Appendix J

Report of the Co-conveners of the Workshop on Conversion Factors for Toothfish
(Virtual Meeting, 12 and 13 April 2022)

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on Conversion Factors for Toothfish
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Introduction

1. The Workshop on Conversion Factors for Toothfish was held online on 12 and 13 April 2022. The workshop was co-convened by Mr N. Walker (New Zealand) and Mr N. Gasco (France) and supported by the CCAMLR Secretariat. Scientists from 10 Members attended the Workshop.

2. At the opening of the meeting, Mr Gasco welcomed and acknowledged the 43 participants (Attachment I) and noted that the workshop was an informal meeting to review current procedures and develop standardised guidelines for on-board sampling procedures, including the calculation and use of conversion factors (CFs) in all CCAMLR toothfish fisheries (SC-CAMLR-40, paragraph 3.35). Accordingly, this report is not an adopted report, but is a summary by the Co-conveners for the consideration of the Scientific Committee and its working groups. The intent is that the recommendations and analyses outlined below will be reported to WG-FSA-2022 for further discussion and agreed at SC-CAMLR-41 according to the Scientific Committee Rules of Procedure.

Terms of reference and agenda

3. The Co-conveners recalled the terms of reference taken from WG-FSA-2021, paragraphs 2.6 and 2.7:

   (i) To review and develop standardised guidelines for on-board sampling procedures and the calculation, and use of, CFs in all CCAMLR toothfish fisheries.

   (ii) Review a summary of on-board sampling procedures, and an analysis of the calculation and implementation of CFs in deriving catch weights between and within vessels, Members and fisheries to be undertaken by the Secretariat as an update to WG-FSA-15/02, including consideration of the effect of CF variability on total catch removals.

   (iii) Consider that the workshop be hosted virtually, facilitated by the Secretariat during March/April 2022, with the meeting of a duration of two days. Results from the workshop will be presented as a convener report to WG-FSA-2022.

4. The agenda was adopted (Attachment II).

5. This report was prepared by the Co-conveners with support from the Secretariat.

Review of onboard sampling procedures

6. Documents submitted to the meeting are listed in Attachment III.

7. WS-CF-2022/03 described the variables that influence CF values and how to improve their accuracy. It was noted that only one type of scale is used on French vessels, therefore it was not possible to determine the effect of the type of scale.

8. WS-CF-2022/01 described the analyses of CF data and its implication for estimation of total catch. This document showed that from 2016 through 2021 observer-reported values were more variable and typically higher than vessel-reported values, and that in most cases estimated green weight would be less than 4% higher if using the observer-reported CFs.

9. WS-CF-2022/02 described the sampling, calculation and use of CFs by New Zealand vessels. Observers are tasked with undertaking 2–3 CF samples of at least 20 fish per week. It was noted that the use of motion-compensated scales provide the best accuracy, although maintaining larger sample sizes may make the use of motion-compensated scales impractical when factory configurations make the use of the same scale onerous for both measurements. It was noted that clear illustration on the type of cuts being used would be welcome.

10. WS-CF-2022/04 presented an analysis of CF data from longline vessels in CCAMLR Subarea 48.3. Cut type, weighing method, seasonal variation, size of fish and vessel were likely important factors influencing CFs.

11. It was noted that a modelling approach on the data held by the Secretariat would provide valuable information that could be presented during the next Working Group on Fish Stock Assessment (WG-FSA) meeting.

12. During the review of current on-board sampling procedures, it was noted that there are no rules on how CFs are to be calculated or implemented beyond the instructions for Scheme of International Scientific Observation (SISO) observers on how to conduct a CF sampling test. Various Members undertake different approaches regarding personnel conducting CF tests, frequency of sampling, sample sizes, and if or how CFs are then used by the vessels when reporting their C2 data (see Figure 1).

13. With regard to the sampling methodology, the following key points were discussed:

    (i) Draining the water from the stomach: The stomach often empties itself as the fish are being handled but, in some cases, it is observed that there is still significant water in the stomach. Draining the water is easy to do and important for accuracy. Noting that the increased accuracy gained by draining the water may be lost if not using motion-compensated scales.

    (ii) Stomach contents: Depending on the geographic area, most stomachs are likely to be empty of prey, however, large volumes of prey in some stomachs could add additional variability to CFs. Some methods for emptying the stomach contents were mentioned, although damage to the end product may result.

    (iii) Using un-bled fish: Sampling using un-bled fish is preferable but not always practical as the fish are bled immediately when brought on board many vessels. The volume of blood was estimated to be relatively small, with the largest fish likely to have less than 500 ml of blood removed.

    (iv) Use fish in good condition: Do not use fish that have been preyed upon (liced (scavenging amphipods) or otherwise damaged by predators) for CF sampling.

(v) Batch or individual records: Recording CFs for individual fish within the sample has a benefit of providing an accurate size that can be used to calculate a length-frequency distribution for fish included in the sample. This can then be compared to the length-frequency distribution of the catch to see if the fish used for CF tests were representative of sizes of fish in the catch. It is possible to calculate an overlap statistic analogous to the tagging size overlap statistic to provide a metric indexing how well the CF of fish reflected the overall size distribution of the catch.

(vi) Type of scale: Motion-compensated scales are expensive. They can weigh fish up to 60 kg which represents most of the fish caught. Having a motion-compensated scale is a priority as without it, the other factors such as draining water are negligible errors. Large fish are difficult to move through the factory to the motion-compensated scales if not optimally located. Even with motion-compensated scales, condition factor tests should not be conducted if the weight data may not be accurate, for example in extremely rough weather.

(vii) Sample size and frequency of sampling: Undertaking smaller more frequent CF tests may lead to more accurate CF data. Currently no instructions are provided on how often to conduct CF tests.

(viii) Type of processing cut: It is important to report more detail on the cut used by the vessel, but clear descriptions would be needed as there is variation in the detail of how the cut is used. It was noted that market preference may be influencing the exact cuts used even within a trip.

(ix) Maturity stage: Gonad weight is worth collecting during CF tests as it gives information on the size of the gonad which influences CF value. Reproductive development could influence the CF in different seasons as well and could require sampling stratification.

(x) Location of fishing: More generally, it is important to recognise that different size fish exist in different locations and that CF will therefore vary geographically. Real-time sampling or stratification of CF sampling to occur when vessels enter new areas, or if fish migrate at certain times of the year, which changes the size distribution in an area. An analysis to standardise the relative impacts of various factors on the resulting CF would assist in developing procedures for data collection that account for the most influential variables (see paragraph 11).

(xi) Individual fish data: Attention must be paid to keep track of the fish through the process to obtain the final processed weight. It was noted that some vessels glaze the fish prior to the blast freezer and subsequent tail removal, and this might affect the final weight depending on when the final weight for the processing method is obtained (including changes due to additional water weight from the glazing and/or water loss in the freezing process).

(xii) Although observer CF tests are reported to the Secretariat, they are currently not routinely analysed or reported back to the working groups to identify potential data quality issues. The Workshop recommended standard reporting of CF data would be useful to identify how well the data collection system is performing.

14. The analysis undertaken by WS-CF-2022/03 indicated that CFs may not be required to be undertaken in real time during the fishing season, if stratification of fisheries using the appropriate factors was undertaken. The Workshop requested that the Secretariat undertake a similar generalised linear model (GLM) analysis to explore factors on which to base a stratified approach to setting CFs. Further consideration of the future approach should be based on this further analysis.

15. The Workshop considered that there was a need for a more consistent approach for undertaking CF tests and supplying data to the Secretariat, and a consistent approach for setting CFs to be utilised by the vessels. A suggested approach for this is given in Figure 2.

Development of draft guidelines

16. The Workshop recommended that the Secretariat develop a more complete guide to collecting CF data for both observers and vessels, updating that once the sampling methodology for CF tests and CF data implementation has been agreed. The current instructions are attached as Attachment IV.

17. The Workshop discussed various potential improvements to the guidelines, including potential benefits of smaller sample sizes undertaken more frequently. However, the Workshop considered that a power analysis should be undertaken to verify the ideal sample size for the strata determined by the GLM analysis.

Next steps

18. The Secretariat will undertake a standardisation analysis to identify recorded factors that influence the CF value and report to WG-FSA-2022.

19. The Workshop considered that a power analysis could guide data collection of CF data as it could determine required sample sizes given the accuracy needed in CFs for management purposes. The accuracy and power required would need to be specified by the Scientific Committee.

20. The Workshop recommended the Secretariat consider and propose a standard reporting of CF data to identify how well the data collection system is performing.

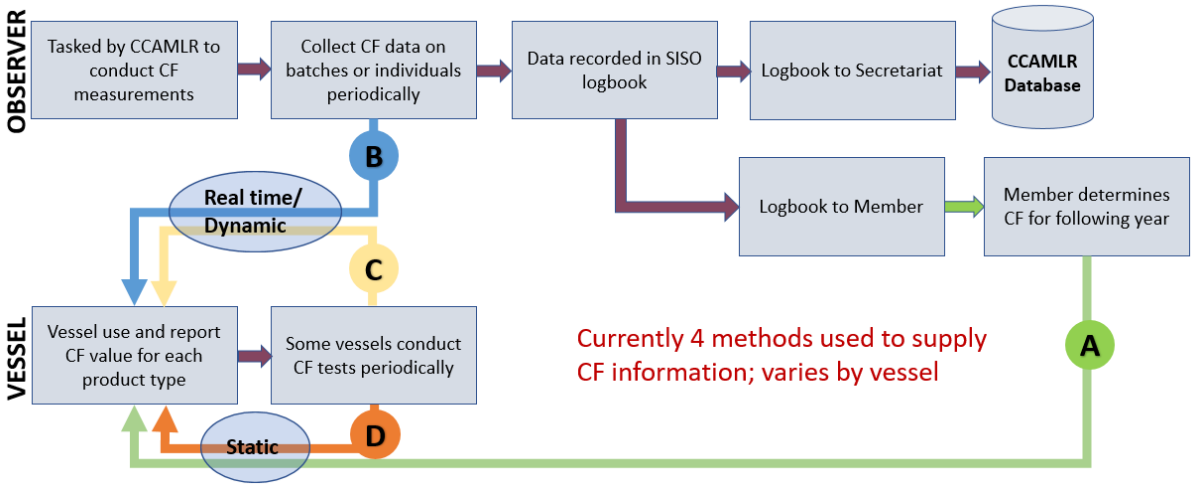

Figure 1: Diagram of the current variations on the use of CF information within CCAMLR. The letters A to D indicate the different pathways for CF data in current use.

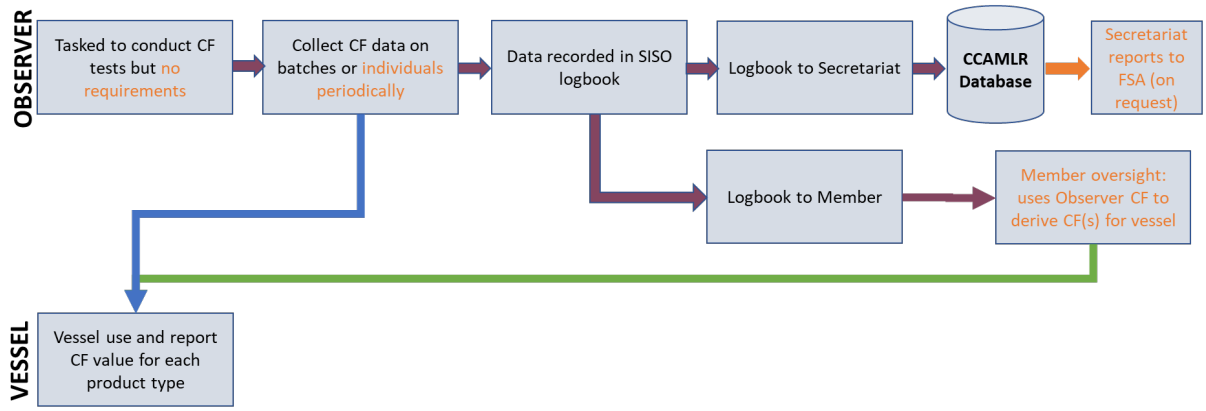

Figure 2: Diagram of the potential data flow for CF data in CCAMLR. The blue arrow indicates a real-time data flow to utilise the CF data. The green arrow would follow a static approach where CFs would be set by Members (or the Secretariat) in advance of each season.

Attachment I

List of Participants

Workshop on Conversion Factors for Toothfish
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Co-conveners	Mr Nicolas Gasco Muséum national d'Histoire naturelle
	Mr Nathan Walker Ministry for Primary Industries
Australia	Mr Nigel Abery Australian Fisheries Management Authority
	Mr Rhys Arangio Austral Fisheries Pty Ltd
	Mr Tim Lamb Australian Antarctic Division, Department of Agriculture, Water and the Environment
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	Dr Leonid Pshenichnov Institute of Fisheries and Marine Ecology (IFME) of the State Agency of Fisheries of Ukraine
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	Ms Sue Gregory Foreign and Commonwealth Office
	Mrs Rhona Kent WWF UK
	Ms Georgia Robson Centre for Environment, Fisheries and Aquaculture Science (Cefas)
	Dr Frane Skeljo -

	Mr Peter Thomson Argos Froyanes
	Mr Andrew Watson MRAG Ltd
CCAMLR Secretariat	Isaac Forster Fisheries and Observer Reporting Coordinator
	Eldene O'Shea Compliance Officer
	Dr Steve Parker Science Manager
	Alison Potter Data Administration Officer
	Claire van Werven Research, Monitoring and Compliance Analyst

Attachment II

Agenda

Workshop on Conversion Factors for Toothfish
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1. Welcome

2. Review

    2.1 Current on-board sampling procedures
    2.2 Conversion factor calculation methodology
    2.3 Conversion factor implementation
    2.4 Effect of variability on total catch removals

3. Develop draft guidelines

    3.1 On board sampling
    3.2 Calculation
    3.3 Use of conversion factors

4. Next steps.

Attachment III

List of Documents

Workshop on Conversion Factors for Toothfish
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WS-CF-2022/01	A review of toothfish conversion factor data submitted by vessels and scientific observers, and implications for estimation of total catch CCAMLR Secretariat
WS-CF-2022/02	Sampling, calculation and use of conversion factors by New Zealand N.A. Walker, J. Fenaughty, A. Berry, M. Messina and A. Burgess
WS-CF-2022/03	Variables that drive conversion factors and how to improve their accuracy N. Gasco
WS-CF-2022/04	Analysis of conversion factor data from longline vessels in CCAMLR Subarea 48.3 J. Moir Clark, J. Chapman and R. Stacy
Other Documents	
WG-FSA-15/77	Conversion factors used for Patagonian toothfish in Division 58.5.1 and Subarea 58.6 N. Gasco (France)
WG-FSA-2021/03	Results from the Conversion Factor Survey conducted by the Secretariat in 2020, from Members' vessels participating in CCAMLR toothfish fisheries CCAMLR Secretariat

Attachment IV

Current CCAMLR Conversion Factor Procedure

Conversion factor procedure

Process

1. The process of determining a conversion factor (CF) (Table 1) is by recording fish weights in an unprocessed state and later recording the weights of the same fish when processed. The CF value is the number obtained by dividing the green weight by the processed weight.

Number of fish and frequency of sampling

2. Sample five fish per individual haul with a weekly sample size of 25 individuals.

Table 1: CF step by step procedure.

1	Randomly select the fish that will be used for the process. It is important to select a range of fish sizes that are representative of the whole catch for the haul.
2	Drain the water from the fish's stomach using a sharp knife or a pipe (Figure 1) to ensure that water swallowed by the fish during the hauling process is not included as part of the live weight.
3	Weigh the fish whole and unprocessed, before any parts are removed.
4	Record the product type (e.g. HGT for headed, gutted and tailed) and, if appropriate, the cut type (e.g. straight cut).
5	Record the weight of the final processed product for each fish. For HGT, this is normally just the trunk of the fish (Figure 2). Calculate the CF by dividing the whole live weight by the processed weight.

Figure 1: Demonstration of a drain tube used for draining toothfish stomachs of water.

Figure 2: Trunks produced using the HGT processing method.