North Pacific Fisheries Commission

NPFC-2024-TWG CMSA09-RP02

2nd Intersessional Meeting of the Technical Working Group on Chub Mackerel Stock Assessment

April 22−23, 2024 (9am – 1pm Tokyo time)

WebEx

Summary

Agenda Item 1. Opening of the Meeting

The 2nd intersessional meeting of the Technical Working Group on Chub Mackerel Stock Assessment (TWG CMSA) in the 2024 operational year commenced at 9 AM on 22 April 2024, Tokyo time in the format of video conferencing via WebEx. The meeting was attended by Members from Canada (Chris Rooper), China (Qiuyun Ma, Libin Dai, Heng Zhang, Yongchuang Shi, Zheng Linlin, Zhiwei Liu), European Union (Karolina Molla Gazi), Japan (Kazuhiro Oshima, Shuya Nakatsuka, Shota Nishijima, Momoko Ichinokawa, Akihiro Manabe, Ryuji Yukami, Hiroshi Kubota, Yuga Kisara) and Russia (Oleg Katugin, Vladimir Kulik, Igor Chernienko) as well as the Secretariat (Robert Day, Alex Zavolokin, Sungkuk Kang, Jihwan Kim). Dr. Joel Rice attended the meeting as invited expert. The meeting was opened by Dr. Kazuhiro Oshima (Japan), Chair of the TWG CMSA.

The Chair outlined the goals of this meeting which are (1) to confirm input data for stock assessment of chub mackerel, (2) to review progress in stock assessment by SAM and future projections, and (3) to start discussion on the content of stock assessment report. Chair's presentation is available on the Collaboration website under TWG CMSA intersessional meetings. The Chair informed participants about chub mackerel-related requests from the recent COM08 meeting and re-affirmed the intention to conduct stock assessment in 2024.

Agenda Item 2. Adoption of Agenda

There were no amendments to the agenda.

Agenda Item 3. Review of 1st intersessional meeting on 12 March 2024

The Chair reminded participants about the outcomes of the 1st intersessional meeting of the TWG CMSA on 12 March, including agreements and remaining issues.

Agenda Item 4. Input data

4.1 Confirmation on latest version of input data for base case shared 18 March 2024

The Chair presented a summary of CAA, WAA and MAA data and abundance indices agreed by the TWG CMSA for stock assessment.

Agenda Item 4. Input data

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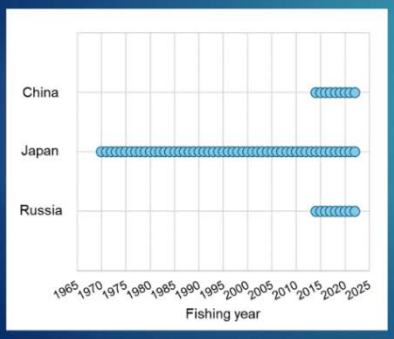
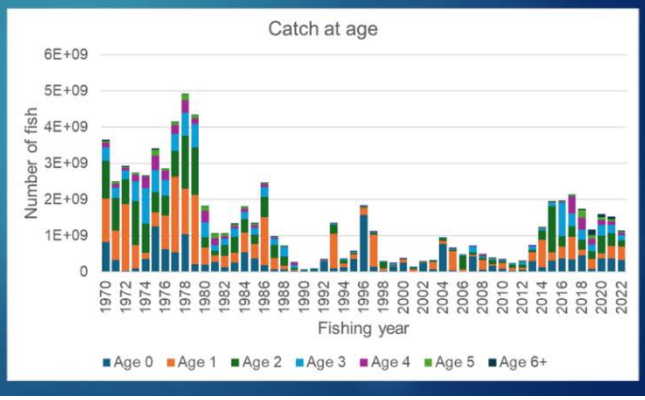
4.1 Confirmation on latest version of input data for base case shared 18 March 2024

Catch at age





Weight at age & Maturity at age

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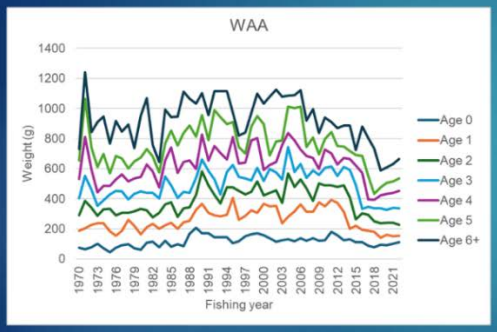

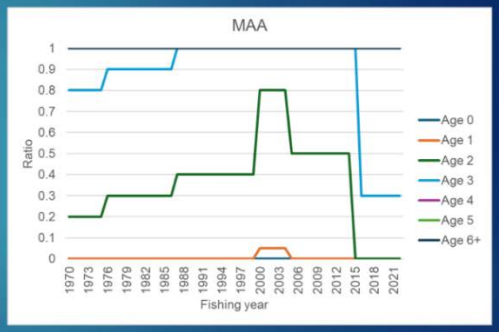

Abundance indices (Fishing year)

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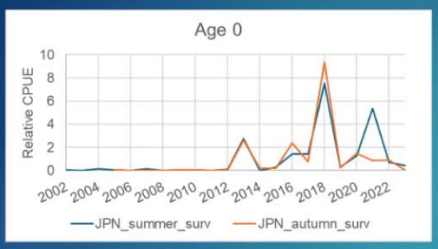

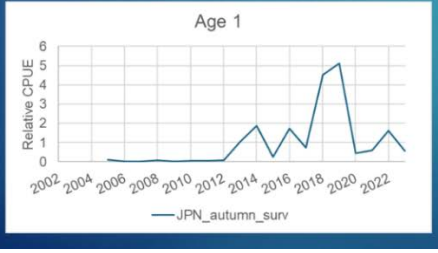

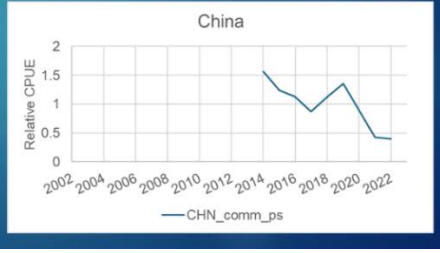

4.2 Review of revised standardized CPUE from Russian fleet

Russia (Dr. Igor Chernienko) presented an update on standardized CPUE of chub mackerel caught by the Russia's trawl fishery from 2016 to 2023.

The Chair thanked Russia for the revised CPUE standardization document and requested Russia to provide CVs for standardized CPUE.

Participants **agreed** to use the revised Russia's standardized CPUE for 2016-2022 (excluding 2023) as a sensitivity case for the stock assessment.

Russia will add CVs to its CPUE standardization and upload the revised document on the Collaboration site under TWG CMSA intersessional meetings.

Participants **agreed** that Russia's standardized CPUE will be treated the same way as China's standardized CPUE when fitting CPUE indices in SAM:

- the fleet-specific F will be approximated as follows:

  $$F_{a,y,f} \fallingdotseq \frac{C_{a,y,f}}{\sum_f C_{a,y,f}} F_{a,y} ,$$

  where $C_{a,y,f}$ are the observed catch number in age a and year y for fleet f.
- For values for age-specific weights, the mean weight-at-age for biomass calculation, as in the SSB indices, will be used.

4.3 Discussion on input data for sensitivity runs

Catch-at-age

Japan (Dr. Akihiro Manabe) presented scenarios on how to calculate missing China's CAA data for 2015 and missing Russia's CAA data for 2014-2015, for which catch-at-length data and ALK are not available:

(1) exclude 2015 China's CAA from input data for base case
(2) use mean catch-at-length from 2016
(3) use catch-at-length from Eastern Japan for 2014 and 2015

Participants **agreed** to use these three scenarios as sensitivity cases.

Maturity-at-age

Participants discussed options on how to use China's MAA data for sensitivity analysis.

Participants **re-affirmed** that Japanese MAA data for 1970-2022 will be used for the base case

stock assessment and **agreed** to use two more scenarios as sensitivity cases: (1) mean of annual mean of Chinese MAA and Japanese MAA in 2018 onward and (2) mean of seasonal mean of Chinese MAA and Japanese MAA in 2018 onward.

#	Scenario	Description
Scenarios for setting of CAA		
CN_CAA-1	Exclusion of 2015 CN_CAA	Exclude 2015 CN_CAA from input data for base case
CN_CAA-2	Use estimated 2015 CN_CAA with Cal2016	Use mean catch-at-length from 2016
CN_CAA-3	Use estimated 2015 CN_CAA with JPcal	Use catch-at-length from eastern Japan for 2014 and 2015
Scenarios for setting of MAA		
CNJP_MAA-1	Use annual mean of CN_MAA	Calculate mean of MAA from CJ and Jp in 2018 onward
CNJP_MAA-2	Use seasonal mean of CN_MAA	Calculate mean of MAA from CJ and Jp in 2018 onward

The invited expert suggested to limit the number of alternatives for sensitivity analyses to the extent possible.

China raised the issue of catch uncertainty caused by the mixed catch of chub and blue mackerels in Convention Area and misidentification of chub mackerel which may lead to over- or underestimation of small-sized/younger chub mackerel catch.

Participants discussed potential options to address this issue, including:

- Setting constant CVs for younger age groups and for specific years such as in 2014 onward (this option is subject to SAM model settings)
- Taking into account species misidentification in actual mackerel catch

Participants will continue discussions on how to address these uncertainties in chub mackerel catch in future stock assessments.

Agenda Item 5. Progress of stock assessment

5.1 Tentative results from SAM runs

Japan (Dr. Shota Nishijima) gave a comprehensive presentation on the preliminary results of the chub mackerel stock assessment by SAM. Presentation is available on the Collaboration site under TWG CMSA intersessional meetings. He explained basic model configurations, datasets used and model selection approach. He also presented the results of sensitivity analysis and model diagnostics and identified matters to be discussed at this meeting. Dr. Nishijima had

uploaded the SAM code and results on the NPFC CMSA GitHub https://github.com/The-North-Pacific-Fisheries-Commission/CMSA/tree/sam and invited participants to conduct analysis themselves. The input data are available on the Collaboration site.

Participants expressed appreciations to Dr. Nishijima for his work and discussed the following matters:

Dataset: How to treat the JPN indices in FY2023
Participants recognized the importance of the latest available data for scientific analyses, however expressed different views on how to use them in stock assessment. Participants **agreed** that the terminal year for the base case will be 2022, and 2023 data will be used for sensitivity analysis.

Is the model-selection method OK?
In response to the question about AIC used for model selection, Dr. Nishijima explained that a simpler model (#15) was chosen as the base case from the two models with lowest AIC. The results (B, SSB etc) do not differ significantly between these two models (#13 and #15).

Participants **agreed** with the model selection method used by Dr. Nishijima.

Sensitivity analysis: any other sensitivity run? (e.g. Chinese MAA is missing in sensitivity analysis in Dr. Nishijima's presentation)
Dr. Qiuyun Ma volunteered to **draft a table** of base case and sensitivity scenarios in cooperation with Dr. Nishijima and Dr. Rice, based on the agreements made at this and previous meetings.

How do you consider current model diagnostic results? (retrospective)
- *Retrospective bias*
- *Residual plot*

This issue will be further discussed in future.

Other effective model diagnostics?
Participants **suggested** to use likelihood profiles and leave-one-out analysis for CPUE indices as additional model diagnostics. They will also provide biological interpretation of stock assessment results.

How to treat the N process error for age 1+
- *Pros: high consistency, robustness, fitting*
- *Cons: difficult interpretation of unknown process errors, challenging implementation of future projection, and risk of overfitting*

The EU (Dr. Karolina Molla Gazi) shared a link to the paper from ICES Workshop on Catch Forecast from Biased Assessments to facilitate discussion on how to deal with retrospective patterns and what potential solutions are.

Participants will further discuss this issue in future.

5.2 Future projections

Japan (Dr. Momoko Ichinokawa) gave a presentation on future projection and reference points. The presentation is available on the Collaboration website under TWG CMSA intersessional meetings. The preliminary results of future projection had been uploaded on the NPFC CMSA GitHub. Dr. Ichinokawa explained the content of the uploaded files and the process for calculating future projection. She identified the following issues for discussion at this meeting:

What biological parameters are used for calculating reference points such as MSY, %SPR etc?
(recent decrease of maturity and weight causes steepness to be extremely small (around 0.3), which will largely affect MSY reference points)
Participants noted that:

- Usually 20-40% SPR is used, assuming around MSY level
- 75% is unusual situation
    - Potential reason: MSY RPs of CM is time-varying
    - Dr. Ichinokawa will check the calculation of RPs and report to TWG CMSA
- Scenarios on future biological parameters (particularly, WAA and MAA) are key
    - Base case: use of the most recent information on biological parameters
    - Potential sensitivity cases: alternative scenarios, density-dependent effect. To be further discussed in future.

It is needed to conduct sensitivity analysis of biological parameters on the calculation of other biological reference points (which are not affected by steepness) such as F%SPR and F0.1
TBD.

What selectivity is used for future projection?
Participants **agreed** that C-based projection scenarios will be used as they are easier to communicate to managers than F-based scenarios. They noted the following issues:

- A range of catch scenarios for short-term projections [how many years?]
    - selectivity is derived from recent ones
    - what biological parameters are assumed? [need some scenarios]
- Probabilities of SB below some specific threshold (e.g. historical lowest SB etc.)

Assumptions of the most recent fishing mortality

Participants noted that a TAC for chub mackerel was recently determined by COM08 (June 2024-May 2025, 100,000MT). The question is if this TAC should be assumed in the projection.

Weight at age for calculation of total catch

Participants discussed different options of WAA for calculating total catch.

The invited expert pointed out that future projection should be based on the current understanding of biology and productivity. He suggested to keep projections simple, informative and straight-forward.

Agenda Item 6. Stock assessment report

6.1 Brief review of latest stock assessment report on Pacific saury

The Chair presented the latest stock assessment report for Pacific saury and suggested to use it as a starting point for the development of a stock assessment report for chub mackerel.

The Science Manager informed participants that there is no standard template for stock assessment report in the SC.

6.2 Discussion on formats and contents of CM stock assessment report

6.2.1 List of results

6.2.2 Scientific advise

6.2.3 Contents of executive summary

The Chair presented a strawman proposal for the format and content of the stock assessment report for chub mackerel. Participants reviewed and revised the proposed document. It is available on the Collaboration site under TWG CMSA intersessional meetings. The TWG CMSA will continue working on the structure of stock assessment report by email correspondence.

China raised a question about how to accommodate the results of sensitivity runs in stock assessment report and suggested to develop guidelines to address this issue.

6.3 Work assignment toward creation of stock assessment report

Participants **agreed** to provide the information requested by the Chair (see assignments for each Member in the draft stock assessment report on the Collaboration site).

Agenda Item 7. Other matters

7.1 Review and update of timeline towards TWG CMSA09 meeting

No updates have been made.

A draft agenda for TWG CMSA09 was circulated to Members for review (Circular 027-2024). MIP01 Meeting Information is available on the TWG CMSA09 meeting webpage. The reservation in the recommended hotel, Yokohama Techno Tower Hotel, will be open from 1 May.

7.2 Update on GitHub manual

The Data Coordinator gave a brief update on the draft GitHub manual and encouraged participants to review it and provide feedback. The draft GitHub manual is available on the Collaboration site under TWG CMSA intersessional meetings.

7.3 Others

The Science Manager informed participants about the proposed dates for the 10th meeting of the TWG CMSA, **17-20 February 2025**. The meeting will be held in a virtual format for 4 hours a day.

The EU suggested to start the meeting from 12pm Tokyo time.

Agenda Item 8. Close of the meeting

The meeting closed at 1:00 PM on 23 April 2024, Tokyo time.