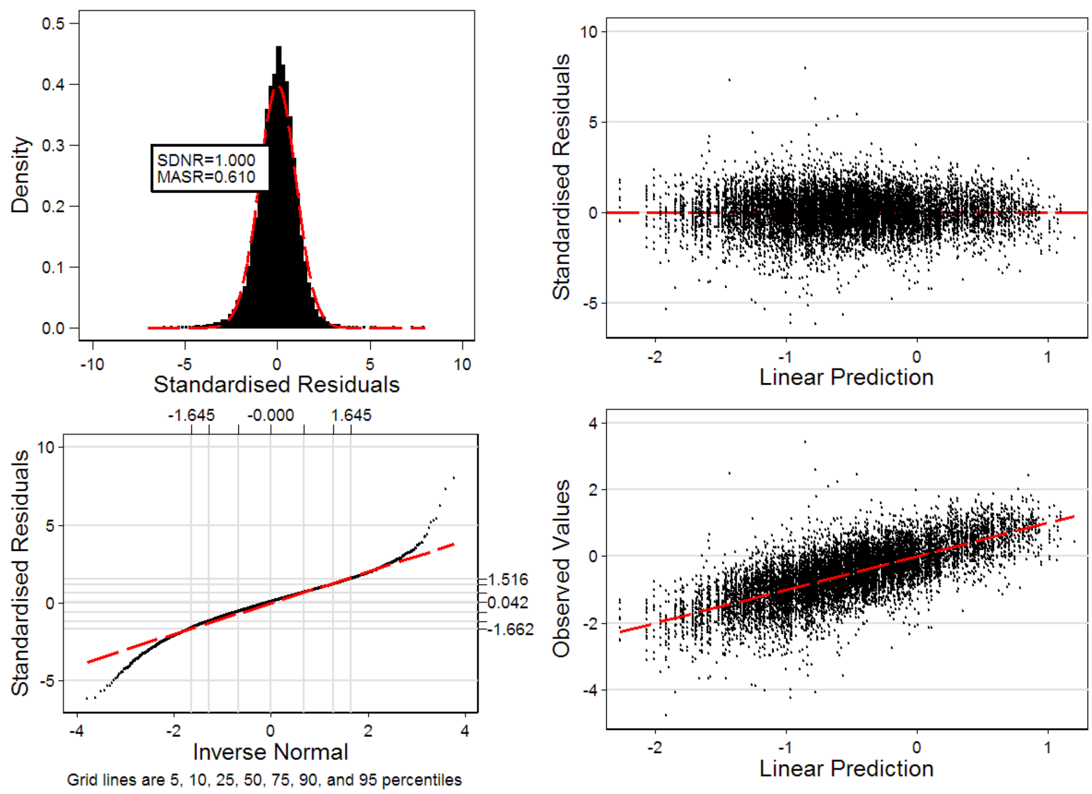

Figure G.1. Standardised residual plots for the CRA 3 F2_LFX standardised offset year CPUE analysis.

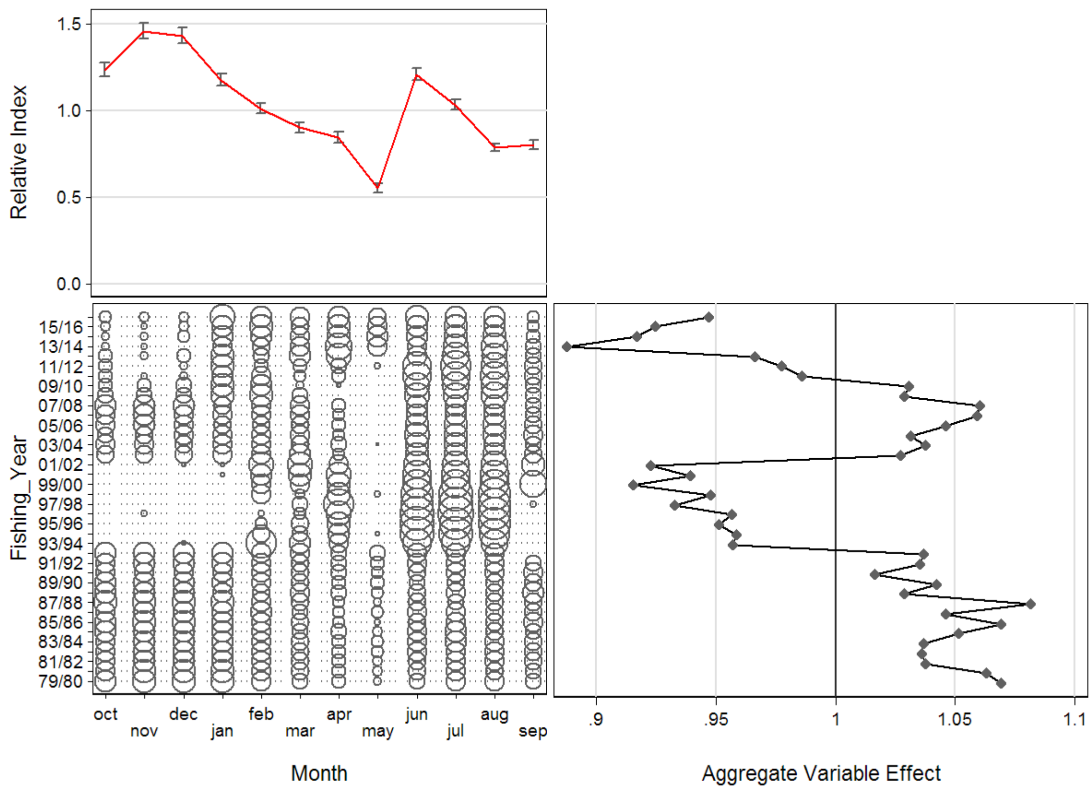

Figure G.2. The effect of the month categorical variable in the offset year CRA 3 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

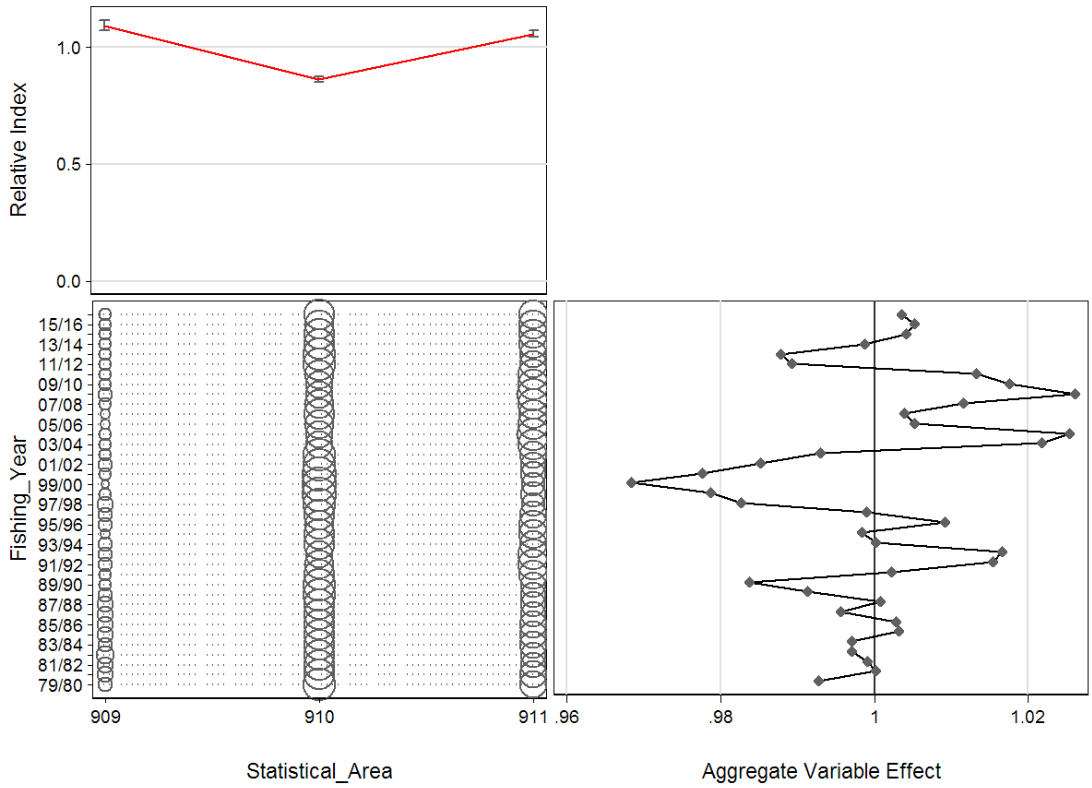

Figure G.3. The effect of the statistical area categorical variable in the offset year CRA 3 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

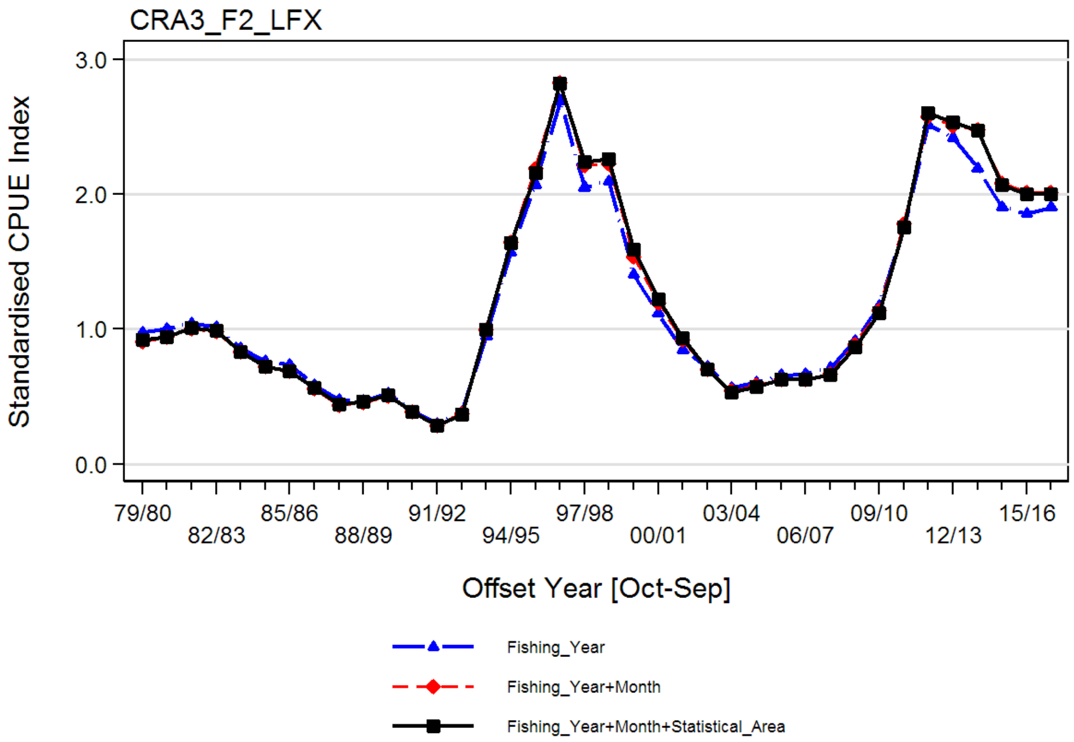

Figure G.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 3 F2_LFX lognormal regression model. The final model is shown by a thick heavy line.

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

The data set for this analysis was prepared using 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 4 F2_LFX CPUE time series. '–': no data for indicated cell.

	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	199	183	274	110	–	766
1989–90	208	196	255	101	2	762
1990–91	230	201	277	109	3	820
1991–92	265	212	260	96	6	839
1992–93	280	214	258	100	12	864
1993–94	190	204	250	98	10	752
1994–95	127	157	219	70	8	581
1995–96	115	102	164	61	5	447
1996–97	85	50	148	40	–	323
1997–98	88	39	123	47	–	297
1998–99	89	41	119	48	4	301
1999–00	95	33	118	44	9	299
2000–01	101	52	119	58	8	338
2001–02	104	88	143	44	4	383
2002–03	109	102	153	62	–	426
2003–04	119	97	161	68	–	445
2004–05	110	101	158	58	–	427
2005–06	89	100	178	81	6	454
2006–07	95	96	186	88	27	492
2007–08	88	77	139	67	23	394
2008–09	80	86	101	51	10	328
2009–10	97	75	112	78	15	377
2010–11	96	93	152	70	10	421
2011–12	75	76	144	48	16	359
2012–13	72	70	155	48	12	357
2013–14	70	65	166	51	5	357
2014–15	72	73	180	61	5	391
2015–16	83	83	182	63	9	420
2016–17	65	74	166	58	12	375

Table H.2. Total deviance (R^2) explained by each variable in the CRA 4 F2_LFX standardised offset year CPUE analysis. The number of categories in each explanatory variable is given in parentheses.

Variable	1	2	3
Offset Year (37)	0.1743		
Month (12)	0.0676	0.2666	
Statistical Area (5)	0.0166	0.1939	0.2859
Additional deviance explained	0	0.0923	0.0193

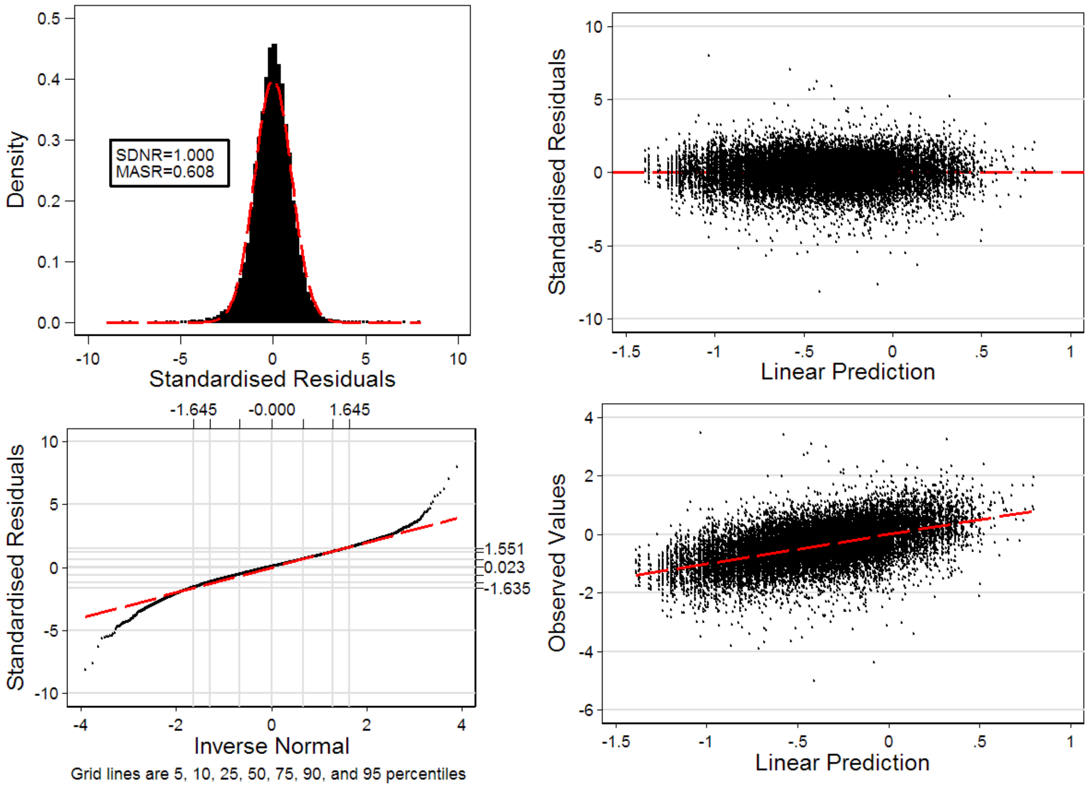

Figure H.1. Standardised residual plots for the CRA 4 F2_LFX standardised offset year CPUE analysis.

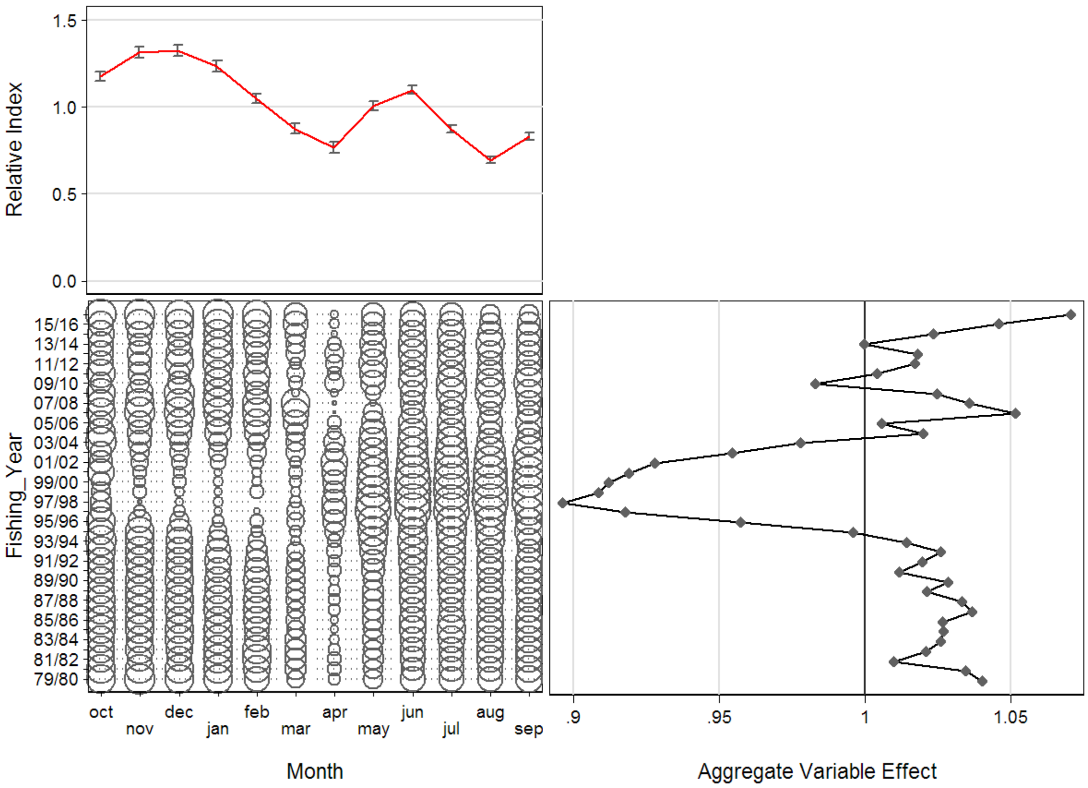

Figure H.2. The effect of the month categorical variable in the offset year CRA 4 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

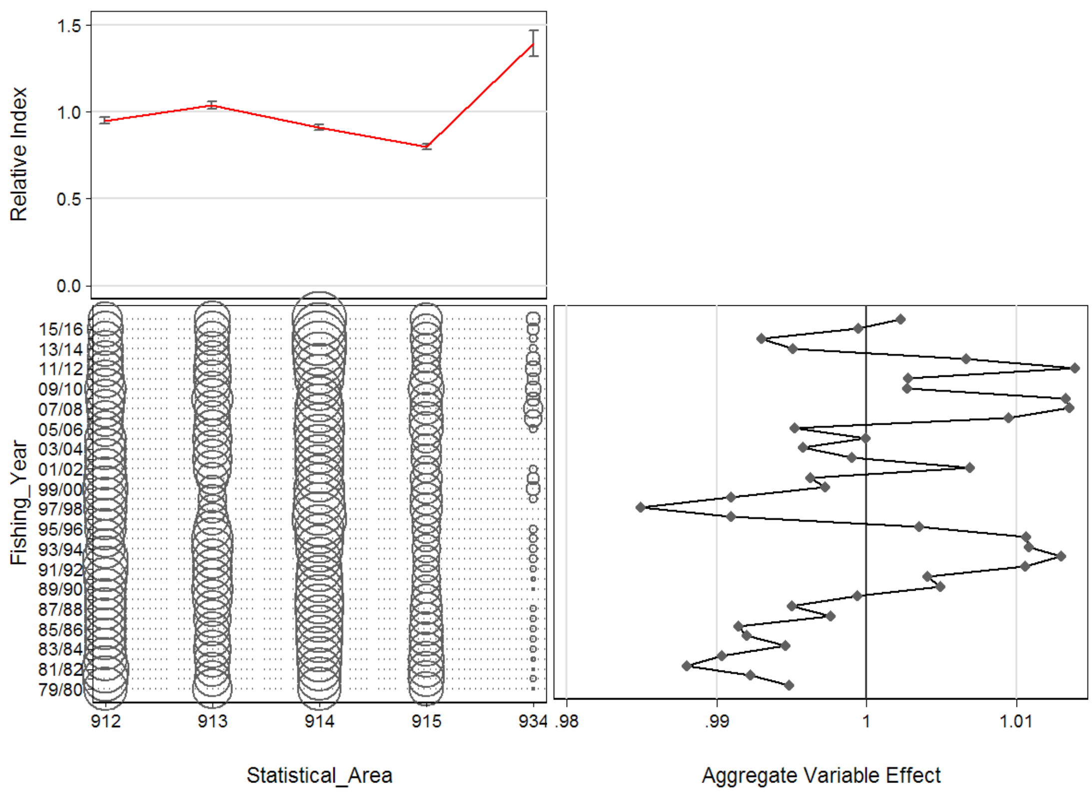

Figure H.3. The effect of the statistical area categorical variable in the offset year CRA 4 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

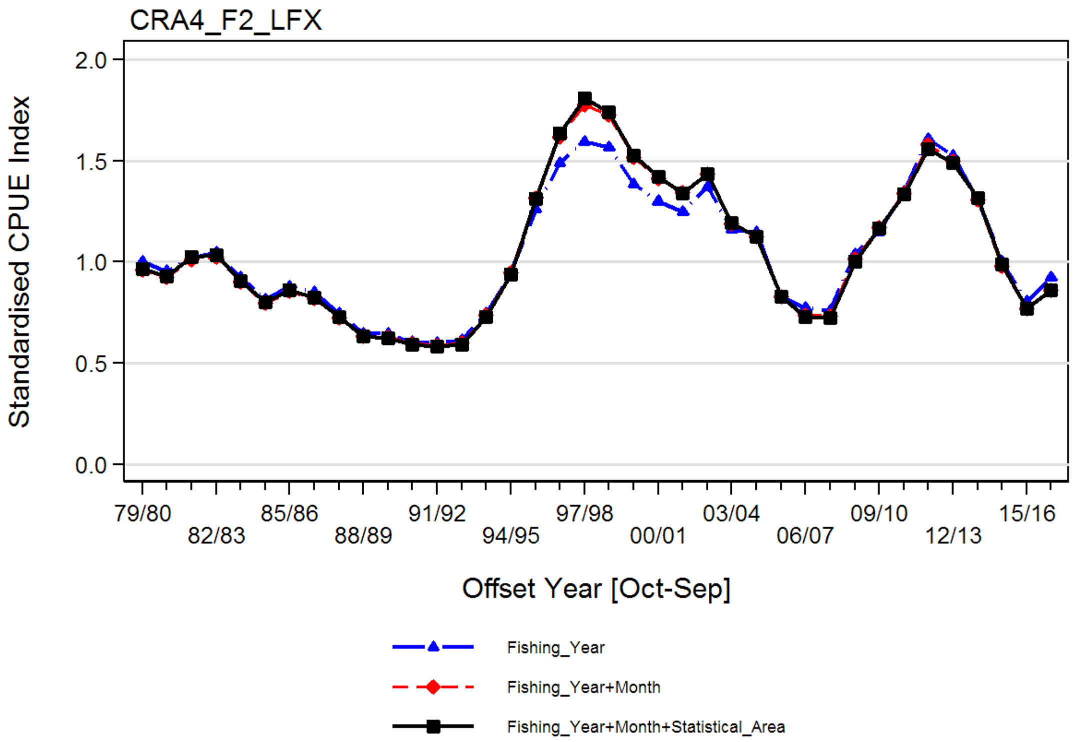

Figure H.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 4 F2_LFX lognormal regression model. The final model is shown by a thick heavy line.

I. DIAGNOSTICS FOR CRA 5 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 LFX destination code.

Table I.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 5 F2_LFX CPUE time series. '–': no data for indicated cell.

	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	49	360	61	9	5	59	543
1989–90	87	277	63	–	3	41	471
1990–91	74	310	85	1	9	74	553
1991–92	52	229	102	–	3	70	456
1992–93	36	222	72	–	1	81	412
1993–94	18	185	81	–	3	68	355
1994–95	19	160	50	–	1	53	283
1995–96	16	172	45	2	1	58	294
1996–97	15	143	41	2	–	54	255
1997–98	19	133	39	–	–	36	227
1998–99	15	136	39	–	1	30	221
1999–00	23	123	31	1	–	28	206
2000–01	29	85	11	–	–	30	155
2001–02	19	68	8	–	–	20	115
2002–03	39	83	7	–	–	44	173
2003–04	38	72	5	–	1	48	164
2004–05	33	113	8	–	1	50	205
2005–06	46	125	13	–	–	46	230
2006–07	50	124	11	–	–	43	228
2007–08	41	127	21	1	–	52	242
2008–09	39	115	9	–	–	46	209
2009–10	38	111	–	1.0	–	54	204
2010–11	35	106	5	1.0	–	45	192
2011–12	34	88	6	–	–	51	179
2012–13	28	96	1	–	–	47	172
2013–14	27	96	5	–	–	47	175
2014–15	25	101	2	–	–	44	172
2015–16	21	88	8	–	–	38	155
2016–17	15	99	5	–	–	27	146

Table I.2. Total deviance (R^2) explained by each variable in the CRA 5 F2_LFX standardised offset year CPUE analysis. The number of categories in each explanatory variable is given in parentheses.

Variable	1	2	3
Offset Year (38)	0.3328		
Month (12)	0.0352	0.3856	
Statistical Area (6)	0.0171	0.3569	0.4079
Additional deviance explained	0.0000	0.0528	0.0223

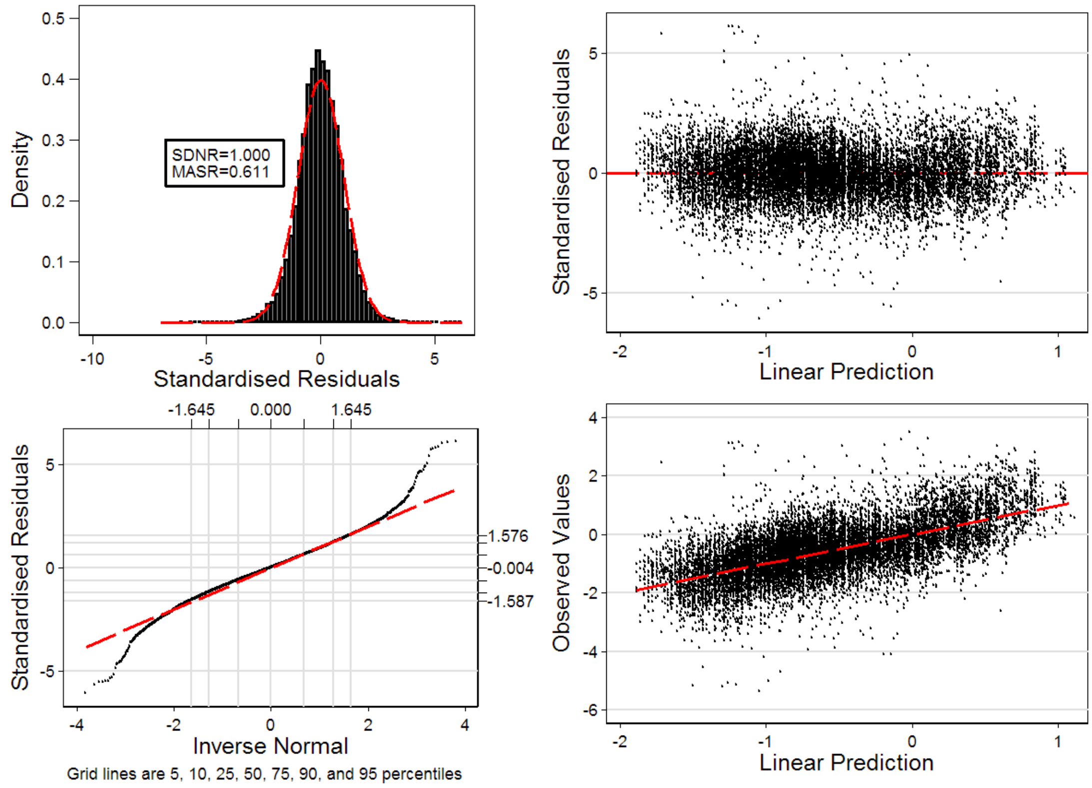

Figure I.1. Standardised residual plots for the CRA 5 F2_LFX standardised offset year CPUE analysis.

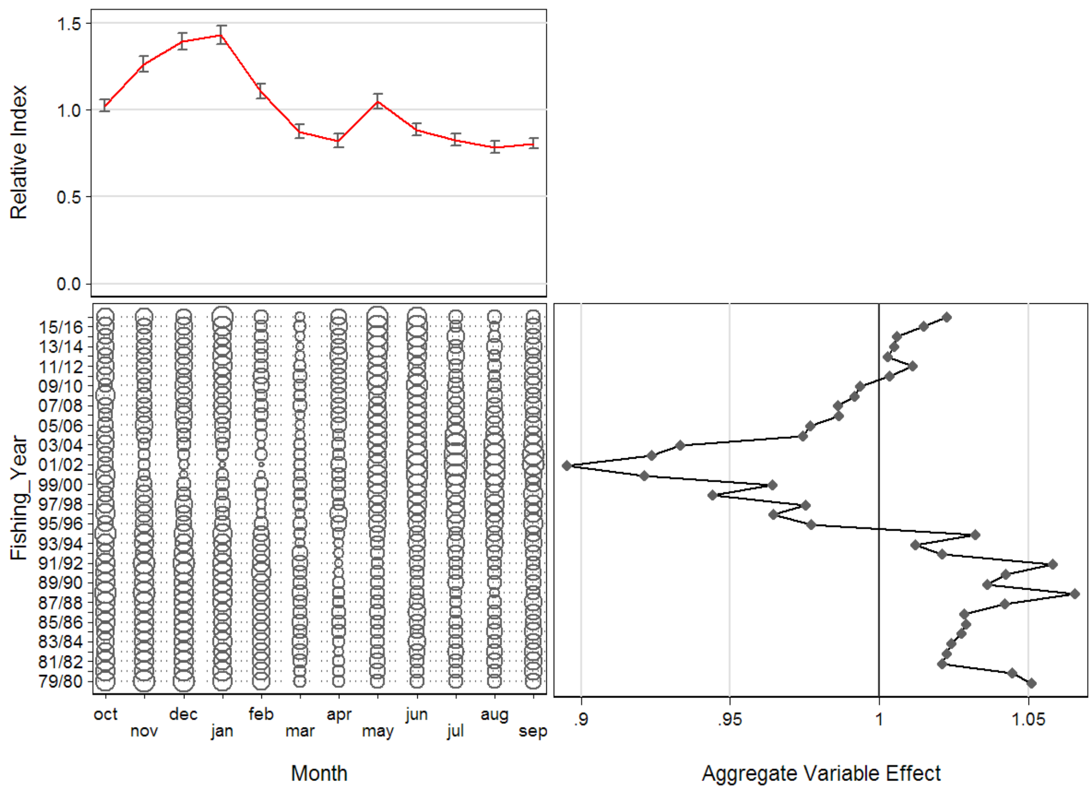

Figure I.2. The effect of the month categorical variable in the offset year CRA 5 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

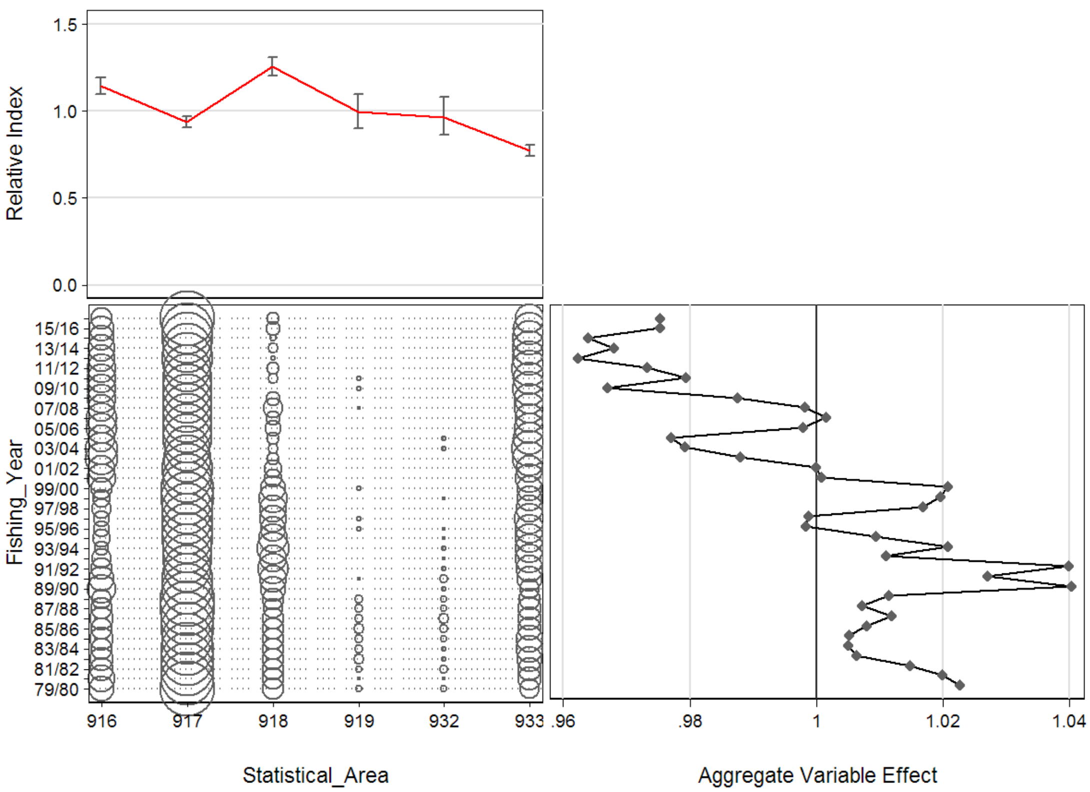

Figure I.3. The effect of the statistical area categorical variable in the offset year CRA 5 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

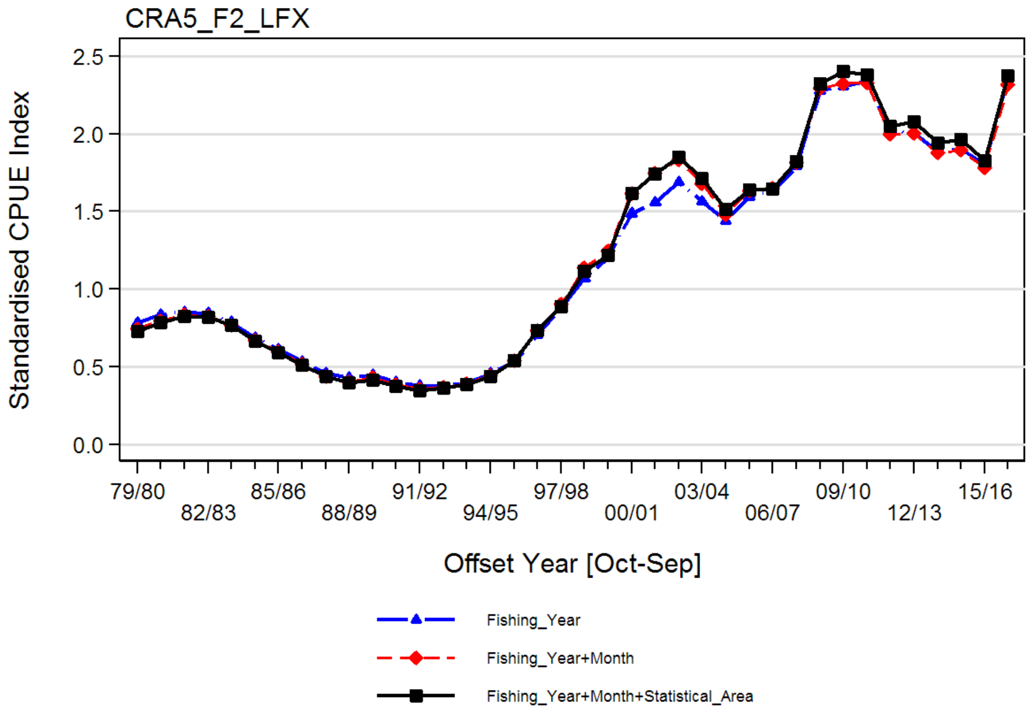

Figure I.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 5 F2_LFX lognormal regression model. The final model is shown by a thick heavy line.

J. 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. December to May data collected after 1 October 2013 have been dropped from this analysis.

Table J.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 7 F2_LFX CPUE time series.

	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	53	306
1990–91	242	82	324
1991–92	136	28	164
1992–93	205	41	246
1993–94	135	34	169
1994–95	145	45	190
1995–96	117	23	140
1996–97	110	31	141
1997–98	92	41	133
1998–99	89	24	113
1999–00	97	33	130
2000–01	88	44	132
2001–02	105	29	134
2002–03	80	14	94
2003–04	64	16	80
2004–05	34	18	52
2005–06	34	25	59
2006–07	51	20	71
2007–08	34	25	59
2008–09	44	29	73
2009–10	57	35	92
2010–11	53	35	88
2011–12	43	27	70
2012–13	32	16	48
2013–14	18	9	27
2014–15	27	12	39
2015–16	33	12	45
2016–17	34	12	46

Table J.2. Total deviance (R^2) explained by each variable in the CRA 7 F2_LFX standardised offset year CPUE analysis. The number of categories in each explanatory variable is given in parentheses.

Variable	1	2	3
Offset year (37)	0.2790		
Statistical Area (2)	0.0578	0.3214	
Month (12)	0.0065	0.2887	0.3300
Additional deviance explained	0.0000	0.0424	0.0086

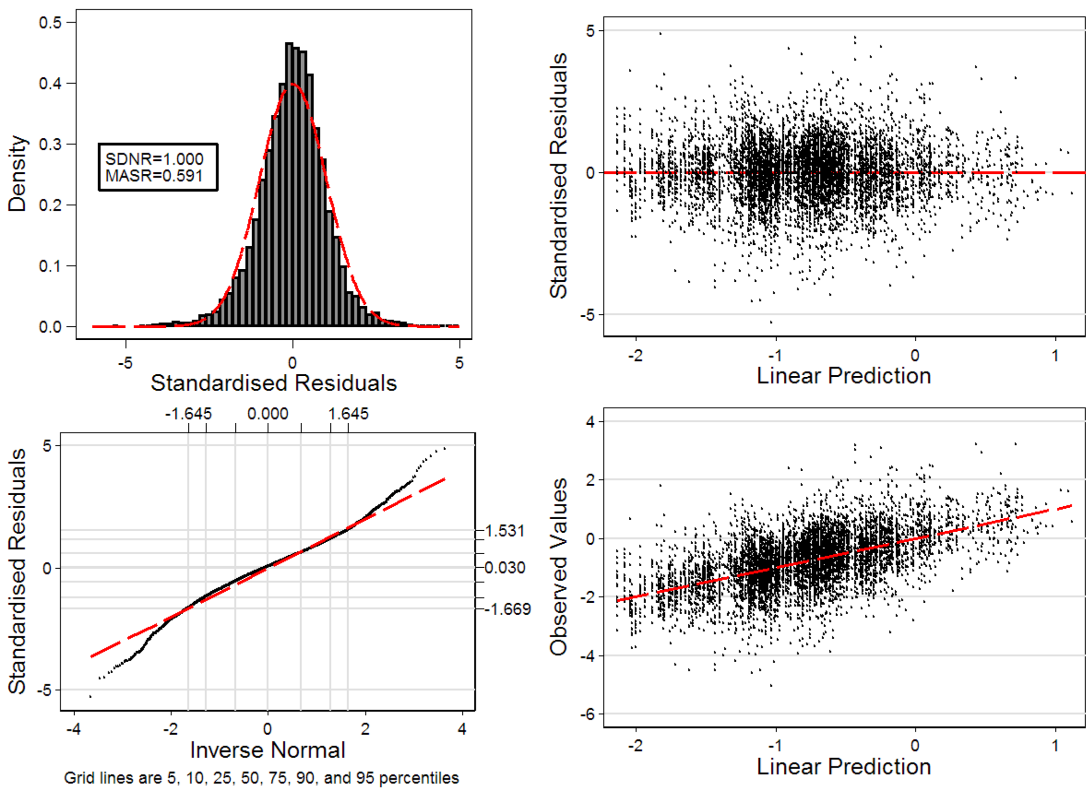

Figure J.1. Standardised residual plots for the CRA 7 F2_LFX standardised offset year CPUE analysis.

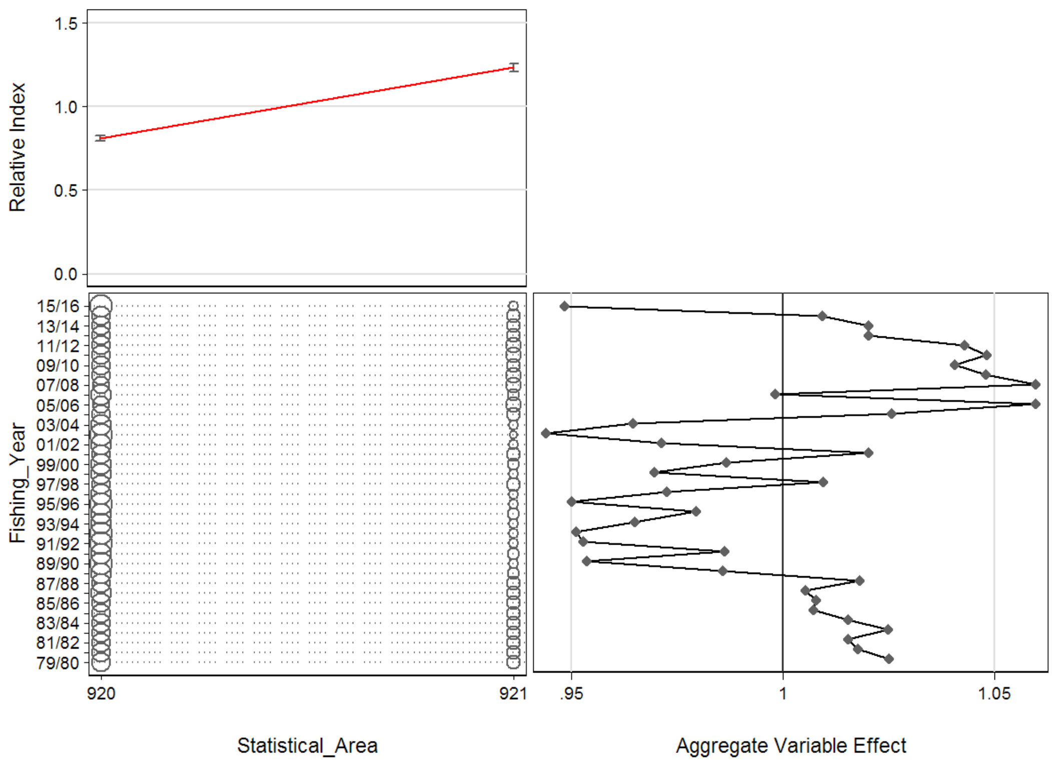

Figure J.2. The effect of the statistical area categorical variable in the offset year CRA 7 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

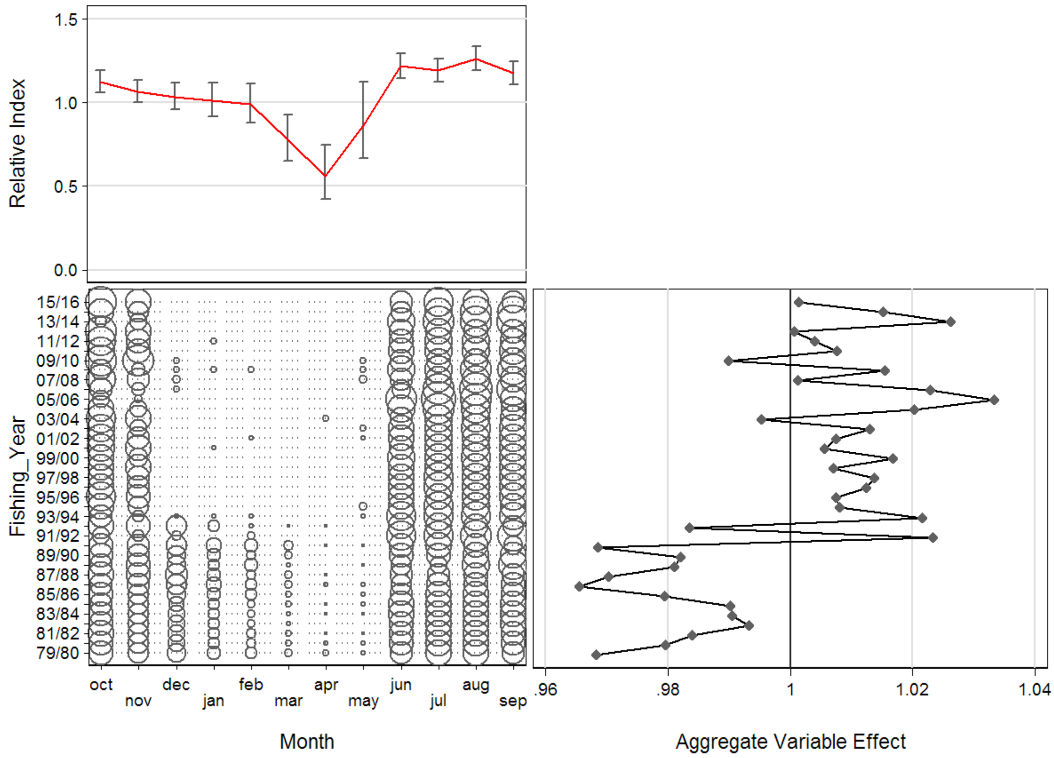

Figure J.3. The effect of the month categorical variable in the offset year CRA 7 F2_LFX lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

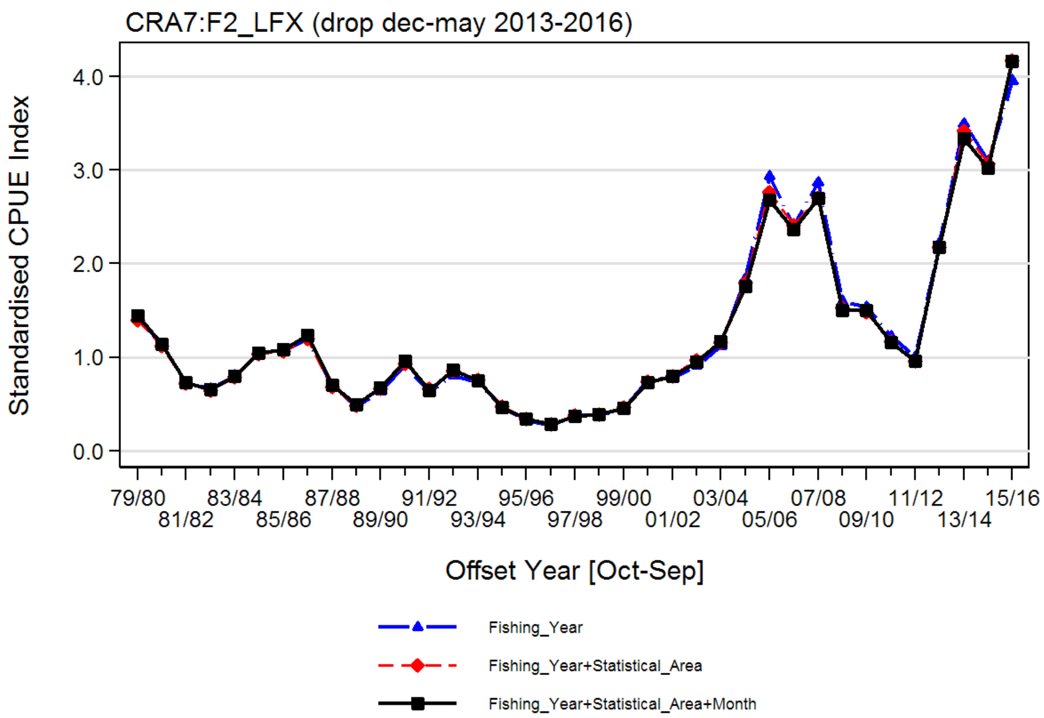

Figure J.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 7 F2_LFX lognormal regression model. The final model is shown by a thick heavy line.

K. 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 LF destination codes.

Table K.1. Number of vessel/statistical area/month records in the dataset used to calculate the offset year CRA 8 F2_LF CPUE time series. '–': no data for indicated cell.

	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	134	209	14	231	142	119	869
1989–90	13	80	178	17	268	198	78	832
1990–91	29	85	189	21	301	198	150	973
1991–92	31	69	162	17	314	206	210	1 009
1992–93	15	73	163	21	314	211	220	1 017
1993–94	19	40	114	31	246	179	211	840
1994–95	9	50	99	48	199	185	177	767
1995–96	4	44	85	34	189	153	161	670
1996–97	5	52	79	22	204	160	207	729
1997–98	3	51	74	16	185	139	230	698
1998–99	–	54	78	17	169	127	188	633
1999–00	1	41	57	13	170	129	119	530
2000–01	–	21	55	8	165	115	93	457
2001–02	4	11	46	5	145	81	84	376
2002–03	4	12	41	4	159	66	78	364
2003–04	3	14	33	1	141	54	77	323
2004–05	3	26	30	4	135	47	63	308
2005–06	6	12	26	–	115	64	53	276
2006–07	7	10	37	2	118	56	52	282
2007–08	6	12	58	5	106	72	67	326
2008–09	7	10	44	–	88	55	73	277
2009–10	4	6	58	2	131	83	88	372
2010–11	1	1	51	1	143	63	67	327
2011–12	–	1	58	6	147	60	60	332
2012–13	–	4	49	4	138	75	72	342
2013–14	1	6	43	3	126	78	74	331
2014–15	–	14	39	3	120	67	63	306
2015–16	–	15	57	7	148	82	59	368
2016–17	1	8	54	7	106	62	53	291

Table K.2. Total deviance (R^2) explained by each variable in the CRA 8 F2_LF standardised offset year CPUE analysis. The number of categories in each explanatory variable is given in parentheses.

Variable	1	2	3
Offset Year (37)	0.2313		
Month (12)	0.0409	0.2959	
Statistical Area (7)	0.0325	0.2602	0.3216
Additional deviance explained	0.0000	0.0646	0.0257

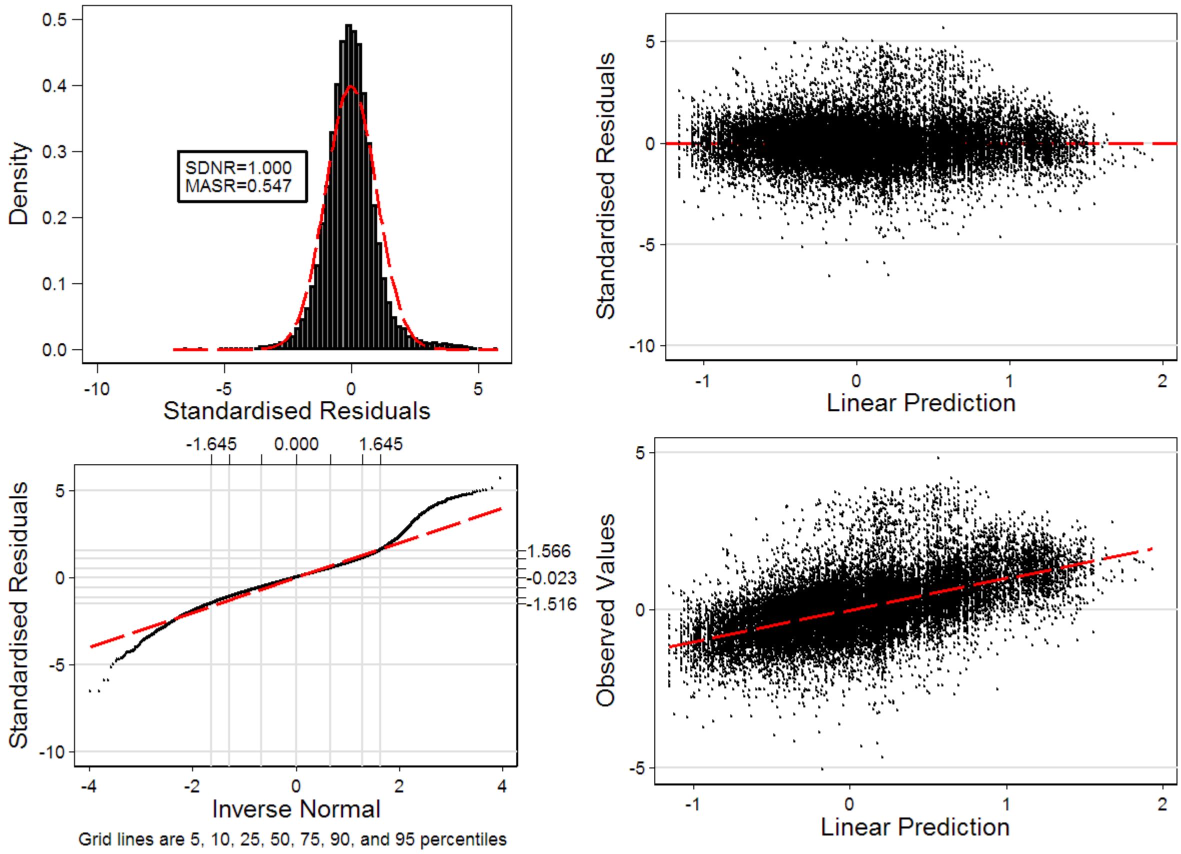

Figure K.1. Standardised residual plots for the CRA 8 F2_LF standardised offset year CPUE analysis.

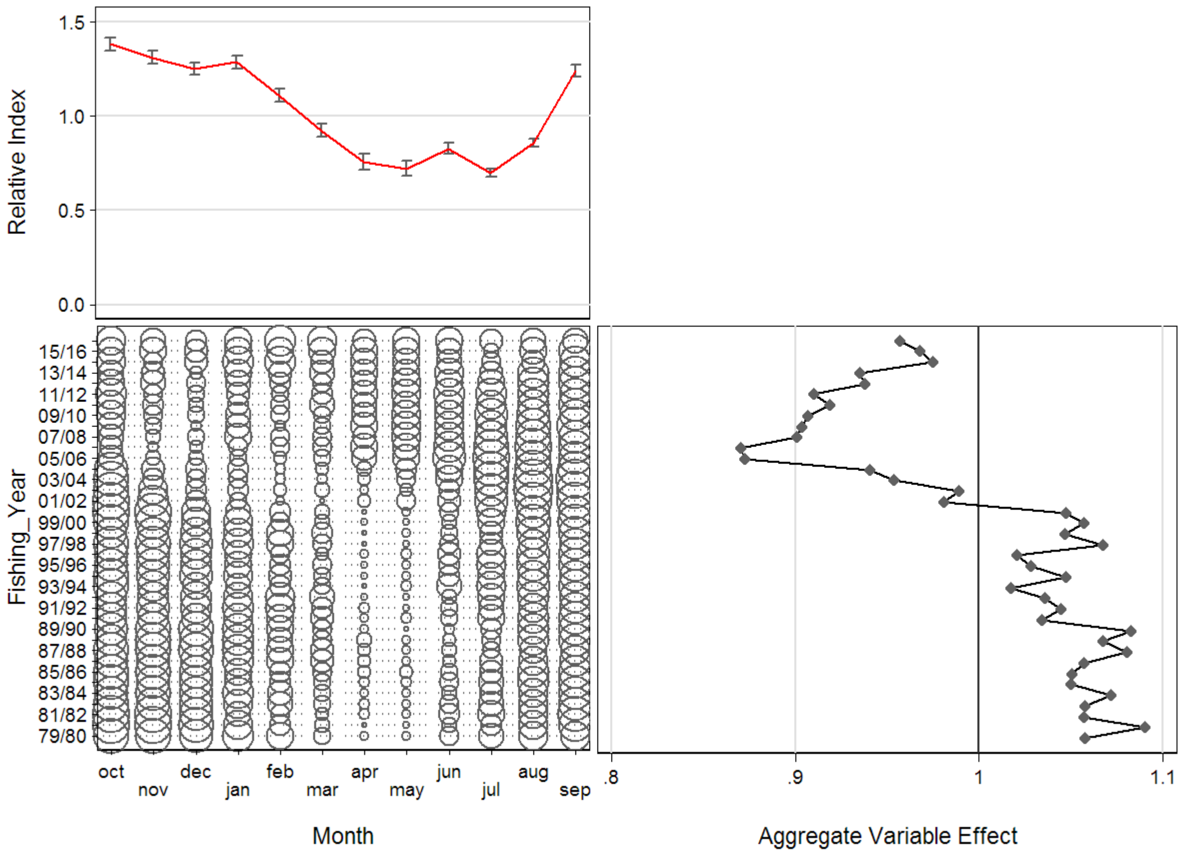

Figure K.2. The effect of the month categorical variable in the offset year CRA 8 F2_LF lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

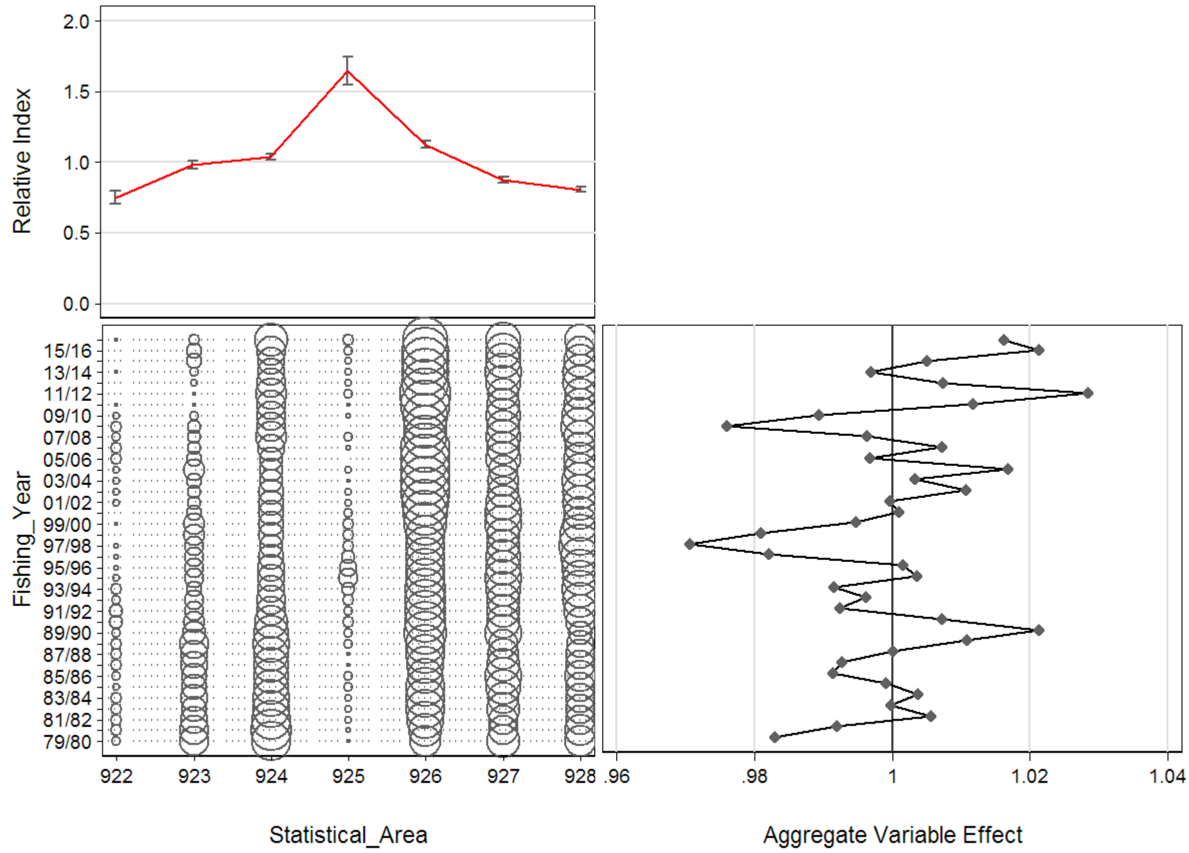

Figure K.3. The effect of the statistical area categorical variable in the offset year CRA 8 F2_LF lognormal regression model: top left: effect by level of variable; bottom-left: distribution of variable by year; bottom-right: cumulative effect of variable by offset year.

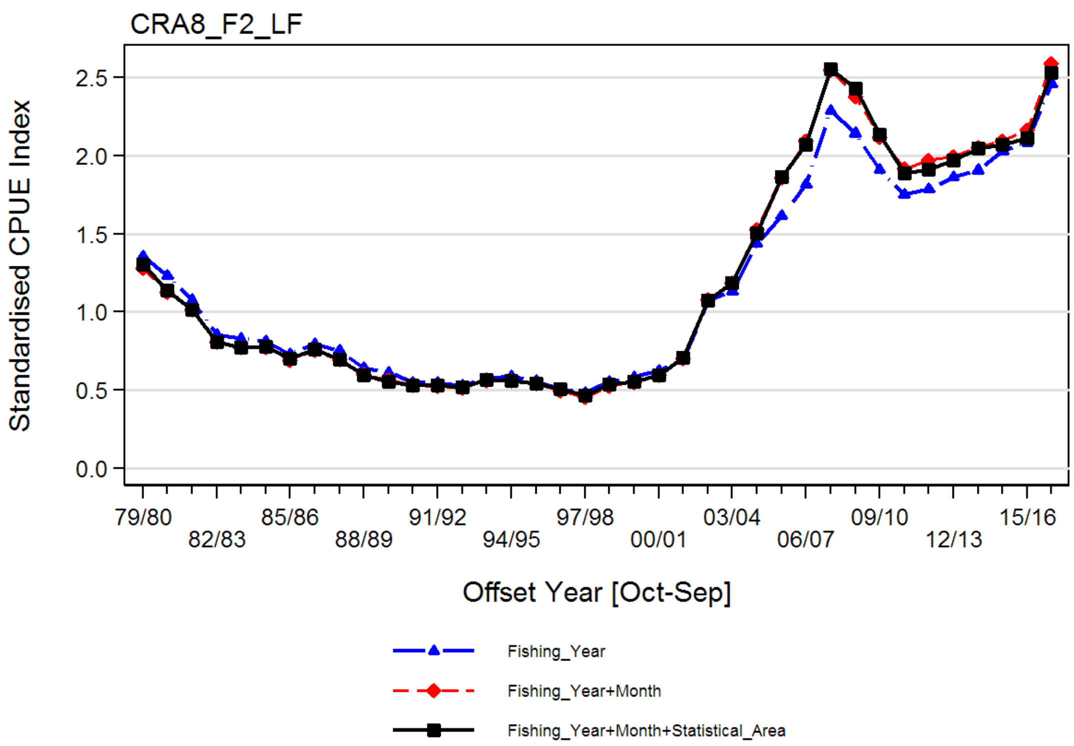

Figure K.4. Stepwise graph showing the effect on the year coefficients from the successive addition of each categorical variable to the offset year CRA 8 F2_LF lognormal regression model. The final model is shown by a thick heavy line.