



Estimation of catch at size of Pacific bluefin tuna caught by Japanese set net fisheries

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Summary

In 2022 PBF stock assessment, the set net size composition data in fishing year 2019 and 2020 was not included in the model because there were spike distributions in the data. We tried to clarify the reason of this, and to fix this problem for 2024 stock assessment. Because of strict management and changing management period, operation style was changed in Nagasaki Prefecture and catch amount in calendar quarter 1 was increased rapidly. We suggest removing the Nagasaki catch data from CY2017 and thereafter.

Introduction

In Japanese coastal area, set-net fishery is operated around Japan. With Pacific Bluefin tuna (PBF) migration, the PBFs are caught in various fishing seasons and grounds. For this fishery, 3 fleets (Fleet 8: Set-net for Fishing quarter (Fqt) 1-3, Fleet 9: Set-net for Fqt 4 and Fleet 10: Set-net for Hokkaido and Aomori) are assigned in the PBF stock assessment model. These fleets are defined by individual size information (length or weight) and seasonal (ISC PBFWG 2022) and raised by spatio, temporal and size strata.

The catch at size data for Japanese set-net fisheries was updated by revised method (Sakai et al., 2015) approved by ISC PBFWG in 2015 (ISC PBFWG 2015). However, updated size compositions for set-net fisheries during FY 2019 – 2020 were not included due to spikey distribution in 2022 stock assessment.

In this document, we tried to clarify the reason to this problem and raised size composition data.

Change of set net catch

For the PBF stock assessment, set-net size composition data have been available since FY1993 . Japanese catch data have been available from Statistics Department (SD report) and Japan Fisheries Agency (JFA data). JFA data has been used for TAC reporting since 2015.

Figure 1 is the annual catch amount of Japanese set net by season. The catch amount in calendar quarter (Cqt) 1 increased recently. In recent years, main catch season for set-net has been changed. Japanese management period for coastal fisheries starts from April since 2019, thus the catch amount tend to increase in the end of management period. Figure 2 is the annual catch amount of Japanese setnet by area. Figure 3 is the map of area definition. Catch amount and ratio since 2017 increased in area 5. Area 5 is located in west part of Japan and the catch ratio has not been large (10-39%) until 2016. However, the catch ratio of area 5 has increased to 39-59% since 2017.

Especially catch amount for qt 1 in Nagasaki prefecture (area 5) increased (Figure 4). Annual catch amount in Nagasaki until 2016 was less than 100 tons in most years. But since 2017 it was over 100 tons and mainly composed by Cqt 1. Because Cqt 1 was migration season of small PBF in this area (Ichinokawa et al., 2014) and Nagasaki prefectural government introduced Olympic system using leftover TAC in January to February since 2020, thus, set net operation style in Nagasaki prefecture may be changed by strict management.

Raised size composition

Based on Sakai et al., 2015, we raised set net size composition. It was found that duplicate data were recorded from Iwate prefecture, so these duplicate data since 2012 were removed from dataset.

And we also tried to remove the catch amount data of Nagasaki prefecture since 2017. Figure 5-8 is the result of raise. Before 2011, almost all results showed similar results. In Fqt1 (figure 5) and Fqt2 (figure 6), there are difference between size composition updated in 2020 and size compositions updated in 2023. It occurred by removing the duplicate size data. In these fishing quarters, there were more duplicate records than the other seasons. The size information of brand in a year gives the other years impact, thus the raised size composition before the year removed duplicate data was changed.

Blue line in figure 5-8 was the raised size composition including all catch data of Nagasaki prefecture and green line in figure 5-8 was the size composition removing catch data of Nagasaki after CY 2017. In Fqt 3 and 4, there are some spikes in the size composition including all data.

Originally area 5 haven't caught large amount of PBF in Fqt 3 and 4. However, the main fishing season was changed in area 5 due to management period. There are fewer ports for measurement survey and these ports could not represent the catch amount of area 5. Thus we recommend to move the catch amount of Nagasaki prefecture from Japanese set-net fleet.

Conclusion

Due to strict regulation and changing the management period, season and locations for landing PBF were changed. Especially of the operation style in Nagasaki prefecture, and thus sized distribution, has changed. We suggest removing the Nagasaki catch data from CY2017 and afterwards in the next assessment.

Reference

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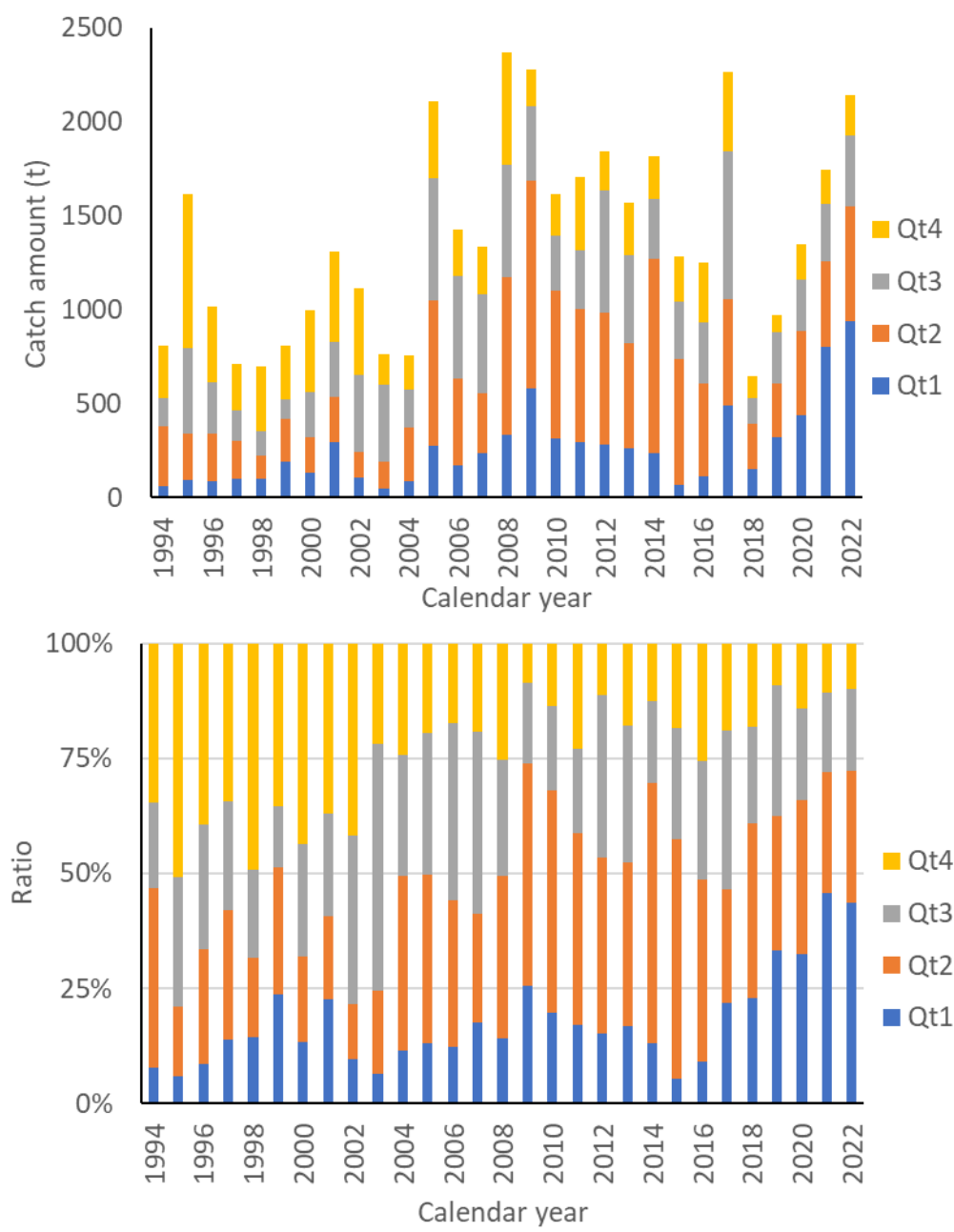


Figure 1 Top panel is the annual catch amount of Japanese set net by Cqt. Bottom panel is the annual ratio of Japanese set net catch by Cqt.

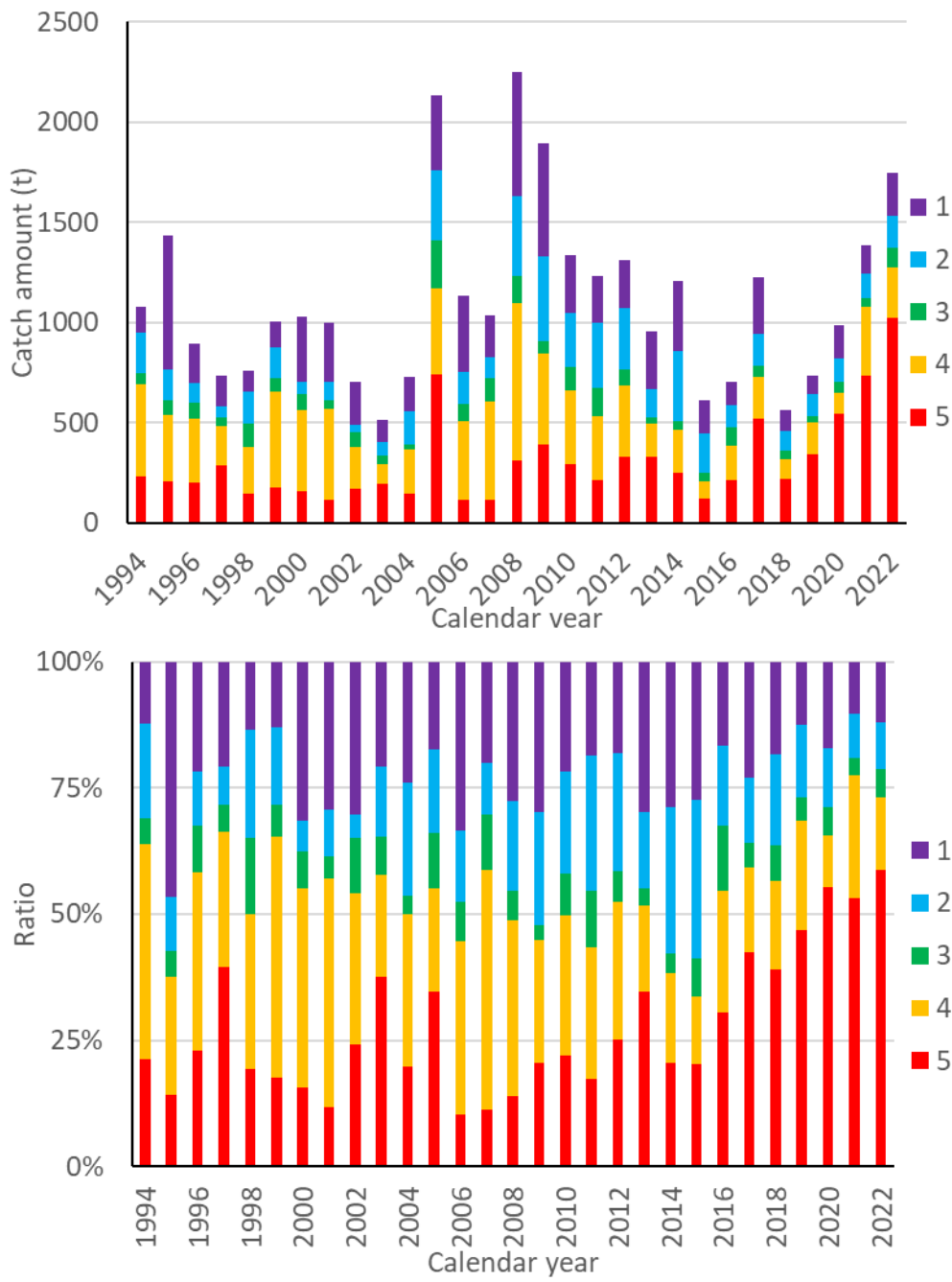


Figure 2. Top panel is the annual catch amount of Japanese set net by area. Bottom panel is the annual ratio of Japanese set net catch by area.

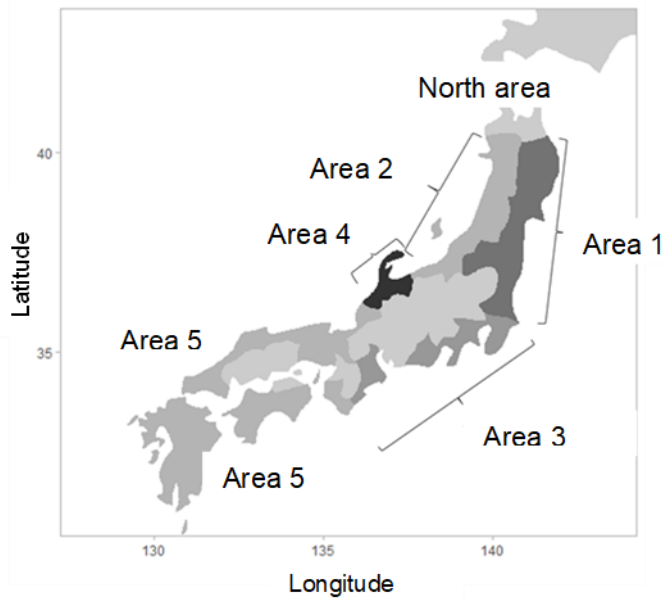


Figure 3. The map of area definition

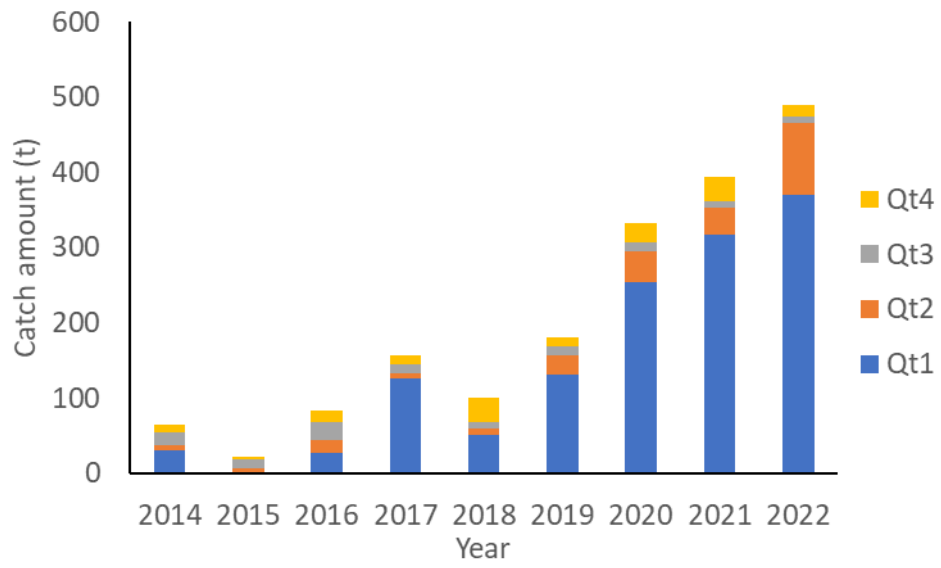


Figure 4. Catch amount by set-net by Cqt in Nagasaki prefecture.

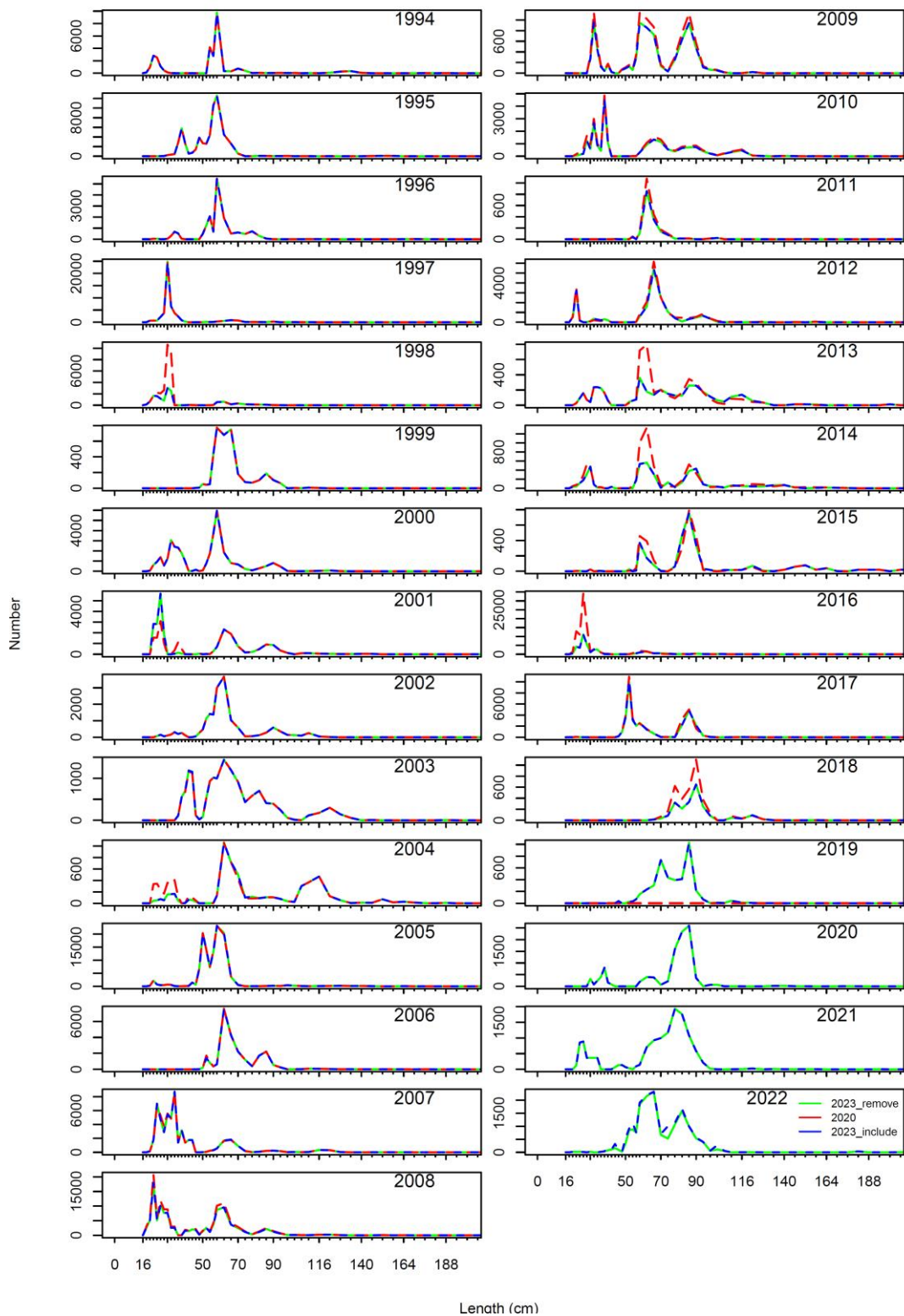


Figure 5. Comparison between raised size compositions for Fqt1. Blue dashed line is the size composition updated up to FY2022. Green line is the size composition updated up to FY2022 and removing Nagasaki catch, and red line is size composition in 2020 stock assessment.

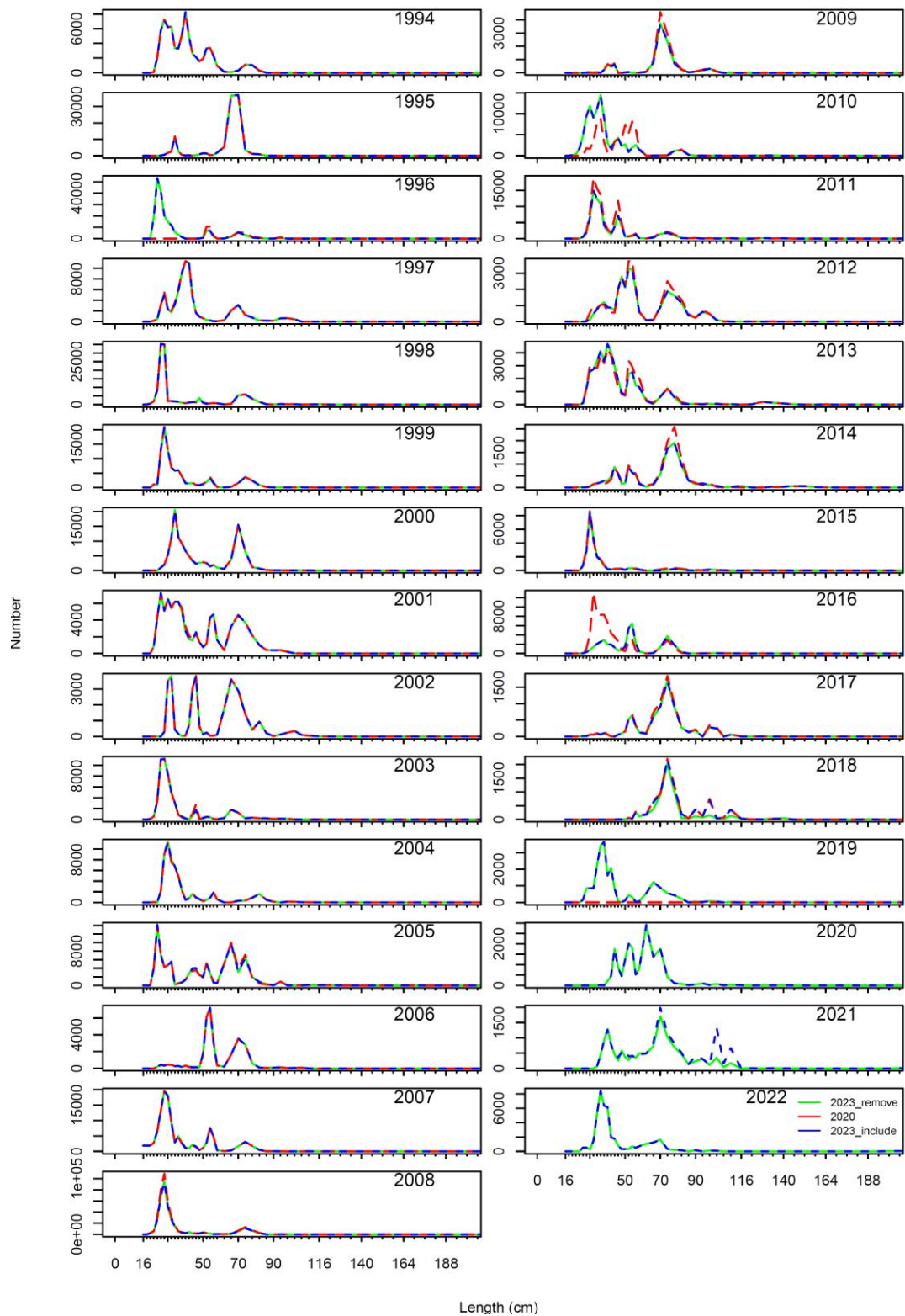


Figure 6. Comparison between raised size compositions for Fqt2. Blue dashed line is the size composition updated up to FY2022. Green line is the size composition updated up to FY2022 and removing Nagasaki catch, and red line is size composition in 2020 stock assessment.

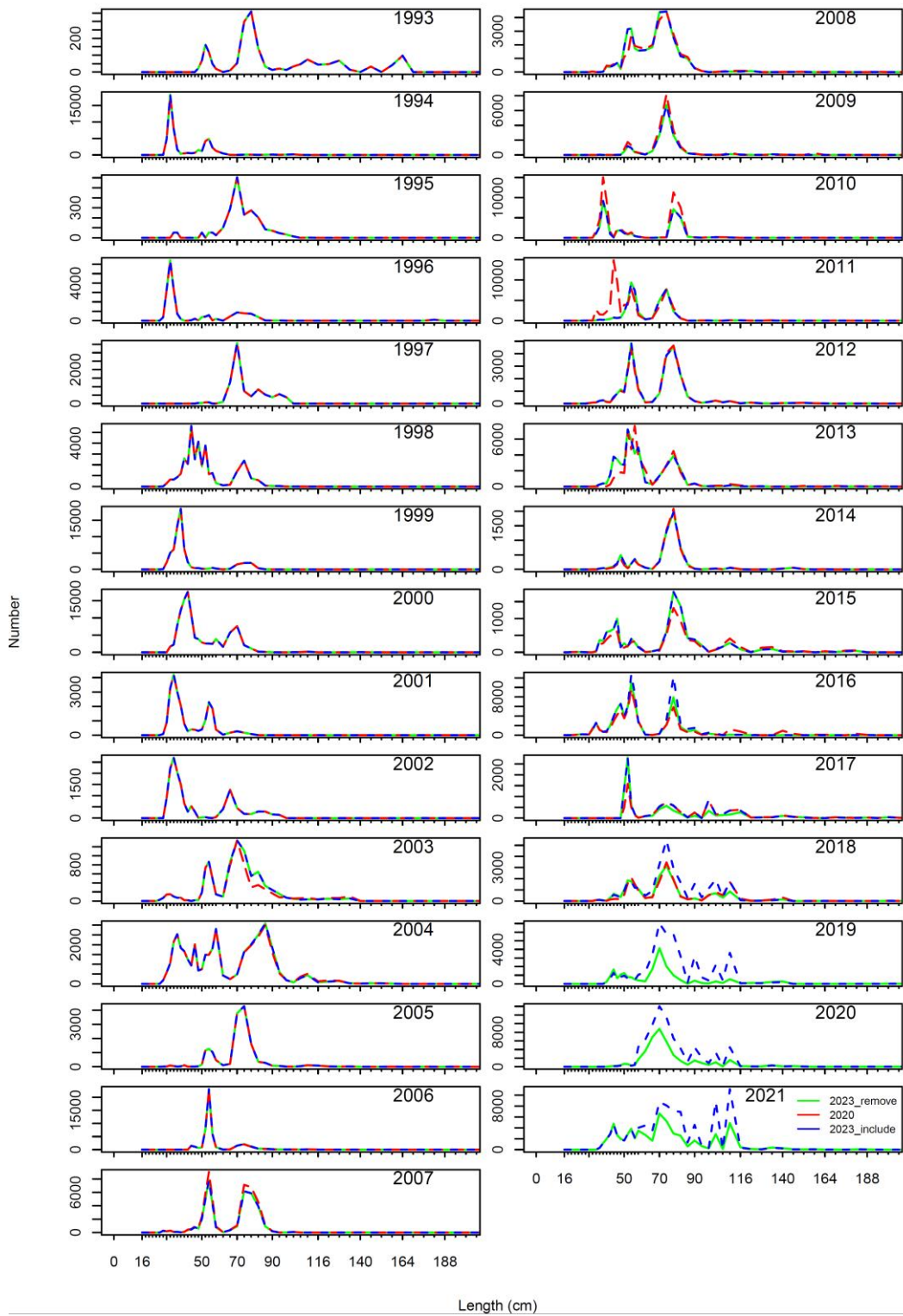


Figure 7. Comparison between raised size compositions for Fqt3. Blue dashed line is the size composition updated up to FY2022. Green line is the size composition updated up to FY2022 and removing Nagasaki catch, and red line is size composition in 2020 stock assessment.

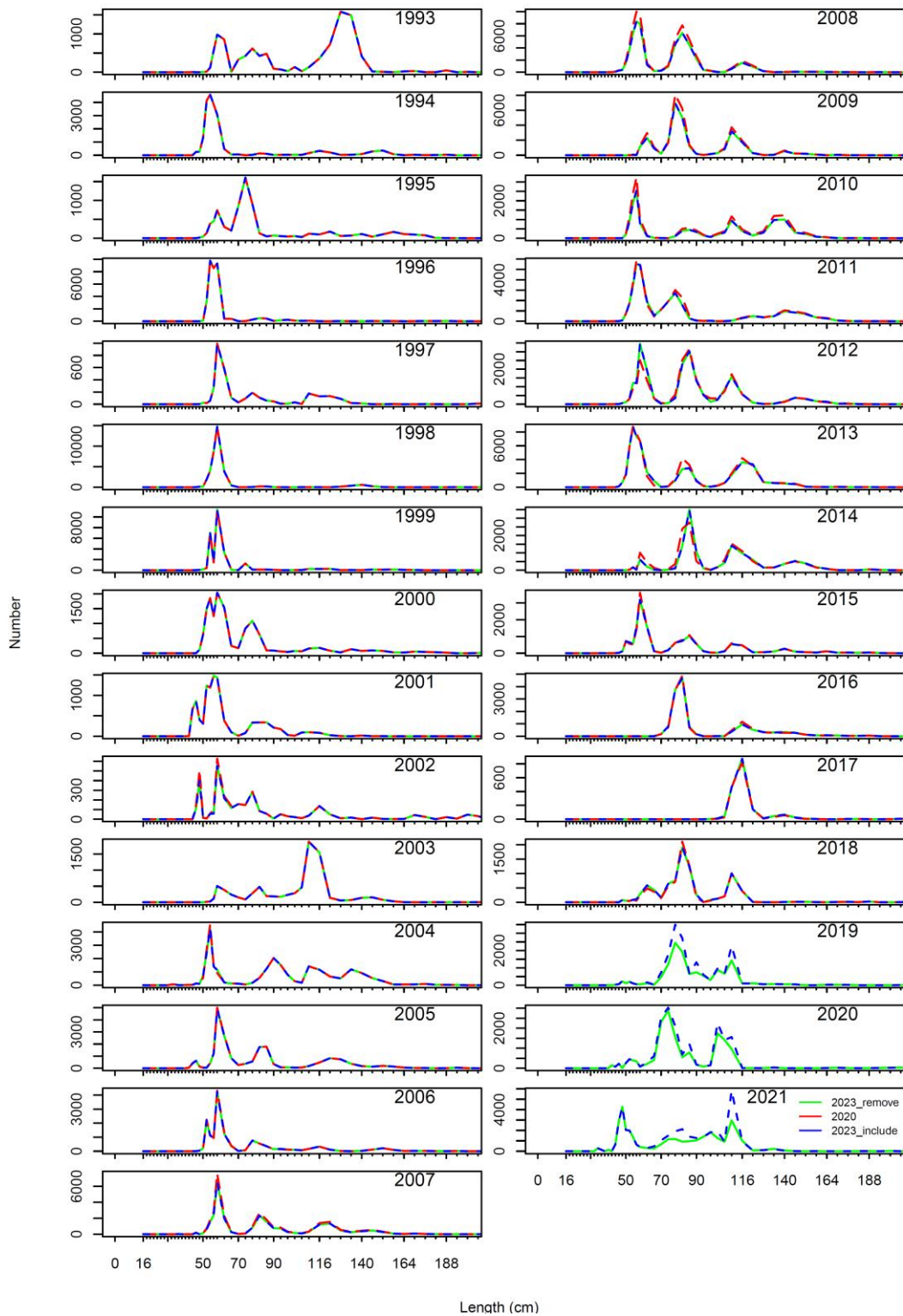


Figure 8. Comparison between raised size compositions for Fqt4. Blue dashed line is the size composition updated up to FY2022. Green line is the size composition updated up to FY2022 and removing Nagasaki catch, and red line is size composition in 2020 stock assessment.