North Pacific Fisheries Commission
10th Meeting of the Technical Working Group on Chub Mackerel Stock Assessment

28 February, 1, 3 and 4 March 2025
(Virtual)

REPORT

Agenda Item 1. Opening of the Meeting

1. The 10th Meeting of the Technical Working Group on Chub Mackerel Stock Assessment (TWG CMSA) was held online via WebEx on 28 February, 1, 3 and 4 March 2025. The meeting was attended by Members from Canada, China, the European Union (EU), Japan, the Russian Federation, and the United States of America. The Pew Charitable Trusts (Pew) attended as an Observer. An invited expert, Dr. Joel Rice, participated in the meeting.

2. The meeting was opened by Dr. Kazuhiro Oshima (Japan), the TWG CMSA Chair.

3. The Science Manager, Dr. Aleksandr Zavolokin, outlined the procedures for the meeting.

4. Mr. Alex Meyer was selected as rapporteur.

Agenda Item 2. Adoption of Agenda

5. The TWG CMSA agreed to add “Discussion on discrepancies between the input data for the 2024 stock assessment and reported values in Annual Summary Footprint” as a new Agenda Item 4, with sub-agenda items on “Review of how to revise data and results,” “How to present the updated results of SAM,” and “Timeline for developing advice to COM based on recommendation from SC09.”

6. The TWG CMSA agreed to change Agenda Item 13 from “Initiation of discussion on management strategy evaluation (MSE) for CM,” to “Future tasks for improving CM stock assessment, reference points and future projections.”

7. The revised agenda was adopted (Annex A). The List of Documents and List of Participants are attached (Annexes B, C).

2nd Floor Hakuyo Hall
Tokyo University of Marine Science and Technology
4-5-7 Konan, Minato-ku, Tokyo
108-8477 JAPAN

TEL +81-3-5479-8717
FAX +81-3-5479-8718
Email secretariat@npfc.int
Web www.npfc.int

Agenda Item 3. Overview of the recommendations and outcomes of previous NPFC meetings relevant to chub mackerel

3.1 TWG CMSA09

8. The Chair provided an overview of the outcomes and recommendations of the 9th TWG CMSA meeting.

3.2 Intersessional meetings of TWG CMSA

9. The Chair provided an overview of the intersessional meeting of the TWG CMSA held on 6 December 2024.

3.3 SC09

10. The Science Manager presented the outcomes from the 9th Meeting of the Scientific Committee (SC09) of relevance to chub mackerel.

Agenda Item 4. Discussion on discrepancies between the input data for the 2024 stock assessment and reported values in Annual Summary Footprint

4.1 Review of how to revise data and results

11. The Chair recalled that prior to SC09, the TWG CMSA identified discrepancies between Members' total catches as reported in the annual summary footprint and their total calculated catches as the sum of product of catch-at-age (CAA) with weight-at-age (WAA). He reminded the TWG CMSA that the SC requested that Members revise their data and submit the revised data to the TWG CMSA, that the TWG CMSA re-run the stock assessment and update the model output if possible, and that the TWG CMSA investigate the source of the discrepancies and recommend quality assurance and quality control measures to prevent the recurrence of similar issues in the future. The Chair also explained that since SC09, China, Japan, and Russia have conducted preliminary revisions and shared the updated data on the Collaboration site and that the invited expert has reviewed these data.

12. China, Japan, and Russia provided explanations on their methods for computing the calculated catch, the potential sources of the data discrepancies, and proposed approaches for resolving the discrepancies. The TWG CMSA reviewed the information and provided feedback for further improvements. China, Japan, and Russia continued to revise their data during the meeting based on the feedback.

13. Japan provided an explanation on potential causes of the catch discrepancy, and after addressing the causes, the discrepancy in fishing year (FY) 2014 was resolved (0% difference) and was similar to other years (NPFC-2025-TWG CMSA10-IP08).

14. The TWG CMSA noted that Members have made significant efforts to identify the sources of the data discrepancies, resolve the issues, and revise their data accordingly. The TWG CMSA noted that, nevertheless, some issues still remain, and therefore agreed to continue to work to resolve the outstanding issues in the intersessional period.

15. The TWG CMSA requested that China, Japan, and Russia each prepare and provide a paper documenting their methods for computing the calculated catch, the potential sources of the data discrepancies, and their proposed approaches for resolving the discrepancies in the intersessional period and provide it by 4 April.

4.2 How to present the updated results of SAM

16. Japan presented the preliminary results from inputting Members' latest available revised data that were submitted prior to TWG CMSA 10. These included scaling CAA to better agree with the footprint catch estimates for China and Japan, and a modification to the underlying age length key (ALK) used by Russia when calculating CAA. The preliminary results suggested the difference between estimated model parameters from the state-space assessment model (SAM) results using the original and the tentatively revised data received prior to the TWG CMSA10 meeting were generally less than 10%.

4.3 Timeline for developing advice to COM based on recommendation from SC09

17. The TWG CMSA agreed to discuss the timeline for developing advice to the Commission based on the recommendation from SC09 in the intersessional period.

18. The TWG CMSA discussed possible measures for the assurance and control of data quality, including:
    (a) Establishment of TWG CMSA Data Manager(s) to compile submitted data and prepare input data for stock assessment
    (b) Appointment of Data Correspondent(s) by Member
    (c) Data templates for each data item in CSV format
    (d) R code for Member's data compilation
        i. Agree on a set of checks to include
        ii. Agree on CAA*WAA and annual footprint acceptable error threshold
    (e) R code for stock assessment input data preparation

19. The TWG CMSA discussed the creation of a data preparation protocol that would include the following steps:
    (a) Submit data by the predetermined deadline prior to the TWG CMSA data preparatory

meeting

i. Important to ensure the quality assurance of the data
ii. Data templates for each data type to reduce format processing time

(b) TWG CMSA Data Manager runs Member's data compilation R code and shares the compiled file with Members
(c) Members check their data and correct any mistakes, if possible
(d) TWG CMSA Data Manager re-runs R data compilation, if needed
(e) Data preparation and compilation results presented at TWG CMSA data preparatory meeting

20. The TWG CMSA agreed to appoint Karolina Molla Gazi (EU) and Akihiro Manabe (Japan) as the TWG CMSA Data Managers. Members nominated Qiuyun Ma (China), Heng Zhang (China), Akihiro Manabe (Japan), Kazunari Higashiguchi (Japan) and Igor Chernienko (Russia) as TWG CMSA Data Correspondents.

Agenda Item 5. Members' fishery status and research activities

21. The TWG CMSA noted the information provided by Canada on Canadian catches of chub mackerel (NPFC-2025-TWG CMSA10-IP01). Chub mackerel have been captured as bycatch in bottom trawl, midwater trawl, and the hook and line halibut fisheries, as well as in research surveys. Chub mackerel are also often captured as bycatch in recreational and commercial fisheries for Pacific salmon species, especially in northern British Columbia.

22. Japan presented a review of the recent fishery and stock status of chub mackerel (NPFC-2025-TWG CMSA10-IP04). Japan's catch comes from large-scale purse seine vessels, small-scale purse seine vessels, set nets, and dip nets and other gears. The majority of the catch is from large-scale purse seine vessels. In the FY2023, the catch has been approximately 74,600 MT. There is usually substantial catch between November and March, with catch in November tending to be high, but the catch has been decreasing. Japan's 2024 summer surface trawl survey showed broad distribution of age-0 and age-1+ fish offshore by 170 °E, although nominal catch per unit effort (CPUE) was generally low. Japan's 2024 autumn surface trawl survey was limited and could not be conducted in coastal areas due to adverse weather conditions, but showed broad distribution of chub mackerel offshore. The egg survey shows that the main spawning ground is near the Izu Islands and coastal Japan. Egg abundance has been low since 2023. The most commonly caught bycatch species from large-scale purse seine vessels is Japanese sardine. Japan also explained its methods for distinguishing chub mackerel and blue mackerel and estimating their ratio in mackerel catch and provided an overview of the Japanese domestic stock assessment for chub mackerel conducted using a state-space assessment model (SAM).

23. Russia presented a review of its chub mackerel fishery and research activities in 2024 (NPFC-2025-TWG CMSA10-IP02). In 2024, the main fishing grounds were in the Japanese exclusive economic zone (EEZ) in January and partially in December, and the Russian EEZ for the rest of the fishing season. Some vessels also fished in the Convention Area in April, May and December. Average catch per unit effort (CPUE; catch per vessel per day) was high in the winter months, but significantly lower than in 2020–2022. In the summer and the first half of autumn, the CPUE was very low and did not exceed 5 tons, only starting to increase in November. The average CPUE in 2024 was significantly lower than in 2023. Monthly catches were also highest during the winter in 2023. Catches were minimal in the summer and increased in the autumn as the number of fishing vessels increased. The 2024 catch is lower than the 2023 catch. The Russian targeted mackerel fishery was started in 2016 when 6,700 MT of mackerel were caught. In 2018, the maximum catch was reached (98,800 MT) and catch started to decrease thereafter. In 2024, the catch was 7,200 MT. In terms of research activities, Russian vessels carry out surveys of the Northwest Pacific Ocean, covering both the Russian EEZ and open waters to the east of the Kuril Islands. Surveys are carried out in June–July annually, and in some years a second survey is carried out in August-September. Surveys are carried out in two ways: pelagic trawls and hydroacoustic surveys. In the survey in the first half of summer 2024, the biomass of mackerel in Pacific waters was estimated as 9,130 MT by trawl survey and 364,000 MT by hydroacoustic survey data.

24. China presented a review of its chub mackerel fishery and research activities (NPFC-2025-TWG CMSA10-IP03). In 2024, China operated 103 purse seine vessels and 3 trawl vessels in the Convention Area. The estimated catch in 2024 of chub mackerel and blue mackerel was about 72,000 MT, an increase from 2023. Nominal CPUE has also increased in 2024. The distribution of chub mackerel in 2024 was similar to that in 2023. The average length of caught individuals was 249.4 mm, slightly larger than in 2023 (231.1 mm). The main ages at catch in 2024 were from 1 to 3, similar to previous years. China collects and analyzes fishing logbooks every year, collects samples on fishing vessels and in ports, monitors the monthly ratio of chub mackerel and blue mackerel in catch, and conducts monitoring of biological features. Since 2023, China has increased sample collection for pelagic trawl nets in the North Pacific. The fork length frequency in trawl nets has been very similar to that in the purse seine fishery.

Agenda Item 6. Review of stock assessment for CM

6.1 Member's stock assessment

25. The TWG CMSA noted the domestic stock assessment presented by Japan under Agenda Item 5.

26. The invited expert presented a preliminary analysis of the CM data submitted to TWG CMSA 09 using the Stock Synthesis 3 modeling platform (SS3, https://nmfs-ost.github.io/ss3-website/). The presentation included only preliminary fits to the data, and the invited expert stressed that this was an early attempt to incorporate the CM data into SS3. The invited expert noted the ongoing effort to develop finalized catch-at-age values by the TWG CMSA and noted that these data would be incorporated into the model when ready along with other suggested changes. The invited expert will post the updated model to the Collaboration site along with the figures and tables related to the output.

27. Members briefly discussed challenges and opportunities of using the SS3 modeling framework with respect to chub mackerel and shared their feedback on the Collaboration site for future work.

6.2 2024 stock assessment by TWG CMSA

28. The Chair presented an overview of the 2024 stock assessment conducted by the TWG CMSA.

Agenda Item 7. Update of biological information

7.1 Maturity-at-age and natural mortalities

29. Japan presented its updated maturity-at-age data (NPFC-2025-TWG CMSA10-IP05). Maturity at age in FY2023 is considered unchanged from FY2022.

30. Japan presented the study of criteria to determine the maturation status used in Japan and explained that the criteria used in Watanabe (2010) is still applicable to the current stock according to histological observation. Japan also presented its progress on the study of maturity-at-age in different regions in Japanese coastal waters and proposed that Japan will continue investigate the method to calculate maturity-at-age (NPFC-2025-TWG CMSA10-IP06).

31. China presented its updated maturity-at-age data that was shared on the Collaboration site.

32. As future work, the TWG CMSA encouraged China and Japan to work together to develop a standardized protocol for determining maturity.

7.2 Finalization of biological parameters for stock assessment in TWG CMSA11

33. The TWG CMSA discussed the biological parameters to be used for the stock assessment of chub mackerel under Agenda Item 10.

Agenda Item 8. Fishery and biological data for stock assessment

8.1 Catch-at-age

8.1.1 Length frequency, catch-at-length/size and age-length key

8.1.2 Calculation of catch-at-age

8.2 Weight-at-age

34. China explained that it has shared its latest catch-at-age and weight-at-age data and the documentation describing the calculation methods on the Collaboration site.

35. Japan presented the estimation method and data on catch, weight, and maturity at age of the chub mackerel caught by Japan up to calendar year (CY) 2024 Q2 (NPFC-2025-TWG CMSA10-WP03). Catch data are collected by month, prefecture, and gear type. Measurement of length data is obtained from the major landing port to develop catch at length from each prefecture on a quarterly basis. Age data are obtained from the subsample of mackerels for which fork length are measured and annulus of scale or annual increments of otolith are counted. The age data are subdivided into the Eastern and Western part of the Pacific coastal prefectures of Japan to construct an age-length key and catch at age is calculated for each quarter. Japan has prepared and presented data to construct catch at age up to the second quarter of 2024 (CY2024 Q2). The trend of catch at age shows a decreased catch number in CY2023 Q3-CY2024 Q2 compared to the previous years.

36. Russia explained that it will share its updated catch-at-age data and weight-at-age data and the documentation describing the calculation methods within March.

37. The TWG CMSA agreed to continue discussions intersessionally to decide on the calculation method for weight-at-age to be used in SAM to convert the stock number to stock biomass.

38. China presented the annual ratios of each species in China's combined blue mackerel and chub mackerel catch for 2014–2023.

39. Japan presented the annual ratios of each species in Japan's combined blue mackerel and chub mackerel catch for 2014–2023.

40. The TWG CMSA requested China and Japan to continue to regularly provide this information. As future work, the TWG CMSA encouraged China and Japan to work together to develop a standardized approach for calculating the ratio of chub mackerel and blue mackerel and also to provide quarterly ratios.

8.3 Finalization of fishery and biological data for stock assessment in TWG CMSA11

41. The TWG CMSA compiled a table of age-specific data to be used in the stock assessment

(Annex D).

42. The TWG CMSA requested that Russia update its quarterly data up to the first half of 2024 (CY). Russia agreed to submit its updated data by the end of March 2025.

Agenda Item 9. Abundance indices

9.1 Update of abundance indices submitted by Members

9.2 Usage of abundance indices in the 2025 stock assessment

43. China presented a standardization of CPUE data for chub mackerel caught by the China's lighting purse seine fishery from 2014 to 2023 using a generalized additive model (GAM) (NPFC-2025-TWG CMSA10-WP09). Four groups of independent variables were considered in the CPUE standardization: spatial variables (latitude and longitude), temporal variables (year and month), fishery variables (vessel length) and environmental variables (sea surface temperature (SST) and chlorophyll-a concentration (Chla)). China recommended using the standardized CPUE derived from GAM as an input for the forthcoming chub mackerel stock assessment.

44. The TWG CMSA agreed to use China's standardized CPUE derived from GAM as an input for the chub mackerel stock assessment.

45. Japan presented a standardization of egg abundances from monthly egg density data obtained by research surveys for the Pacific stock of chub mackerel (NPFC-2024-TWG CMSA10-WP07). Japan applied the VAST model to the monthly egg survey data from 2005 to 2024 off the Pacific coast of Japan to cover the spawning ground of chub mackerel. The standardized CPUE reached its peak in 2019, but has been on a downward trend since then, reaching its lowest levels in 2023 and 2024 since 2005. Japan found no serious problems in the diagnostics of the spatio-temporal model. Japan recommended using the estimated index as a spawning stock biomass (SSB) abundance index for the forthcoming chub mackerel stock assessment.

46. The TWG CMSA agreed to use Japan's standardized chub mackerel egg abundance index as an input for the stock assessment.

47. Japan presented a standardization of CPUE data for Pacific chub mackerel from 2003 to 2024 from its commercial dip-net fishery using a generalized linear mixed-effect model (NPFC-2025-TWG CMSA10-WP06). The analysis showed that the dip-net fishery CPUE was affected by month, area, SST, and ship as well as year. The abundance index standardizing these influential variables except for year showed a great decline in 2022-2024 after a high-level decade from 2011 to 2021. Model diagnostics suggested some areas in which the model could

be improved. Nevertheless, the CPUE of the dip-net fishery targeting the spawners represents valuable information regarding the abundance of spawning fish of chub mackerel because it is believed that the majority of spawning chub mackerel migrates around the Izu Islands. Japan recommended using the standardized CPUE derived from a generalized linear mixed-effect model as an input for the forthcoming chub mackerel stock assessment.

48. The TWG CMSA agreed to use Japan's standardized CPUE derived from a generalized linear mixed-effect model as an input for the stock assessment.

49. Japan presented a standardization of CPUE data from surface trawl surveys in summer for Pacific chub mackerel using the VAST model (NPFC-2025-TWG CMSA10-WP08). The survey covers a broad area in the Northwest Pacific Ocean. Japan estimated local densities of young-of-the-year fish in the Northwest Pacific from 2002 to 2024 with consideration for environmental factors of SST and 50m-depth temperature as well as spatial autocorrelation. The analysis showed high levels of recruitment index have frequently occurred since 2013, although the recruitment has been decreasing since 2021. This standardized index covers a long time series from periods of poor recruitment to high recruitment. Model diagnostics found no serious problems in residual patterns and showed favorable results. Japan recommended using this standardized recruitment index as the abundance index of age-0 fish in the forthcoming chub mackerel stock assessment.

50. The TWG CMSA agreed to use Japan's standardized recruitment index as the abundance index of age-0 fish in the stock assessment.

51. Japan presented a standardization of CPUE data from surface trawl surveys in autumn for Pacific chub mackerel using the vector-autoregressive spatio-temporal (VAST) model (NPFC-2025-TWG CMSA10-WP05). The survey covers a moderately broad area in the Northwest Pacific Ocean. Japan estimated local densities of 0-year-old fish and 1-year-old fish in the Northwest Pacific from 2005 to 2024 with consideration for environmental factors of SST and 30m-depth temperature as well as spatial autocorrelation. The analysis showed high levels of abundances frequently occurred since 2013. However, the abundance decreased in 2023 and 2024. This standardized index covers a long time series from periods of poor recruitment to high recruitment. Model diagnostics found no serious problems in residual patterns and showed favorable results. Japan recommended using these standardized abundance indices as the abundance indices for age-0 fish and age-1 in the forthcoming chub mackerel stock assessment.

52. The TWG CMSA agreed to use Japan's standardized abundance indices for age-0 fish and age-1 fish as inputs for the stock assessment.

53. Russia explained that since the previous standardization of the CPUE data for chub mackerel caught by its trawl fishery from 2016 to 2023 using GAM, which it presented at TWG CMSA09 (NPFC-2024-TWG CMSA09-WP11), it has prepared an updated CPUE standardization but is not yet able to present it at this meeting. Russia noted that the updated CPUE standardization does not differ significantly from its previous CPUE standardization.

54. The TWG CMSA09 noted that Russia's previous CPUE standardization included data up to the planned terminal year (FY2023) for the forthcoming stock assessment and that this has been reviewed by the TWG CMSA. The TWG CMSA therefore agreed that Russia's standardized CPUE derived from GAM described in NPFC-2024-TWG CMSA09-WP11 could be used as an input for the chub mackerel stock assessment. At the same time, the TWG CMSA noted Russia's intention to provide its updated CPUE standardization and agreed to review Russia's CPUE standardization, if it is provided by the end of March 2025, at an intersessional meeting and consider it for use in the forthcoming stock assessment.

9.3 Finalization of abundance indices for stock assessment in TWG CMSA11

55. The TWG CMSA compiled a table of abundance indices to be used in the stock assessment (Annex E).

Agenda Item 10. Settings and specifications of SAM

10.1 Review of current settings and specifications

56. The TWG CMSA agreed that the assessment period will be FY1970–FY2023 (from 1 July 1970 to 30 June 2024).

10.2 Discussion towards finalization of settings and specifications

57. The TWG CMSA reviewed and updated the draft table of settings and specification of SAM (Annex F). In particular, the use of a smooth hockey stick stock recruitment function was suggested by a Member and its trial and further consideration was welcomed by the Members. The TWG CMSA agreed to continue to discuss and develop the table and to finalize it at TWG CMSA11.

Agenda Item 11. Biological reference points

11.1 Methods to calculate biological reference points

11.2 List of reference points for stock assessment in TWG CMSA11

58. The TWG CMSA reviewed and updated the draft table of reference points (Annex G). The TWG CMSA agreed to continue to discuss and develop the table and to finalize it at TWG CMSA11. In particular, the TWG CMSA noted the need to hold further discussions on the

applicable period for the reference points, whether to use deterministic or stochastic MSY-based reference points, and the applicable year for defining Fcurrent.

Agenda Item 12. Future projection of chub mackerel

12.1 Methods to conduct future projection

59. The TWG CMSA reviewed and updated the draft table of possible options for the basic specifications for conducting future projections for chub mackerel (Annex H). In particular, incorporation of uncertainty in parameter estimation into the future projection was suggested by a Member and its trial and further consideration was welcomed by the Members. The TWG CMSA agreed to continue to discuss and develop the table and to finalize it at TWG CMSA11.

Agenda Item 13. Future tasks for improving CM stock assessment, reference points and future projections

60. The TWG CMSA discussed potential future tasks for improving the CM stock assessment, including:
    (a) Consider the frequency of stock assessments, including benchmark stock assessments and simpler stock assessment updates (short/mid-term). It would be useful to receive input from the Commission in this regard.
    (b) Collaborative work on chub mackerel maturity (short/mid-term)
    (c) Selection of abundance indices in base case runs based on similarity in trends (mid-term)
    (d) Introduction of fleet configuration in SAM (mid-term)
    (e) Further consideration of process error application into SAM (mid-term)
    (f) Continuation of use of SAM or development of another stock assessment model (long-term)

61. In relation to future projections, the TWG CMSA discussed the potential development of an HCR as a mid-term task.

Agenda Item 14. Review of the Work Plan of the TWG CMSA

62. The TWG CMSA agreed to review and update its work plan for 2025–2029 at TWG CMSA11.

14.1 Discussion on possible changes in TWG CMSA meeting schedule to include most recent data into stock assessment

63. The TWG CMSA held preliminary discussions on possible changes in the TWG CMSA meeting schedule to be able to include the most recent data into stock assessments. The TWG CMSA drafted a potential modified meeting timeline, with data submission and meeting timings (Annex I). The TWG CMSA agreed to continue to discuss this matter in the future.

Agenda Item 15. Other matters

15.1 Timeline and intersessional activities before TWG CMSA11

64. The TWG CMSA drafted a timeline of tasks leading up to TWG CMSA11 (Annex J).

65. The TWG CMSA agreed to hold its next meeting on 15–18 July 2025.

15.2 Observer Program

15.2.1 Review of data or data description on fisheries bycatch in chub mackerel fisheries

66. Japan presented bycatch information from its chub mackerel fisheries when presenting a review of its recent fishery and the stock status of chub mackerel under Agenda Item 5. Japan also submitted a separate working paper with more detailed information to the meeting (NPFC-2025-TWG CMSA10-WP04). Chub mackerel has historically been caught by various fisheries, with a large proportion of the catch coming from the large purse seine fisheries. The Japanese large purse seine fisheries targeting small pelagic fish species, including mackerels, have captured several other pelagic fish species as bycatch as well.

67. China presented bycatch information from its chub mackerel fisheries (NPFC-2025-TWG CMSA10-IP07). The main bycatch species are Japanese sardine and blue mackerel. Other bycatch species include squid, Pacific saury and other pelagic species.

68. The TWG CMSA requested that Russia present the bycatch information its chub mackerel fisheries at TWG CMSA11.

15.3 Species summary

69. The TWG CMSA reviewed the species summary for chub mackerel and updated the draft table of data availability from Members regarding chub mackerel (NPFC-2025-TWG CMSA10-WP02 (Rev. 1)). The TWG CMSA agreed to continue to update the species summary as appropriate in the future.

15.4 Other issues

70. No other matters were discussed.

Agenda Item 16. Adoption of Report

71. The report was adopted by consensus.

Agenda Item 17. Close of the Meeting

72. The meeting closed at 11:00 on 4 March 2025, Tokyo time.

Annexes

Annex A – Agenda

Annex B – List of Documents

Annex C – List of Participants

Annex D – Age-specific data to be used in the stock assessment and their specification

Annex E – Abundance indices to be used in the stock assessment and their specification

Annex F – Settings and specification of SAM

Annex G – Draft reference points for chub mackerel stock assessment

Annex H – Draft options for the basic specifications for conducting future projections for chub mackerel

Annex I – Timeline for data submission and meeting timing

Annex J – Timeline and activities for intersessional work from the conclusion of TWG CMSA10 to the next TWG CMSA meeting in July

Annex A

Agenda

Agenda Item 1. Opening of the Meeting

Agenda Item 2. Adoption of Agenda

Agenda Item 3. Overview of the recommendations and outcomes of previous NPFC meetings relevant to chub mackerel

- 3.1 TWG CMSA09
- 3.2 Intersessional meetings of TWG CMSA
- 3.3 SC09

Agenda Item 4. Discussion on discrepancies between the input data for the 2024 stock assessment and reported values in Annual Summary Footprint

- 4.1 Review of how to revise data and results
- 4.2 How to present the updated results of SAM
- 4.3 Timeline for developing advice to COM based on recommendation from SC09

Agenda Item 5. Members fishery status and research activities

Agenda Item 6. Review of stock assessment for CM

- 6.1 Member's stock assessment
- 6.2 2024 stock assessment by TWG CMSA

Agenda Item 7. Update of biological information

- 7.1 Maturity-at-age and natural mortalities
- 7.2 Finalization of biological parameters for stock assessment in TWG CMSA11

Agenda Item 8. Fishery and biological data for stock assessment

- 8.1 Catch-at-age
  - 8.1.1 Length frequency, catch-at-length/size and age-length key
  - 8.1.2 Calculation of catch-at-age
- 8.2 Weight-at-age
- 8.3 Finalization of fishery and biological data for stock assessment in TWG CMSA11

Agenda Item 9. Abundance indices

- 9.1 Update of abundance indices submitted by Members

9.2 Usage of abundance indices in the 2025 stock assessment

9.3 Finalization of abundance indices for stock assessment in TWG CMSA11

Agenda Item 10. Settings and specifications of SAM

10.1 Review of current settings and specifications

10.2 Discussion towards finalization of settings and specifications

Agenda Item 11. Biological reference points

11.1 Methods to calculate biological reference points

11.2 List of reference points for stock assessment in TWG CMSA11

Agenda Item 12. Future projection of chub mackerel

12.1 Methods to conduct future projection

Agenda Item 13. Future tasks for improving CM stock assessment, reference points and future projections

Agenda Item 14. Review of the Work Plan of the TWG CMSA

14.1 Discussion on possible changes in TWG CMSA meeting schedule to include most recent data into stock assessment

Agenda Item 15. Other matters

15.1 Timeline and intersessional activities before TWG CMSA11

15.2 Observer Program

15.2.1 Review of data or data description on fisheries bycatch in chub mackerel fisheries

15.3 Species summary

15.4 Other issues

Agenda Item 16. Adoption of Report

Agenda Item 17. Close of the Meeting

Annex B

List of Documents

MEETING INFORMATION PAPERS

Symbol	Title
NPFC-2025-TWG CMSA10-MIP01	Meeting Information
NPFC-2025-TWG CMSA10-MIP02 (Rev. 1)	Provisional Agenda
NPFC-2025-TWG CMSA10-MIP03 (Rev. 1)	Annotated Indicative Schedule

WORKING PAPERS

Symbol	Title
NPFC-2025-TWG CMSA10-WP01	TWG CMSA Work Plan, 2025-2029
NPFC-2025-TWG CMSA10-WP02 (Rev. 1)	Species summary for chub mackerel
NPFC-2025-TWG CMSA10-WP03	The estimation method and data on catch, weight, and maturity at age of the chub mackerel caught by Japan up to CY2024 Q2
NPFC-2025-TWG CMSA10-WP04	Bycatch information in chub mackerel fisheries from the Japanese fisheries
NPFC-2025-TWG CMSA10-WP05	Standardized Abundance Indices for Ages 0 and 1 Fish of Chub Mackerel from Northwest Pacific Autumn Surveys up to 2024
NPFC-2025-TWG CMSA10-WP06	Standardized CPUE of Japanese commercial dip-net fishery targeting spawners of chub mackerel in the Northwest Pacific up to 2024
NPFC-2024-TWG CMSA10-WP07 (Rev. 1)	Standardizing monthly egg survey data as an abundance index for spawning stock biomass of chub mackerel in the Northwest Pacific
NPFC-2025-TWG CMSA10-WP08	Standardized abundance index for recruitment of chub mackerel from Northwest Pacific summer surveys up to 2024
NPFC-2025-TWG CMSA10-WP09	Standardized CPUE of Chub mackerel (*Scomber japonicas*) caught by the China's lighting purse seine fishery up to 2023

INFORMATION PAPERS

Symbol	Title
NPFC-2025-TWG CMSA10-IP01	Chub Mackerel Catch in Canada (updated for 2024)
NPFC-2025-TWG CMSA10-IP02	Chub mackerel Russian fishery in the northwest Pacific Ocean Pacific Ocean, research activities in

	2024
NPFC-2025-TWG CMSA10-IP03	Review of chub mackerel fishery in China and research activities
NPFC-2025-TWG CMSA10-IP04	Recent fishery and stock status of chub mackerel from Japan
NPFC-2025-TWG CMSA10-IP05	Updated Maturity at age from Japan
NPFC-2025-TWG CMSA10-IP06	Progress report on the study of maturity at age of Chub mackerel
NPFC-2025-TWG CMSA10-IP07	Bycatch of chub mackerel fishery in China
NPFC-2025-TWG CMSA10-IP08	Details on discrepancy of Japanese catch and its solution

REFERENCE DOCUMENTS

Symbol	Title
NPFC-2024-TWG CMSA09-Final Report	9th TWG CMSA meeting report
NPFC-2024-SC09-Final Report	SC09 meeting report

Annex C

List of Participants

CHAIR

Kazuhiro OSHIMA
oshima_kazuhiro28@fra.go.jp

CANADA

Janelle CURTIS
Janelle.Curtis@dfo-mpo.gc.ca

Chris ROOPER
chris.rooper@dfo-mpo.gc.ca

CHINA

Qiuyun MA
qyma@shou.edu.cn

Jie CAO
jcao22@ncsu.edu

Libin DAI
644318716@qq.com

Heng ZHANG
zhangh1@ecsf.ac.cn

Zhiwei LIU
1401514772@qq.com

Yufei ZHOU
787715502@qq.com

Yongchuang SHI
1024731143@qq.com

Zhengyan JIANG
Jungle_jiang@189.cn

EUROPEAN UNION

Karolina MOLLA GAZI
karolina.mollagazi@wur.nl

JAPAN

Momoko ICHINOKAWA
ichinokawa_momoko09@fra.go.jp

Shota NISHIJIMA
nishijima_shota02@fra.go.jp

Kazunari HIGASHIGUCHI
higashiguchi_kazunari34@fra.go.jp

Sayoko ISU
isu_sayoko92@fra.go.jp

Hiroshi KUBOTA
kubota_hiroshi89@fra.go.jp

Akihiro MANABE
manabe_akihiro97@fra.go.jp

Shuya NAKATSUKA
nakatsuka_shuya49@fra.go.jp

Ryuji YUKAMI
yukami_ryuji41@fra.go.jp

RUSSIA

Dmitrii ANTONENKO
dmantonenko@yandex.ru

Emilia CHERNIENKO
emilya.petrovna@gmail.com

Igor CHERNIENKO
chernienko.igor@gmail.com

Vladimir KULIK
vladimir.kulik@tinro.vniro.ru

USA

Erin BOHABOY
erin.bohaboy@noaa.gov

Donald KOBAYASHI
donald.kobayashi@noaa.gov

OBSERVER

THE Pew Charitable Trusts

Raiana MCKINNEY
rmckinney@pewtrusts.org

INVITED EXPERT

Joel RICE
ricemarineanalytics@gmail.com

RAPPORTEUR

Alex MEYER
meyer@urbanconnections.jp

NPFC SECRETARIAT

Robert DAY
rday@npfc.int

Alex ZAVOLOKIN
azavolokin@npfc.int

Sungkuk KANG
skang@npfc.int

Jihwan KIM
jkim@npfc.int

Shinnosuke KATO
skato@npfc.int

Jiyu WANG
jwang@npfc.int

Annex D

Age-specific data to be used in the stock assessment and their specification

Data	CHINA		JAPAN		RUSSIA	
	Starting year	Terminal year	Starting year	Terminal year	Starting year	Terminal year
CAL	2016 Q1 (CY)	2024 Q2 (CY)	1970 Q3 (CY)	2024 Q2 (CY)	2016 Q2 (CY)	2024 Q2 (CY)*[2]
ALK	2018 Q1 (CY)	2024 Q2 (CY)	1970 Q3 (CY)	2024 Q2 (CY)	-	-
CAA	2015 Q1 (CY)*[1]	2024 Q2 (CY)	1970 Q3 (CY)	2024 Q2 (CY)	2014 Q1 (CY)*[1]	2024 Q2 (CY)*[2]
WAA	2018 Q1 (CY)	2024 Q2 (CY)	1970 Q3 (CY)	2024 Q2 (CY)	2016 Q2 (CY)	2024 Q2 (CY)*[2]
MAA	2018 Q1 (CY)	2024 Q2 (CY)	1970 Q3 (CY)	2024 Q2 (CY)	-	-
CM:BM ratio	2015 (CY)	2023 (CY)	2014 (CY)	2023 (CY)	-	-

*1 For 2016, compute catch-at-age data based on Chinese catch-at-length data using Eastern Japanese ALK. For 2015 for China and 2014-2015 for Russia, compute catch-at-age based on the average of 2016-2018 catch-at-length data using Eastern Japanese ALK. For 2018-2022, compute catch-at-age based on the catch-at-age from China.

*2 Russia will provide catch-at-length, catch-at-age and weight-at-age data by the end of March 2025.

Annex E

Abundance indices to be used in the stock assessment and their specification

Member	Gear/Survey	Ages	Starting year	Terminal year
CHINA	Lighting purse seine	Multiple ages	2015 FY	2023 FY
JAPAN	Summer trawl survey	Age 0 (Recruitment)	2002 FY	2024 FY
	Autumn trawl survey	Age 0 (Recruitment)	2005 FY	2024 FY
		Age 1	2005 FY	2024 FY
	Egg survey	SSB	2005 FY	2024 FY
	Dip net	SSB	2003 FY	2024 FY
RUSSIA	Trawl	Multiple ages	2016 FY	2023 FY

Annex F

Draft table on settings and specifications of SAM

Model configuration	Parameter	Option(s) addressed after input data fixed by TWG CMSA09	Potential option(s) requiring revision or development (long-term work)	Note
Recruitment	$N_{0,y}$	Parameterized Beverton-Holt stock-recruitment relationship with α and β estimated in the model	• Beverton-Holt stock-recruitment relationship with fixed parameters such as α and β or steepness parameter h, exploring the fit of the model to a range of values that would give low, intermediate, and high steepnesses that seem plausible • Smooth hockey-stick stock-recruitment relationship • Consider other possible options	Analyzing HS SRR is difficult in SAM
Catchability or proportionality constant for abundance indices	q_k	Assume constant	Consider time-varying catchability	

Nonlinear coefficient for abundance indices	b_k	Searching the best option(s) about how constraints are imposed on which indices based on AIC etc		
Years of F random walk	-	Include the Markov process for all years as the base case		
Correlation of age classes in F random walk	ρ	Using a simple function of age difference ($\rho^{\lvert a-a' \rvert}$)		
Process errors in numbers older than age 0	ω_a $(a>0)$	• Estimate process errors for age 1 and older (adopted as the base case)		
SD in F random walk	σ_a	Searching the best option(s) about how constraints are imposed on which age classes based on AIC etc	Consider other structures of random errors	
SD in measurement errors of catch at age	τ_a	Searching the best option(s) about how constraints are imposed on which age classes based on AIC etc	Consider other structures of random errors	
SD in measurement errors of abundance indices	v_a	Assuming different measurement errors among abundance indices	Consider other structures of random errors	

Number of fleets	-	Single fleet (explore calculation of F by fleet to fit to the Chinese and Russian fishery CPUEs)	Multiple	• A relatively large revision is required • Extension to multi-fleets may be useful in fitting fishery-dependent CPUE and for management purpose
Natural mortality	M	• Age-specific M (0.80 for age 0, 0.60 for age 1, 0.51 for age 2, 0.46 for age 3, 0.43 for age 4, 0.41 for age 5, and 0.40 for age 6+) (adopted as the base case) • Likelihood profiles on natural mortality	Time varying M	
Maturity-at-age		• Jpn MAA (base case) • Using the average of Chn MAA and Jpn MAA as a sensitivity scenario	Incorporate density dependence in weight growth and maturity	
Catch-at-age	$C_{a.y}$	• See Annex F, TWG CMSA10 report	Put different weights based on data uncertainty	SAM allows missing data in catch-at-age
Weight-at-age		To compute total biomass and SSB using an average, weighted by age-specific catch number with the same ratio across all years (FY2014–FY2022) by Member, of Chn, E/WJpn and Rus WAA		New methods will be explored in the intersessional meeting

Summer survey index (age 0)		Used for SA (NPFC-2025-TWG CMSA10-WP08)		
Autumn survey indices (ages 0, 1)		Used for SA (NPFC-2025-TWG CMSA10-WP05)	Compare the effect of assuming an autoregressive process or an independent and identically distributed process in the CPUE standardization	
Egg abundance (SSB)		Used for SA (NPFC-2025-TWG CMSA10-WP07(Rev1))		
Dipnet fishery (SSB)		Used for SA (NPFC-2025-TWG CMSA10-WP06)		
Chinese fishery CPUE		Used for SA (NPFC-2025-TWG CMSA10-WP09)		
Russian fishery CPUE		Used for SA (NPFC-2024-TWG CMSA09-WP11)*		

*Russian fishery CPUE provided in July 2024 will be used as an abundance index in base case model, if no update.

Annex G

Draft table on reference points for the 2025 chub mackerel stock assessment

Biological parameters used	**FY2016-FY2023**	FY1970-FY2023
current%SPR		
Fmed/Fcur		
F0.1/Fcur		
FpSPR.30.SPR/Fcur		
FpSPR.40.SPR/Fcur		
FpSPR.50.SPR/Fcur		
FpSPR.60.SPR/Fcur		
FpSPR.70.SPR/Fcur		
F_{MSY}/Fcur		
B_{MSY}		
SSB_{MSY}		
h		
SSB0		
SSB_{MSY}/SSB0		
F_{MSY}SPR		
MSY		
MSY/B_{MSY} (exploitation rate at MSY)		

Draft options for the basic specifications for conducting future projections for chub mackerel

(to be finalized in conjunction with the finalization of the stock assessment report)

Items	Option for base case	Option for future	Issue to be clarified
Type of simulation	**Stochastic (3000 times)**		Model uncertainty, Management objective Deterministic run is not recommended (random effects are estimated, so deterministic run is not appropriate)
Duration	Short (5 years after introduction of management)	**Medium (5-10 years) or Long (> 10 years),** Equilibrium (related to projection levels of Fref)	Ask the COM to consider management objective and methods. Consider appropriate duration for chub mackerel
Start year for incorporating management	2025		
Catch or F levels	Constant catch	HCR	Management Method, HCR, Include terminal year's F or not
Estimation of catch from terminal year (FY 2023) to current year (FY 2024)	**recent F**	Last year of harvest, Average of 2 or 3 recent years	

Other parameters (not recruitment)	**Parameter estimates without uncertainty**	Parameter estimates with uncertainty (will be discussed in TWG CMSA11)	
Process error other than Age 0	Consider as stochasticity with the estimated variances in SAM when it is estimated		Note that SAM includes process error on all ages
Recruitment level	Model-based approach using S-R relations–	Empirical approach by resampling past recruitments (what duration?)	Model uncertainty
Error structure in recruitment	**Parametric with process error**	Non-parametric (resampling of deviations)	Future work could consider that future recruitment is lower and possibly link to an environmental signal
Biological parameters	**Recent X-years average (after the year when maturity has dropped) and all year's average as sensitivity**	Possible density dependent relationship	

Annex I

Timeline for data submission and meeting timing

Month	**TWG CMSA and other meetings**	**Data submission**		
		China	**Japan**	**Russia**
January	Data preparatory meeting (Data up to June of **the previous year**)			
February				
March				
April				
May				
June				
July	Stock assessment meeting			
August				
September				
October				
November		Possible to submit the latest data (Data up to June of **the same year**)	Domestic SA meeting (Data up to June of **the same year**)	Possible to submit the latest data (Data up to June of **the same year**)
December	SC meeting			
January				
February				
March	COM meeting			

Annex J

Timeline and activities for intersessional work from the conclusion of TWG CMSA10 to the next TWG CMSA meeting in July

<table>
<tr><th colspan="2"></th><th>Catch@Age</th><th>Weight@Age</th><th>Abundance Indices</th><th>SAM/Future projection</th></tr>
<tr><td rowspan="3">March</td><td>Early</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Mid</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Late</td><td colspan="2">Russia submits the quarterly CAL, CAA and WAA by the end of March.</td><td>Russia submits a paper on the updated trawl CPUE by the end of March.</td><td></td></tr>
<tr><td rowspan="3">April</td><td>Early</td><td colspan="2">• All Members finalize and re-submit the quarterly CAA and WAA.
• All Members submit a document on source of data discrepancy and data revision.</td><td></td><td></td></tr>
<tr><td>Mid</td><td colspan="2">Data Manager conducts data compilation and finalizes input data</td><td></td><td></td></tr>
<tr><td>Late</td><td colspan="4">1st intersessional meeting (two days, 25-26 April)
• To review the finalized input data for the 2025 stock assessment • To review documents on data discrepancy and data revision
• To draft data preparation protocol</td></tr>
<tr><td rowspan="3">May</td><td>Early</td><td></td><td></td><td></td><td rowspan="2">Codes of SAM, calculation of BRP and future projections are shared in GitHub repository, if possible</td></tr>
<tr><td>Mid</td><td></td><td></td><td></td></tr>
<tr><td>Late</td><td colspan="4">2nd intersessional meeting (one day), if needed
• To check progress of stock assessment works; and • To continue to draft data preparation protocol for review in TWG CMSA11 meeting</td></tr>
<tr><td rowspan="3">June</td><td>Early</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Mid</td><td colspan="4">Working paper due (16 June)</td></tr>
<tr><td>Late</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">July</td><td>Early</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Mid</td><td colspan="4">TWG CMSA11 meeting in China (15-18 July)</td></tr>
</table>