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A RECOMMENDATION ON THE ALL VESSELS CPUE SERIES CONSIDERING LOSS OF DATA FROM JAPANESE-FLAGGED CHARTER VESSELS IN THE NEW ZEALAND FISHERY

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Abstract: Based on Nishida & Tsuji model, all vessels CPUE series between 1969 and 2015 were calculated using two alternative approaches to minimize the impact of the loss of the data from charter vessels in the New Zealand fishery on the CPUE series: data for Areas 5 and 6 were omitted in standardization and index calculation (approach A); data were analyzed as Areas 4 and 5 combined, and as Areas 6 and 7 combined (approach B). Neither approach produced a considerable difference in trend of the CPUE series compared to the current approach. Given the merits and demerits of both approaches, the approach B is recommended to use for future calculation of the all vessels CPUE series.

要旨： 西田・辻モデルを基に、ニュージーランド漁業でのチャーター船からのデータの欠落を最小限にするための 2 つのアプローチを用いて全船 CPUE シリーズを計算した：標準化と指数計算で 5 と 6 海区のデータを除く（アプローチ A）；4 と 5 海区、6 と 7 海区をそれぞれ統合してデータを解析する（アプローチ B）。いずれのアプローチも、現行アプローチと比較して、CPUE トレンドに大きな違いを生じさせなかった。2 つのアプローチのメリット、デメリットを考慮すると、全船 CPUE シリーズの今後の計算にはアプローチ B を用いることを推奨する。

1. Introduction

At the ESC for the SC21 in 2016, New Zealand and Japan advised that no Japanese-flagged foreign charter vessels in the NZ SBT fishery in 2016, and therefore there would be no observations from the charter vessels for Areas 5 and 6 in 2016 in the CPUE dataset (CCSBT 2016). This loss of data from the charter vessels would also continue from 2017 onward.

All vessels CPUE series (or all vessels abundance index) for age 4+ fish has been used as one of fisheries indicators (Takahashi et al. 2016). The all vessels CPUE series between 1969 and 2008 has also been utilized to calibrate the Core vessels CPUE series (Itoh and Takahashi 2016) between 1986 and the most recent year (attachment 7 of CCSBT 2010). Thus, it is necessary to explore alternative approaches for calculating the future all vessels series to minimize the impact of the loss of the data from the charter vessels on the series.

In this document, I showed trends of the all vessels CPUE series which were calculated using two alternative approaches of attempting to minimize the impact of the loss of the data on the CPUE series, and compared these trends with that of the all vessels CPUE series calculated using the current approach. Based on these comparisons for examining the impact on the series, a recommendation of alternative approach for calculating the future all vessels CPUE series was made.

2. Data and Methods used

Catch and effort data (labelled "combined") for age 4+ fish in the CPUE input data file of the 2016 Data Exchange were used. The raw CPUE data of all vessels were standardized by the Nishida and Tsuji model (Nishida and Tsuji 1998). Abundance indices (w0.5 and w0.8) were then calculated from the standardized CPUE multiplied by area indices (Takahashi et al. 2001, Takahashi 2008).

Considering potential future unavailability of data from Japanese-flagged charter vessels in the NZ fishery, the abundance indices were calculated using the following two approaches to minimize the impact of the loss of data on the indices, and then trends of these CPUE series were compared with that of the CPUE series calculated using the current approach.

(1) Approach A:

Data for Areas 5 and 6 were omitted in standardization and index calculation. This approach is a similar approach to "A-1" in Itoh (2017).

(2) Approach B:

Data were analyzed as Areas 4 and 5 combined, and as Areas 6 and 7 combined. This approach is the same as the approach "B" in Itoh (2017).

3. Results and Recommendation

Comparisons of trends between CPUE series (w0.5 and w0.8) calculated by the alternative approaches and those by the current approach were shown in Fig. 1 and 2 (Each index was normalized to the mean).

Either of the approaches produced almost no difference in trends of the CPUE series, and thus is considered able to reduce the impact of the loss of data on the CPUE series. However, given the merits and demerits of both approaches with respect to data utilization and future data availability (see Itoh 2017), the approach B is recommended to use for future calculation of the CPUE indices.

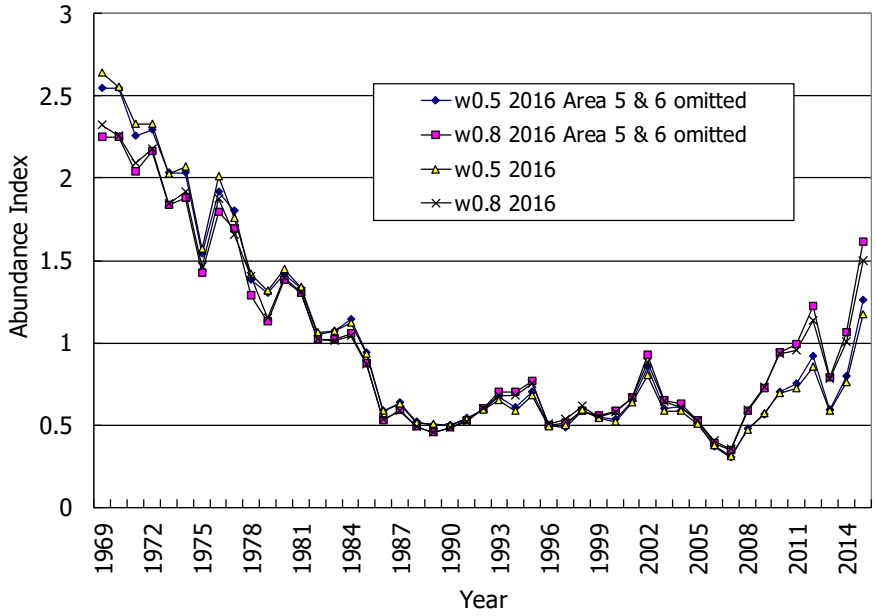

Fig. 1. Comparisons of trends between abundance indices (w0.5 and w0.8) calculated by the approach A (data for Areas 5 and 6 omitted) and those by the current approach.

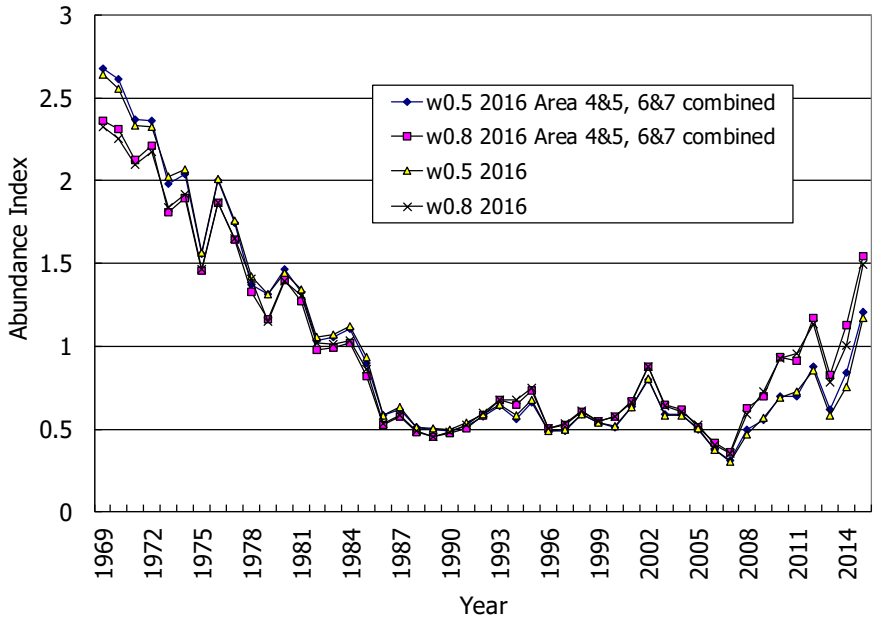

Fig. 2. Comparisons of trends between abundance indices (w0.5 and w0.8) calculated by the approach B (data for Areas 4 and 5, and 6 and 7 combined in the analysis) and those by the current approach.

4. References

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