North Pacific Fisheries Commission

Yearbook 2019

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FOREWORD

The North Pacific Fisheries Commission has grown by leaps and bounds since its establishment in July 2015. I attribute this to the dedication and collective hard work of all Members.

This book summarizes our efforts for the past year reflecting our strong commitment in ensuring the long-term conservation and sustainable use of our fisheries resources within the Convention Area in the high seas of the North Pacific.

I thank all the Members who joined us in this journey. Not only do we celebrate the special joyous moments, but we also look upon the hardships that we had to endure in the past to appreciate everything that shaped us and made us what we are today.

This yearbook entails the events and activities of NPFC in the past year and I trust you will enjoy reading it as much as I did when reviewing our work in the year 2019.

Dr. Vladimir Belyaev
Chairman
North Pacific Fisheries Commission

ACKNOWLEDGEMENT

This book is the accumulation of all the discussions and results of the meetings and workshops conducted by NPFC in the previous year. The Secretariat wishes to recognize the people behind the success of each meeting that has moved us closer to our goal of sustainable fisheries in the North Pacific region.

First, I would like to express my gratitude to all the Members of the North Pacific Fisheries Commission. Thank you very much for your generous time and effort in bringing forth to successful completion all the activities listed in this book.

I also would like to express my appreciation to our current Chair, Dr. Vladimir Belyaev, and to the Chairs of the Scientific Committee, Technical and Compliance Committee, Finance and Administration Committee, all working groups, and small committees for your utmost dedication and inspiring hard work on behalf of the Commission.

Thank you very much to our Rapporteur, Alex Meyer, and to Peter, Alex, Yuko and Mervin, our dedicated staff at the Secretariat for helping the Commission bring this remarkable year to a productive close.

This book is a collection of a year's worth of activities and is published in an easy-to-read format for all our readers who share the same passion for conservation and sustainable use of the fisheries resources and protection of the marine environment in the North Pacific.

Thank you very much!

Dr. Dae-Yeon Moon
Executive Secretary
North Pacific Fisheries Commission

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INTRODUCTION

The North Pacific Fisheries Commission (NPFC) is an inter-governmental organization established by the Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean. The objective of the Convention is to ensure the long-term conservation and sustainable use of the fisheries resources in the Convention Area while protecting the marine ecosystems of the North Pacific Ocean in which these resources occur. The Convention was adopted on 24th February 2012 and came into force 180 days after receipt of the 4th ratification on 19th July 2015.

The task of the Commission is to achieve the objective and to establish management regimes to ensure the conservation and sustainable use of the fisheries resources of the North Pacific Ocean and its sensitive marine ecosystems. At present, there are eight (8) Members of the NPFC, namely: Canada, China, Japan, Republic of Korea, the Russian Federation, Chinese Taipei, the United States of America, and Republic of Vanuatu. Panama is a Cooperating Non-contracting Party (CNCP). The Secretariat of the North Pacific Fisheries Commission is located in Tokyo, Japan. Dr. Dae-Yeon Moon of Korea is the current Executive Secretary and has been leading the Secretariat since September 2015.

Fisheries resources covered by the Convention include all the fish, mollusks, crustaceans and other marine species caught by fishing vessels within the Convention Area, *excluding*:

(i) Sedentary species insofar as they are subject to the sovereign rights of coastal States and indicator species of vulnerable marine ecosystems as listed in, or adopted pursuant to the NPFC Convention, including at the moment four families of cold-water corals;
(ii) Catadromous species;
(iii) Marine mammals, marine reptiles and seabirds; and
(iv) Other marine species already covered by pre-existing international fisheries management instruments within the area of competence of such instruments.

Currently the fish species targeted by the NPFC Members include bottom fish stocks and pelagic fish stocks as follows:

- **Fishery for Bottom Fish Stocks**

In the Northwestern Pacific Ocean, bottom trawl fisheries, bottom gillnet fisheries and bottom longline fisheries have been conducted over the Emperor seamounts by Japan, Korea and Russia. The primary target species of the bottom trawl fisheries have been North Pacific Armorhead (*Pentaceros wheeleri*), and splendid alfonsino (*Beryx splendens),* and the primary target species of the bottom gillnet fisheries have been splendid alfonsino, oreo (*Allocyttus verrucosus)* and mirror dory (*Zenopsis nebulosa)*.

In the Northeastern Pacific Ocean, the seamount long-line fishery began in the 1970's. Four seamount aggregations (Eickelberg Seamounts, Warwick Seamount, Cobb Seamounts, and Brown Bear Seamounts) have been fished by Canada, via longline hook and longline trap gear.

Since the inception of the fishery, the target species of both the above fishing gears has been sablefish (*Anoplopoma fimbria*)

- **Fishery for Pelagic Fish Stocks**

Pacific saury (*Cololabis saira)* is one of the major target species in the Convention Area and has been harvested by China, Japan, Korea, Russia, Chinese Taipei and Vanuatu. Most fleets mainly use stick-held dip nets or lift nets (a similar fishing method which uses fishing lamps) to catch Pacific saury. While Japanese and Russian vessels operate mainly within their EEZs, Chinese, Korean, Chinese Taipei and Vanuatu vessels operate mainly in the high seas of the North Pacific. Stock assessments of this particular species are the basis of establishing conservation and management measures for the sustainability of the fishery.

Neon flying squid (*Ommastrephes bartramii*) and Japanese flying squid (*Todarodes pacificus*) are also traditionally harvested by squid jigging vessels within the Convention Area.

Chub mackerel (*Scomber japonicus*) fishery is also active in the NPFC Convention Area in the Northwestern Pacific Ocean. Similar with the Pacific saury, stock assessment for chub mackerel also determines the status and dynamics of the stock and provides advice towards conservation and management measures to ensure the sustainable use of these marine resources.

NPFC Personnel:

The personnel of the Secretariat and the Chairman are representatives of the multinational and multicultural nature of the Commission. The Commission is led by the current Chair, Dr. Vladimir Belyaev of Russia. Each of the Subsidiary Committees is also led by its Chairperson. The Scientific Committee is currently chaired by Dr. Janelle Curtis of Canada, the Technical and Compliance Committee is chaired by Dr. Robert Day of Canada and the Finance and Administration Committee is currently chaired by Dr. Bai Li of China.

The Secretariat is headed by the Executive Secretary, Dr. Dae-Yeon Moon of Korea. The Science Manager is Dr. Aleksandr Zavolokin of Russia and the Compliance Manager is Mr. Peter Flewwelling of Canada. The Executive Assistant Ms. Yuko Yoshimura-Takamiya and the Data Coordinator Mr. Mervin Ogawa are from Japan. The Secretariat has also engaged temporary consultants for a limited period of time to assist the Commission in finance, compliance and science-related activities.

Period of Coverage:

This publication picks up immediately after the last reported activity of the previous yearbook and covers key activities and Commission meetings held from the Workshop on Data Requirements and Data Sharing for Small Scientific Committees on Vulnerable Marine Ecosystems and Bottom Fish in November 2018 up to the 5th Annual Commission Meeting in July 2019.

In its efforts to achieve the objective of the Convention, the Commission:

a. held scientific committee meetings and workshops on vulnerable marine ecosystems, bottom fish, chub mackerel and Pacific saury;
b. adopted four new CMMs (Sablefish, Japanese Sardine and Japanese Flying Squid, Vessel Monitoring System, and Compliance Monitoring Scheme);
c. revised six CMMs (Vessel Registration, IUU fishing vessels, Pacific Saury, Chub Mackerel, Bottom Fisheries NW and NE Pacific)

To address the TCC intersessional work, the Commission formed four Technical and Compliance Committee Small Working Groups (SWGs): Assessing Compliance (TCC SWG AC), Operational Enforcement (TCC SWG OE), Vessel Monitoring System (TCC SWG VMS) and Vessel Registry (TCC SWG VR). These SWGs have been actively meeting regularly through web conferences and have recently streamlined operations into two SWGs namely Operations (TCC SWG Ops) and Planning & Development (TCC SWG PD).

Changes in the Yearbook

The format of this document has been altered to lessen the carbon footprint in producing this yearbook. All report annexes have links to the NPFC website and we encourage everyone to refer to the online source for any specific meeting report details.

The following pages provide the final approved reports of the internal meetings held by the NPFC in the chronological order in which the meetings were held.

NPFC

Workshop on Data Requirements and Data Sharing for Small Scientific Committees on Vulnerable Marine Ecosystems and Bottom Fish

07-09 November 2018
Xiamen, China
Workshop Report

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WORKSHOP REPORT

Agenda Item 1. Opening of the Meeting

1. The 1st workshop on data requirements and data sharing for the Small Scientific Committees on Vulnerable Marine Ecosystems (SSC VME) and Bottom Fish (SSC BF) of the North Pacific Fisheries Commission (NPFC) took place in Xiamen, China on 7-9 November 2018, and was attended by Members from Canada, China, Japan, the Republic of Korea, and the Russian Federation. One expert from the United States participated remotely via Skype. The meeting was co-chaired by Dr. Bai Li (China), Dr. Cherisse Du Preez (Canada), and Dr. Masashi Kiyota (Japan).

1.1 Welcome Address

2. Dr. Siquan Tian (China) welcomed the participants to Xiamen on behalf of China and Shanghai Ocean University. He pointed out that the aim of the NPFC is to ensure the long-term conservation and sustainable use of marine resources in the Convention Area while protecting the surrounding ecosystem. It is necessary to collect scientific data to understand the biodiversity in the Convention Area as well as the impact of fishing activities, and this workshop should improve the quality of data analyses and understanding of the situation in the Convention Area. China places great importance on this task and hopes that the workshop will yield fruitful results.

1.2 Purpose of Workshop and Expectations

3. The Co-Chairs explained the purpose of the workshop and expectations. The workshop is aimed at developing a data wish list and identifying minimum data required (1) for creating a combined footprint and effort map of all bottom fisheries and a combined assessment of significant adverse impact (SAI) on vulnerable marine ecosystems (VMEs) in the Convention Area and (2) for implementing the newly introduced adaptive management scheme for bottom fish (CMM-2018-05). To that end, scientific cooperation and the promotion of the best scientific knowledge is essential.

Agenda Item 2. Adoption of Agenda

4. Russia suggested that it present NPFC-2018-WS DATA01-WP02 under Agenda Item 8, rather than Agenda Item 3. The participants agreed.

5. Japan requested that it give a presentation on SAI assessment methods and potential VME indicator taxa under Agenda Item 3. The participants agreed.

6. The agenda was adopted without revision (Annex A). List of documents and list of participants are attached (Annex B, C).

Agenda Item 3. Data wish list for combined footprint and effort map of all bottom fisheries by gear and time for SAI assessment

3.1 Fishing ground

3.2 Fishing effort

7. Japan presented a review of the assessment of the potential impacts of Japanese bottom fisheries on VMEs within the fished seamounts (NPFC-2017-SSC VME02-WP03 (Rev 1)). Japan's SAI assessment method consists of three steps: (1) Fine-scale overlap with fishing efforts, (2) Risk scoring of underwater survey locations, and (3) Identification of VME sites. For this, Japan uses data from its scientific observer program to determine the density of fishing operations at a resolution of 30-second grids and drop camera observation from the Japanese scientific survey to determine the density of potential VME taxa at a resolution of points. Using this method, Japan has also assessed the risk of sponges and hydrocorals. It found that the frequency of sponges was low and that while a number of hydrocoral colonies were observed, their size was small and they did not provide significant habitats to other species. However, Japan acknowledged that its data are from 2009 to 2015 and said that it will provide an update using 2009-2017 data at the next SSC VME meeting.

8. The Secretariat presented the joint bottom footprint drafted by the South Pacific Regional Fisheries Management Organization (SPRFMO) in 2011 for the participants' reference.

9. The participants drafted a list of existing data for potential combined footprint and effort map from Members to better identify bottom fishing grounds in the Convention Area to define the fishing footprint and effort in relation to assessing SAI on VMEs in the Convention Area (Annex D).

10. The participants noted that there are major differences in the temporal and spatial resolutions between Members' potentially available data, which requires further discussion. It was also noted that existing data are at a much finer resolution than currently shared spatial resolution, which is at a seamount scale.

11. An expert from the USA, Dr. Amy Baco-Taylor, gave a presentation via WebEx, reviewing the data available for defining the bottom contact fisheries footprint on the seamounts of the Northwestern Hawaiian Ridge and Emperor Chain (NPFC-2018-WS DATA01-WP05).

12. The participants discussed the findings from Dr. Amy Baco-Taylor's presentation based on Global Fishing Watch automatic identification system (AIS) data and 2014-2015 autonomous underwater vehicle (AUV) survey images (NPFC-2018-WS DATA01-WP05), and made the following points:
    (a) There are some significant data discrepancies between the fishing effort data presented and the effort data published by the NPFC. This could be due to the uncertainty and coverage of AIS data, and that the Global Fishing Watch does not distinguish between pelagic and benthic trawling. It is also possible that some vessels that are not registered as trawlers swap gear and conduct trawling and vice versa. Regardless, there is uncertainty around the Global Fishing Watch data and caution must be exercised when using such data.
    (b) The results of the study should be verified by examining the false positive rate of the habitat suitability models (Yesson et al. 2012, 2017) and would benefit from including the risk estimates for bycatch by different gear types.
    (c) The closure of seamounts to fishing, recommended by Dr. Amy Baco-Taylor as the precautionary approach, may make it difficult to assess SAI. Even if SAI can be assessed visually using AUV/submersible surveys, it may be difficult to determine SAI

by gear type. That said, if closed, exploratory fishing protocols could be followed. Cameras attached to fishing gear could be useful to assess gear specific potential for SAIs in potential areas to be fished.

(d) Members could use the framework presented by Dr. Amy Baco-Taylor to conduct further studies with their own data, upon clarifying the input and output uncertainties, and assessing the sensitivity of the results.

3.3 Other data

13. The Secretariat presented on Global Fishing Watch as a potential open-source tool for use in the future. Global Fishing Watch collects AIS data for all types of vessels, and estimates where and when vessels fish using its own algorithm. It is publicly available and free, and provides near real-time data with a three-day delay, since September 2016.

Agenda Item 4. Minimum data requirements and data resolution for combined SAI assessment

4.1 Review of other relevant VME indicator taxa, in addition to the four existing taxa, and taxonomic resolution for VME indicators

14. Canada presented information from emerging scientific findings on Northeast Pacific Seamounts that relate to other relevant taxa under consideration to be added to the existing four NPFC VME indicator taxa (NPFC-2018-WS DATA01-WP06). Emerging scientific findings show that hydrocorals (Stylasteridae) and sponges (Porifera) are present in and adjacent to the Convention Area, that according to other RFMOs and supported by local visual observations they meet all FAO VME criteria (uniqueness/rarity, functional significance, fragility, recovery difficulties, structural complexity), that the higher density clusters of sponges and corals are primarily single taxa dominated, that the different VME coral taxa, hydrocorals, and sponges are spatially separated by distinct biogeographic or depth distributions, and that evidence of the fragility and low catchability of these two taxa demonstrates the historic bias in using fisheries data in their assessment. Therefore identifying VMEs based on the existing NPFC indicator taxa list will expectedly miss protecting high-density aggregations of hydrocoral- and sponge-dominated VMEs in the Convention Area.

15. The participants discussed whether or not the current indicator taxa are sufficient for determining VMEs, and whether or not the practices of the NPFC in relation to VMEs in the Convention Area are consistent with that of other regional fisheries management organizations (RFMOs). The participants recommend SSC VME to continue working on answering the two questions with updated research from Members.

16. Russia commented that the most suitable resolution for VME indicator taxa is genus level, which can be easily utilized by observers and is suitable for detailed mapping and modeling.

4.2 Combined SAI assessment

17. The Co-Chairs presented a paper by Adron *et al.* on a systematic approach towards the identification and protection of VMEs (NPFC-2018-WS DATA01-IP02) for the participants' reference. Based on the 10-step framework in the paper, the Co-Chairs proposed that participants consider the status of steps 1-7 in the context of the NPFC. For each of these steps, participants should assess whether it has been previously addressed or if it needs to be addressed, re-addressed or reviewed, and if the latter is true, what data are required. Steps 8-10 were excluded as they were considered to be management issues.

18. The participants considered the usefulness of the 10-step framework, began the work proposed above and drafted a table of the results (Annex E).

19. Canada pointed out that a PICES working group has done predictive distribution modeling in the North Pacific Ocean. The modeling includes data on environmental variables and taxa, but is primarily in national waters and not in the NPFC Convention Area, although some modeling has been done for the entire North Pacific Ocean. Canada suggested that the NPFC could apply the same methodology for predictive distribution modeling in the Convention Area.

Agenda Item 5. Benthic habitat data wish list and data review

5.1 Bathymetry data

5.2 Review of scientific and fisheries independent survey data to conduct habitat mapping

5.3 Review of all other available data and potentially relevant information from inside and outside the Convention Area to conduct habitat mapping

5.4 Review of predictive models done by Members

20. The Secretariat presented a summary of open-source bathymetry data from Earthref.org that could be used for predictive VME distribution models for the Emperor Seamounts area (NPFC-2018-WS DATA01-IP04).

21. Canada presented a data wish list for an analysis of the tradeoffs between fishing and VME protection (NPFC-2018-WS DATA01-WP04). Canada is conducting a case study in an area that covers seamounts in national waters and the Convention Area, combining spatial modeling with trade-off analysis to maintain socio-economic benefits of the sablefish fishery while promoting the conservation of VMEs. Canada has compiled sablefish landing data and developed species distribution models for six VME indicator taxa, and is assessing trade-offs between fishing and VME protection using the decision support tool Marxan. Analyses could be improved with better VME species identification, more multibeam or backscatter data, improved species distribution models, model validation with visual surveys, location of fishing activity, improved accuracy of location and value of catches, development of species distribution models for commercial species, definition of quantities of catches needed from social and economic perspectives, and quantification of how much of VME areas should be protected.

22. The participants recognized that the study conducted by Canada is a good reference for considering a similar study in the Emperor Seamounts. However, the situation in the Emperor Seamounts is more complicated as fisheries are multi-gear, multispecies and multinational, and the distribution and stock status of some of the fished species are highly variable.

23. Japan recommended that Canada model Gorgonacea separately, rather than as part of Alcyonacea soft corals, as it is one of the specific VME indicator taxa of the NPFC. Canada agreed to conduct such a model as part of its sensitivity analyses.

5.5 Recommendation for future work (e.g., consolidation of data)

24. The Co-Chairs presented a draft table with a benthic habitat data wish list, potential predictive models and potential collaborators for the participants' consideration. The participants considered and revised the table (Annex F).

25. During the workshop, multiple predictive models were discussed, each with benefits and limitations. Discussion on validity focused on data source; taxa, spatial and temporal resolution; and uncertainty with model predictions and sensitivity analyses.

Agenda Item 6. Timely arrangement and aggregation of the bottom fisheries information in relation to the post-encounter requirements

26. The Co-Chairs presented an updated summary comparison of VME encounter protocols in bottom fish RFMO/As (NPFC-2018-WS DATA01-IP03) and highlighted some points in the NPFC VME encounter protocol requiring additional clarification and specification:
    (a) How quickly should an encounter be reported to avoid multiple damages to the encountered VME?
    (b) Is there a need to restrict the behavior of the fishing vessel that hit the encounter threshold after relocation from the encounter point?
    (c) Is there a need to restrict the behavior of other fishing vessels around the encounter location more explicitly?
    (d) Is there a need to introduce a protected area around the location where the encounter occurred as a precautionary measure?

27. The participants discussed the points raised by the Co-Chairs. They recommended that post-encounter reporting should be done as soon as possible.

28. The participants noted that Members should include post-encounter reporting in the Annual Report.

29. The SSC VME Chair and the Secretariat, in cooperation with Members, will prepare a draft post-encounter reporting scheme based on the practices of other RFMOs for consideration by the SSC VME Members.

Agenda Item 7. Scientific information collected from the monitoring survey

7.1 Recruitment period of North Pacific armorhead and location

7.2 Criteria for strong recruitment of North Pacific armorhead

30. The Co-Chairs summarized the monitoring survey plan for the detection of strong recruitment of North Pacific armorhead and the related sections of CMM 2018-05, highlighting points requiring further clarification or specification.

31. Japan presented a more detailed overview of the monitoring survey plan based on CMM 2018-05, Annex 6-1.

32. The participants discussed the monitoring survey plan and the related sections of CMM 2018-05. They noted that the following points require further clarification or specification:
    (a) How often/where/when must the criteria for strong recruitment of North Pacific armorhead be met? The participants' understanding was that the criteria should be met for four consecutive hauls for each of the monitoring blocks. As the hauls in each block must be conducted at least one week apart, a minimum of four weeks is needed to determine strong recruitment.
    (b) Which areas would be closed in the case of strong recruitment? The participants' understanding was that fishing Members have the right to determine which areas would be closed. In practice, the fishing Members are Japan and Korea and they will coordinate bilaterally and with the Secretariat to ensure that there are no gaps or inconsistencies in the areas they decide to close.
    (c) The CMM stipulates that bottom fishing with trawl gear shall be prohibited in specific areas in the Emperor Seamounts in the case of strong recruitment, but it does not explicitly prohibit other types of fishing or gear.
    (d) Which/how many vessels should conduct monitoring surveys in each monitoring block? The participants' understanding was that, from a feasibility standpoint, surveys

do not need to be conducted by multiple/different vessels.

(e) The monitoring survey is scheduled to start in March, while the fishing season starts in January. Would the timing of the monitoring survey change if the catch limits are reached before March? The participants pointed out the difficulties in controlling the catch limits due to the two-month delay of the monitoring surveys from the beginning of the fishing season. Japan explained that catches in the monitoring survey will not be included in the catch limit and that the monitoring survey would not be able to begin until March for practical reasons.

(f) Data reporting is to be done as soon as possible but "as soon as possible" should be defined more clearly. The participants' understanding was that, as surveys can be conducted as frequently as once a week, data reporting should be done within one week so that the sequence of the data being reported can be more easily understood.

33. The participants requested that Japan and Korea share the outcomes of their bilateral consultation and the potential proposed modifications to CMM 2018-05 with the Members in a transparent and timely manner, before the coming SSC BF meeting.

34. The participants encouraged the SSC BF to modify CMM 2018-05 based on the outcomes of the consultation between Japan and Korea, together with the Secretariat, and taking into account the points highlighted by the Data Workshop as requiring further clarification or specification.

35. The participants encouraged the SSC BF to continue to conduct research on the relationship between environmental conditions and recruitment levels for North Pacific armorhead.

Agenda Item 8. Bycatch data wish list and data review

8.1. Review of the data collection program

36. Russia presented data on bycatch of corals during Russian long-line fishing on the Emperor Seamounts in 2018 (NPFC-2018-WS DATA01-WP02).

37. Korea provided an overview of its scientific observer program and VME field guide. The VME field guide that was translated into English is now in review and will be submitted to the coming SC meeting. The Members recommended that the work to develop a common NPFC VME field guide should be continued.

8.2. Review of the flow of the observer reports

38. The participants reviewed the flow of the observer reports. There were no updates on the current reporting procedure through Member's annual report in the meta-data format whereas discussions are in progress toward the compilation of observer data for specific purposes such as combined SAI assessment.

8.3. Review of the data and measures needed for species identification guides

39. Japan presented two examples of the fish identification guides for scientific observers on Japanese vessels operating bottom fisheries in the Emperor Seamounts area (NPFC-2018-WS DATA01-IP05): (1) A pictorial guide for fish specimens collected by Japanese commercial vessels in the Emperor Seamounts with a specimen photograph and a brief description for each species and (2) Species identification of sharks and rays observed during tuna longline fisheries with illustrated keys.

8.4. Recommendation for future work

40. The participants recommended that each Member submit a list of all known bycatch taxa at

finest taxonomic resolution possible to the next SSC BF and SSC VME meetings to create a combined species inventory of regional bycatch.

41. The participants encouraged the SSC BF to develop an NPFC fish identification guide for scientific observers based on the guides presented by Japan. As part of this work, it may be useful to translate Japan's guides into each Member's language.

42. The Co-Chairs drew attention to SSC VME recommendations and discussions which support the objective of this workshop to aggregate data required for future combined SAI on VME assessments, which included: the recommendations to (i) continue work on standard regional bycatch identification guides for observers; (ii) consider conducting standardized training programs for observers with support from FAO (NPFC-2018-SSC VME03); (iii) consider creating standardized observer protocols for biological samples and scientifically informative photographs of VME indicator taxa (discussions at NPFC-2018-WS VME01); (iv) collect standardized scientific data on VME bycatch according to CMM 2018-05 and CMM 2017-06 and consolidate all available bycatch data to map VMEs and get more detailed information about interactions between VMEs and bottom fish (NPFC-2018-SSC VME03).

Agenda Item 9. Review of data availability against data requirements from the FAO DSF Guidelines

43. The participants reviewed and updated data availability and progress in VME protection in the NPFC against data requirements from the FAO DSF Guidelines (NPFC-2018-WS DATA01-WP01 (Rev. 1)).

Agenda Item 10. Data collection and sharing

10.1 Data collection template (type of data and spatial-temporal resolution)

44. The participants reviewed the NPFC bottom fisheries observer program standards: scientific component (Annex 5 of CMM 2018-05 and CMM 2017-06). They recommended that the SSC BF address the following points:
    (a) There is duplicative information in Section B, paragraph 2, subparagraph (v) and Section H, paragraph 2.
    (b) Section K, paragraph 4, subparagraph (a) requires the description of species by their FAO 3 letter species codes. However, some important species in the Emperor Seamounts do not have such letter species codes. It should be possible to describe such species by their name.
    (c) The language in Section F, paragraph 1, subparagraph (d) should be reconsidered. Specifically, "indeterminate" would be more appropriate than "immature" and "not examined" would be more appropriate than "unsexed."

45. Japan presented an updated proposal of a template for collecting scientific observer data from the NPFC bottom fisheries (NPFC-2018-WS DATA01-WP03).

46. The participants reviewed the template and suggested various revisions. Members agreed to continue to work on the template intersessionally and submit a revised proposal to the coming SSC BF meeting.

10.2 Data sharing protocols

47. The participants began work to develop an Interim Guidance for Management of Scientific Data (Annex G) and requested that the SSC VME and SSC BF consider the draft interim guidance and continue its development.

10.3 Central data repository

48. The Co-Chairs noted that the subject of the existing data repository fell outside the scope of the workshop. Therefore, discussions focused on resolution and availability of potential data for a central data repository.

49. The participants revised the drafted table for a potential combined bottom fisheries footprint and effort map (Annex D).

50. The Co-Chairs presented a draft template for recording existing taxa data for a potential combined VME map (Annex H). The participants agreed to continue developing the template intersessionally.

51. The Co-Chairs presented a draft template for recording existing multibeam data (Annex I). The participants agreed to continue developing the template intersessionally.

52. The Co-Chairs presented a draft template for recording existing predictive models (Annex F). The participants agreed to continue discussing the template intersessionally.

Agenda Item 11. Recommendations to the SSC VME and SSC BF

53. The workshop recommended the following to the SSC VME:
    (a) Review the draft list of potentially available data to better identify current and historical bottom fishing grounds in the Convention Area and fishing footprint and effort in relation to assessing SAI in the Convention Area (Annex D).
    (b) Identify appropriate temporal and spatial resolution of data to be shared in order to map a combined fishing footprint and effort to better identify fishing grounds.
    (c) Identify appropriate temporal and spatial resolution of data to be shared in order to define the fishing footprint in relation to assessing SAI.
    (d) Continue working on whether or not the current indicator taxa are sufficient for determining VME, and whether or not the practices of the NPFC in relation to VME in the Convention Area are consistent with that of other regional fisheries management organizations (RFMOs).
    (e) When consolidating available data and relevant information from inside and outside the Convention Area to map VMEs, consider the benefits and limitations of publicly available high-resolution fishing activity data and existing predictive species distribution models.
    (f) Review the summary table of the status of the NPFC's identification and protection of VMEs and data requirements (Annex E).
    (g) Consider using the summary of potential data, methods and collaborators for predictive models (Annex F).
    (h) For the Encounter protocol (CMM 2018-05, Paragraph 4G and CMM 2017-06, Paragraph 3j), require that encounters are reported to the Secretariat as soon as possible and requirement to report encounters is included in the Annex 4 of the CMMs.
    (i) Continue work on quick reporting protocol to avoid multiple impacts on the same VME site.
    (j) Continue the work to develop a common NPFC VME field guide.
    (k) Consider including standardized systematic sampling, such as photographs and biological sampling, where possible.
    (l) Consolidate all available VME bycatch data for combined mapping assessment.
    (m) Review updates and continue to revise the table of data availability and progress in VME protection in the NPFC against data requirements from the FAO DSF Guidelines

(NPFC-2018-WS DATA01-WP01 (Rev. 1)).

(n) Consider the revision of Interim Guidance for Management of Scientific Data (Annex G) and continue its development.

(o) Consider continuing to develop templates to summarize existing data potentially available on bottom fishing footprint and effort, taxa, multibeam and VME predictive modelling (Annex H, I).

54. The workshop recommended the following to the SSC BF:

(a) Revise CMM 2018-05 taking into account the points highlighted by the Data Workshop as requiring further clarification or specification and based on the outcomes of the consultation among Members.

(b) Continue to conduct research on the relationship between environmental conditions and recruitment levels for North Pacific armorhead to improve timely detection of the strength of recruitment.

(c) Develop a combined bycatch taxa list at finest taxonomic resolution possible based on the lists submitted by each Member.

(d) Develop a common NPFC fish identification guide for scientific observers based on the guides presented by Japan. As part of this work, it may be useful to translate Japan's guides into each Member's language.

(e) Modify Annex 5 of CMM 2018-05 and CMM 2017-06 to address the points raised by the Data Workshop (paragraph 44).

(f) Consider the draft Interim Guidance for Management of Scientific Data (Annex G) and continue its development.

Agenda Item 12. Adoption of the Report

55. The report was adopted by consensus.

Agenda Item 13. Close of Workshop

56. The workshop closed at 17:34 on 9 November 2018.

Annexes

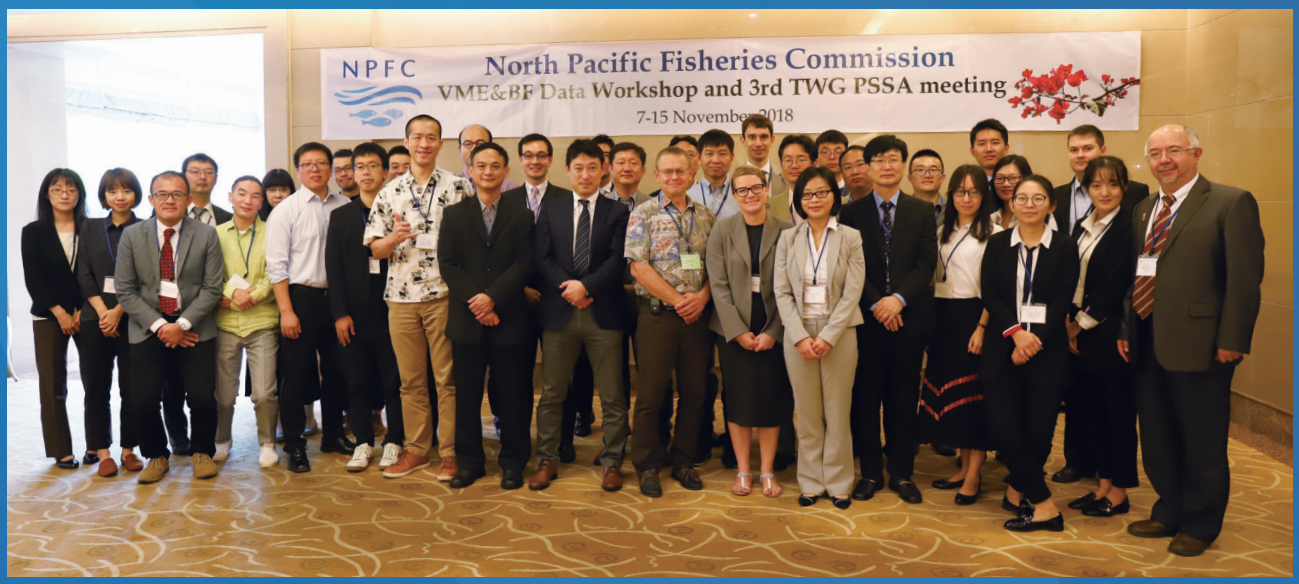
Annex A – Agenda
Annex B – List of Documents
Annex C – List of Participants
Annex D – Existing Data for Potential Combined Footprint and Effort Map of all Bottom Fisheries by Gear and Time
Annex E – Summary Table of the Status of the NPFC's Identification and Protection of VMEs and Data Requirements
Annex F – Potential Data to be Consolidated for Predictive Modeling, Potential Iterative Predictive Models and Potential Collaborators
Annex G – Revised Interim Guidance for Management of Scientific Data
Annex H – Existing Taxa Data for Combined Assessment
Annex I – Existing Multibeam Data for Combined Assessment

Please refer to the NPFC website for the complete annexes.

NPFC

3rd Meeting of the Technical Working Group on Pacific Saury Stock Assessment

12-15 November 2018
Xiamen, China
Meeting Report



Agenda

Agenda Item 1. Opening of the Meeting

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  - 5.2.1 Data security regulations
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Agenda item 6. Review of fishery-dependent and fishery-independent indices
- 6.1 Review of the existing CPUE Standardization Protocol
- 6.2 Review of data quality of abundance indices
- 6.3 Review any new/updated information on the indices
- 6.4 Finalization of abundance indices for updating BSSPM
- 6.5 Recommendations for future work

Agenda item 7. Work toward joint CPUE series
- 7.1 Review of the background of joint CPUE standardization
- 7.2 Review of available data
- 7.3 Review of progress on the intersessional work
- 7.4 Development of the Protocol for the joint CPUE standardization
  - 7.4.1 Data quality
  - 7.4.2 Statistical modelling and estimation
  - 7.4.3 Diagnostics
- 7.5 Toward finalization of single joint CPUE series
- 7.6 Conclusion and recommendations for future work

Agenda Item 8. Review and update of biological information/data

Agenda item 9. Toward update of the stock assessment using "provisional base models" (BSSPM)

9.1 Review of the existing model and stock assessment protocol

9.2 Finalization of specification of BSSPM

9.2.1 Common data set

9.2.2 Base and robustness cases of statistical and population dynamics models

9.2.3 Common output forms to provide management advice including risk analyses of alternative catch levels

9.3 Timeline toward the 4th TWG PSSA meeting

Agenda item 10. Other matters

10.1 Discussion of draft literature review of the TRPs and LRPs

Agenda Item 11. Recommendations to the Small Scientific Committee on Pacific Saury

Agenda Item 12. Adoption of Report

Agenda Item 13. Close of the Meeting

MEETING REPORT

Agenda Item 1. Opening of the Meeting

1. The 3rd Meeting of the Technical Working Group on Pacific Saury Stock Assessment (TWG PSSA) of the North Pacific Fisheries Commission (NPFC) took place in Xiamen, China on 12-15 November 2018, and was attended by Members from China, Japan, the Republic of Korea, the Russian Federation, Chinese Taipei, and Vanuatu. Dr. Larry Jacobson, an invited expert, also attended the meeting.

2. The meeting was opened by the TWG PSSA Chair, Dr. Toshihide Kitakado, who outlined the objectives and procedures for the meeting.

3. China sincerely welcomed the participants to Xiamen.

4. The Executive Secretary, Dr. Dae-Yeon Moon, reminded the TWG PSSA that at its fourth meeting, the Commission requested the Scientific Committee (SC) and the Small Scientific Committee on Pacific Saury (SSC PS) to work to provide consensus stock assessments for Pacific saury beginning in 2019 in order to advance efforts to ensure the sustainable management of the Pacific saury stock as described in the SC Work Plan. The Executive Secretary also thanked the United States for providing a voluntary contribution to support the stock assessment for Pacific saury.

Agenda Item 2. Adoption of Agenda

5. The participants discussed and revised Agenda Item 7 as follows: 7.1 Review of the background of joint CPUE standardization, 7.2 Review of available data, 7.3 Review of progress on the intersessional work, 7.4 Development of the Protocol for the joint CPUE standardization, 7.4.1 Data quality, 7.4.2 Statistical modelling and estimation, 7.4.3 Diagnostics, 7.5 Toward finalization of single joint CPUE series, and 7.6 Conclusion and recommendations for future

work.

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

Agenda Item 3. Overview of the outcomes of previous NPFC meetings relevant to Pacific saury

7. The Chair provided an overview of the outcomes relevant to Pacific saury from previous meetings of the TWG PSSA, SSC PS, SC, and the Commission. In particular, the Chair pointed out that the mandate of the current meeting of the TWG PSSA is to finalize the data set and specifications of the models for the updated stock assessment of Pacific saury.

8. The Secretariat provided an overview of CMM 2018-08, highlighting the task of the SC and SSC PS to provide the Commission with a consensus stock assessment result beginning in 2019 and scientific guidance necessary for the development of harvest control rules, as well as to submit to the Commission relevant scientific information on geographical distribution of juvenile fish in the Convention Area and migration patterns for the protection of juvenile fish.

9. The participants noted that Members need to further discuss and clarify the definition of juvenile fish.

Agenda Item 4. Review of the Terms of Reference of the TWG PSSA

10. The participants reviewed the Terms of Reference of the TWG PSSA and determined that no revisions are currently required.

Agenda Item 5. Review of fishery data and their availability

5.1 Catch series

5.1.1 Review of data quality of catch series

11. The Secretariat presented a summary of the discussions on data quality of catch series from the SSC PS03 meeting.

12. The participants identified differences between the monthly 1 degree by 1 degree grid data, and the total reported catch and effort data, and noted that there are still uncertainties with the data. The participants agreed to proceed with the stock assessment and preliminary joint CPUE standardization work using the available data, while recognizing that Members should continue to investigate data uncertainties and improve the quality of the data.

5.1.2 Review of progress on update/refinement of catch series

13. The Secretariat presented updated data on Pacific saury catches in the northwestern Pacific Ocean in 1950-2017 (NPFC-2018-TWG PSSA03-WP15 (Rev. 2)).

14. China reported that it has provided the NPFC with monthly 1 degree by 1 degree grid data which should be used to fill the gap in China's catch statistics for 2003-2011.

15. Japan explained that there are three possible sources of its catch data: Statistics Department (SD), Ministry of Agriculture, Forestry and Fisheries report; survey by fishing industry; and total allowable catch (TAC) system. The SD data and TAC data have the same coverage and there is negligible difference between them. The reporting of the industry data and TAC data is prompt, but the industry data has slight coverage gaps. The disadvantage of the SD data is the two-year reporting lag. Based on this, Japan recommended that SD data should continue to be used for the period up to and including 2016, but that TAC data should be used from 2017 onward for catch series.

16. Russia explained that, as was discussed at the SSC PS03 meeting, there are two sources of data, that reported from vessels to the Centre of Fishery Monitoring and Communication, and that reported by Russia to FAO. The FAO data are most accurate and should be used in the updated stock assessment. However, there is a discrepancy between the two data sources for 2017. This is currently being verified. For the time being, the 2017 data that Russia reported to the SSC PS03 meeting should be used.

17. Chinese Taipei reported that it has updated the catch amount for 2017 after cross-checking its e-logbook data and landing data.

18. China requested that, whenever a Member's data are updated intersessionally, the Secretariat should inform all Members of the update and clarify what specifically has been updated.

5.1.3 Finalization of catch series for updating BSSPM

19. The participants reviewed the catch series data and agreed to use the updated data listed in NPFC-2018-TWG PSSA03-WP15 (Rev. 2) and Annex D for the updated stock assessment.

5.1.4 Recommendations for future work

20. The participants recommended that Members continue to investigate data uncertainties and hold further discussions on this subject at future meetings of the TWG PSSA to improve the quality of the data.

5.2 Review of progress on the recommended work on data collection and data sharing

5.2.1 Data security regulations

21. The participants reviewed the Interim Guidance for Management of Scientific Data Used in Stock Assessments and determined that no revisions are currently required.

5.2.2 Data sharing

22. China, Japan, Korea, Russia, Chinese Taipei and Vanuatu shared data for a single joint CPUE index and joint map (NPFC-2018-TWG PSSA03-WP02 (Rev. 2), WP03, WP04, WP06a,b, WP08 (Rev. 1), WP12). The participants discussed the shared data under Agenda Item 7.

Agenda Item 6. Review of fishery-dependent and fishery-independent indices

6.1 Review of the existing CPUE Standardization Protocol

23. The participants reviewed the CPUE Standardization Protocol. They agreed to use the existing Protocol for the current stock assessment update. They also considered revising the Protocol to include coefficient-distribution-influence (CDI) analysis for each independent variable in the CPUE standardization in the future.

6.2 Review of data quality of abundance indices

24. The Secretariat presented a summary of the discussions on data quality of abundance indices from the SCC PS03 meeting. Participants reviewed the quality and updates of the abundance indices under Agenda Item 6.3.

6.3 Review any new/updated information on the indices

25. Japan presented the updated biomass estimate through Japanese fishery independent survey for Pacific saury in 2018 (NPFC-2018-TWG PSSA03-WP09 (Rev. 1)). Japan conducted surface-trawling surveys using the area-swept method and two research vessels. The surveys were conducted in June and July, in the North Pacific between 143^0 E and 165^0 W. Survey stations were placed every 4 degrees along the longitude line. Sea surface temperature (SST) was approximately 8-18 degrees Celsius. The estimated biomass was 2,346 thousand metric tons, a similar level to 2015 and 2016. The percentage of age-1 fish caught in the eastern portion of the survey area was relatively high compared to the western portion.

26. The participants reviewed and agreed to use the updated biomass estimate from the Japanese fishery independent survey for Pacific saury for the input of the stock assessment update.

27. Japan presented additional information regarding changes in the Japanese stick-held dip net fishery for Pacific saury, especially from 1980 to 1993 (NPFC-2018-TWG PSSA03-WP11).

New fishing equipment (sonar, side thruster, fish pump, and auxiliary electrical generator) was installed on vessels in this fishery from 1980 to 1993. This contributed to an increase in catchability from 1980 to 1993. However, comprehensive data that could be incorporated into CPUE standardization are not available. Therefore, Japan suggested using only the CPUE data from 1994 onwards for the base case scenario.

28. China requested that Japan make the monthly 1 degree by 1 degree grid CPUE data from 1980 to 1993 available to the Commission for the further improvement of the stock assessment work. Japan agreed to share the data among the members of the TWG PSSA.

29. Japan presented an update of the standardized CPUE of Pacific saury caught by its stick-held dip net fishery during 1994 to 2017 (NPFC-2018-TWG PSSA03-WP10).

30. The participants reviewed Japan's standardized CPUE data and determined that the data should be separated into two time series, one before 1994 (1980-1993) and one from 1994 onwards, due to the change in catchability between 1980 and 1993. They agreed to use both time series for the updated stock assessment. The standardized CPUE index for 1980-1993 is accessible on the webpage of the TWG PSSA02 meeting (NPFC-2017-TWG PSSA02-WP06).

31. China presented the standardization of CPUE data of Pacific saury caught by its stick-held dip net fishery (NPFC-2018-TWG PSSA03-WP05 (Rev. 1)).

32. The participants reviewed China's standardized CPUE data and noted that the Pacific saury fishery was a developing fishery before 2013 and then became a targeted fishery from 2013 onwards. The participants agreed to use the 2013-2017 time series data for the updated stock assessment.

33. Chinese Taipei presented the CPUE standardization of Pacific saury for its stick-held dip net fishery in the northwestern Pacific Ocean from 2001-2017 (NPFC-2018-TWG PSSA03-WP13 (Rev. 1)).

34. The participants reviewed and agreed to use Chinese Taipei's updated standardized CPUE data for the updated stock assessment.

35. Russia presented the CPUE standardization for its Pacific saury catches in the northwestern Pacific Ocean (NPFC-2018-SSC PS03-WP08) and for all Pacific saury catches in the Russian EEZ in the northwestern Pacific Ocean (NPFC-2018-SSC PS03-WP09).

36. Russia recommended that, for the updated stock assessment, Members should use the standardized CPUE data for Russian catches in the northwestern Pacific Ocean rather than for all Pacific saury catches in the Russian EEZ, to avoid double-counting other Members' catches. The participants reviewed Russia's recommendation and agreed to use the standardized CPUE data for Russian catches only in the northwestern Pacific Ocean.

37. Korea presented information about the status of its CPUE standardization for its Pacific saury catches in the northwestern Pacific Ocean for Members' reference.

38. As Korea's updated CPUE standardization work is still ongoing, the participants agreed to use the standardized CPUE data up to 2016 that Korea previously submitted to the SSC PS03 meeting (NPFC-2018-SSC PS03-WP07). Korea agreed to continue to work on its CPUE standardization and present the updated data by the next update of the stock assessment.

39. Vanuatu presented the nominal CPUE data for its Pacific saury catches in the northwestern Pacific Ocean.

40. The participants reviewed Vanuatu's nominal CPUE data. They agreed that, given the number of vessels and spatial coverage, it would be prudent not to include the data in the current stock assessment update, but it may be possible to include them in future stock assessment updates.

6.4 Finalization of abundance indices for updating BSSPM

41. The finalized table of abundance indices is attached to the report as Annex D.

6.5 Recommendations for future work

42. The participants suggested that Japan might incorporate age truncation to calculate the relative biomass, rather than the absolute biomass, for consistency with the catch data.

43. The participants recognized the importance of Japan's biomass survey and recommended that this work be continued and, if possible, augmented.

44. It was agreed that Japan should continue to further evaluate the uncertainty in the estimated catchability coefficient for Japan's biomass survey.

45. The Japanese survey is now recognized as a primary and very important part of the assessment. The TWG PSSA encouraged Japan to continue the survey and explore enhancements.

46. Russia highlighted the importance of area-swept surveys for biomass assessment of marine living resources, in particular, pelagic fish species, such as Pacific saury, and informed the participants that Russian research vessels conduct regular pelagic surveys in the northwestern Pacific Ocean in summer. The possibility of the use of data from these surveys for the purpose of Pacific saury stock assessment could be further explored.

47. Japan agreed to further investigate and clarify the cause of the spike in the AIC value in its GAM model to better understand and improve its CPUE data.

48. China agreed to further investigate its CPUE data for standardization from 2003 to 2012, in addition to the data from 2013 onwards.

49. The participants encouraged Chinese Taipei to explore the cross-validation of CPUE prediction.

50. Korea agreed to continue collaborating with other Members to improve the quality of its CPUE standardization for future stock assessments.

51. The participants agreed to establish a small working group (SWG) to share, review and finalize the common R script for GLM and GAM by the next TWG PSSA meeting. The participants recommended the SSC PS to provide the SWG with a secure working space on the web such as GitHub or a new tool for code reviewing under the NPFC Collaboration website.

Agenda Item 7. Work toward joint CPUE series

7.1 Review of the background of joint CPUE standardization

52. The participants reviewed the background of the joint CPUE standardization and recognized that joint CPUE standardization would enable the calculation of the CPUE with higher spatial and temporal coverage. They also considered the possibility of developing multiple joint CPUE series in addition to the single joint CPUE index adopted by the SC.

53. China presented a summary of important points to consider in conducting joint CPUE standardization, including different measures of effort, environmental variables, scenarios for combining CPUEs, and models. China also raised further points that could be considered, including cluster analysis, catchability of vessels, vessel-year interaction and data coverage. China noted that the data coverage for CPUE standardization for some Members changes over time, which may confound interpretation of the CPUE trend.

7.2 Review of available data

54. The participants reviewed the available Pacific saury data shared in accordance with the template (NPFC-2018-TWG PSSA03-WP01).

7.3 Review of progress on the intersessional work

55. Russia presented a preliminary analysis of the generalized additive models (GAMs) using the Gamma and Tweedie distributions for selected GAMs and shared a formatted with markdown R code at the NPFC collaboration website for reproducing the results, further refactoring and improvements of common R script or markdown notebook.

56. Japan presented a preliminary analysis of the GAMs by log normal distribution.

57. Japan presented a preliminary analysis of the generalized linear models (GLMs) by log normal distribution and gamma distribution.

58. The participants noted that some preliminary results from the four different configurations are similar with the nominal CPUE, suggesting that the models are robust or could possibly be simplified.

59. Chinese Taipei presented a preliminary evaluation of the spatio-temporal distributions and abundance index of the Members' aggregated monthly 1 degree by 1 degree grid data using geostatistical delta-generalized mixed models.

60. China presented a preliminary analysis of three scenarios for joint CPUE standardization: (1) One combined CPUE; (2) CPUE for exclusive economic zones vs. CPUE for Convention Area; and (3) CPUE by operation days vs. CPUE by net haul.

61. China presented a preliminary analysis of CPUE standardization with consideration of spatial autocorrelation by spatial-GLM.

7.4 Development of the Protocol for the joint CPUE standardization

62. Due to time constraints, the participants were unable to develop a finalized Protocol for the joint CPUE standardization and instead developed preliminary specifications and a plan for the joint CPUE standardization (Annex E).

7.5 Toward finalization of single joint CPUE series

63. As a first step, the participants agreed to conduct an initial single joint CPUE standardization

according to the preliminary specifications, share their initial results through the Collaboration website by 20 January 2019, and submit working papers on their initial joint CPUE standardization results to the next TWG PSSA meeting by 6 February 2019. To facilitate this work, the TWG PSSA tasked the Secretariat to prepare SST, sea surface temperature gradient (SSTG) and sea surface height (SSH) data by the end of November 2018.

7.6 Conclusion and recommendations for future work

64. The participants agreed to continue working on the development and finalization of the single joint CPUE index for use in the next stock assessment.

65. The participants considered incorporating environmental variables for improvement of the joint CPUE analysis.

66. The participants requested that the Secretariat prepare and regularly update the following data sets which should be uploaded on the NPFC website for Members for quick access: monthly SST, monthly SSTG, monthly SSH by 1 degree by 1 degree grid.

67. The participants considered the possibility of calculating a joint nominal CPUE as a trial. The participants agreed that such work could be done as a voluntary exercise by interested Members and not as a sensitivity analysis in the stock assessment report.

Agenda Item 8. Review and update of biological information/data

68. No reviews or updates of biological information/data were presented, and the participants agreed to defer discussions to future meetings of the TWG PSSA.

Agenda Item 9. Toward update of the stock assessment using "provisional base models" (BSSPM)

9.1 Review of the existing model and stock assessment protocol

69. The participants agreed to continue to use the existing model and stock assessment protocol.

9.2 Finalization of specification of BSSPM

9.2.1 Common data set

9.2.2 Base and robustness cases of statistical and population dynamics models

70. The participants reviewed the BSSPM specifications and agreed on a common data set for catch, abundance indices, and six base and six sensitivity cases. The finalized BSSPM specification is attached to the report as Annex F.

9.2.3 Common output forms to provide management advice including risk analyses of alternative catch levels

71. Chinese Taipei presented possible ways to summarize the outcomes of the stock assessment. The participants discussed the possibilities and finalized a template for the presentation of stock assessment results, stock status information and future projection (Annex G).

72. The participants agreed that the six base cases will be given equal weight.

73. The participants agreed that stock assessment working papers must include 12 scenarios (six base cases and six sensitivity cases) and may include models fit to nominal joint CPUE. Such models are for exploration only and will not be used as sensitivity analyses in this assessment.

9.3 Timeline toward the 4th TWG PSSA meeting

74. Stock assessment working papers must be complete with all six base case models and six sensitivity models, and must be submitted no later than 20 February. Incomplete papers and papers submitted after the deadline will be treated as information papers. Based on established NPFC Document Rules, information papers may or not be reviewed depending on consensus among the Members. Papers should not be revised after submission unless requested by the TWG PSSA.

75. In discussion of this procedural issue, the TWG PSSA recommended that the SC draft rules to address submission, revision and treatment of scientific papers before and during meetings, and submit the rules to the Commission for consideration.

Agenda Item 10. Other matters

76. Given the importance of the Japanese survey, it may be desirable to utilize scientists from other Members during the survey as scientific crew. Japan agreed to explore this idea.

77. Participants recognized the contribution by invited expert in facilitating the work of the TWG PSSA and agreed to invite Dr. Larry Jacobson to also attend the TWG PSSA04 meeting in March 2019.

10.1 Discussion of draft literature review of the TRPs and LRPs

78. Due to time constraints, the participants were unable to discuss the ongoing review of target and limit reference points prepared by the consultant, Dr. Laurence Kell (NPFC-2018-TWG PSSA03-WP14 (Rev. 1)). The participants agreed to assess the ongoing review intersessionally, and submit any comments and suggestions by the end of November 2018.

Agenda Item 11. Recommendations to the Small Scientific Committee on Pacific Saury

79. The TWG PSSA will continue working to update the BSSPM and, based on the outcomes of this work, will provide recommendations on the status of Pacific saury and scientific advice for management of Pacific saury stock to the SSC PS at the TWG PSSA04 meeting in March 2019. Regarding the matters other than the BSSPM, the TWG PSSA recommended the following to the SSC PS:
    (a) Continue developing a single joint CPUE index to resolve different patterns in standardized indices among Members and to enable the calculation of the CPUE with higher spatial and temporal coverage;
    (b) Update the shared data for a single joint CPUE index for future stock assessment; and
    (c) Provide the TWG PSSA with a secure space for collaborative work, such as GitHub.

Agenda Item 12. Adoption of the Report

80. The report was adopted by consensus.

Agenda Item 13. Close of Meeting

81. The meeting closed at 18:05 on 15 November 2018.

82. The Chair thanked the participants for their hard work and cooperation, China for hosting the meeting, Dr. Jacobson for his advice and the Secretariat for facilitating the meeting. The participants thanked the Chair for his guidance.

Annexes

Annex A – Agenda
Annex B – List of Documents
Annex C – List of Participants
Annex D – Updated total catch, CPUE standardizations and biomass estimates for the stock assessment of Pacific saury
Annex E – Preliminary specifications and plan for the single joint CPUE standardization
Annex F – Specifications of the BSSPM for the updated stock assessment
Annex G – Template for stock status information and future projection

Please refer to the NPFC website for the complete annexes.

NPFC

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

28 February-02 March 2019

Yokohama, Japan

Meeting Report

Agenda

Agenda Item 1. Opening of the meeting

Agenda Item 2. Adoption of Agenda

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

- 3.1 3rd SC meeting and 4th Commission meeting
- 3.2 Skype meeting of the SWG OM CMSA and intersessional work

Agenda Item 4. Review of Member's fisheries and research activities

Agenda Item 5. Review and evaluation of fishery-dependent and fishery-independent data available for stock assessment

- 5.1 Review of catch data availability and quality
- 5.2 Review of length and age data availability and quality
- 5.3 Data collection templates
- 5.4 Data sharing

Agenda Item 6. Review and evaluation of fishery-dependent and fishery-independent indices

- 6.1 Review of the existing CPUE Standardization Protocol
- 6.2 Quality of the indices
- 6.3 Recommendations for future work

Agenda Item 7. Stock assessment of chub mackerel

- 7.1 Review of the existing Stock Assessment Protocol
- 7.2 Progress on the development of operating model
  - 7.2.1 Protocol of the Operating Model Development
  - 7.2.2 Type(s) of operating model and its performance measures
  - 7.2.3 Framework and structure of operation model
  - 7.2.4 Towards development and conditioning of operating model
- 7.3 Recommendations for future work

Agenda Item 8. Review of the Terms of Reference and Work Plan of the TWG CMSA

Agenda Item 9. Other matters

9.1 Observer Program

9.2 Selection of TWG CMSA Chair

9.3 Next TWG CMSA meeting

9.4 Other matters

Agenda Item 10. Recommendations to the Scientific Committee

Agenda Item 11. Adoption of Report

Agenda Item 12. Close of the Meeting

MEETING REPORT

Agenda Item 1. Opening of the Meeting

1. The 2nd Meeting of the Technical Working Group on Chub Mackerel Stock Assessment (TWG CMSA) of the North Pacific Fisheries Commission (NPFC) took place in Yokohama, Japan on 28 February-2 March 2019, and was attended by Members from Canada, China, Japan, and the Russian Federation. The European Union attended as an observer.

2. The meeting was opened by the TWG CMSA Chair, Dr. Oleg Katugin, who outlined the objectives and procedures for the meeting.

3. Japan welcomed the participants to Yokohama, highlighted that chub mackerel is an important species for the NPFC, and expressed the hope that the participants would make good progress towards completing the chub mackerel stock assessment.

Agenda Item 2. Adoption of Agenda

4. The Agenda was adopted without revision (Annex A). The List of Documents and Participants List are attached (Annexes B, C).

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

3.1 3rd SC meeting and 4th Commission meeting

5. The Science Manager explained that the 3rd Scientific Committee (SC) meeting and 4th Commission meeting adopted the recommendations made by the TWG CMSA01.

6. The Science Manager provided an overview of CMM 2018-07 for Chub Mackerel.

3.2 Skype meeting of the SWG OM CMSA and intersessional work

7. The Science Manager provided an overview of the outcomes of the skype meeting of the Small Working Group on Operating Model for Chub Mackerel Stock Assessment (SWG OM CMSA).

8. The Science Manager explained that an informal, face-to-face meeting of the SWG OM CMSA was held and that the outcomes of the meeting would be presented under Agenda Item 7.2.

Agenda Item 4. Review of Member's fisheries and research activities

9. Russia gave a presentation on its fisheries for chub mackerel in 2018 (NPFC-2019-TWG CMSA02-WP05). Russia resumed its chub mackerel fisheries in 2015. Total catch by Russian vessels almost doubled from 2017 to 2018. Russia suggested that this is likely due to the increased abundance of chub mackerel. Russia is collecting size distribution data and found that the dominant length is 30-34 cm.

10. China presented an update on its fishery and research activities (NPFC-2019-TWG CMSA02-IP04). China resumed its chub mackerel fisheries in 2014. From 2015-2018, fishing effort has been stable, with a decrease after 2016. Based on the observation of increasing CPUE in recent years, China suggested that the chub mackerel stock is gradually recovering. China is collecting size and age distribution data, and has found that the dominant length is 19-32 cm and that the age structure of chub mackerel in the high seas is dominant from 1 year to 3 years.

11. Japan presented an update on its fishery and research activities (NPFC-2019-TWG CMSA02-IP05). Japan has been collecting size and age distribution data for its domestic stock assessment since the 1970s, from which it has estimated catch-at-age data. In 2014-2016, fish from the 2013 year-class (a very strong year-class) accounted for most of the catch. In 2017, fish from the 2013 year-class accounted for half of the catch. For abundance indices, Japan is conducting four fisheries-independent surveys (spring/summer/autumn recruitment surveys and year-round egg survey) and one fisheries-dependent survey (dip-net fishery). Based on biological studies, Japan has found that growth of chub mackerel has been reduced since 2014 and that maturity has been delayed since 2013. The reduced growth and delayed maturity rates can be partially explained by a density-dependent effect, but they are likely also affected by other factors.

Agenda Item 5. Review and evaluation of fishery-dependent and fishery-independent data available for stock assessment

5.1 Review of catch data availability and quality

5.2 Review of length and age data availability and quality

12. The participants reviewed and updated catch data availability, and length and age data availability (Annex D).

13. Regarding data quality, the participants agreed to conduct a simple review before starting the

operating model work, and to submit descriptions of their data to and conduct a more thorough review at the next TWG CMSA meeting.

5.3 Data collection templates

14. The participants agreed to defer discussions on the data collection templates until Agenda Item 7, as it would be more appropriate to discuss them after deciding on the type of operating model to be used for the stock assessment.

5.4 Data sharing

15. The participants agreed that discussions on data sharing should be held in conjunction with discussions on the data collection templates, and therefore agreed to defer discussions until Agenda Item 7.

Agenda Item 6. Review and evaluation of fishery-dependent and fishery-independent indices

6.1 Review of the existing CPUE Standardization Protocol

16. The participants reviewed the CPUE Standardization Protocol and determined that no revisions are currently necessary.

6.2 Quality of the indices

17. Japan presented a standardized abundance index for spawning stock biomass of chub mackerel in the Northwest Pacific based on historical monthly egg survey data using a Vector Autoregressive Spatio-Temporal (VAST) model (NPFC-2019-TWG CMSA02-WP03 (Rev. 1)). Japan found that the yearly patterns of its nominal CPUE and the standardized CPUE were similar. It also found that, although the effects of sea-surface temperature (SST) were small, the best model includes the effects of SST. Furthermore, Japan found that estimated egg density is always high along Japan's Pacific coast. Japan considered its approach for standardization to be reasonable, and the diagnostics it has run did not show any serious violation of model assumptions. Japan suggested that one reason for the small effect of SST may be a mismatch between the temporal scales of SST in the model and that of the biological phenomenon. Japan will examine this further.

6.3 Recommendations for future work

18. The participants agreed to use the abundance indices derived from Japan's summer recruitment survey, autumn recruitment survey, and dip-net fishery as candidate indices.

19. Japan explained that the indices from its summer and autumn recruitment surveys are more representative than that from its spring recruitment survey, as the fish in spring are still small and susceptible to instantaneous natural mortality. Japan said that it will explore the possibility

of using the abundance index derived from the spring recruitment survey.

20. The participants agreed to use the abundance index derived from Russia's historical chub mackerel fisheries as a candidate index.

21. The participants agreed to explore the possibility of using an abundance index derived from Russia's resumed chub mackerel fisheries as a candidate index.

22. The participants agreed to explore the possibility of using an abundance index derived from China's chub mackerel fisheries as a candidate index.

23. The participants agreed to explore the possibility of using an abundance index derived from Japan's purse seine fishery as a candidate index. The participants noted the importance of this fishery but also recognized the difficulty of deriving a reliable CPUE from it.

Agenda Item 7. Stock assessment of chub mackerel

24. Japan presented a range of estimates of natural mortality rate (M) for chub mackerel in the North Pacific Ocean (NPFC-2019-TWG CMSA02-WP01 (Rev. 2)). Japan suggested that the median M value of 0.41 be used for the reference case in future stock assessments and for operating models, and that 0.3 and 0.5 be used for sensitivity analysis/robustness tests because most estimates fall in values between 0.3 and 0.5.

25. The TWG CMSA considered the possibility to use three reference cases for natural mortality for operating models: the median value for M, the mean value for M, and age-specific mortality from the working paper presented by Japan (NPFC-2019-TWG CMSA02-WP01 (Rev. 2)).

26. Japan presented a preliminary analysis of state-space stock assessment model (SAM) for the chub mackerel in the Northwest Pacific as an alternative to virtual population analysis (VPA), Japan's longstanding domestic stock assessment model for Pacific chub mackerel (NPFC-2019-TWG CMSA02-WP02). Based on the analysis, Japan proposed using SAM as a candidate stock assessment model for chub mackerel, to be tested using the NPFC's operating model.

27. The participants agreed to Japan's proposal. Taking into account the decision of the TWG CMSA01 meeting, the participants agreed to test the following five stock assessment models using the operating model: a SAM model, a VPA model, an age-structured assessment program (ASAP) model, a cohort analysis with Kalman filter (KAFKA) model, and a state-space production model.

7.1 Review of the existing Stock Assessment Protocol

28. The participants reviewed the Stock Assessment Protocol and determined that no revisions are currently necessary.

7.2 Progress on the development of operating model

29. SWG OM CMSA presented a draft summary of the outcomes of its informal meeting held on 27 February 2019. The SWG reported that it had reviewed some existing models and tools for data simulation (NPFC-2019-TWG CMSA02-IP01 (Rev. 1), 02 and 03) and discussed the structure of the operating model to be used for testing stock assessment models for chub mackerel.

7.2.1 Protocol of the Operating Model Development

30. The participants reviewed the draft Protocol of the Operating Model Development prepared by the SWG OM CMSA (NPFC-2019-TWG CMSA02-WP06) and adopted it (Annex E).

7.2.2 Type(s) of operating model and its performance measures

7.2.3 Framework and structure of operation model

31. The participants agreed to use Population Simulator (PopSim) as the platform for the operating model and drafted a flowchart for the development of the operating model. The flowchart is attached to the TWG CMSA Work Plan.

32. The participants noted that the basic operating model has no spatial structure and agreed that they will consider spatially-structured models as future work.

33. The participants agreed that the operating model has an age-based structure rather than length-based structure according to the availability of the existing data, and that the starting year of operating model is 1970 since age-specific data (e.g., catch-at-age) are available from 1970.

7.2.4 Towards development and conditioning of operating model

34. The participants discussed and compiled a list of possible and compulsory performance measures for evaluating the candidate stock assessment models (Annex F).

35. The participants discussed data required for the operating model. The participants agreed on the list of data to be shared in order to estimate parameters for the operating model using the candidate stock assessment models (Annex G).

36. The participants proposed that the TWG CMSA should seek an external expert to support the development of the operating model and invite him/her to attend the next TWG CMSA meeting.

7.3 Recommendations for future work

37. Recommendations for future work are as described in the flowchart for the development of the operating model and the updated TWG CMSA Work Plan (Annex H).

Agenda Item 8. Review of the Terms of Reference and Work Plan of the TWG CMSA

38. The participants reviewed the Terms of Reference and determined that no revisions are currently necessary.

39. The participants reviewed and updated the Work Plan of the TWG CMSA (Annex H).

Agenda Item 9. Other matters

9.1 Observer Program

40. The Science Manager provided an overview of the plans to establish an NPFC Observer Program and explained that it could collect scientific data needed for the chub mackerel stock assessment. The participants agreed to discuss which scientific data should be collected by the NPFC Observer Program for chub mackerel at the next TWG CMSA meeting, when data requirements will be clearer.

9.2 Selection of TWG CMSA Chair

41. The participants agreed to extend the term of the current Chair, Dr. Oleg Katugin, for two more years.

9.3 Next TWG CMSA meeting

42. The TWG CMSA proposed that the next TWG CMSA meeting should be held at the end of 2019 or in early 2020, and if necessary SWG OM CMSA will meet informally prior to TWG CMSA03.

9.4 Other matters

43. No other matters were discussed.

Agenda Item 10. Recommendations to the Scientific Committee

44. The TWG CMSA recommended the following to the SC:
    (a) The TWG CMSA agreed to use abundance indices derived from Japan's summer recruitment survey, autumn recruitment survey, and dip-net fishery, as well as Russia's historical chub mackerel fisheries as candidate indices.
    (b) The TWG CMSA agreed to explore the possibility of using abundance indices derived

from Japan's spring recruitment survey, Russia's resumed chub mackerel fisheries, China's chub mackerel fisheries, and Japan's purse seine fishery as candidate indices.

(c) The TWG CMSA agreed to further discuss using three reference cases for natural mortality for operating models: the median value for M, the mean value for M, and age-specific mortality from NPFC-2019-TWG CMSA02-WP01 (Rev. 2).

(d) The TWG CMSA agreed to test the following five stock assessment models using the operating model: a SAM model, a VPA model, an ASAP model, a KAFKA model, and a state-space production model.

(e) The TWG CMSA recommended that the SC endorse the Protocol of the Operating Model Development (Annex E).

(f) The TWG CMSA agreed to use PopSim as the platform for the operating model.

(g) The TWG CMSA agreed that the basic operating model has no spatial structure and agreed to consider spatially-structured models as future work.

(h) The TWG CMSA agreed that the operating model has an age-based structure rather than length-based structure according to the availability of the existing data, and that the starting year of operating model is 1970.

(i) The TWG CMSA agreed on the list of possible and compulsory performance measures for evaluating the candidate stock assessment models (Annex F).

(j) The TWG CMSA agreed to share data to estimate parameters for the operating model using the candidate stock assessment models (Annex G).

(k) The TWG CMSA recommended that the SC endorse the TWG CMSA's proposal of seeking an external expert to support the development of the operating model and inviting him/her to attend the next TWG CMSA meeting.

(l) The TWG CMSA recommended that the SC endorse the updated TWG CMSA Work Plan (Annex H).

(m) The TWG CMSA agreed to extend the term of the current Chair, Dr. Oleg Katugin, for two more years.

(n) The TWG CMSA recommended that the next TWG CMSA meeting should be held at the end of 2019 or in early 2020, and if necessary SWG OM CMSA will meet informally prior to TWG CMSA03.

Agenda Item 11. Adoption of the Report

45. The report was adopted by consensus.

Agenda Item 12. Close of the Meeting

46. The meeting closed at 17:22 on 2 March 2019.

Annexes

Annex A – Agenda
Annex B – List of Documents
Annex C – List of Participants
Annex D – Potentially available data for chub mackerel stock assessment
Annex E – Protocol of the Operating Model Development
Annex F – Performance measures for evaluating stock assessment models
Annex G – Data requirements for candidate stock assessment models and available data to be shared to estimate parameters for the operating model using the stock assessment models
Annex H – TWG CMSA Work Plan, 2017-2021

Please refer to the NPFC website for the complete annexes.

NPFC

Biological Reference Point/ Harvest Control Rule/ Management Strategy Evaluation Workshop

04-05 March 2019
Yokohama, Japan
Workshop Report

Agenda

Agenda Item 1. Opening of the Workshop

Agenda Item 2. Adoption of Agenda

Agenda Item 3. Basic information about NPFC priority species

Agenda Item 4. Review of the general concept and best practices of BRP, HCR and MSE

Agenda Item 5. Overview of the outcomes of literature reviews on BRPs and HCRs that have been applied to small pelagic fish stock management

Agenda Item 6. Potential directions on application of BRPs, HCR and MSE to the management of NPFC priority species

Agenda Item 7. Recommendations to the SC and its subsidiary bodies

Agenda Item 8. Adoption of the Report

Agenda Item 9. Close of the Workshop

WORKSHOP REPORT

Agenda Item 1. Opening of the Workshop

1. The Biological Reference Point/Harvest Control Rule/Management Strategy Evaluation Workshop (WS BRP_HCR_MSE) of the North Pacific Fisheries Commission (NPFC) took place in Yokohama, Japan on 4-5 March 2019, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, and Chinese Taipei. Dr. Doug Butterworth, Mr. Patrick Cordue and Dr. Laurence Kell also attended the workshop as invited experts.

2. The workshop was opened by the WS BRP_HCR_MSE Chair, Mr. Luoliang Xu, who outlined the objectives and procedures for the workshop.

3. Japan extended its sincere welcome to all the participants to Yokohama and emphasized the importance of the workshop to the work of the NPFC.

4. The Executive Secretary, Dr. Dae-Yeon Moon, explained that the purpose of the WS BRP_HCR_MSE is to consider potential directions on the application of the biological reference points (BRPs), harvest control rules (HCR) and management strategy evaluation (MSE) for the NPFC priority species, and to provide recommendations to the Scientific Committee (SC). The Executive Secretary also thanked the United States, on behalf of the NPFC, for providing voluntary contribution for funding the participation of the invited experts.

5. The Chair presented an overview of the Terms of Reference for the Workshop and explained the expected outputs.

Agenda Item 2. Adoption of Agenda

6. The participants agreed to add an agenda item entitled “basic information about NPFC priority

species" between "Adoption of the Agenda" and "Review of the general concept and best practices of BRP, HCR and MSE."

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

Agenda Item 3. Basic information about NPFC priority species

8. The Chair of the Small Scientific Committee on Pacific Saury (SSC PS), Dr. Toshihide Iwasaki, presented the biological and fisheries-related information used for the Pacific saury stock assessment, and explained the current stock assessment work being done by the NPFC.

9. The Chair presented the biological and fisheries-related information available for chub mackerel and explained the relevant stock assessment work being done by the NPFC.

10. Science Manager, Dr. Aleksandr Zavolokin, presented a list of data available for stock assessment of Pacific saury and chub mackerel.

11. Dr. Butterworth pointed out the importance of recruitment variability in short-lived pelagic species such as Pacific saury, as a poor incoming year-class poses a significant risk for the health of the overall stock of such a species. Being able to identify poor recruitment is important for implementing appropriate management measures. Length composition data can help identify the strength of the incoming year-class.

Agenda Item 4. Review of the general concept and best practices of BRP, HCR and MSE

12. Dr. Butterworth gave a presentation on quantifying resource risk for highly variable species in MSE and measuring risk consistently for fisheries on small pelagics (NPFC-2019-WS BRP_HCR_MSE01-WP09). He argued that pristine biomass (B_0) is not always well estimated for short-lived and highly variable stocks, such as small pelagic species, and B_0-based reference points should not be used for such species. Dr. Butterworth also used the example of the management of South African sardine to explain the difficulties in defining a level of acceptable risk, due to the variability of estimates of B_0, recruitment and natural mortality.

13. Dr. Kell presented a review of target and limit reference points used in pelagic species fisheries by other regional fisheries management organizations (RFMOs) and fishery management bodies (NPFC-2019-WS BRP_HCR_MSE01-WP08 (Rev. 1)). Dr. Kell pointed out the importance of tailoring reference points to life history characteristics such as growth and maturity and also to variability in recruitment; understanding the weaknesses and uncertainties inherent in reference points; and testing the robustness of reference points for fishing mortality

and spawning stock biomass.

14. Dr. Butterworth presented the pros and cons of best assessment versus management procedure (MP) based management (NPFC-2019-WS BRP_HCR_MSE01-WP05). MP-based approaches can reduce lengthy negotiations and free up time for longer-term research, enable better evaluation of risk, provide a sound basis to impose limits on TAC variability, are consistent with the Precautionary Principle, and provide a framework for interactions with stakeholders. In practice, there is growing acceptance for them when they have been applied. However, there has been a greater frequency of recourse to exceptional circumstances and MP revisions than was originally foreseen. Furthermore, the MSE processes are lengthy, resulting in less time saved than originally envisioned. It may also be difficult to explain MPs to stakeholders and convince stakeholders of their value initially.

15. Dr. Butterworth gave a presentation on what makes an MP an MP and an MSE an MSE (NPFC-2019-WS BRP_HCR_MSE01-WP03). He explained that an MSE is an approach that can be used to evaluate management strategies that are well specified and implementable in reality, while an MP is a fully-specified management strategy. Furthermore, the more incompletely the management strategy is specified, the more complex the evaluation process will be.

16. Following a query from the invited experts, Chinese Taipei provided a more detailed explanation of the Pacific saury stock assessment work done by the NPFC to date, including comparison of CPUE indices, stock assessment results and some issues to be addressed to move forward.

17. Mr. Cordue presented a case study on orange roughy, covering stock assessment, reference points, HCR and MSE (NPFC-2019-WS BRP_HCR_MSE01-WP02). Based on the case study, he argued that excellent stock assessment and MSE are not mutually exclusive, and advised having the best possible stock assessment and also conducting an MSE in order to determine an MP. Mr. Cordue pointed out that MPs based on accurate stock assessments will most likely perform much better than those based on inaccurate assessments. Lastly, he emphasized that accurate stock assessment requires a defensible model using defensible data and assumptions.

18. Dr. Butterworth presented a case study on South African hake (NPFC-2019-WS BRP_HCR_MSE01-WP06). While recognizing that the case of South African hake differed greatly from that of Pacific saury or chub mackerel, he used the case study to illustrate in concrete terms how MPs can be implemented successfully.

Agenda Item 5. Overview of the outcomes of literature reviews on BRPs and HCRs that have been applied to small pelagic fish stock management

19. Dr. Kell presented a review of HCR and MSE used in pelagic species fisheries by other RFMOs and fishery management bodies (NPFC-2019-WS BRP_HCR_MSE01-WP01, 07). He provided an overview of the precautionary approach, and presented examples of HCR simulations and MSE approaches. Dr. Kell highlighted the importance of limiting MSE to one stock at a time and of developing a multi-year road map. He also pointed out that, while conducting an MSE can be a lengthy process, the lessons learned from conducting it for one stock can be transferred to other stocks.

Agenda Item 6. Potential directions on application of BRPs, HCR and MSE to the management of NPFC priority species

20. Dr. Butterworth gave a presentation on improving communication as the key to more effective MSE processes (NPFC-2019-WS BRP_HCR_MSE01-WP04, NPFC-2019-WS BRP_HCR_MSE01-IP02). He outlined typical issues faced by RFMOs in implementing MPs, and explained an initiative by the PEW Organisation to deal with these issues, with a focus on intermediary groups and their scientist-stakeholder interactions, and improving visual communication tools for presentation of complex results.

21. The participants recommended conducting MSE for only one species at a time due to the resource-intensive and complex nature of the process. Of the target species being considered at the Workshop, the participants noted that chub mackerel is a longer-lived species than Pacific saury and more stock assessment data are available, enabling the operating model to be conditioned. They therefore recommended conducting MSE for chub mackerel as the first priority.

22. For Pacific saury, the invited experts suggested that age-structured stock assessment models would be more appropriate than age-aggregated models and that age-structured operating models were preferable to length-based operating models.

23. For Pacific saury, the participants recognized the value in developing an age-structured operating model for use in simulation work to identify and evaluate potential reference points (for example B_{lim} and F_{target}). They suggested that initial simulation work focus on constant F runs (e.g. to investigate MSY-based reference points, B_{lim} and F_{target}) and empirical HCR (e.g. taking a constant proportion of the estimated survey biomass). The participants also pointed out that model-based and empirical HCRs could both be considered when a full MSE is undertaken.

24. For chub mackerel, the invited experts suggested that initial assessments be conducted with a range of models. The stock assessment results can be used to ground-truth a range of age-based operating models for use in an MSE. The operating models can also be used to investigate potential reference points. A range of model-based and empirical HCRs could be explored in the MSE.

25. The participants suggested that it would be useful to explore the possibility of creating an intermediary group consisting of scientists, managers and stakeholders, as needed, when conducting an MSE.

26. The participants noted that consideration could be given to the role of small pelagic fish in the ecosystem as key low trophic level stocks and also to climate variability when setting the reference points.

Agenda Item 7. Recommendations to the SC and its subsidiary bodies

27. The WS BRP_HCR_MSE considered two priority species, Pacific saury and chub mackerel, and recommended the following to the SC and its subsidiary bodies:
    (a) The Workshop recommended conducting MSE for only one species at a time due to the resource-intensive and complex nature of the process. Because chub mackerel is a longer-lived species than Pacific saury and more stock assessment data are available, enabling the operating model to be conditioned, the Workshop recommended conducting MSE for chub mackerel as the first priority (see Punt et al. 2016 for best practices).
    (b) For Pacific saury, the Workshop recommended to consider developing an age-structured operating model for use in simulation work to identify and evaluate potential reference points (for example B_{lim} and F_{target}). It is suggested that initial simulation work focus on constant F runs (e.g. to investigate MSY-based reference points, B_{lim} and F_{target}) and empirical HCR (e.g. taking a constant proportion of the estimated survey biomass). Model-based and empirical HCRs could both be considered when a full MSE is undertaken.
    (c) For chub mackerel, the Workshop recommended considering to conduct initial assessments with a range of models, which could be used in a subsequent MSE.
    (d) The Workshop recommended that the SC propose to the Commission to explore the possibility of creating an intermediary group consisting of scientists, managers and stakeholders, as needed, when conducting an MSE.
    (e) Consideration could be given to the role of small pelagic fish in the ecosystem as key low trophic level stocks and also to climate variability when setting the reference points.

Agenda Item 8. Adoption of the Report

28. The report was adopted by consensus.

Agenda Item 9. Close of the Workshop

29. The workshop closed at 17:28 on 5 March 2019.

Annexes

Annex A – Agenda

Annex B – List of Documents

Annex C – List of Participants

Please refer to the NPFC website for the complete annexes.

NPFC

4th Meeting of the Technical Working Group on Pacific Saury Stock Assessment

06-09 March 2019
Yokohama, Japan
Meeting Report

Agenda

Agenda Item 1. Opening of the Meeting

Agenda Item 2. Adoption of Agenda

Agenda Item 3. Overview of the outcomes of previous NPFC meetings and intersessional activities relevant to Pacific saury
- 3.1 TWG PSSA03 meeting
- 3.2 BRP/HCR/MSE workshop
- 3.3 Progress of work on the joint CPUE standardization

Agenda Item 4. Review of the Terms of References of the TWG PSSA

Agenda Item 5. Review of recent fishery status

Agenda Item 6. Review of results of the stock assessment using "provisional base models" (BSSPM)
- 6.1 Review of the Stock Assessment Protocol
- 6.2 Review of the specification agreed in TWG PSSA03 meeting
- 6.3 Review of stock assessment results
- 6.4 Conclusion on the stock assessment of Pacific saury
  - 6.4.1 Stock biomass
  - 6.4.2 Fishing mortality
  - 6.4.3 Level of uncertainty
  - 6.4.4 Conclusion on the stock assessment results
- 6.5 Recommendations for future work
  - 6.5.1 Possible improvements of the models within BSSPM
  - 6.5.2 Visual presentation of stock assessment results to SC and Commission
  - 6.5.3 Facilitation of code-sharing processes
  - 6.5.4 Others

Agenda Item 7. Implication for management of Pacific saury based on "provisional base models" (BSSPM)
- 7.1 Biological reference points
- 7.2 Review results of future projection
- 7.3 Risk analyses of alternative catch levels
- 7.4 Conclusion on the management advice

Agenda Item 8. Review and update of biological information/data

Agenda item 9. Exploration of stock assessment models other than existing "provisional base models"
- 9.1 Data invention/availability (including the identification of potential covariates)
- 9.2 Initial discussion on age/size/stage-structured models
- 9.3 Identification of information/data gaps and limits
- 9.4 Recommendations for future work

Agenda item 10. Other matters

10.1 Initial discussion on Management Strategy Evaluation

10.2 Priorities for next meeting

10.3 Selection of TWG PSSA Chair for next biennium

10.4 Other

Agenda Item 11. Recommendations to the Small Scientific Committee on Pacific Saury

Agenda Item 12. Adoption of Report

Agenda Item 13. Close of the Meeting

MEETING REPORT

Agenda Item 1. Opening of the Meeting

1. The 4th Meeting of the Technical Working Group on Pacific Saury Stock Assessment (TWG PSSA) of the North Pacific Fisheries Commission (NPFC) took place in Yokohama, Japan on 6-9 March 2019, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, and Chinese Taipei. Dr. Larry Jacobson also attended the meeting as an invited expert.

2. The meeting was opened by the TWG PSSA Chair, Dr. Toshihide Kitakado, who outlined the objectives and procedures for the meeting.

3. Japan welcomed the participants to Yokohama, pointed out that Pacific saury is an important species for the NPFC, and wished for the success of the meeting.

4. The Executive Secretary, Dr. Dae-Yeon Moon, reminded the participants that the Commission has tasked the TWG PSSA with providing a consensus stock assessment for Pacific saury by the beginning of 2019 and scientific guidance necessary for the development of harvest control rules for Pacific saury sufficient to prevent a declining trend of the stock. The Executive Secretary commended the participants for the good progress they achieved at the TWG PSSA03 meeting and for their hard work and cooperation to date. The Executive Secretary also thanked the United States, on behalf of the NPFC, for providing a voluntary contribution for funding the participation of the invited expert.

Agenda Item 2. Adoption of Agenda

5. The participants agreed to modify the titles of Agenda Item 6.4 and 6.4.4 to “Conclusion on the stock assessment of Pacific saury” and “Conclusion on the stock assessment results” respectively.

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

Agenda Item 3. Overview of the outcomes of previous NPFC meetings relevant to Pacific saury

3.1 TWG PSSA03 meeting

7. The Chair summarized the outcomes and recommendations from the TWG PSSA03 meeting.

3.2 BRP/HCR/MSE workshop

8. The Chair of the Biological Reference Point/Harvest Control Rule/Management Strategy Evaluation Workshop, Mr. Luoliang Xu, summarized the outcomes and recommendations relevant to Pacific saury from the Workshop.

3.3 Progress of work on the joint CPUE standardization

9. Japan presented a preliminary joint CPUE standardization for Pacific saury with generalized linear models (GLM) and generalized additive models (GAM) on the assumption of lognormal distribution of errors (NPFC-2019-TWG PSSA04-WP01).

10. Russia presented a preliminary joint CPUE standardization for Pacific saury with GLM and GAM on the assumption of Tweedie with natural logarithm as a link function for distribution of errors (NPFC-2019-TWG PSSA04-WP03).

11. China presented a preliminary joint CPUE standardization for Pacific saury with spatial-GLM (NPFC-2019-TWG PSSA04-WP05).

12. China presented a preliminary joint CPUE standardization for Pacific saury with multiple indices (NPFC-2019-TWG PSSA04-WP06).

13. Chinese Taipei presented an evaluation of the spatio-temporal distribution and abundance of Pacific saury using Vector Autoregressive Spatio-Temporal (VAST) models.

14. The participants had some concerns about applying the VAST model to the CPUE data and agreed to discuss this issue further in a future meeting of the TWG PSSA. However, they agreed that it would be useful to apply such a spatio-temporal model to Japan's biomass survey. Japan explained that it is already conducting such work and will present the results at a future meeting of the TWG PSSA.

15. The participants agreed to continue the joint CPUE standardization work and provide updates at the next TWG PSSA meeting as appropriate.

Agenda Item 4. Review of the Terms of Reference of the TWG PSSA

16. The participants reviewed the Terms of Reference of the TWG PSSA and determined that no revisions are currently necessary.

Agenda Item 5. Review of recent fishery status

17. China presented an update on the status of its fishery for Pacific saury with catch and CPUE data for 2018 (NPFC-2019-TWG PSSA04-IP01). Total catch has fluctuated from 2013 to 2018, and increased in 2018 compared to 2017. Fishing effort has declined since 2016.

18. Russia presented an update on the status of its fishery for Pacific saury (NPFC-2019-TWG PSSA04-WP07) with catch, CPUE and size composition data for 2018. Catch has been low in 2017 and 2018 compared to previous years. The number of vessels declined in 2018 compared to 2017. However, the catch per day per vessel has increased in 2018. In 2018, the fishing season began earlier than usual and was therefore longer. The average body length of caught Pacific saury was slightly larger in 2018 than in 2017.

19. Korea presented an update on the status of its fishery for Pacific saury with catch, CPUE and spatial distribution data for 2018 (NPFC-2019-TWG PSSA04-IP02). In 2018, total catch was 23,701 tons and 12 vessels fished for Pacific saury over 811 fishing days.

20. Japan presented an update on the status of its fishery for Pacific saury with catch, CPUE, spatial distribution, age composition and size composition data for 2018 (NPFC-2019-TWG PSSA04-IP03). Total catch in 2018 was 128,000 tons, over 99% of which was caught by stick-held dip nets. The fishing grounds were mainly offshore with one-third of catch caught in the high seas.

21. Chinese Taipei presented an update on the status of its fishery for Pacific saury with catch and CPUE data for 2018, and spatial distribution and size composition data for 2017 (NPFC-2019-TWG PSSA04-IP04). In 2018, total catch was 177,951 tons, an increase from 2017, and 83 vessels fished for Pacific saury over 6,235 fishing days. The average size of caught Pacific saury has declined over the 2015-2017 period. Fishing grounds have been expanding eastward in 2017.

Agenda Item 6. Review of results of the stock assessment using "provisional base models" (BSSPM)

6.1 Review of the Stock Assessment Protocol

22. The participants reviewed the Stock Assessment Protocol and determined that no revisions are currently necessary.

6.2 Review of the specification agreed in TWG PSSA03 meeting

23. The participants reviewed the specifications of the Bayesian state-space production model (BSSPM) for the updated stock assessment and template for stock status information and future projection as agreed in the TWG PSSA03 meeting (TWG PSSA03 report, Annexes F and G).

6.3 Review of stock assessment results

24. China presented its results of Pacific saury stock assessment (NPFC-2019-TWG PSSA04-WP08). The estimated median B_{2018} from the six base case scenarios (961,500-3,575,000 metric tons) was greater than the B_{2017} (583,800-1,950,000 metric tons). The median B_{2017}/B_{MSY} and F_{2017}/F_{MSY} from the six base case scenarios ranged from 0.23-0.69 and 0.59-1.17, respectively. The median B_{2018}/B_{MSY} from the six base case scenarios ranged from 0.88-1.40. Based on its diagnostics, China made the following research recommendations for future stock assessment: 1) Quantify the impact of changes in the input data on the assessment results since there were a few substantive changes in this assessment in addition to the modifications of model methods; 2) Explore random walk of time-varying catchability for other CPUE indices because the random walk catchability for the Japanese early CPUE performed better than the other tested patterns; 3) Conduct additional research for the estimated biomass index and the catchability of Japanese biomass index.

25. Chinese Taipei presented a stock assessment of Pacific saury in the Western North Pacific Ocean through 2018 (NPFC-2019-TWG PSSA04-WP09). Based on the results of its stock assessment, Chinese Taipei concluded that estimates of biomass have increased since 2000 with peaks in 2005 and 2008, and then dramatically decreased until 2017. There is a slight increasing trend in 2018 in all base cases. The median values of biomass depletion and the ratio of biomass to B_{MSY} in 2017 were estimated at 0.33 (80 percentile range 0.15 – 0.40) and 0.80 (80 percentile range 0.34 – 0.95), respectively. Recent fishing mortality is estimated to be below F_{MSY}. Sensitivity runs indicated slightly pessimistic results compared to the six base cases. Overall, the results of the sensitivity analysis confirmed the robustness of the base case model.

26. Japan presented the updated outcomes of its stock assessment for the Pacific saury using the BSSPM (NPFC-2019-TWG PSSA04-WP10). Based on the results of its stock assessment, Japan concluded that the stock status differed somewhat between 2017 and 2018, and the ranges of median B/K in 2017 and 2018 over the six base cases are respectively 0.196-0.268 and 0.338-0.491. Such a significant difference was also observed in B-ratio and F-ratio. Although Japan concluded in its previous stock assessment report in 2018 that the population status was overfished and subject to overfishing, the recent increase in the biomass estimated by the

Japanese survey drove the population status to a more optimistic condition as overfished but not subject to overfishing.

27. Russia demonstrated a different stock assessment model for Pacific saury in the western North Pacific Ocean using Just Another Bayesian Biomass Assessment (JABBA), as an example of the use of publicly available stock assessment software without using prior distributions for the survey or CPUE catchability coefficients (NPFC-2019-TWG PSSA04-WP04). Such approaches should be discussed further in the next assessment. A similar study with JABBA Select was recommended.

6.4 Conclusion on the stock assessment of Pacific saury

6.4.1 Stock biomass

6.4.2 Fishing mortality

6.4.3 Level of uncertainty

6.4.4 Conclusion on the stock assessment results

28. The participants reviewed the stock assessments presented by Members and aggregated the results (Annex D).

6.5 Recommendations for future work

6.5.1 Possible improvements of the models within BSSPM

29. The participants considered the following possible improvements that could be made to the models within the BSSPM:
    (a) Develop continuous production models.
    (b) Analyze the sensitivity of the models to each of the prior assumptions.
    (c) Perform a maximum likelihood estimation without assumed priors.
    (d) Examine each other's prior settings.
    (e) Further investigate the uncertainty in certain key parameters (i.e. catchability, intrinsic growth rates and shape).
    (f) Add histograms to Kobe plots in the template for stock status information.

6.5.2 Visual presentation of stock assessment results to SC and Commission

30. The participants agreed to include an Executive Summary in the stock assessment report to facilitate better understanding of the stock assessment results by managers. A draft of the Executive Summary is prepended to the stock assessment report (Annex D).

31. Because of the similarity in Members' stock assessment results, the participants agreed to include in the Executive Summary a direct aggregation of the results for all 18 models (six base cases by three Members) for ease of understanding. The results for each model are included in

the main body of the stock assessment report. The participants also noted that it may not always be advisable to aggregate stock assessment results, such as when Members' assessments show disagreement on key results.

32. The TWG PSSA agreed to provide the results of the retrospective analyses in graphic terms in the stock assessment report. No retrospective patterns were observed.

33. Hindcasting projections were included in the retrospective analyses for Japan. Results showed poor projection performance (see paragraph 38).

6.5.3 Facilitation of code-sharing processes

34. The participants reaffirmed the importance of working towards using a single, shared model code, which would enable more efficient stock assessments.

6.5.4 Others

35. No other future work was discussed.

Agenda Item 7. Implication for management of Pacific saury based on "provisional base models" (BSSPM)

7.1 Biological reference points

7.2 Review results of future projection

7.3 Risk analyses of alternative catch levels

7.4 Conclusion on the management advice

36. Based on combined model estimates, B was below B_{MSY} (average B/B_{MSY} during 2016-2018 = 0.82) and F was below F_{MSY} (average F/F_{MSY} during 2015-2017 = 0.82). Results indicate that the stock declined from near carrying capacity in the mid-2000's after a period of high productivity to current levels. Exploitation rates were increasing slowly during this period but remained lower than F_{MSY}. Point estimates indicate that stock biomass fell to the lowest value since 1980 (B/B_{MSY} = 0.63) in 2017, then increased to B_{MSY} in 2018. Biomass estimates show long-term fluctuations and interannual variability.

37. Several years of new data will be required to detect changes in stock condition because individual assessment model estimates and survey observations are highly uncertain. It would therefore be reasonable to wait perhaps three years before carrying out another benchmark assessment. A limited set of current model scenarios could be updated more frequently, and survey data should be monitored annually although individual year-to-year changes will be difficult to interpret.

38. The participants noted that the BSSPM model projections for Pacific saury were not useful and likely to be misinterpreted because Pacific saury is a short-lived species and production models like the BSSPM do not explicitly carry information about recent age structure, recruitment strength, growth rates or other factors that might be used to predict short-term changes in the stock. The participants decided that the projections should not be included in the main body of the report due to their misleading nature. The TWG PSSA's ability to improve the accuracy of the future projections may increase when an age-structured assessment model is developed for Pacific saury and other projection procedures are considered.

Agenda Item 8. Review and update of biological information/data

39. Japan presented a review of available information on growth, maturation and mortality for future stock assessment and management of Pacific saury (NPFC-2019-TWG PSSA04-WP02).

40. The participants reaffirmed the importance of biological information for the Pacific saury stock assessment, especially as the TWG PSSA moves towards the development of age-structured models and MSE analyses.

41. Japan provided supplementary information on the geographical distribution change over time of Pacific saury because some Members pointed out the importance to clarify distribution by age.

42. The participants encouraged Japan to submit a working paper on the ecology and biology of Pacific saury to a future TWG PSSA meeting.

43. The participants recommended that the TWG PSSA conduct simulation studies to evaluate the existing and alternative survey designs, in light of the changes in the spatial dynamics of the Pacific saury stock and fisheries in recent years. The TWG plans to review any progress on spatial/temporal model-based survey biomass estimation and variance of the current survey catchability estimate prior to the next assessment. Japan agreed to internally discuss the possibility of making survey data available to the Members and associated conditions.

44. The participants encouraged Japan to present the plans for its 2019 biomass survey at the upcoming SSC PS04 meeting.

45. Japan encouraged scientists from other Members to participate in Japan's biomass survey (refer to the NPFC Circular #012/2019 Invitation to Japanese Biomass Survey for Pacific saury, distributed on 5 March 2019).

Agenda Item 9. Exploration of stock assessment models other than existing "provisional base models"

9.1 Data invention/availability (including the identification of potential covariates)

46. The participants reviewed the table of each Member's data availability for size composition and catch/CPUE data for Pacific saury that was compiled at the TWG PSSA02 meeting (Annex E).

9.2 Initial discussion on age/size/stage-structured models

47. The participants agreed to review a preliminary application of age-structured models to Pacific saury or existing approaches to other short-lived stocks. It will be important to maintain the existing BSSPM as the benchmark model, while new models are considered. It may be desirable to use both the BSSPM and the age-structured model in future.

48. The participants considered the recommendation by the BRP/HCR/MSE workshop to develop age-structured models for Pacific saury stock assessment and agreed that this is the direction the TWG PSSA should work towards.

9.3 Identification of information/data gaps and limits

49. The participants agreed to continue discussion towards the identification of information/data gaps and limits when appropriate.

9.4 Recommendations for future work

50. The participants considered the following as possible future work:
    (a) Further investigate the natural mortality of Pacific saury.
    (b) Conduct simulation studies to evaluate the existing and alternative designs of the Japanese biomass survey.

51. The participants encouraged any scientist from the Members to develop an age-structured model and present a preliminary demonstration at a future TWG PSSA meeting.

Agenda Item 10. Other matters

10.1 Initial discussion on Management Strategy Evaluation

52. The participants agreed that it would be premature to hold discussions on Management Strategy Evaluation (MSE) at the current meeting and that such discussions would be more appropriate after the development of an age-structured model. They recognized that, under its Terms of Reference, the TWG PSSA is expected to explore the design of the MSE framework and MSE will therefore continue to be a standing agenda item at future TWG PSSA meetings.

10.2 Priorities for next meetings

53. The participants recognized the following as priorities for the next TWG PSSA meetings:
    (a) Conduct a stock assessment update with base case model 2 (q_biomass=1).
    (b) Further investigate improvements to the BSSPM.
    (c) Develop an age-structured model.
    (d) Continue joint CPUE work to incorporate broader spatial and temporal coverage.
    (e) Update the biomass estimate using the existing method.
    (f) Explore the possibility of developing a spatio-temporal model for the biomass estimate.
    (g) Further investigate the coefficient of variation for the catchability coefficient in the Japanese survey. This variance should be included in the variance of the biomass data. If possible, refine the catchability estimate for the survey.
    (h) Develop a longer-term roadmap for work related to Pacific saury stock assessment.

10.3 Selection of TWG PSSA Chair for next biennium

54. The participants agreed to extend the term of the current Chair, Dr. Toshihide Kitakado, for two more years.

10.4 Other

55. Canada informed the participants that the North Pacific Marine Science Organization (PICES) will hold a workshop on 16 October 2019 in Victoria, Canada on the influence of environmental changes on the potential for species distribution shifts and subsequent consequences for estimating abundance of Pacific saury and encouraged Members to attend the workshop.

56. The participants recommended that the SC draft rules to address submission, revision and treatment of scientific papers before and during meetings, and submit the rules to the Commission for consideration. Members should be encouraged to bring attention to any changes in data or results detected before/during/after meetings to the TWG PSSA as soon as possible.

Agenda Item 11. Recommendations to the Small Scientific Committee on Pacific Saury

57. The TWG PSSA recommended the following to the SSC PS:
    (a) The participants agreed to continue the joint CPUE standardization work.
    (b) The participants recommended that the SSC PS endorse the stock assessment report (Annex D).
    (c) The participants agreed to use the current stock assessment models (BSSPM) as a benchmark and continue to improve them.
    (d) The participants agreed to continue biological research related to the stock assessment of Pacific saury.

(e) The participants agreed to continue work towards the development of age-structured models as new stock assessment models as well as the potential operating model for MSE.
(f) The participants recommended considering sharing more data for improving the current stock assessment and developing future ones.
(g) The participants recognized the contribution by the invited expert in facilitating the work of the TWG PSSA and recommended inviting Dr. Larry Jacobson (or an expert with similar qualifications and experience) to also attend the next TWG PSSA meetings.

Agenda Item 12. Adoption of the Report

58. The report was adopted by consensus.

Agenda Item 13. Close of Meeting

59. The meeting closed at 12:15 on 9 March 2019.

Annexes

Annex A – Agenda
Annex B – List of Documents
Annex C – List of Participants
Annex D – Stock Assessment Report for Pacific Saury
Annex E – Data availability on size composition and catch/CPUE for Pacific saury

Please refer to the NPFC website for the complete annexes.

NPFC

4th Meeting of the Small Scientific Committee on Vulnerable Marine Ecosystem

15-16 April 2019
Jeju, Republic of Korea
Meeting Report

Agenda

Agenda Item 1. Opening of the meeting

Agenda Item 2. Adoption of Agenda

Agenda Item 3. Review of outputs and recommendations from the VME&BF Data Workshop and intersessional work
- 3.1 Recommendations from the Workshop
- 3.2 Lists of existing data on bottom fishing footprint and effort, existing taxa data and existing multibeam data
- 3.3 Resolution of data to be shared for mapping and SAI assessment
- 3.4 VME indicator taxa
- 3.5 Post-encounter measure

Agenda Item 4. Review of Members' research activities

Agenda Item 5. SSC VME Work Plan for 2019
- 5.1 Map of combined fishing footprint and effort
- 5.2 Standardized approach for SAI assessment
- 5.3 Encounter Protocol
- 5.4 Exploratory Fishery Protocol
- 5.5 Management objectives for recovering VME sites

Agenda Item 6. Review of CMMs 2018-05 and 2017-06 for bottom fisheries and protection of vulnerable marine ecosystems

Agenda Item 7. Scientific projects
- 7.1 Ongoing projects
  - 7.1.1 Spatial management of VMEs and bottom fisheries
  - 7.1.2 VME taxa identification guide
- 7.2 New projects

Agenda Item 8. Review/update of the 2017-2021 Work Plan

Agenda Item 9. Other matters
- 9.1 Selection of SSC VME Chair
- 9.2 Other issues

Agenda Item 10. Recommendations to the Scientific Committee

Agenda Item 11. Next meeting

Agenda Item 12. Adoption of the Report

Agenda Item 13. Close of the Meeting

MEETING REPORT

Agenda Item 1. Opening of the meeting

1. The 4th Meeting of the Small Scientific Committee on Vulnerable Marine Ecosystems (SSC VME04) took place in Jeju, Republic of Korea on 15-16 April 2019, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation and the United States of America. The meeting was opened by Dr. Bai Li (China) who served as the SSC VME Chair.

2. Dr. Seok-Gwan Choi welcomed the participants to Jeju on behalf of the host Member.

Agenda Item 2. Adoption of Agenda

3. The agenda was adopted without revision (Annex A). The List of Documents and Participants List are attached (Annexes B, C).

Agenda Item 3. Review of outputs and recommendations from the VME&BF Data Workshop and intersessional work

3.1 Recommendations from the Workshop

4. The Chair summarized the outputs of the VME&BF Data Workshop and presented recommendations for consideration by the SSC VME.

5. The recommendations endorsed by the SSC VME are listed under paragraph 37.

3.2 Lists of existing data on bottom fishing footprint and effort, existing taxa data and existing multibeam data

6. The Science Manager, Dr. Aleksandr Zavolokin, presented the lists of existing data for VME assessments (NPFC-2019-SSC VME04-WP04 (Rev.2)), including existing data for potential combined footprint and effort map of all bottom fisheries by gear and time, existing taxa data for combined assessment, and existing multibeam data for combined assessment.

7. The SSC VME reviewed and updated the above lists (Annex D).

3.3 Resolution of data to be shared for mapping and SAI assessment

8. The SSC VME agreed to defer discussions of the appropriate temporal and spatial resolution of data to be shared for mapping and SAI assessment to Agenda Item 5.

3.4 VME indicator taxa

9. Japan presented an updated assessment of the potential impact of Japanese bottom fisheries on VMEs in the Emperor Seamounts region (NPFC-2019-SSC VME04-WP02). Japan conducted an SAI assessment on the potential VMEs in the northwestern part of the NPFC Convention Area in accordance with the guidelines in Annex 2 of CMM 2018-05 for bottom fisheries and protection of vulnerable marine ecosystems in the northwestern Pacific Ocean. Based on the assessment, Japan proposed the designation of two potential VME protection areas (a Gorgonacea (*Paragorgia*) habitat in the northwestern part of Koko Seamount and a Scleractinia (*Solenosmilia variabilis*) habitat on the northern ridge of Colahan Seamount); and the revision of the list of VME indicator taxa (from Gorgonacea, Scleractinia, Antipatharia, and Alcyonacea to Gorgonacea, Scleractinia, Antipatharia, and Porifera).

10. Regarding the proposed designation of two potential VME protection areas, the SSC VME expressed support and recommended the closure of the two areas, while acknowledging that further research needs to be done to define the range of the VME sites.

11. The SSC VME noted that the NPFC does not have a quantitative measure for defining VMEs and discussed the possibility to develop a single, standardized step-by-step protocol for defining VMEs in the future. Such a protocol should be sufficiently flexible to account for the different levels of data availability in the northwestern and northeastern areas of the Pacific Ocean, and enable scientists in each area to use their own methodologies and judgment.

12. The SSC VME suggested that it would be worthwhile comparing the results of Japan's current work and those of its past species distribution modeling work to assess the accuracy of species distribution models for mapping potential VME areas. This may be useful for mapping potential VME areas in the northeastern area of the Pacific Ocean, where there is a paucity of data compared to the northwestern area.

13. Regarding the proposed revision of the list of VME indicator taxa, the SSC VME recognized the value of the work done by Japan but determined that further research is needed.

14. The SSC VME recognized that there may be variation in VMEs between the northeastern and northwestern areas of the Pacific Ocean.

3.5 Post-encounter measure

15. The Chair presented a review of other RFMO/As' practices in relation to VME post-encounter treatment and the NPFC situation (NPFC-2019-SSC VME04-WP01).

16. The SSC VME considered the information presented and drafted a general flow chart for the VME post-encounter reporting process in the NPFC (Annex E). The SSC VME agreed to continue developing the post-encounter measure intersessionally and hold further discussions on the details of the VME post-encounter reporting process in future meetings.

Agenda Item 4. Review of Member's research activities

17. Canada presented a case study that illustrates how spatial trade-off analyses can help maintain the socio-economic benefits of the sablefish fishery while promoting the conservation of VMEs (NPFC-2019-SSC VME04-WP06). Specifically, Canada mapped the locations of potential VMEs by developing species distribution models for six of its VME indicator taxa, developed a spatial footprint of sablefish fishing activity, and used Marxan to evaluate several trade-off scenarios by comparing the potential loss in sablefish landings when protecting potential VME areas where Canada fishes for sablefish. Canada explained that its case study methodology is still in progress but could be applied to other parts of the NPFC Convention Area eventually.

18. The SSC VME discussed the work done by Canada and noted the possibility to apply the same approach using other Members' data in the future.

19. Canada presented an update on work it has done to identify and map seamounts in the northeastern Pacific Ocean (NPFC-2019-SSC VME04-IP01). Canada has now identified and mapped the locations of 52 seamounts, three times the amount known in 2016. Canada has visually surveyed 9 of them and mapped 23 of them with single or multibeam surveys.

20. Korea reported on the coral bycatch by Korean trawl fisheries on the Emperor Seamounts in 2018 (NPFC-2019-SSC VME04-WP08). Korea has reported information on bycatch of VME indicator taxa collected by Korean trawl fisheries based on its scientific observer program since 2013 and has observed more than 70% of hauls during that time. In 2018, one Korean trawl vessel operated in the Convention Area and carried an observer on board. The vessel made 154 hauls, 99 (64%) of which were observed. VME taxa were found in 38 (25%) of the observed hauls. The order Antipatharia accounted for the largest composition (50%) by weight, followed by the order Gorgonacea (29%) in 2018.

Agenda Item 5. SSC VME Work Plan for 2019

5.1 Map of combined fishing footprint and effort

21. The SSC VME recognized the importance of combining data to develop an NPFC map of combined fishing footprint and effort, but acknowledged that Members need more time to determine the type of data to be submitted, and the spatial and temporal resolution of such data. The SSC VME agreed to continue discussions intersessionally, with the aim of reaching a consensus on the type and resolution of data by mid-June and sharing data by November 2019.

5.2 Standardized approach for SAI assessment

22. Noting the work done by Japan and Canada in relation to SAI assessment, the SSC VME requested Japan and Canada to develop a draft standardized approach for SAI assessment to be presented at the next SSC VME meeting.

5.3 Encounter Protocol

23. The SSC VME reviewed the Encounter Protocol and determined that no revisions are currently necessary.

5.4 Exploratory Fishery Protocol

24. The SSC VME reviewed the Exploratory Fishery Protocol and determined that no revisions are currently necessary.

5.5 Management objectives for recovering VME sites

25. The SSC VME agreed to defer discussions on the management objectives for recovering VME sites to future meetings.

Agenda Item 6. Review of the CMMs 2018-05 and 2017-06 for bottom fisheries and protection of vulnerable marine ecosystems

26. The SSC VME reviewed and revised CMM 2018-05 (Annex F).

27. The SSC VME reviewed and revised CMM 2017-06 (Annex G).

Agenda Item 7. Scientific projects

7.1 Ongoing projects

7.1.1 Spatial management of VMEs and bottom fisheries

28. The Data Coordinator, Mr. Mervin Ogawa, reported on the progress of ongoing projects for the spatial management of VMEs and bottom fisheries, and the development of the spatial/temporal map of Members' Pacific saury catch and effort (NPFC-2019-SSC VME04-

WP07).

29. The SSC VME considered the information presented and recommended that the Scientific Committee (SC) consider using the Food and Agriculture Organization of the United Nations' (FAO) publicly-available Vulnerable Marine Ecosystems Map as a template for developing the NPFC's own VME map.

7.1.2 VME taxa identification guide

30. The Science Manager presented a summary of the intersessional work of the small working group on the development of a VME taxa identification field guide (NPFC-2019-SSC VME04-WP03 (Rev. 1)). The work included a review of the VME taxa identification guides of four RFMOs, sharing of Members' photos and other documents, discussion of the design and content of the NPFC guide, and preparation of a first draft of the guide for the northwestern area of the Pacific Ocean.

31. The SSC VME reviewed the draft guide and agreed on a list of specifications regarding the design and content of the VME taxa identification guide (Annex H).

7.2 New projects

32. Russia proposed a new project Course/School for NPFC observers and High School students (Annex I). The aim of the project is to share knowledge on the identification of the VME indicator taxa including potential groups which can be added in the list of VME indicators in the future.

Agenda Item 8. Review/update of the 2017-2021 Work Plan

33. The SSC VME reviewed the 2017-2021 Work Plan and updated it as detailed in NPFC-2019-SSC VME04-WP05 (Rev. 1).

Agenda Item 9. Other matters

9.1 Selection of SSC VME Chair

34. The SSC VME selected Dr. Chris Rooper (Canada) to serve as the new SSC VME Chair.

35. The SSC VME thanked Dr. Li for her hard work and excellent chairing over the past two years.

9.2 Other issues

36. No other issues were discussed.

Agenda Item 10. Recommendations to the Scientific Committee

37. The SSC VME informs the SC that it endorses the following recommendations made by the VME&BF Data Workshop:
    (a) Review the draft list of potentially available data to better identify current and historical bottom fishing grounds in the Convention Area and fishing footprint and effort in relation to assessing SAI in the Convention Area (Annex D).
    (b) Identify appropriate temporal and spatial resolution of data to be shared in order to map a combined fishing footprint and effort to better identify fishing grounds.
    (c) Identify appropriate temporal and spatial resolution of data to be shared in order to define the fishing footprint in relation to assessing SAI.
    (d) Continue working on whether or not the current indicator taxa are sufficient for determining VME, and whether or not the practices of the NPFC in relation to VME in the Convention Area are consistent with that of other regional fisheries management organizations (RFMOs).
    (e) When consolidating available data and relevant information from inside and outside the Convention Area to map VMEs, consider the benefits and limitations of publicly available high-resolution fishing activity data and existing predictive species distribution models.
    (f) Review the summary table of the status of the NPFC's identification and protection of VMEs and data requirements (Annex J).
    (g) Consider using the summary of potential data, methods and collaborators for predictive models (Annex K.
    (h) For the Encounter protocol (CMM 2018-05, Paragraph 4G and CMM 2017-06, Paragraph 3j), require that encounters are reported to the Secretariat as soon as possible and requirement to report encounters is included in the Annex 4 of the CMMs.
    (i) Continue work on quick reporting protocol to avoid multiple impacts on the same VME site.
    (j) Continue the work to develop a common NPFC VME field guide.
    (k) Consider including standardized systematic sampling, including photographs and biological sampling, as part of the scientific observer program.
    (l) Consolidate all available VME bycatch data for combined mapping assessment.
    (m) Review updates and continue to revise the table of data availability and progress in VME protection in the NPFC against data requirements from the FAO DSF Guidelines (NPFC-2018-WS DATA01-WP01 (Rev. 1)).
    (n) Consider the revision of Interim Guidance for Management of Scientific Data [(Annex L] and continue its development.
    (o) Consider continuing to develop templates to summarize existing data potentially available on bottom fishing footprint and effort, taxa, multibeam and VME predictive modelling (Annex D).

38. The SSC VME recommends the following to the SC:
    (a) Endorse a plan and timelines to determine the type and resolution of data to be shared for SAI assessment and a map of combined fishing footprint and effort (paragraph 21).
    (b) Endorse a flowchart for VME post-encounter treatment in the NPFC and continue developing the details of the post-encounter measure intersessionally (Annex E)
    (c) Conduct further research to define the range of the two VME sites identified in NPFC-2019-SSC VME04-WP02 and close them to fishing.
    (d) Endorse the revised CMM 2018-05 (Annex F).
    (e) Endorse the revised CMM 2017-06 (Annex G).
    (f) Consider using the FAO's publicly-available Vulnerable Marine Ecosystems Map as a template for developing the NPFC's own VME map.
    (g) Consider the holding of a course/school on VME indicator taxa identification as a new project (Annex I).
    (h) Endorse the draft guide and a list of specifications regarding the design and content of the common VME taxa identification guide in the western North Pacific Ocean (Annex H).
    (i) Endorse the updated 2017-2021 SSC VME Work Plan (NPFC-2019-SSC VME04-WP05 (Rev. 1)).

Agenda Item 11. Next meeting

39. The SSC VME requests the guidance of the SC for determining the date and location of the next meeting.

Agenda Item 12. Adoption of the Report

40. The SSC VME04 Report was adopted by consensus.

Agenda Item 13. Close of the Meeting

41. The meeting closed at 14:47 on 16 April 2019.

Annexes

Annex A – Agenda
Annex B – List of Documents
Annex C – List of Participants
Annex D – List of Existing Data for VME Assessments
Annex E – Flowchart for VME Post-encounter Treatment
Annex F – Revised CMM 2018-05 - Conservation and Management Measure for Bottom Fisheries and Protection of Vulnerable Marine Ecosystems in the Northwestern Pacific Ocean
Annex G – Revised CMM 2017-06 - Conservation and Management Measure for Bottom Fisheries and Protection of Vulnerable Marine Ecosystems in the Northeastern Pacific Ocean
Annex H – Draft Guide and a List of Specifications Regarding the Design and Content of the Common VME Taxa Identification Guide in the Western North Pacific Ocean
Annex I – Project: International Course/School for NPFC Observers and High School Students
Annex J – Summary Table of the Status of the NPFC's Identification and Protection of VMEs and Data Requirements
Annex K – Potential Data to be Consolidated for Predictive Modeling, Potential Iterative Predictive Models and Potential Collaborators
Annex L – Revised Interim Guidance for Management of Scientific Data

Please refer to the NPFC website for the complete annexes.

NPFC

2nd Meeting of the Small Scientific Committee on Bottom Fish

17-18 April 2019
Jeju, Republic of Korea
Meeting Report

Agenda

Agenda Item 1. Opening of the meeting

Agenda Item 2. Adoption of Agenda

Agenda Item 3. Review of Member's bottom fisheries and research activities

Agenda Item 4. Review of recommendations from the VME&BF Data Workshop

Agenda Item 5. Stock assessment and scientific advice on the management of bottom fish
- 5.1 Adaptive management process and harvest control rules for North Pacific armorhead
- 5.2 Stock assessment of splendid alfonsino

Agenda Item 6. Data collection and reporting
- 6.1 Template for collection of scientific observer data
- 6.2 Combined bycatch taxa list

Agenda Item 7. Review of the CMMs 2018-05 and 2017-06 for bottom fisheries and protection of vulnerable marine ecosystems

Agenda Item 8. Review/update of the 2017-2021 Work Plan

Agenda Item 9. Scientific projects
- 9.1 Ongoing projects
  - 9.1.1 Spatial management of VMEs and bottom fisheries
- 9.2 New projects

Agenda Item 10. Other matters
- 10.1 Selection of SSC BF Chair
- 10.2 Other issues

Agenda Item 11. Recommendations to the Scientific Committee

Agenda Item 12. Next meeting

Agenda Item 13. Adoption of the Report

Agenda Item 14. Close of the Meeting

MEETING REPORT

Agenda Item 1. Opening of the meeting

1. The 2nd Meeting of the Small Scientific Committee on Bottom Fish (SSC BF02) took place in Jeju, Republic of Korea on 17-18 April 2019, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, and the United States of America. The meeting was opened by Dr. Taro Ichii (Japan) who served as the SSC BF Chair.

2. Dr. Seok-Gwan Choi welcomed the participants to Jeju on behalf of the host Member and expressed his hope that the SSC BF would hold fruitful discussions towards the development of measures for the sustainable management of bottom fisheries.

Agenda Item 2. Adoption of Agenda

3. The agenda was adopted without revision (Annex A). The List of Documents and Participants List are attached (Annexes B, C).

Agenda Item 3. Review of Member's bottom fisheries and research activities

4. Canada reported on its sablefish catch in the Convention Area (NPFC-2019-SSC BF02-IP03). Canada mainly fishes on four seamounts in the Convention Area using bottom longline traps and longline hooks. Since 2014, a maximum of six vessels per year have been allowed to fish in the Convention Area and historically fewer than three vessels per year on average have done so. From 2008 to 2018, the annual number of fishing days ranged from 25 days to 100 days. Catch of sablefish from Convention Area seamounts have ranged from an average of about 10 metric tons per year from 2005 to 2007 to about 67 metric tons in 2017. Since 2011, Canada has implemented output controls for sablefish and other species to limit the amount of fish that can be landed.

5. The Secretariat encouraged Canada to allow the NPFC to release data by uploading them to the public website.

6. Canada and the United States explained that they are conducting research on range-wide sablefish ecology and management to develop a range-wide, spatially explicit population model for sablefish that can be used to explore questions of biological and management relevance across the eastern North Pacific. In 2018, Canada and the United States have initiated a synthesis of life history characteristics across the sablefish range, identified potential indices of abundance, and evaluated movement within and among regions.

7. Russia reported on its bottom fishing activities in the Convention Area (NPFC-2019-AR-Annual Summary Footprint – Bottom Fisheries (Rev. 1)). In 2018, Russia operated one bottom longliner for 99 fishing days.

8. Korea reported on its bottom fishing activities in the Convention Area (NPFC-2019-AR-Annual Summary Footprint – Bottom Fisheries (Rev. 1)). In 2018, Korea operated one trawler for 79 days. Total catch for armorhead and splendid alfonsino was 298.3 tons and 139.8 tons, respectively.

9. Japan reported on its bottom fishing activities in the Convention Area (NPFC-2019-AR-Annual Summary Footprint – Bottom Fisheries (Rev. 1)). In 2018, Japan operated four trawl vessels and one gillnet vessel. Total catch for North Pacific armorhead and splendid alfonsino was 793.2 tons and 2,651.5 tons, respectively. In terms of research, Japan conducted a multi-beam sea bottom topography survey in the northern and central parts of Koko Seamount.

10. The Science Manager, Dr. Aleksandr Zavolokin, informed the SSC BF that the Secretariat has started work to summarize life-history, catch and other relevant information about NPFC priority species from meeting documents and literature. The Secretariat will prepare a draft paper for circulation among Members intersessionally or at the next SSC BF meeting.

11. The SSC BF observed that total catch of North Pacific armorhead exceeded 1,000 tons in 2018 and the catch levels have remained low for six consecutive years.

Agenda Item 4. Review of recommendations from the VME&BF Data Workshop

12. The Co-Chair of the VME&BF Data Workshop, Dr. Bai Li (China), summarized the outputs of the workshop and presented recommendations for consideration by the SSC BF.

13. The recommendations endorsed by the SSC BF are listed under paragraph 35.

14. As recommended by the VME&BF Data Workshop, the SSC BF considered the draft Interim Guidance for Management of Scientific Data and developed it further (Annex D).

Agenda Item 5. Stock assessment and scientific advice on the management of bottom fish

5.1 Adaptive management process and harvest control rules for North Pacific armorhead

15. Japan presented an implementation plan for the adaptive management measures for North Pacific armorhead developed in consultation with Korea (NPFC-2019-SSC BF02-WP05). The plan consists of two parts: monitoring surveys to be conducted in pre-determined monitoring blocks for the Koko and Kammu Seamounts from 1 March to 30 June 2019, and closure of specific areas to bottom trawl fishing if strong recruitment is detected. The criteria for determining strong recruitment and the specific areas to be closed are those stipulated in CMM 2018-05.

16. The SSC BF discussed the proposed adaptive management plan and the points raised by the VME&BF Data Workshop (WS DATA01 Report, Paragraph 32), and considered potential revisions to CMM 2018-05.

17. Japan showed a video taken from a squid jigging survey vessel showing a direct observation of a large school of sub-adult North Pacific armorhead in the northeastern Pacific Ocean in August 2018.

5.2 Stock assessment of splendid alfonsino

18. Japan presented a yield-per-recruit analysis of splendid alfonsino in the Emperor Seamounts (NPFC-2019-SSC BF02-WP01). The study showed that, to maximize yield-per-recruit, age of entry to the fishery should be above two years old at least. It also supported the concern that growth overfishing had been occurring prior to the implementation of new mesh size regulations in 2019 in accordance with CMM 2018-05. Therefore, the effect of the new regulations should be monitored.

Agenda Item 6. Data collection and reporting

6.1 Template for collection of scientific observer data

19. Japan presented an updated draft template for collecting scientific observer data from NPFC bottom fisheries, based on the discussions in the VME&BF Data Workshop (NPFC-2019-SSC BF02-WP02).

20. The SSC BF discussed the updated draft template and the points raised by the VME&BF Data Workshop (WS DATA01 Report, Paragraph 44), and considered potential revisions to CMMs

2018-05 and CMM 2017-06.

21. The SSC BF further updated the draft template (NPFC-2019-SSC BF02-WP02 (Rev. 1)).

6.2 Combined bycatch taxa list

22. Japan presented a review of bycatch species by Japanese bottom fisheries in the Emperor Seamounts and a preliminary list of bycatch species, including both retained and discarded catch by Japanese vessels, primarily based on scientific observer data (NPFC-2019-SSC BF02-WP03). Japan also pointed out the existence of a number of issues that may make the compilation of bycatch species list difficult, namely incomplete recording of discarded bycatch, misidentification and the usage of ambiguous species names.

23. Korea presented a preliminary list of target and bycatch species by Korean bottom fisheries in the Emperor Seamounts, based on data collected by onboard observers from 2010 to 2018 (NPFC-2019-SSC BF02-IP02).

24. The SSC BF agreed to continue to work intersessionally to develop a combined bycatch taxa list, for all bottom fishing gears, at the finest taxonomic resolution possible, building on the preliminary lists submitted by Japan and Korea. The SSC BF encouraged Canada and Russia to submit their lists of bycatch species.

Agenda Item 7. Review of the CMMs 2018-05 and 2017-06 for bottom fisheries and protection of vulnerable marine ecosystems

25. The SSC BF reviewed and revised CMM 2018-05 (Annex E).

26. The SSC BF reviewed and revised CMM 2017-06 (Annex F).

Agenda Item 8. Review/update of the 2017-2021 Work Plan

27. The SSC BF reviewed the 2017-2021 Work Plan and updated it as detailed in NPFC-2019-SSC BF02-WP04 (Rev. 1).

Agenda Item 9. Scientific projects

9.1 Ongoing projects

9.1.1 Spatial management of VMEs and bottom fisheries

28. The Data Coordinator, Mr. Mervin Ogawa, reported on the progress of ongoing projects for the spatial management of VMEs and bottom fisheries (NPFC-2019-SSC VME04-WP07).

29. The SSC BF considered the information presented and recommended that the Scientific Committee (SC) consider using the Food and Agriculture Organization of the United Nations' (FAO) publicly-available bottom fishing areas map as a template for developing the NPFC's own bottom fishing map.

9.2 New projects

30. Canada presented a proposal for the standardization of a bycatch species list and fish species identification guides (Annex G). The SSC BF endorsed the proposal and recommended that the SC establish a small working group for the development of the combined bycatch taxa list for the Convention Area, and the development of the fish identification guide for scientific observers for the northwestern Pacific Ocean. The SSC BF participants nominated the following members of the group: Chris Rooper, Vladimir Kulik, Kyum Joon Park, Kota Sawada and Kari Fenske and noted that the list of members will be revised in the future.

Agenda Item 10. Other matters

10.1 Selection of SSC BF Chair

31. The participants from the SSC BF proposed that the SSC BF and the SSC VME could be combined into one group, given the overlap in the scope, objectives and membership of the two groups, in order to facilitate more efficient discussions and work.

32. The SSC BF endorsed the proposal and recommended that the SC combine the SSC BF and the SSC VME into one new SSC addressing VME and BF.

33. The SSC BF recommended that the SC select Dr. Chris Rooper (Canada) to serve as the Chair of the SSC addressing VME and BF, and Ms. Kari Fenske (United States) to serve as its Vice-Chair.

10.2 Other issues

34. The SSC BF noted that, in 2018, Japan and Korea had exceeded the encouraged catch levels for North Pacific armorhead that are stipulated in Paragraph 4M of CMM 2018-05, but recognized that CMM 2018-05 was not active in 2018. Japan noted that it is making active efforts to limit its catch to the aforementioned levels.

Agenda Item 11. Recommendations to the Scientific Committee

35. The SSC BF informs the SC that it endorses the following recommendations made by the VME&BF Data Workshop:
    (a) Revise CMM 2018-05 taking into account the points highlighted by the Data Workshop

as requiring further clarification or specification and based on the outcomes of the consultation among Members.

(b) Continue to conduct research on the relationship between environmental conditions and recruitment levels for North Pacific armorhead to improve timely detection of the strength of recruitment.

(c) Develop a combined bycatch taxa list at finest taxonomic resolution possible based on the lists submitted by each Member.

(d) Develop a common NPFC fish identification guide for scientific observers based on the guides presented by Japan. As part of this work, it may be useful to translate Japan's guides into each Member's language.

(e) Modify Annex 5 of CMM 2018-05 and CMM 2017-06 to address the points raised by the Data Workshop.

(f) Consider the draft Interim Guidance for Management of Scientific Data and continue its development.

36. The SSC BF recommends the following to the SC:

(a) Endorse the Interim Guidance for Management of Scientific Data (Annex D).

(b) Endorse the updated draft template for collecting scientific observer data from NPFC bottom fisheries (NPFC-2019-SSC BF02-WP02 (Rev. 1)).

(c) Endorse the revised CMM 2018-05 (Annex E).

(d) Endorse the revised CMM 2017-06 (Annex F).

(e) Endorse the updated 2017-2021 SSC BF Work Plan (NPFC-2019-SSC BF02-WP04 (Rev. 1)).

(f) Consider using the FAO's publicly-available bottom fishing areas map as a template for developing the NPFC's own bottom fishing map.

(g) Establish a small working group for the development of the combined bycatch taxa list for the Convention Area, and the development of the fish identification guide for scientific observers for the northwestern Pacific Ocean (Annex G).

(h) Combine the SSC BF and the SSC VME into one new SSC addressing VME and BF.

(i) The SSC BF recommended that the SC select Dr. Chris Rooper (Canada) to serve as the Chair of the SSC addressing VME and BF, and Ms. Kari Fenske (United States) to serve as its Vice-Chair.

Agenda Item 12. Next meeting

37. The SSC BF requests the guidance of the SC for determining the date and location of the next meeting.

Agenda Item 13. Adoption of the Report

38. The SSC BF02 Report was adopted by consensus.

Agenda Item 14. Close of the Meeting

39. The participants thanked the Chair for his hard work and excellent chairing over the past four years.

40. The meeting closed at 11:57 on 18 April 2019.

Annexes

Annex A – Agenda
Annex B – List of Documents
Annex C – List of Participants
Annex D – Revised Interim Guidance for Management of Scientific Data
Annex E – Revised CMM 2018-05 - Conservation and Management Measure for Bottom Fisheries and Protection of Vulnerable Marine Ecosystems in the Northwestern Pacific Ocean
Annex F – Revised CMM 2017-06 - Conservation and Management Measure for Bottom Fisheries and Protection of Vulnerable Marine Ecosystems in the Northeastern Pacific Ocean
Annex G – Proposal for standardization of bycatch species list and fish species identification guides

Please refer to the NPFC website for the complete annexes.

NPFC

4th Meeting of the Small Scientific Committee on Pacific Saury

19-22 April 2019

Jeju, Republic of Korea

Meeting Report

Agenda

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Agenda Item 5. Reports and recommendations from the 3rd and 4th TWG PSSA meetings, BRP/HCR/MSE Workshop and intersessional work of the TWG PSSA

Agenda Item 6. Spatial distribution of juvenile Pacific saury in the Convention Area

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- 7.1 Observer Program
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- 8.1 Ongoing/planned projects
  - 8.1.1 Stock assessment meeting
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Agenda Item 9. Other matters
- 9.1 Selection of SSC PS Chair
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Agenda Item 12. Adoption of the Report

Agenda Item 13. Close of the Meeting

MEETING REPORT

Agenda Item 1. Opening of the meeting

1. The 4th Meeting of the Small Scientific Committee on Pacific Saury (SSC PS04) took place in Jeju, Republic of Korea on 19, 20, 22 April 2019, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, Chinese Taipei, the United States of America, and Vanuatu. The meeting was opened by Dr. Toshihide Iwasaki (Japan) who served as the SSC PS Chair.

2. Dr. Seok-Gwan Choi welcomed the participants to Jeju on behalf of the host Member. He highlighted the important role of the SSC PS and commended the valuable efforts it has made to date to complete the Pacific saury stock assessment. Lastly, Dr. Choi expressed his hope that the meeting would facilitate further progress for the sustainable management of fisheries.

Agenda Item 2. Adoption of Agenda

3. The agenda was adopted without revision (Annex A). The List of Documents and Participants List are attached (Annexes B, C).

Agenda Item 3. Review of the CMM 2018-08 for Pacific saury

4. The Chair presented CMM 2018-08 for Pacific saury adopted by the Commission in July 2018. The Chair highlighted tasks from the Commission for the SC and SSC PS specified in the CMM.

Agenda Item 4. Review of Members' fisheries and research activities

5. China presented its fisheries and research activities. There were 49 active fishing vessels in the Convention Area in 2018, a decrease from 2017. Total catch was approximately 90,000 tons. Every vessel reports its position via VMS to China Overseas Fishing Association, as well as weekly catch. Logbook information is reported to Shanghai Ocean University, under the authorization of the Chinese government. In 2018, China implemented two study fleets to collect biological information on Pacific saury.

6. Russia presented its fisheries activities. Russia explained that the 2017 catch information it had initially reported in the 2017 annual report (6,315 tons) was correct and the information reported to the Technical Working Group on Pacific Saury Stock Assessment (TWG PSSA) incorrect. In 2018, nominal catch-per-unit-effort (CPUE) increased from 2017. There were four active vessels in the Convention Area and ten active vessels in the Russian EEZ, only seven of which fished for a long period.

7. Korea presented its fisheries activities. In 2018, there were 12 active vessels in the Convention Area. Total catch was approximately 23,000 tons. The total number of fishing days was 811. The fishing months are from May to December. In 2018, the set of months with the highest catch differed from that for 2001-2017. Korea is preparing fine-scale spatial distribution data and will submit them to the next meeting.

8. Japan presented its fisheries and research activities. In 2018, total catch was approximately 129,000 tons. Almost all fish were caught by stick-held dip nets. Less than 1% was caught by set nets and drift gill nets. 140 vessels, divided into two size groups (>100 tons; <50 tons), were licensed by the national government to fish for Pacific saury. 51 vessels (size: <10 tons) were licensed by prefectural governments to fish for Pacific saury. The majority of the catch was of age-1 fish (73%). From June to July 2018, Japan conducted its annual fisheries-independent survey for Pacific saury in two areas: 151 degrees east longitude to 161 degrees east longitude, and east of 170 degrees east longitude. The estimated biomass is 2,346,000 metric tons. Japan will conduct its 2019 fisheries independent survey in June and July, which should contribute to the next stock assessment. The survey will be conducted from the near coast of Japan to 165 degrees west longitude, in areas where the sea surface temperature (SST) is 9-17 degrees Celsius. Two research vessels will be used. Three types of gears will be used: sea surface trawl nets, frame nets and Neuston nets. Japan will also conduct oceanographic observations, sampling of phytoplankton, and sampling of zooplankton. Scientists from China and Russia will participate in the survey.

9. Chinese Taipei presented its fisheries and research activities. In 2018, the preliminary catch estimate is approximately 180,000 tons. The number of active vessels in the Convention Area was 83. Fishing effort was approximately 6,000 fishing days. Chinese Taipei has been conducting Pacific saury-related research on the effects of environmental factors and climate change on abundance, the spatial distribution of fishing patterns, CPUE standardizations, stock assessments, and biology.

10. Vanuatu presented its fisheries activities. In 2018, there were four active vessels in the Convention Area. Fishing effort was 277 days, a decrease from 2017. The fishing months were

July to November. Total catch was approximately 8,000 tons.

Agenda Item 5. Report and recommendations from the 3rd and 4th TWG PSSA meetings, BRP/HCR/MSE Workshop and intersessional work of the TWG PSSA

11. On behalf of the Chair of the Biological Reference Point/Harvest Control Rule/Management Strategy Evaluation (BRP/HCR/MSE) Workshop, Dr. Jie Cao (China) summarized the outputs of the workshop and presented recommendations for consideration by the SSC PS.

12. The SSC PS thanked the United States for providing a voluntary contribution for facilitating the attendance of the three invited experts at the workshop.

13. The Science Manager, Dr. Aleksandr Zavolokin, informed the SSC PS that the consultant, Dr. Laurence Kell, had updated his report on the review of target and limit reference points based on the discussions at the workshop. The report is available on the NPFC website.

14. The Chair of the TWG PSSA, Dr. Toshihide Kitakado (Japan), summarized the outputs of the 3rd and 4th TWG PSSA meetings, and the intersessional work of the TWG PSSA, and presented recommendations and stock assessment results (Annex D) for consideration by the SSC PS.

15. The SSC PS commended the TWG PSSA for the significant amount of work it has done and great progress it has made, as well as the TWG PSSA Chair for his dedicated work and leadership.

16. The SSC PS thanked the United States for providing a voluntary contribution for facilitating the attendance of an invited expert at the 3rd and 4th TWG PSSA meetings.

17. The SSC PS adopted the reports of the 3rd and 4th TWG PSSA meetings and endorsed the recommendations from the meetings. The endorsed recommendations are listed under paragraph 41.

18. The SSC PS endorsed the estimates of reference quantities based on the stock assessment results (Annex D) provided by the TWG PSSA04: Based on combined model estimates, B was below Bmsy (B/Bmsy during 2016-2018 = 0.82) and F was below Fmsy (F/Fmsy during 2015-2017 = 0.82). Results indicate that the stock declined from near carrying capacity in the mid-2000's after a period of high productivity to current levels. Exploitation rates were increasing slowly during this period but remained lower than Fmsy. Point estimates indicate that stock biomass fell to the lowest value since 1980 (B/Bmsy = 0.63) in 2017, then increased to Bmsy in 2018. Biomass estimates show long-term fluctuations and interannual variability.

Agenda Item 6. Spatial distribution of juvenile Pacific saury in the Convention Area

19. Japan presented a summary of available biological and ecological information on age-0 Pacific saury relevant to CMM 2018-08, including relevant literature, differences in distribution and migration between ages, and length at maturity (NPFC-2019-SSC PS04-IP01 and 02). Based on a review of this information, Japan suggested that age-0 fish are abundant east of 165 degrees east longitude during June to July and it is unlikely that a large proportion of age-0 fish will migrate into fishing grounds in the main fishing season (August to November) of the same year.

20. SSC PS recognized the importance of the definition of juvenile as it pertains to Pacific saury. Juvenile Pacific saury was defined as immature fish according to the following definitions of juvenile given by some organizations:
    (a) A young fish or animal that has not reached sexual maturity[1].
    (b) One of several marked phases or periods in the development and growth of many animals. The life history stage of an animal that comes between the egg or larval stage and the adult stage; juveniles are considered immature in the sense that they are not yet capable of reproducing, yet they differ from the larval stage because they look like smaller versions of the adults[2].
    (c) An immature fish, i.e. one that has not reached sexual maturity (but could still be larger than the minimum landing size – MLS)[3].
    (d) Larva are defined as 0-30 days old. Juveniles are from 1 month to 3 months. Young fish are defined as 3 – 6 months old. Immature fish are 6 – 9 months old. Adult Pacific saury are defined as fish older than 9 months[4,5].

21. The SSC PS concluded that the spawning season of Pacific saury ranges from autumn to spring[6].

22. The SSC PS noted the seasonal observed differences in minimum length at maturity are as follows:

[1] Roberts K.J. et al., 1995. Defining fisheries: a user's glossary. Louisiana State University, Louisiana, USA, 22 p. (Rev.)
[2] New England Fishery Management Council. https://www.nefmc.org/files/Glossary.pdf.
[3] Joint Nature Conservation Committee. http://jncc.defra.gov.uk/pdf/glossary.pdf.
[4] Tian Y., Akamine T., Suda M. 2004. Modeling the influence of oceanic–climatic changes on the dynamics of Pacific saury in the northwestern Pacific using a life cycle model[J]. Fisheries Oceanography, 13(S1): 125-137.
[5] Ito S., Kishi J. M., Kurita Y., et al. 2004. Initial design for a fish bioenergetics model of Pacific saury coupled to a lower trophic ecosystem model[J]. Fisheries Oceanography, 13(S1): 111-124.
[6] Fuji T., Suyama S., Vijai D., Kidokoro H. and Iwasaki T. 2017. Stock identity, spawning ground, maturation, and migration of Pacific saury, *Cololabis saira*. NPFC-2017-TWG PSSA02-WP07.

(a) Autumn: 26.0-28.7 cm[7,8]
(b) Winter (main spawning season): 25.4 cm[9]
(c) Spring: 27.0-29.4 cm[10]
(d) August-November: 25 cm[6,11]

23. Under experimental conditions, which differ in terms of feeding condition and water temperature, etc., from the natural condition described in paragraph 22, the minimum length of male and female fish that had matured was 23.5 and 22.4 cm, respectively.[12]

24. Considering the annual variation in survey results, the SSC PS concluded that age-0 Pacific saury are abundant east of 165-170 degrees east during June to July, when age-0 fish have not reached sexual maturity, and most of them are unlikely to migrate into fishing grounds in the main fishing season (August to November) of the same year. Both immature fish and adults are under fishing pressure[13,14,15,16].

25. The SSC PS recognized that further analyses on length at maturity and age composition over time and space may be beneficial for management and stock assessment. The SSC PS agreed to examine the amount of data available for maturity and length, and fit a logistic curve to maturity data considering all spatial or temporal combinations that are relevant and possible.

Agenda Item 7. Data collection and management

7.1 Observer Program

26. The Science Manager presented a draft template for identification of scientific data which can be collected and/or validated by at-sea observers, fishermen, electronic reporting systems and other means for Pacific saury (NPFC-2019-SSC PS04-WP02). The SSC PS reviewed and

[7] Suyama S. 2002. Study on the age, growth, and maturation process of Pacific saury *Cololabis saira* (Brevoort) in the North Pacific. Bull Fish Res Agen 5: 68-113.
[8] Huang W.-B. and Huang Y.-C. 2015. Maturity characteristics of Pacific saury during fishing season in the northwest Pacific. J Mar Sci Tech 23: 819-826.
[9] Hatanaka M., Watanabe T., Sekino K., Kosaka M., Kimura K. 1953. Studies on the reproduction of the saury, *Cololabis saira* (Brevoort), of the Pacific coast of Japan. Tohoku J Agric Res 3: 293-302.
[10] Kurita Y. 2006. Regional and interannual variations in spawning activity of Pacific saury *Cololabis saira* during northward migration in spring in the north-western Pacific. Biol Fish 69: 846-859.
[11] Fuji T., Suyama S. and Oshima K. 2019. Available information of growth, maturation and mortality for future stock assessment and management of Pacific saury, *Cololabis saira*. NPFC-2019-TWG PSSA04-WP02.
[12] Nakaya M., Morioka T., Fukunaga K., Murakami N., Ichikawa T., Sekiya S., Suyama S. (2010) Growth and maturation of Pacific saury *Cololabis saira* under laboratory conditions. Fisheries Science 76: 45-53
[13] Fuji T., Suyama S., Kidokoro H., Abo J., Miyamoto H. and Vijai D. 2018. Consideration of precautionary approach to sustain the Pacific saury stock and fishery based on spatial distribution of immature age-0 fish. NPFC-2018-SSC PS03-WP01.
[14] Suyama S., Miyamoto H., Naya M., Fuji T., Hashimoto M., Oshima K., Nakayama S. and Iwasaki T. 2018. Update of biomass estimate through Japanese fishery independent survey for Pacific saury in 2018. NPFC-2018-TWG PSSA03-WP09 (Rev. 1).
[15] Suyama S., Nakagami M., Naya M. and Ueno Y. 2012. Migration route of Pacific saury *Cololabis saira* inferred from the otolith hyaline zone. Fisheries Science, 78: 1179–1186.
[16] Suyama S., Ozawa H., Shibata Y., Fuji T., Nakagami M. and Shimizu A. 2019. Geographical variation in spawning histories of age-1 Pacific saury *Cololabis saira* in the North Pacific Ocean during June and July. Fisheries Science DOI: 10.1007/s12562-019-01308-0.

updated the template (Annex E).

7.2 Data sharing

27. The Science Manager updated the SSC PS on progress in data sharing.

28. The SSC PS reviewed the shared data and noted the need to share biological data, such as catch-at-size and catch-at-age data, for work towards the use of age-structured stock assessment models. The SSC PS reviewed a table of the availability of such data.

Agenda Item 8. Review/update of the 2017-2021 Work Plan

8.1 Ongoing/planned projects

8.1.1 Stock assessment meeting

29. The SSC PS agreed to hold stock assessment meetings twice a year in 2019-2020. The SSC PS suggested that the next two stock assessment meetings should be four days each, subject to possible change based on intersessional discussions.

8.1.2 Spatial/temporal map of Members' catch and effort

30. The Data Coordinator, Mr. Mervin Ogawa, reported on the progress of an ongoing project for the development of the spatial/temporal map of Members' Pacific saury catch and effort (NPFC-2019-SSC VME04-WP07).

31. The SSC PS reviewed the spatial/temporal map of Members' Pacific saury catch and effort and suggested holding further discussions intersessionally.

8.1.3 Expert to review Pacific saury stock assessment

32. The SSC PS recognized the significant contributions made by Dr. Larry Jacobson to the work of the TWG PSSA and recommended that the SC recommend that the Commission fund the participation of Dr. Jacobson (or an expert with similar qualifications and experience) in the next Pacific saury meetings.

8.2 New projects

33. No new projects were proposed.

8.3 2017-2021 Work Plan

34. The SSC PS drafted a two-year workplan for the stock assessment and management of Pacific saury (NPFC-2019-SSC04-IP03).

35. The SSC PS reviewed the 2017-2021 Work Plan and updated it as detailed in NPFC-2019-SSC

PS04-WP03 (Rev. 1).

Agenda Item 9. Other matters

9.1 Selection of SSC PS Chair

36. The participants from the SSC PS proposed that the SSC PS and the TWG PSSA be combined into one group, given the overlap in the scope, objectives and membership of the two groups, to facilitate more efficient discussions and work.

37. The SSC PS endorsed the proposal and recommended that the SC combine the SSC PS and the TWG PSSA into one new SSC.

38. The SSC PS recommended that the SC select Dr. Toshihide Kitakado (Japan) to serve as the Chair of the new SSC.

39. The SSC PS recommended that the SC recommend that the Commission consider allowing more flexibility (i.e. multiple extensions) in the terms for the Chairs of the SC's subsidiary bodies.

9.2 Other issues

40. No other matters were discussed.

Agenda Item 10. Recommendations to the Scientific Committee

41. The SSC PS informs the SC that it endorses the following recommendations made by the TWG PSSA:

TWG PSSA03 meeting

(a) Continue developing a single joint CPUE index to resolve different patterns in standardized indices among Members and to enable the calculation of the CPUE with higher spatial and temporal coverage;
(b) Update the shared data for a single joint CPUE index for future stock assessment; and
(c) Provide the TWG PSSA with a secure space for collaborative work, such as GitHub.

TWG PSSA04 meeting

(a) The participants recommended that the SC draft rules to address submission, revision and treatment of scientific papers before and during meetings, and submit the rules to the Commission for consideration.
(b) The participants recommended that the SSC PS endorse the stock assessment report.
(c) The participants recommended considering sharing more data for improving the current stock assessment and developing future ones.
(d) The participants recognized the contribution by the invited expert in facilitating the work

of the TWG PSSA and recommended inviting Dr. Larry Jacobson (or an expert with similar qualifications and experience) to also attend the next TWG PSSA meetings.

42. The SSC PS recommends the following to the SC:
    (a) The SSC PS recommends that the SC endorse the stock assessment report from the TWG PSSA04 (Annex D).
    (b) According to the stock assessment results by TWG PSSA04, the SSC PS recommends that further measures should be taken effectively to avoid the increasing trend in the exploitation rate to sustain biomass.
    (c) The SSC PS recommends that Members share more data (e.g. size-at-maturity measurements, catch-at-size data and catch-at-age data, etc.) for improving the current stock assessment and developing future stock assessments.
    (d) The SSC PS recommends that the SC endorse the updated table for identification of scientific data which can be collected and/or validated by at-sea observers, fishermen, electronic reporting systems and other means for Pacific saury (Annex E).
    (e) The SSC PS recommends that the SC recommend that the Commission fund the participation of Dr. Larry Jacobson (or an expert with similar qualifications and experience) in the next Pacific saury meetings.
    (f) The SSC PS recommends that the SC endorse the updated 2017-2021 SSC PS Work Plan (NPFC-2019-SSC PS04-WP03 (Rev. 1)).
    (g) The SSC PS recommends that the SC combine the SSC PS and the TWG PSSA into one new SSC.
    (h) The SSC PS recommends that the SC select Dr. Toshihide Kitakado (Japan) to serve as the Chair of the new SSC.
    (i) The SSC PS recommends that the SC determine the Terms of Reference (TORs) for the new SSC which should include the TORs of the TWG PSSA.
    (j) The SSC PS recommends that the SC recommend that the Commission consider allowing more flexibility (i.e. multiple extensions) in the terms for the Chairs of the SC's subsidiary bodies.
    (k) The SSC PS noted the definitions of juvenile as it pertains to Pacific saury, its spawning season, its seasonal change in minimum length at maturity and areas where age-0 Pacific saury are abundant (paragraphs 20-24).
    (l) The SSC PS agreed to examine the amount of data available for maturity and length of Pacific saury, and fit a logistic curve to available maturity data considering all spatial or temporal combinations that are relevant and possible.

Agenda Item 11. Next meeting

43. The SSC PS suggested that its next meeting should be held in fall 2019. The SSC PS suggested

it to be four days long, subject to possible change based on intersessional discussions.

Agenda Item 12. Adoption of the Report

44. The SSC PS04 Report was adopted by consensus.

Agenda Item 13. Close of the Meeting

45. The SSC PS thanked the Chair for his hard work and excellent chairing over the past four years.

46. The meeting closed at 12:19 on 22 April 2019.

Annexes

Annex A – Agenda
Annex B – List of Documents
Annex C – List of Participants
Annex D – Stock Assessment Report for Pacific Saury
Annex E – Scientific data which can be collected and/or validated by at-sea observers, fishermen, electronic reporting systems and other means for Pacific saury

Please refer to the NPFC website for the complete annexes.

NPFC

4th Scientific Committee Meeting

23-26 April 2019
Jeju, Republic of Korea
Meeting Report

Agenda

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Agenda Item 2. Adoption of Agenda

Agenda Item 3. Meeting arrangements

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MEETING REPORT

Agenda Item 1. Opening of the Meeting

1. The 4th Meeting of the Scientific Committee (SC) took place in Jeju, Republic of Korea on 23-26 April 2019, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, Chinese Taipei, the United States of America and Vanuatu. The European Union and the North Pacific Anadromous Fish Commission (NPAFC) attended as observers. The meeting was opened by Dr. Joji Morishita (Japan) who served as the SC Chair.

2. Mr. Dong Yeob Yang, Director-General, Ministry of Oceans and Fisheries of the Republic of Korea, welcomed the participants to Jeju on behalf of the host Member. He highlighted the important role played by the SC, as well as the scientific research and surveys conducted by the NPFC Members, for the sustainable use and conservation of fisheries resources in the North Pacific Ocean. Mr. Yang also commended the NPFC for the successful and constructive holding of the NPFC's small scientific committee (SSC) meetings over the past few days. Lastly, he expressed his hope that the SC meeting would yield fruitful outcomes that would lay the foundation for the development of management measures for the ecosystems in the North Pacific Ocean and contribute to the discussions of the upcoming Commission meeting.

Agenda Item 2. Adoption of Agenda

3. The agenda was adopted without revision (Annex A). The List of Documents and Participants List are attached (Annexes B, C).

Agenda Item 3. Meeting arrangements

4. The Science Manager, Dr. Aleksandr Zavolokin, outlined the meeting arrangements.

Agenda Item 4. Review of reports and recommendations from the Small Scientific Committees (SSCs), Technical Working Group on Chub Mackerel Stock Assessment and BRP/HCR/MSE Workshop

4.1 SSC on Vulnerable Marine Ecosystems (SSC VME)

5. The Chair of the SSC VME, Dr. Bai Li (China), summarized the outcomes and recommendations of the 4th SSC VME meeting (NPFC-2019-SSC VME04-Final Report).

6. The SC reviewed the recommendations of the SSC VME and endorsed the following recommendations:
   (a) Endorse a plan and timelines to determine the type and resolution of data to be shared for SAI assessment and a map of combined fishing footprint and effort.
   (b) Endorse a flowchart for VME post-encounter treatment in the NPFC and continue developing the details of the post-encounter measure intersessionally.
   (c) Conduct further research to define the range of the two VME sites identified in NPFC-2019-SSC VME04-WP02 and close them to fishing.
   (d) Endorse the revised CMM 2018-05.
   (e) Endorse the revised CMM 2017-06.
   (f) Consider using the FAO's publicly-available Vulnerable Marine Ecosystems Map as a template for developing the NPFC's own VME map.
   (g) Consider the holding of a course/school on VME indicator taxa identification as a new project.
   (h) Endorse the draft guide and a list of specifications regarding the design and content of the common VME taxa identification guide in the western North Pacific Ocean.
   (i) Endorse the updated 2017-2021 SSC VME Work Plan (NPFC-2019-SSC VME04-WP05 (Rev. 1)).

7. Based on recommendation (a) of the SSC VME, the SC observed that the SSC VME agreed to continue discussions about data sharing intersessionally, with the aim of reaching a consensus on the type and resolution of data by mid-June and sharing data by November 2019. The outcomes of this intersessional work will be reported by the SC Chair to the Commission for adoption, if needed.

8. Based on recommendation (c) of the SSC VME, the SC agreed to conduct further research to define the range of the two VME sites identified in NPFC-2019-SSC VME04-WP02 with the potential to close them to fishing.

9. The SC reviewed and endorsed the revisions proposed by the SSC VME to CMM 2018-05 (Annex D) and CMM 2017-06 (Annex E) in relation to the reporting of VME encounters to the NPFC Secretariat as soon as possible and also reporting of detailed information about VME encounters in the annual reports of the Members.

10. Based on recommendation (f) of the SSC VME, the SC considered and endorsed the use of the

FAO's publicly-available Vulnerable Marine Ecosystems Map as a template for developing the NPFC's own VME map.

11. The SC considered recommendation (g) of the SSC VME regarding the holding of an international course on VME indicator taxa identification as a new project, and requested more information. Russia provided further details including the aim, intended participants, course content, estimated duration, number of lecturers, and estimated costs. The SC endorsed the proposal and included it as part of its list of proposed scientific projects (Annex F). The SC also considered the possibility of conducting this course in collaboration with the North Pacific Marine Science Organization (PICES), which has extensive experience in holding such courses, or other organizations.

4.2 SSC on Bottom Fish (SSC BF)

12. The Chair of the SSC BF, Dr. Taro Ichii (Japan), summarized the outcomes and recommendations of the 2nd SSC BF meeting (NPFC-2019-SSC BF02-Final Report).

13. The SC reviewed the recommendations of the SSC BF and endorsed the following recommendations:
    (a) Endorse the Interim Guidance for Management of Scientific Data.
    (b) Endorse the updated draft template for collecting scientific observer data from NPFC bottom fisheries (NPFC-2019-SSC BF02-WP02 (Rev. 1)).
    (c) Endorse the revised CMM 2018-05.
    (d) Endorse the revised CMM 2017-06.
    (e) Endorse the updated 2017-2021 SSC BF Work Plan (NPFC-2019-SSC BF02-WP04 (Rev. 1)).
    (f) Consider using the FAO's publicly-available bottom fishing areas map as a template for developing the NPFC's own bottom fishing map.
    (g) Establish a small working group for the development of the combined bycatch taxa list for the Convention Area, and the development of the fish identification guide for scientific observers for the northwestern Pacific Ocean.
    (h) Combine the SSC BF and the SSC VME into one new SSC addressing VME and BF.
    (i) Select Dr. Chris Rooper (Canada) to serve as the Chair of the SSC addressing VME and BF, and Ms. Kari Fenske (United States) to serve as its Vice-Chair.

14. The SC reviewed and endorsed the revisions proposed by the SSC BF to CMM 2018-05 (Annex D) in relation to the monitoring survey for the adaptive management of North Pacific armorhead.

15. The SC reviewed and endorsed the revisions proposed by the SSC BF to CMM 2018-05 (Annex D) and CMM 2017-06 (Annex E) in relation to the type and format of scientific observer data to be collected in accordance with Annex 5 of each of the CMMs.

16. Based on recommendation (f) of the SSC BF, the SC considered and endorsed the use of the FAO's publicly-available bottom fishing areas map as a template for developing the NPFC's own bottom fishing map.

17. Based on recommendation (g) of the SSC BF, the SC agreed to establish a small working group for the development of the combined bycatch taxa list for the Convention Area, and the development of the fish identification guide for scientific observers for the northwestern Pacific Ocean. The SC included this work in its work plan (Annex G) and its list of scientific projects (Annex F).

18. Based on recommendation (h) of the SSC BF, the SC agreed to combine the SSC VME and the SSC BF into the new SSC for Bottom Fish & Marine Ecosystems (SSC BF-ME). The SC drafted and adopted the Terms of Reference (TOR) for the SSC BF-ME (Annex H).

4.3 SSC on Pacific Saury (SSC PS)

19. The Chair of the SSC PS, Dr. Toshihide Iwasaki (Japan), summarized the outcomes and recommendations of the 4th SSC PS meeting (NPFC-2019-SSC PS04-Final Report).

20. The SC reviewed the recommendations of the SSC PS and endorsed the following recommendations:
    (a) The SSC PS recommends that the SC endorse the stock assessment report from the TWG PSSA04.
    (b) According to the stock assessment results by TWG PSSA04, the SSC PS recommends that further measures should be taken effectively to avoid the increasing trend in the exploitation rate to sustain biomass.
    (c) The SSC PS recommends that Members share more data (e.g. size-at-maturity measurements, catch-at-size data and catch-at-age data, etc.) for improving the current stock assessment and developing future stock assessments.
    (d) The SSC PS recommends that the SC endorse the updated table for identification of scientific data which can be collected and/or validated by at-sea observers, fishermen, electronic reporting systems and other means for Pacific saury.
    (e) The SSC PS recommends that the SC recommend that the Commission fund the participation of Dr. Larry Jacobson (or an expert with similar qualifications and experience) in the next Pacific saury meetings.

(f) The SSC PS recommends that the SC endorse the updated 2017-2021 SSC PS Work Plan (NPFC-2019-SSC PS04-WP03 (Rev. 1)).

(g) The SSC PS recommends that the SC combine the SSC PS and the TWG PSSA into one new SSC.

(h) Select Dr. Toshihide Kitakado (Japan) to serve as the Chair of the new SSC.

(i) The SSC PS recommends that the SC determine the Terms of Reference (TORs) for the new SSC which should include the TORs of the TWG PSSA.

(j) The SSC PS recommends that the SC recommend that the Commission consider allowing more flexibility (i.e. multiple extensions) in the terms for the Chairs of the SC's subsidiary bodies.

(k) The SSC PS noted the definitions of juvenile as it pertains to Pacific saury, its spawning season, its seasonal change in minimum length at maturity and areas where age-0 Pacific saury are abundant (NPFC-2019-SSC PS04-Final Report, paragraphs 20-24).

(l) The SSC PS agreed to examine the amount of data available for maturity and length of Pacific saury, and fit a logistic curve to available maturity data considering all spatial or temporal combinations that are relevant and possible.

21. The SC recognized and commended the significant work done by the SSC PS and the Technical Working Group on Pacific Saury Stock Assessment (TWG PSSA) to produce a consensus stock assessment.

22. The SC endorsed the stock assessment report from the TWG PSSA and the estimates of reference quantities based on the stock assessment results provided by the TWG PSSA: Based on combined model estimates, B was below Bmsy (B/Bmsy during 2016-2018 = 0.82) and F was below Fmsy (F/Fmsy during 2015-2017 = 0.82). Results indicate that the stock declined from near carrying capacity in the mid-2000's after a period of high productivity to current levels. Exploitation rates were increasing slowly during this period but remained lower than Fmsy. Point estimates indicate that stock biomass fell to the lowest value since 1980 (B/Bmsy = 0.63) in 2017, then increased to Bmsy in 2018. Biomass estimates show long-term fluctuations and interannual variability.

23. The SC considered the results of the stock assessment conducted by the TWG PSSA and recommended that the Commission consider further management measures for avoiding an increasing trend in the exploitation rate of Pacific saury to sustain biomass.

24. The SC recognized the significant contributions made by Dr. Larry Jacobson to the work of the TWG PSSA and recommended that the Commission fund the participation of Dr. Larry

Jacobson (or an expert with similar qualifications and experience) in the next Pacific saury meetings.

25. Based on recommendations (g) – (i), the SC agreed to combine the SSC PS and the TWG PSSA as a new SSC PS. The SC held initial discussions on the development of the TOR for the new SSC PS and requested that the SSC PS develop a draft TOR at its next meeting for submission to and adoption at the SC05 meeting.

26. The SC recognized the specialized nature of the subjects and tasks that its subsidiary bodies deal with, and noted that allowing Chairs to serve more than two consecutive terms would provide greater consistency and continuity of expertise to its subsidiary bodies. The SC therefore recommended that the Commission allow multiple extensions of the terms of the Chairs of the SC's subsidiary bodies, if necessary.

27. The SC recognized the importance of defining juvenile as it pertains to Pacific saury and considered the initial review of available information conducted by the SSC PS. The SSC PS noted differences in the definition of juvenile among different organizations, seasonal observed minimum length at maturity, and minimum length at maturity between experimental and natural conditions. The SSC PS concluded that age-0 Pacific saury are abundant east of 165-170 degrees east during June to July, when age-0 fish have not reached sexual maturity, and most of them are unlikely to migrate into fishing grounds in the main fishing season (August to November) of the same year. Furthermore, the SSC PS concluded that both immature fish and adults are under fishing pressure. The SC recognized that further research is needed, and endorsed the work proposed by the SSC PS to further analyze maturity and length data for Pacific saury.

4.4 Technical Working Group on Chub Mackerel Stock Assessment (TWG CMSA)

28. The Chair of the TWG CMSA, Dr. Oleg Katugin (Russia), summarized the outcomes and recommendations of the 2nd TWG CMSA meeting (NPFC-2019-TWG CMSA02-Final Report).

29. The SC reviewed the recommendations of the TWG CMSA and endorsed the following recommendations:
    (a) The TWG CMSA agreed to use abundance indices derived from Japan's summer recruitment survey, autumn recruitment survey, and dip-net fishery, as well as Russia's historical chub mackerel fisheries as candidate indices.
    (b) The TWG CMSA agreed to explore the possibility of using abundance indices derived from Japan's spring recruitment survey, Russia's resumed chub mackerel fisheries, China's chub mackerel fisheries, and Japan's purse seine fishery as candidate indices.

(c) The TWG CMSA agreed to further discuss using three reference cases for natural mortality for operating models: the median value for M, the mean value for M, and age-specific mortality from NPFC-2019-TWG CMSA02-WP01 (Rev. 2).
(d) The TWG CMSA agreed to test the following five stock assessment models using the operating model: a SAM model, a VPA model, an ASAP model, a KAFKA model, and a state-space production model.
(e) The TWG CMSA recommended that the SC endorse the Protocol of the Operating Model Development.
(f) The TWG CMSA agreed to use PopSim as the platform for the operating model.
(g) The TWG CMSA agreed that the basic operating model has no spatial structure and agreed to consider spatially-structured models as future work.
(h) The TWG CMSA agreed that the operating model has an age-based structure rather than length-based structure according to the availability of the existing data, and that the starting year of operating model is 1970.
(i) The TWG CMSA agreed on the list of possible and compulsory performance measures for evaluating the candidate stock assessment models.
(j) The TWG CMSA agreed to share data to estimate parameters for the operating model using the candidate stock assessment models.
(k) The TWG CMSA recommended that the SC endorse the TWG CMSA's proposal of seeking an external expert to support the development of the operating model and inviting him/her to attend the next TWG CMSA meeting.
(l) The TWG CMSA recommended that the SC endorse the updated TWG CMSA Work Plan.
(m) The TWG CMSA agreed to extend the term of the current Chair, Dr. Oleg Katugin, for two more years.
(n) The TWG CMSA recommended that the next TWG CMSA meeting should be held at the end of 2019 or in early 2020, and if necessary SWG OM CMSA will meet informally prior to TWG CMSA03.

30. Japan stated that chub mackerel is mainly distributed around Japan for most of its life history including its spawning grounds. Japan has been conducting responsible management of the species using TAC based on its own stock assessment. Chub mackerel catch has been increasing in the Convention Area due to increasing stock abundance because of recent high recruitment and appropriate management. The recent stock increase was a result of a single dominant year class, thus it is expected that stocks will decrease in the future. Following Convention Article 3i of the NPFC, management should be consistent with Japanese domestic management. In the BRP/HCR/MSE Workshop in March 2019, the Workshop recommended that the construction of MSE would be the highest priority for the stock assessment of chub

mackerel. It is also pointed out that uncertainty for the Japanese stock assessment of the species prevents the taking of appropriate management measures for the Convention Area based on stock assessment. Considering the current chub mackerel fisheries status and the stock assessment progress made by the TWG CMSA, Japan suggested that further increase of fishing effort in the Convention Area be avoided to be consistent with the precautionary principle until the stock assessment is completed and a recommended sustainable level of fishing is available.

31. Russia echoed the concern on a possible increase in fishing effort for chub mackerel in the Convention Area, and pointed out that, at this stage, the existing CMM 2018-07 For Chub Mackerel is sufficient to address this issue.

4.5 Biological Reference Point/Harvest Control Rule/Management Strategy Evaluation Workshop (BRP/HCR/MSE) Workshop

32. The Chair of the BRP/HCR/MSE Workshop, Mr. Luoliang Xu, summarized the outcomes and recommendations of the workshop.

33. The SC reviewed the recommendations of the BRP/HCR/MSE Workshop and endorsed the following recommendations:
    (a) The Workshop recommended conducting MSE for only one species at a time due to the resource-intensive and complex nature of the process. Because chub mackerel is a longer-lived species than Pacific saury and more stock assessment data are available, enabling the operating model to be conditioned, the Workshop recommended conducting MSE for chub mackerel as the first priority (See Punt et al. 2016 for best practices).
    (b) For Pacific saury, the Workshop recommended to consider developing an age-structured operating model for use in simulation work to identify and evaluate potential reference points (for example Blim and Ftarget). It is suggested that initial simulation work focus on constant F runs (e.g. to investigate MSY-based reference points, Blim and Ftarget) and empirical HCR (e.g. taking a constant proportion of the estimated survey biomass). Model-based and empirical HCR could both be considered when a full MSE is undertaken.
    (c) For chub mackerel, the Workshop recommended considering to conduct initial assessments with a range of models, which could be used in a subsequent MSE.
    (d) The Workshop recommended that the SC propose to the Commission to explore the possibility of creating an intermediary group consisting of scientists, managers and stakeholders, as needed, when conducting an MSE.
    (e) Consideration could be given to the role of small pelagic fish in the ecosystem as key low trophic level stocks and also to climate variability when setting the reference points.

Agenda Item 5. Progress in data collection, management and security

34. The Science Manager provided a summary of the status of Members' annual reports for 2018 (NPFC-2019-SC04-IP01 (Rev. 2)) and informed the SC that annual summary footprints for bottom fish, Pacific saury, chub and spotted mackerels, Japanese sardine, and squids are available on the NPFC website.

35. The SC discussed the need to report data for measuring effort and analyzing trends in effort as accurately as possible. In particular, the SC noted that it would be useful to report information on the number of vessels licensed to fish for the priority species of the NPFC as this would enable the measurement of latent effort. At the same time, the SC recognized that there are various factors that make it difficult to report such data for certain species, for example because they are caught within and outside Members' exclusive economic zones or by several types of gear. The SC noted that the reporting of information on the number of licensed vessels may also facilitate the work of the Technical and Compliance Committee (TCC).

5.1 Data reporting templates

36. The Science Manager reported on the progress in developing standardized templates for data collection and reporting for bottom fish (complete), Pacific saury (complete), chub and spotted mackerels (not yet started; to be developed when the stock assessment model and corresponding data requirements are decided), Japanese sardine (not yet started), and squids (not yet started).

5.2 Observer Program

37. The Science Manager presented a template for collecting scientific observer data from NPFC bottom fisheries and a table for identification of scientific data which can be collected and/or validated by at-sea observers, fishermen, electronic reporting systems and other means for Pacific saury (Annex I).

38. The SC reviewed the work done and agreed to continue to develop the scientific aspects of the regional observer program, while recognizing the need to distinguish between the scientific and compliance aspects of the program.

5.3 Information management and security regulations

5.3.1 Interim Guidance for Management of Scientific Data

5.3.2 Regulations for management of scientific meeting documents

39. The Science Manager presented the Interim Regulations for Management of Scientific Data and Information (NPFC-2019-SC04-WP01 (Rev. 1)), which includes the Interim Guidance for Management of Scientific Data and regulations for management of scientific meeting

documents, meeting reports and intersessional communications on the NPFC website.

40. The SC reviewed and revised the Interim Regulations for Management of Scientific Data and Information (Annex J). The SC recommended that the Commission endorse the regulations for use by the SC and its subsidiary bodies on an interim basis.

5.4 NPFC data management system

5.4.1 Update on the developments since the previous SC meeting

5.4.2 Electronic Annual Report

41. The Data Coordinator, Mr. Mervin Ogawa, reported on the progress in the development of the SC-related data management system (NPFC-2019-SC04-WP03). This includes improvement of the user interface of the NPFC Collaboration site; launch of a new Meeting Management System; development of preliminary spatial maps for VME and bottom fisheries, and Pacific saury catch and effort; and development of a prototype Electronic Annual Report.

42. The SC recognized the good progress made by the Secretariat and requested that the Secretariat continue developing the SC-related data management system, with comments and advice to be provided by Members.

43. The SC discussed the development of preliminary spatial maps for VME and bottom fisheries, and Pacific saury catch and effort, and made the following recommendations:
    (a) The SC recommends that Pacific saury catch and effort data be displayed on a publicly accessible map on the NPFC website in 1x1 degree cells for each month for both the national waters and for NPFC Convention Area cells. The map should show a small, medium, or large circle in each monthly 1x1 degree cell representing the catch or effort (different layers) for data from all Members. The size of the circle to be shown in each grid cell and month will be as follows: The small circles will represent catch (or effort) values equal to or smaller than the median catch (or effort) for that month from all Members' data minus the median absolute deviation. The large circles will represent catch values equal to or larger than the median plus the median absolute deviation. A medium circle will represent median catch levels that fall between the small and large circles.
    (b) Months and cells with no catch or with no effort will have no symbol. This will allow for the public to see relative catch and effort data for Pacific saury, without revealing specific catch or effort data values or identifying which Members are represented.
    (c) Catch and effort map specifications for other species will be determined on a case-by-case basis.

Agenda Item 6. Scientific projects for 2019 and 2020

6.1 Ongoing/planned projects

6.2 New projects

6.3 Review and prioritization of projects

44. The Science Manager presented a draft list of scientific projects that were discussed above and during the SSC meetings.

45. The SC reviewed and revised the list of proposed scientific projects, and endorsed it for consideration by the Commission (Annex F).

46. As the SC noted at its previous meeting, the scope of the scientific activities of the NPFC continues and will continue to grow, as illustrated by the intensive schedule of scientific meetings and projects planned for the end of 2019 and the beginning of 2020. In light of this, the SC recognized the potential need to provide greater support for the Secretariat in the future, for example through the enhanced capacity of the Secretariat itself, support from external suppliers, or assistance from Members.

Agenda Item 7. 2017-2021 Research Plan and Work Plan

47. The SC reviewed and revised its Work Plan (Annex G), which shall be included in the 2017-2021 Research Plan.

48. The SC agreed to transition to five-year rolling research and work plans from 2020 onwards, and requested that each of its subsidiary bodies prepare corresponding five-year rolling work plans (i.e. 2020-2024) for the relevant priority areas, for submission to the SC05 meeting.

Agenda Item 8. Cooperation with other organizations

49. The Science Manager presented a compiled list of cooperation opportunities and requests from other organizations, for consideration by the SC (NPFC-2019-SC04-IP05).

8.1 Joint PICES-NPFC Study Group (PICES-NPFC SG)

50. The Co-Chair of the PICES-NPFC SG, Dr. Vladimir Kulik (Russia), presented an update on the intersessional work of the SG, including a draft NPFC-PICES Framework for Enhanced Scientific Collaboration in the North Pacific (NPFC-2019-SC04-WP02).

51. The SC recognized the merits of cooperation between the NPFC and PICES in the areas of their joint interest which are (i) support for stock assessment for priority species; (ii) vulnerable marine ecosystems; and (iii) ecosystem approach to fisheries.

52. The SC reviewed and endorsed the framework (Annex K). The SC thanked the Co-Chairs, Dr.

Vladimir Kulik and Mr. Eddy Kennedy, for their leadership in advancing the work of the SG.

53. Canada presented a proposal from PICES to hold a joint PICES-NPFC workshop on *The influence of environmental changes on the potential for species distributional shifts and subsequent consequences for estimating abundance of Pacific saury* at the PICES Annual Meeting in Victoria, Canada, in October 2019 (NPFC-2019-SC04-WP02).

54. The SC endorsed the holding of the joint PICES-NPFC workshop mentioned above. The SC nominated Dr. Bai Li to attend the workshop on behalf of the NPFC as an invited speaker and give a presentation on a collaborative analysis of Member CPUE data with regards to environmental and distributional changes of Pacific saury, and recommended that the Commission provide travel support for Dr. Li's participation.

8.2 NPAFC's multinational survey in the North Pacific

55. NPAFC shared an update about the NPAFC's International Year of the Salmon (IYS) surveys in the high seas of the North Pacific (NPFC-2019-SC04-IP04). The IYS successfully conducted its first international research survey in the Gulf of Alaska in February-March 2019 and started drafting a program for a large-scale pan-Pacific multinational ecosystem survey in the high seas of the North Pacific in the near future.

56. The Science Manager informed the SC that the NPFC is invited to attend a NPAFC-PICES workshop on *Developing a collaborative, integrated ecosystem survey program to determine climate/ocean mechanisms affecting the productivity and distribution of salmon and associated pelagic fishes across the North Pacific Ocean* in Victoria, Canada, in October 2019 and take part in the development of the program (NPFC-2019-SC04-IP04).

57. The SC recognized the benefits of the NPFC's continued participation in the IYS survey program and endorsed the NPFC's participation in the NPAFC-PICES workshop. The SC endorsed the participation of the Science Manager as the workshop convener and nominated Dr. Chris Rooper to attend on behalf of the NPFC.

8.3 Cooperation with other organizations

58. The Science Manager presented a draft concept note from the Areas Beyond National Jurisdiction (ABNJ) Deep-Sea Project of FAO for the promotion of work on ecological risk assessments for deep-water elasmobranchs caught in the high seas (NPFC-2019-SC04-IP02).

59. The SC expressed its interest in the proposed work and noted its relevance to the work of the SSC BF-ME, particularly in relation to bycatch issues.

60. The Science Manager presented an invitation for the NPFC to participate in and contribute to *the North Pacific Regional Consultative and Planning Workshop for the International Decade of Ocean Science in support of Sustainable Development Goals* in Tokyo, Japan, on 31 July – 2 August 2019 (NPFC-2019-SC04-IP03). The NPFC is invited to participate as a member of the International Steering Committee, a co-leader of one of the Working Group/Sub Themes, a participant, and/or a contributor to a list of important sustainability questions that need to be addressed on the Ocean Decade.

61. The SC encouraged any representatives from Members who are attending the workshop in a non-NPFC capacity to also consider attending as an NPFC observer and report on the workshop outcomes to the next SC meeting.

62. The Science Manager presented an invitation from FAO for the NPFC to join FAO's Fisheries and Resources Monitoring System (FIRMS) Partnership (NPFC-2019-SC04-OP01). The FIRMS Partnership aims to facilitate access to a wide range of high-quality information on the status and trends of global marine fishery resources, fisheries and their management, in order to provide decision-makers with necessary information to develop effective fisheries policies in accordance with the Code of Conduct for Responsible Fisheries.

63. The SC determined that it requires more information before it can make a recommendation regarding whether or not the NPFC should join the FIRMS Partnership. The SC suggested that a representative from FAO FIRMS could attend the next SC meeting to give a detailed explanation.

Agenda Item 9. Other matters

9.1 Selection of SC Chair

64. The SC selected Dr. Janelle Curtis (Canada) to serve as the new SC Chair and Dr. Jie Cao (China) as the new SC Vice Chair.

65. The SC thanked the Chair for his strong leadership and excellent chairing over the past four years, and hoped it would have the opportunity to continue to work with him in the future.

9.2 Structure of the Scientific Committee

66. Based on the discussion above, the SC has updated its structure, combining the SSC VME and the SSC BF into the new SSC BF-ME, and combining the SSC PS and the TWG PSSA as a new SSC PS (Annex L).

9.3 MCS related issues from SC to TCC

67. Based on the discussion above, the SC identifies the following matters as MCS related issues for consideration by TCC:
    (a) Revisions of CMMs 2018-05 and 2017-06.
    (b) As described under Agenda Item 5, the SC discussed the need to report data for measuring effort and analyzing trends in effort as accurately as possible and noted that it would be useful to report information on the number of vessels licensed to fish for the priority species of the NPFC. The SC noted that the reporting of information on the number of vessels licensed to fish each priority species may also facilitate the work of the TCC.
    (c) The SC has continued to work on the scientific aspects of the development of an NPFC observer program and encourages the TCC to continue collaboration with the SC for the development of the NPFC observer program.

9.4 Other issues

68. No other issues were discussed.

Agenda Item 10. Advice and recommendations to the Commission

69. Based on the recommendations from its SSCs, TWG CMSA, and the BRP/HCR/MSE Workshop, the SC recommends that the Commission:
    (a) Endorse the revised Work Plan (Annex G).
    (b) Endorse the proposed scientific projects (Annex F).
    (c) Allow multiple extensions of the terms of the Chairs of the SC's subsidiary bodies, if necessary.
    (d) Endorse the Interim Regulations for Management of Scientific Data and Information for use by the SC and its subsidiary bodies on an interim basis (Annex J).

    VME & Bottom Fish

    (e) Adopt the proposed revisions to CMM 2018-05 as described in Annex D, with editorial revisions to Annexes 6-1, 6-2 and 6-3 which will be done by Japan intersessionally.
    (f) Adopt the proposed revisions to CMM 2017-06 as described in Annex E.

    Pacific Saury

    (g) Consider summary stock assessment results for Pacific saury (paragraph 22).
    (h) Consider further management measures for avoiding an increasing trend in the exploitation rate of Pacific saury to sustain biomass.
    (i) Fund the participation of Dr. Larry Jacobson (or an expert with similar qualifications and experience) in the next Pacific saury meetings.

    Chub Mackerel

    (j) Contract an external expert to support the development of the operating model for chub mackerel stock assessment and fund his/her participation in the next TWG CMSA

meeting.

BRP/HCR/MSE

(k) Adopt the proposal of the SC to conduct MSE for only one species at a time due to the resource-intensive and complex nature of the process. Because chub mackerel is a longer-lived species than Pacific saury and more stock assessment data are available, enabling the operating model to be conditioned, conduct MSE for chub mackerel as the first priority (See Punt et al. 2016 for best practices).

(l) Adopt the proposal of the SC for Pacific saury to develop an age-structured operating model for use in simulation work to identify and evaluate potential reference points (for example Blim and Ftarget). It is suggested that initial simulation work focus on constant F runs (e.g. to investigate MSY-based reference points, Blim and Ftarget) and empirical HCR (e.g. taking a constant proportion of the estimated survey biomass). Model-based and empirical HCR could both be considered when a full MSE is undertaken.

(m) Adopt the proposal of the SC for chub mackerel to conduct initial assessments with a range of models, which could be used in a subsequent MSE.

(n) Adopt the proposal of the SC to give consideration to the role of small pelagic fish in the ecosystem as key low trophic level stocks and also to climate variability when setting the reference points

(o) Explore the possibility of creating an intermediary group consisting of scientists, managers and stakeholders, as needed, when conducting an MSE.

Data Sharing

(p) Share data for the assessment of SAI of bottom fisheries on VME and creation of a map of combined fishing footprint and effort after the SSC BF-ME agrees upon the type and resolution of data.

(q) Share more data of Pacific saury (e.g. size-at-maturity measurements, catch-at-size data and catch-at-age data, etc.) for improving the current stock assessment and developing future stock assessments after the SSC PS agrees upon the type and resolution of data.

(r) Display Pacific saury catch and effort data on a publicly accessible map on the NPFC website according to the specifications described in paragraph 43.

(s) Share data of chub mackerel to estimate parameters for the operating model using the candidate stock assessment models, as specified in Annexes G and H of the TWG CMSA02 report.

Cooperation with Other Organizations

(t) Endorse the NPFC-PICES Framework for Enhanced Scientific Collaboration in the North Pacific (Annex K).

(u) Hold a joint PICES-NPFC workshop on *The influence of environmental changes on the potential for species distributional shifts and subsequent consequences for estimating*

abundance of Pacific saury at the PICES Annual Meeting in Victoria, Canada, in October 2019. Provide travel support for Dr. Bai Li's participation on behalf of the NPFC as an invited speaker to give a presentation on the subject described in paragraph 54.

(v) Endorse the participation of Dr. Chris Rooper on behalf of the NPFC in the NPAFC-PICES workshop on *Developing a collaborative, integrated ecosystem survey program to determine climate/ocean mechanisms affecting the productivity and distribution of salmon and associated pelagic fishes across the North Pacific Ocean* in Victoria, Canada, in October 2019 as described in paragraph 57.

70. In relation to the tasks for the SC specified in CMMs and the Convention, the SC informs the Commission of the following:

VME

(a) For VME indicator taxa, the SC noted a comprehensive SAI assessment conducted by Japan in the Emperor Seamounts and a proposal from Japan to revise the list of VME indicator taxa from Gorgonacea, Scleractinia, Antipatharia, and Alcyonacea to Gorgonacea, Scleractinia, Antipatharia, and Porifera. The SC recognized the value of the work done by Japan but determined that further research is needed.

(b) The SC agreed to conduct further research to define the range of the two VME sites identified in NPFC-2019-SSC VME04-WP02 with the potential to close them to fishing.

Bottom Fish

(c) The SC advises the Commission to consider the SC's discussions under Agenda Item 4.

Pacific Saury

(d) For juvenile Pacific saury, the SC recognized the importance of defining juvenile and considered the initial review of available information conducted by the SSC PS. The SC recognized that further research is needed, and endorsed the work proposed by the SSC PS to further analyze maturity and length data for Pacific saury.

(e) Regarding distribution of juvenile Pacific saury, the SC concluded that age-0 Pacific saury are abundant east of 165-170 degrees east during June to July, when age-0 fish have not reached sexual maturity, and most of them are unlikely to migrate into fishing grounds in the main fishing season (August to November) of the same year.

Chub Mackerel

(f) The SC advises the Commission to consider the current chub mackerel fisheries status, the stock assessment progress made by the TWG CMSA and the SC's discussions under Agenda Item 4.

Observer Program

(g) The SC has identified a number of types of scientific data for Pacific saury which can only be collected and/or validated by at-sea observers (Annex I). It will continue to develop the

scientific aspects of the regional observer program.

Cooperation with Other Organizations

(h) The SC considered an invitation for the NPFC to participate in and contribute to *the North Pacific Regional Consultative and Planning Workshop for the International Decade of Ocean Science in support of Sustainable Development Goals* in Tokyo, Japan, on 31 July – 2 August 2019. The SC encouraged any representatives from Members who are attending the workshop in a non-NPFC capacity to also consider attending as an NPFC observer and report on the workshop outcomes to the next SC meeting.

(i) The SC considered a concept note from the Areas Beyond National Jurisdiction (ABNJ) Deep-Sea Project of FAO for the promotion of work on ecological risk assessments for deep-water elasmobranchs caught in the high seas. The SC expressed its interest in the proposed work and noted its relevance to the work of the SSC BF-ME, particularly in relation to bycatch issues.

Agenda Item 11. Next meeting

71. The SSC PS05 meeting will be held in Japan in November 2019. The TWG CMSA03 meeting will be held in Japan in February 2020. The SC05, SSC PS06 and SSC-BF-ME01 meetings will be held in Vanuatu in April 2020. Members will be notified of the exact dates and locations by the Secretariat via correspondence.

Agenda Item 12. Adoption of the Report

72. The SC04 Report was adopted by consensus.

Agenda Item 13. Close of the Meeting

73. The meeting closed at 12:50 on 26 April 2019.

Annexes

Please refer to the NPFC website for the complete annexes.

NPFC

4th Meeting of the Technical and Compliance Committee

11-13 July 2019
Tokyo, Japan
Meeting Report

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MEETING REPORT

Agenda Item 1. Opening of Meeting

1. The 4th Meeting of the Technical and Compliance Committee (TCC) took place in Tokyo, Japan on 11-13 July 2019, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, Chinese Taipei, the United States of America, and Vanuatu. The meeting was opened by Dr. Robert Day (Canada) who served as the TCC Chair.

Agenda Item 2. Appointment of Rapporteur

2. Mr. Alexander Meyer was appointed as the Rapporteur.

Agenda Item 3. Admission of Observers

3. The Chair listed approved observers present. The meeting was attended by the European Union, Panama, the North Pacific Anadromous Fish Commission (NPAFC), Global Fishing Watch, the Organization for Regional and Inter-regional Studies of Waseda University of Japan and the Pew Charitable Trusts. The observers were admitted without objection.

Agenda Item 4. Adoption of Agenda

4. The TCC agreed to discuss Agenda Item 7.2.1 in conjunction with Agenda Items 9.2 and 9.3, and Agenda Item 7.2.3.b.i) in conjunction with Agenda Item 9.1.

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

Agenda Item 5. Chair's Reflections

6. The Chair summarized the progress and pending tasks of the TCC, based on its work plan. To date, the TCC has transitioned to an electronic reporting and vessel registry system, developed an Interim Vessel Register, established four Small Working Groups (SWGs) for advancing the various work streams of the TCC, and developed and implemented high seas boarding and

inspections (HSBIs). The Commission has adopted nine CMMs which all have a component of compliance. As for pending tasks, the TCC is presenting a draft CMM for a regional VMS at this meeting and needs to agree on a plan for implementing the regional vessel monitoring system (VMS), review and complete the development of a compliance monitoring system (CMS), develop an observer program and consider updating the interim transshipment scheme. As with other regional fisheries management organizations consideration could also be given to the potential need for port state measures, and further develop data management and security measures.

Agenda Item 6. Review of MCS-related Issues from SC

6.1 Observer Program

7. The Secretariat presented an update on the work of the Scientific Committee (SC) towards the development of a science observer program. The SC has reviewed the existing observer programs of NPFC Members and the observer programs of other RFMOs. Based on this it has considered the need for NPFC science observer programs for priority species.

6.2 Other Issues from SC

8. The Secretariat explained that the SC has identified two issues that may require the attention of the TCC:
   (a) Changes proposed by the SC to CMMs 2018-05 and 2017-06
   (b) The SC noted that the reporting of information on the number of vessels licensed to fish each priority species may also facilitate the work of the TCC.

Agenda Item 7. Progress Report on TCC Work Plan

7.1 Brief Overview of North Pacific Fisheries

9. The Secretariat presented a brief overview of the NPFC fisheries addressing each fishery (NPFC-2019-TCC04-IP01 (Rev 1)) as well as a brief overview of the work of the four SWGs and considerations for TCC. It was noted that all Members complied with the requirement for no increase in authorized fishing vessels. The bottom fisheries appear to remain in the current state where no high recruitment has been seen to date. Catches in the Pacific saury and chub mackerel fisheries appear to have increased from 2017. Catches increased with reduced effort for Japanese sardines. The squid fishery attracted little effort in 2018.

10. Japan emphasized the need for the NPFC to design and implement a monitoring and control system for at-sea transshipment activities, noting that approximately 85% of the fish harvested in the NPFC Convention Area is transshipped. Japan pointed out that the NPFC is behind other RFMOs in this regard and suggested that this issue be given priority in the TCC's work in the coming year.

7.2 SWG Lead and Co-Lead Updates from intersessional work on the TCC Work Plan 2018-2019

7.2.1 SWG VMS

11. Japan provided an update on the intersessional work of the SWG VMS, which was tasked with proposing a regional VMS and the hiring of a consultant (Collecte Localisation Satellites (CLS)) by the Secretariat to develop a detailed regional VMS design and implementation plan.

12. Japan presented the policy issues that needed to be considered when developing the regional VMS (NPFC-2019-TCC04-IP06). Japan proposed that the SWG VMS could address the technical issues itself, based on the TCC's recommendations on the policy issues.

a. Regional VMS Design and Implementation Plan

13. CLS presented a summary of the consultancy for the development and implementation of the NPFC Regional VMS (NPFC-2019-TCC04-IP02). In terms of the design, CLS has identified minimum technical requirements, made recommendations in relation to the various elements, and estimated indicative costs. As for implementation, CLS provided advice on the specifications that need to be determined by the TCC.

14. Japan provided an update on the work of the SWG VMS to draft text for a CMM on VMS.

15. Canada presented an overview of the draft NPFC Data-Sharing and Data-Security Protocols for VMS Messages as proposed by the SWG VMS (NPFC-2019-TCC04-WP04).

7.2.2 SWG Vessel Registry

a. Fishing Effort Indicators

16. The Secretariat provided an update on the work to address fishing effort indicators by the SWG on Vessel Registry (SWG VR), noting that this was an uncompleted task and hence ongoing for the intersessional period.

17. The TCC urged all Members to ensure that their data reporting is complete.

18. The TCC noted that the number of active vessels may be a better indicator of effort than the number of authorized vessels, which is the current measure in CMM 2017-07 for Chub Mackerel and CMM 2017-08 for Pacific Saury. However, it was noted by one Member that this was not really a compliance issue and should be a subject for discussion at the Commission and not TCC.

Recommendation: That the Commission task TCC, working with SC, to develop advice on effort indicators, including for CMMs 2017-07 and 2017-08, that would effectively control fishing effort.

b. Member use of the online Vessel Registry

19. The Secretariat provided a review on the use of and changes to the online Vessel Registry. All but one Member is currently using the online Vessel Registry.

c. Vessel Marking and IMO Number – Implementation Status

20. The Secretariat reminded Members that all vessel information requirements in the Annex of CMM2018-01, including the International Maritime Organization (IMO) number which will come into force on 1 January 2020, are mandatory, and encouraged all Members to update and complete the information for their vessels on the vessel registers.

d. Fishing Gear Coding

21. The Secretariat reminded the TCC that at TCC03 it was pointed out that a number of important fishing gear types used in the NPFC Convention Area are not included in the Food and Agriculture Organization's (FAO's) International Standard Statistical Classification of Fishing Gear (ISSCFG). Based on this, the Secretariat submitted a request to the FAO that such gear be included in the ISSCFG. The FAO has since added jiggers and stick-held dip nets.

22. The TCC suggested that it could update the NPFC fishing gear list, aligning it with the FAO ISSCFG as much as possible and adding any missing gear. The NPFC could then submit the updated list to the FAO for use in the FAO's next update to the ISSCFG.

Recommendation: That the Commission task the TCC with updating the NPFC fishing gear list and aligning it, to the extent possible, with FAO.

e. Interim Register – Paragraph 18 of CMM 2018-01

23. The Secretariat noted that, in accordance with Paragraph 18 of CMM 2018-01 on Information Requirements for Vessel Registration, the Interim Register for non-Member Carrier Vessels shall expire 60 days after the Annual Regular Session of the Commission in 2019 unless the Commission decides otherwise at its Commission Meeting in 2019.

24. The Secretariat presented a summary of the responses from Members with their assessments of the NPFC Interim Vessel Register (NPFC-2019-TCC04-WP01). China and Chinese Taipei responded requesting the extension of the Interim Vessel Register.

25. The TCC discussed the Interim Vessel Register and, taking into account Panama's application for CNCP status, considered three options: that the Interim Vessel Register be extended for three years, that it be extended until the end of the current fishing season, or that it be allowed to expire as defined in the current CMM. There was no consensus on this matter in TCC04.

26. The Secretariat reported that it had sent two letters to the flag States of non-Member Carrier vessels in August and again in October 2018 to note the proposed expiration of the Interim Non-Member Carrier Vessel Register to encourage them to become Cooperating non-Contracting Parties (CNCPs) as tasked by the Commission. The Secretariat reported that it has received an application from Panama for CNCP status and an inquiry from Liberia indicating its interest in applying for CNCP status.

27. The TCC considered Panama's application under Agenda Item 8.1.2.

28. Regarding Liberia's indication of interest, the Secretariat explained the process and sought advice from Members as to whether to pursue this interest by Liberia intersessionally or await their possible proposal for the next TCC meeting.

29. The Members recommended that Liberia follow the Rules of Procedure and that any application would be considered at TCC05/COM06.

30. Japan pointed out that, other than Panama and Liberia, no other non-Member carriers have responded to the letters from the Secretariat.

f. Member and non-Member carrier vessels and chartering of fishing vessels

31. The Secretariat explained the lack of clarity regarding who was responsible for vessels under charter arrangements, noting that this issue has not yet been addressed by the TCC.

32. The TCC noted the issue and agreed to consider it further at a future meeting.

Recommendation: That the Commission task the TCC with providing clear advice for TCC05/COM06 regarding responsibility for vessels under charter arrangements.

33. The United States noted that Article 94 of the United Nations Convention of the Law of the Sea, which states that a flag State has exclusive jurisdiction and control over its fishing vessels on the high seas, is relevant to determining responsibility.

g. Transshipment Monitoring Scheme

34. The Pew Charitable Trusts presented research on the use of AIS for analyzing fish carrier activity in 2016 in the area of overlap between the NPFC Convention Area and the Western and Central Pacific Fisheries Convention Area (NPFC-2019-TCC04-OP02).

35. Global Fishing Watch presented research on the use of AIS data and remote sensing techniques to monitor fishing activities in the NPFC Convention Area (NPFC-2019-TCC04-OP01).

36. The Secretariat presented a review of the possible approaches for monitoring "vessels of interest," including for transshipment (NPFC-2019-TCC04-IP05).

h. Vessel Registry process issues:

i) Listing of approved vessels vs. previously authorized vessels

ii) Authorization periods and notification requirements (back-dating / forward-dating)

iii) Vessel Nomenclature

iv) Incomplete registration data vis-à-vis Annex A to CMM 2018-01

37. The Secretariat presented a summary of the current status of the Vessel Registry (NPFC-2019-TCC04-IP03).

38. The TCC noted the issues identified by the Secretariat and agreed they needed further consideration.

Recommendation: That the Commission task the TCC with addressing the outstanding issues related to the Vessel Registry identified by the Secretariat for TCC05 and COM06.

i. *Direct Entry and Refinements*

39. The Secretariat provided information related to direct entry of vessel information by Members into the vessel registry system.

Recommendation: That the Commission encourage Members to make full use of the direct online system for registering their fishing vessels and ensure that all data required in Annex A of CMM 2018-01 are included.

j. Vessel Data Sharing with the Food and Agricultural Organization (FAO) Global Record

40. The Secretariat provided information related to the possible sharing of information with the FAO.

Recommendation: That the Commission task TCC to consider this opportunity and provide advice at TCC05/COM06.

7.2.3 SWG Assessing Compliance

a. Electronic Annual Reporting System

41. The Secretariat provided an update on the status of the development of the Electronic Annual Reporting System and explained that the system should make Members' annual reporting work more efficient.

Recommendation: That the Commission endorse the continued work of the Secretariat to develop the Electronic Annual Reporting System.

b. Compliance Monitoring Scheme

i) CMS Plan

42. The United States provided an update on the work of the SWG on Assessing Compliance (SWG AC) to develop the NPFC CMS.

c. NPFC Sustainable Use and Conservation Handbook

43. Canada provided an update on the work to develop the NPFC Sustainable Use and Conservation Handbook and suggested that a draft could be prepared intersessionally and presented to the next TCC meeting.

Recommendation: That the Commission endorse the continued work of the TCC to complete a draft NPFC Sustainable Use and Conservation Handbook for consideration at TCC05/COM06.

7.2.4 SWG Operational Enforcement

a. High Seas Boarding and Inspection

i) Implementation Plan Status

44. The United States provided an update on HSBI implementation. Three Japanese patrol vessels, one US Coast Guard vessel, and three Chinese Taipei patrol vessels have been registered and authorized to conduct HSBI. Two Russian Coast Guard vessels have been registered and will be authorized to conduct HSBI at the end of August 2019. Members have been meeting the requirements for inspector and boarding crew training, notifications to the fishing fleets and the translated questionnaires for HSBI boarding questions. The SWG for Operation Enforcement (SWG OE) has also discussed and proposed a standardized violation case package.

ii) Operational Updates

45. The United States, as SWG OE co-lead, noted that Japan has conducted three HSBIs in which no violations were found. The US has conducted three HSBIs, in which one serious violation was found (CMM2017-09, Paragraph 38(a)).

46. During the discussion of the operational updates, the TCC also noted that four carrier vessels were removed from the NPFC Approved Vessel List upon the request of China, after notification from the Secretariat and Panama.

47. Japan reported that, in the course of conducting HSBIs, its vessels sighted two Chinese-flagged vessels fishing for Pacific saury without NPFC registration. In the subsequent interviews with the captains of the vessels, it was discovered that these vessels have been doing so for several years. The two vessels have since been registered with the NPFC. Japan will consult with China and may propose their inclusion on the IUU vessel list at the next TCC meeting.

48. China gave a brief introduction of institutional reforms of the China Coast Guard (CCG). It also presented a typical CCG investigation of a high-seas illegal fishing case. China explained that it plans to register two vessels for conducting HSBI in the NPFC Convention Area and presented its proposed patrol plan for the coming year.

iii) Standard Violation Case Package

49. The United States, as SWG OE co-lead, provided an update on the work of the SWG OE to develop the Standard Violation Case Package (Annex D). The SWG OE has developed abbreviated case package requirements, in the case that no violation is found and additional requirements in the case that a violation is found. The SWG will continue to make amendments based on operations and lessons learned.

iv) NPAFC Request on Bycatch

50. The United States explained that the NPAFC has made a request to the NPFC to share salmon bycatch or retention information, based on the Memorandum of Cooperation signed between the NPFC and the NPAFC (NPFC-2019-TCC04-WP02). As the NPFC does not yet have a regional observer program, the NPAFC has suggested that the collection and reporting of such information could be conducted as part of HSBIs.

51. The TCC considered the request and determined that Members may consider, on a voluntary basis, to report significant encounters of salmon during inspection to the SWG OE, noting that anadromous fish are not NPFC species. The SWG OE will discuss on a case-by-case basis and, based on consensus, determine what information may be provided to the NPAFC to support its interest in understanding the extent and significance of salmon bycatch/presence in the overlapping convention area, solely for the purpose of scientific research. No change to the boarding form is recommended.

Recommendation: That the Commission encourage Members, on a voluntary basis, to report significant encounters of salmon during inspection to the SWG OE, which will discuss any report on a case-by-case basis. Based on consensus, the SWG OE will determine what information may be provided to the NPAFC.

b. Review of Operations

52. The TCC reviewed operations and encouraged Members to participate in HSBIs and to continue to work effectively together to implement the HSBI scheme.
Recommendation: That the Commission encourage all Members to continue to participate fully in the ongoing development and implementation of the HSBI scheme.

Agenda Item 8. Review of Current CMMs

8.1 CMM 2018-01 – Vessel Registry

53. The Secretariat explained that Paragraph n) of the Annex of CMM 2018-01 requires Members to provide full length side-view, color photographs of the vessel showing full length of vessel and vessel name and markings for the Vessel Registry. However, photographs received from Members are not always consistent with the above requirement. The Secretariat therefore requested the TCC to consider whether or not Paragraph n) should be modified.

54. The TCC considered the issue and agreed that, in the interest of reducing additional workload, it is not necessary to modify Paragraph n). The TCC encouraged Members to submit photographs that meet the requirements stipulated in Paragraph n) going forward.

8.1.1 Interim Register

55. The TCC discussed the approaching expiration of the Interim Register and there was no consensus on this issue in TCC04.

8.1.2 CNCP Status – Panama

56. The Secretariat explained the status of Panama's application to the NPFC for CNCP status (NPFC-2019-TCC04-OP03-4; NPFC-2019-TCC04-IP05).

57. Panama expressed its gratitude for the NPFC's consideration of its request for CNCP status. Panama explained that it has 43 vessels navigating the waters of NPFC as carrier vessels, mostly engaged in transshipment. Panama recognized the importance of cooperating with NPFC for the conservation and sustainability of marine resources in the Convention Area, and expressed its willingness to do so, including by reporting information regarding its transshipment activities.

58. The TCC considered Panama's request based on the criteria stipulated in Paragraph 10.6 of the NPFC Rules of Procedure.

Recommendation: That the Commission approve the application from Panama for CNCP status for a period of two years as stipulated in Rule 10.11 of the Rules of Procedure.

8.2 CMM 2017-02 – IUU

8.2.1 Recommendation for Provisional IUU Vessel List to the Commission

59. The TCC reviewed the Current IUU Vessel List (NPFC-2019-TCC04-WP07).

60. Japan explained that it has collected AIS tracking data for the IUU vessels proposed for inclusion in the IUU Vessel List for 2019 that suggested that the vessels were operating based from ports in China (NPFC-2019-TCC04-IP07). Japan stressed the need to further strengthen control over nationals undertaking illegal fishing activity.

61. The TCC reviewed and endorsed the IUU vessel list for 2019 (NPFC-2019-TCC04-WP08 (Rev 1)) as the Provisional IUU vessel list. Two of the vessels on the list were identified as using the same names as Chinese-legally-authorized vessels. During discussions on how to address the inclusion of the names of these two vessels in the list, Members emphasized the need to protect the interests of the legitimate fishing vessels as well as the need to include as much information as possible on future IUU vessel lists to facilitate the sharing of information with other RFMOs and to make such information searchable as part of databases. TCC suggested further discussion to develop a standard to address the issue of suspected IUU vessels using the same name as legally authorized fishing vessels.

Recommendation: That the Commission adopt the NPFC Provisional IUU Vessel List (Annex E).

Recommendation: The TCC requested that the Commission hold further discussion to develop a standard to address the issues of suspected IUU vessels using the same name as legally authorized fishing vessels, database searchability and information sharing.

8.2.2 Amendment of the CMM to include the approved decision proposed to add the 'CMM and Paragraph of the violation' to the IUU list requirements, summary activities and sightings

62. Canada proposed revisions to CMM 2017-02 to add "CMM and Paragraph of the violation" to the IUU list requirements, summary activities and sightings, as approved by the 2018 meeting of the Commission (NPFC-2019-TCC04-WP09). The TCC endorsed the revisions.

Recommendation: That the Commission adopt the revised CMM2017-02 as CMM 2019-02 (Annex F).

8.3 CMM 2016-03 – Interim Transshipment Procedures

63. The TCC discussed the CMM and noted its interim nature and the interest to consider reviewing and updating it.

    Recommendation: That the Commission task the TCC to develop a more robust Conservation and Management Measure for Transshipment as a priority issue in the Work Plan for 2020.

8.4 CMM 2016-04 – Vessels with No Nationality

64. No amendments were proposed.

8.5 CMM 2018-05 – Bottom Fisheries and VME Protection NW Pacific Ocean

65. No amendments were proposed, other than those proposed by the SC for consideration by the Commission.

8.6 CMM 2017-06 – Bottom Fisheries and VME Protection NE Pacific Ocean

66. No amendments were proposed, other than those proposed by the SC for consideration by the Commission.

8.7 CMM 2018-07 – Chub Mackerel

67. No amendments were proposed, with the TCC noting that Japan has submitted a proposed amendment to the CMM for consideration by the Commission.

8.8 CMM 2018-08 – Pacific saury

68. No amendments were proposed, with the TCC noting that Japan has submitted a proposed amendment to the CMM for consideration by the Commission.

8.9 CMM 2017-09 – High Seas Boarding and Inspection

69. No amendments were proposed.

Agenda Item 9. New MCS-related CMMs and Issues

9.1 Conservation and Management Measure on the Compliance Monitoring System

70. The TCC continued to draft the text for a CMM on CMS but was unable to reach a consensus (NPFC2019-TCC04-WP03 (Rev. 2)).

    Recommendation: That the Commission consider an NPFC Compliance Monitoring Scheme, taking into account the progress made at TCC in NPFC-2019-TCC04-WP03 (Rev. 2) and noting the desire of some Members to conduct a feasibility study.

9.2 Conservation and Management Measure for the Vessel Monitoring System

9.3 Data Sharing and Data-Security Protocols for the Vessel Monitoring System (VMS) Messages

71. The TCC continued to draft the text for a CMM on VMS but was unable to reach a consensus (NPFC2019-TCC04-WP05 (Rev. 3)).

    Recommendation: That the Commission consider adopting the proposed regional VMS framework, taking into account the progress made at TCC and with recognition that some issues will require further discussion at the Commission. Some policy issues that may require further refinement intersessionally are VMS data access and use as outlined in Paragraph 15 of NPFC2019-TCC04-WP05 (Rev. 3) and the data-sharing and data-security protocols of NPFC2019-TCC04-WP04, as well as guidance on minimum standards for mobile transmitting units (MTU) as an annex of WP05.

Agenda Item 10. Data management and security

10.1 Data Collection, Compilation and Exchange Interim Guidelines

72. Canada provided an update on work to develop the NPFC Data Collection, Compilation and Exchange Interim Guidelines that had been undertaken with the United States and noted that a draft could be prepared intersessionally and presented to the next TCC meeting.

    Recommendation: That the Commission endorse the continued work of the TCC to complete the draft NPFC Data Collection, Compilation and Exchange Interim Guidelines for consideration at TCC05/COM06.

10.2 Data Management and Reporting

a. Annual Reporting Format

73. The Annual Reporting Format was discussed under Agenda Item 7.2.3.

10.3 Plans for IT 2019 Fiscal Year

74. The Secretariat presented a summary of the current status of the electronic systems that have been developed (direct entry vessel and interim vessel registers, record of meetings and documents, meeting registration, SWG collaboration sites, IUU vessel record display, and Member and public display of core data for HSBI), or are under development (e-annual report, data warehouse, e-HSBI-events module, e-IUU vessel listing module, e-CMS, VMS, mapping) as detailed in NPFC-2019-TCC04-IP04.

Agenda Item 11. Compliance Work Plan and Priorities

11.1 Update Compliance Work Plan – priorities, projects, and budgets

75. The Chair provided an update on the Work Plan and recognized that budgetary considerations would need to be considered in light of the Commission decisions on key outstanding TCC issues such as VMS and CMS.

76. The Chair also highlighted that ongoing work already tasked by the Commission will continue, as well as new Work Plan elements from this year's recommendations once the Commission has made its decision.

Agenda Item 12. Other Matters

12.1 Selection of next Chair and Vice-Chair

77. The TCC recognized the value in having the current Chair (Dr. Robert Day; Canada) and Vice-Chair (Ms. Hee-Yeon Lee; Korea) continue to serve in their positions for one more term of two years, noting the provision of Paragraph 4 of Article 6 of the Convention and Rule 12.2 of the Rules of Procedure. The TCC recommended that the TCC Terms of Reference reflect this change to allow three consecutive terms of two years per term for a total of six years.
Recommendation: That the Commission extend the terms of the current Chair and Vice-Chair.
Recommendation: That the Commission endorse the TCC's proposal to allow TCC Chairs and Vice-Chairs to serve for a maximum three terms of two years per term, and that the TCC Terms of Reference be updated, taking into account Paragraph 4 of Article 6 of the Convention (Annex I).

Agenda Item 13. Recommendations to the Commission.

78. The TCC recommended the following to the Commission:
(Agenda Item 7)
    a. That the Commission task the TCC, working with the SC, to develop advice on effort indicators, including for CMMs 2017-07 and 2017-08, that would effectively control fishing effort.
    b. That the Commission task the TCC with updating the NPFC fishing gear list and aligning it, to the extent possible, with FAO.
    c. That the Commission task the TCC with providing clear advice for TCC05/COM06 regarding responsibility for vessels under charter arrangements.
    d. That the Commission task the TCC with addressing the outstanding issues related to the Vessel Registry identified by the Secretariat for TCC05 and COM06.
    e. That the Commission encourage Members to make full use of the direct online system for registering their fishing vessels and ensure that all data required in Annex A of CMM 2018-01 are included.
    f. That the Commission task TCC to consider the opportunity to share information with the FAO Global Record and provide advice at TCC05/COM06.

g. That the Commission endorse the continued work of the Secretariat to develop the Electronic Annual Reporting System.
h. That the Commission endorse the continued work of the TCC to complete a draft NPFC Sustainable Use and Conservation Handbook for consideration at TCC05/COM06.
i. That the Commission encourage Members, on a voluntary basis, to report significant encounters of salmon during inspection to the SWG OE, which will discuss any report on a case-by-case basis. Based on consensus, the SWG OE will determine what information may be provided to the NPAFC.
j. That the Commission encourage all Members to continue to participate fully in the ongoing development and implementation of the HSBI scheme.

(Agenda Item 8)

k. That the Commission approve the application from Panama for CNCP status for a period of two years as stipulated in Rule 10.11 of the Rules of Procedure.
l. That the Commission adopt the NPFC Provisional IUU Vessel List (Annex E).
m. The TCC requested that the Commission hold further discussion to develop a standard to address the issues of suspected IUU vessels using the same name as legally authorized fishing vessels, database searchability and information sharing.
n. That the Commission adopt the revised CMM2017-02 as CMM 2019-02 (Annex F).
o. That the Commission task the TCC to develop a more robust Conservation and Management Measure for Transshipment as a priority issue in the Work Plan for 2020.

(Agenda Item 9)

p. That the Commission consider an NPFC Compliance Monitoring Scheme, taking into account the progress made at TCC in NPFC-2019-TCC04-WP03 (Rev. 2) and noting the desire of some Members to conduct a feasibility study.
q. That the Commission consider adopting the proposed regional VMS framework, taking into account the progress made at TCC and with recognition that some issues will require further discussion at the Commission. Some policy issues that may require further refinement intersessionally are VMS data access and use as outlined in Paragraph 15 of NPFC2019-TCC04-WP05 (Rev. 3) and the data-sharing and data-security protocols of NPFC2019-TCC04-WP04, as well as guidance on minimum standards for mobile transmitting units (MTU) as an annex of WP05.

(Agenda Item 10)

r. That the Commission endorse the continued work of the TCC to complete the draft NPFC Data Collection, Compilation and Exchange Interim Guidelines for consideration at TCC05/COM06.

(Agenda Item 12)

s. That the Commission extend the terms of the current Chair and Vice-Chair.

t. That the Commission endorse the TCC's proposal to allow TCC Chairs and Vice-Chairs to serve for a maximum three terms, and that the TCC Terms of reference be updated, taking into account Paragraph 4 of Article 6 of the Convention (Annex I).

(Agenda Item 14)

u. That the Commission consider having the TCC SWG meetings occur as face-to-face meetings, and streamlining the four SWGs into two (policy/planning and operational enforcement)

v. That TCC05 occur over three days in conjunction with COM06 (location and date TBD).

Agenda Item 14. Next Meeting

79. The TCC discussed the increasing compliance-related workload of the NPFC, the limitations of virtual meetings, the benefits of holding a face-to-face meeting further in advance of the annual Commission meeting, and the benefits of streamlining the SWGs into two bodies (policy/planning and operational enforcement). The TCC recognized the need for further discussion on the optimal format for advancing the work of the TCC and its subsidiary bodies, including the associated budgetary requirements.

Recommendation: That the Commission consider having the TCC SWG meetings occur as face-to-face meetings and streamlining the four SWGs into two (policy/planning and operational enforcement).

Recommendation: That TCC05 occur over three days in conjunction with COM06 (location and date TBD).

Agenda Item 15. Adoption of the Report

80. The report was adopted by consensus.

Agenda Item 16. Close of the Meeting

81. The TCC meeting closed at 18:40 on 13 July 2019.

Annexes

Annex A – Agenda

Annex B – List of Documents

Annex C – List of Participants

Annex D – NPFC Case Package Preparation

Annex E – Provisional NPFC IUU Vessel List for 2019

Annex F – Conservation and Management Measure to Establish a List of Vessels Presumed to Have Carried Out Illegal, Unreported and Unregulated Fishing Activities in the Convention Area of the North Pacific Fisheries Commission

Annex G – Conservation and Management Measure on the Compliance Monitoring Scheme

Annex H – Conservation and Management Measure for the Vessel Monitoring System

Annex I – Technical and Compliance Committee Terms of Reference

Please refer to the NPFC website for the complete annexes.

NPFC

3rd Meeting of the Finance and Administration Committee

15 July 2019
Tokyo, Japan
Meeting Report

Agenda

Agenda Item 1. Opening of the Meeting

Agenda Item 2. Appointment of Rapporteur

Agenda Item 3. Adoption of Agenda

Agenda Item 4. Financial Statement

4.1 Financial Statement from 2018 and 2019 to date

4.2 Status of Member Contributions

4.3 Status of Other Funds

- Working Capital Fund
- Special Project Fund
- Voluntary Contribution

Agenda Item 5. Secretariatôs Work Plan 2019; Budget Estimates for 2020-2022

Agenda Item 6. Administration Matters

6.1 Review of Special Projects from SC and TCC

6.2 NPFC Secondment and Intern for 2019

6.3 Amendments to Administrative Compendium

6.4 360-degree Performance Review

Agenda Item 7. Other matters

Agenda Item 8. Recommendations to the Commission

Agenda Item 9. Next meeting

Agenda Item 10. Adoption of the Report

Agenda Item 11. Close of the Meeting

MEETING REPORT

Agenda Item 1. Opening of the Meeting

1. The 3rd Meeting of the Finance and Administration Committee (FAC) took place in Tokyo, Japan on 15 July 2019, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, Chinese Taipei, the United States of America, and Vanuatu. The European Union and the Pew Charitable Trusts attended as observers. The meeting was opened by Dr. Bai Li (China) who served as the FAC Chair.

Agenda Item 2. Appointment of Rapporteur

2. Mr. Alexander Meyer was appointed as the Rapporteur.

Agenda Item 3. Adoption of Agenda

3. The Chair proposed the addition of a new agenda item, 6.4, on 360-degree performance review. The FAC endorsed the proposal.

4. The Chair reviewed the recommendations from FAC02 and explained the agenda items and meeting documents under which these would be addressed.

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

Agenda Item 4. Financial Statement

4.1 Financial Statement from 2018 and 2019 to date

4.2 Status of Member Contributions

4.3 Status of Other Funds

- *Working Capital Fund*
- *Special Project Fund*
- *Voluntary Contribution*

6. The Executive Secretary, Dr. Dae-Yeon Moon, reported on the income and expenses in 2018, expenses to date in 2019, the status of Member contributions, and the status of the other funds, including the Working Capital Fund, the Special Project Fund and Voluntary Contribution (NPFC-2019-FAC03-IP01; NPFC-2019-FAC03-WP01).

7. The FAC expressed its appreciation for the voluntary contribution provided by the United States for the participation of independent experts in the meetings of the Technical Working Group for Pacific Saury Stock Assessment and the Biological Reference Point/Harvest Control Rule/Management Strategy Evaluation Workshop. The FAC recognized the value of having independent experts also participate in future stock-assessment related meetings.

8. The FAC noted that although there was a surplus in the budget for 2019, it would be prudent to keep the overall budgetary contribution at a similar level in 2020-2022 so as to maintain the robustness of the NPFC and its Secretariat.

Agenda Item 5. Secretariatôs Work Plan 2019; Budget Estimates for 2020-2022

9. The Executive Secretary reported on the implementation of the Secretariatôs Work Plan 2018 (NPFC-2019-FAC03-IP02).

10. The Executive Secretary presented the Secretariatôs Work Plan for 2019 (NPFC-2019-FAC03-WP02). The FAC reviewed and revised the work plan.
Recommendation: That the Commission adopt the revised work plan for 2019 (Annex D).

11. The Executive Secretary presented the adjusted budget for 2019 and the budget estimates for 2020-2022 (NPFC-2019-FAC03-WP01 (Rev. 2)) for the review of the FAC. The FAC endorsed the adjusted budget for 2019 and the proposed budget for 2020, and considered the estimated budgets for 2021 and 2022.
Recommendation: That the Commission adopt the adjusted budget for 2019 and the proposed budget for 2020 (Annex E).

Agenda Item 6. Administration Matters

6.1 Review of Special Projects from SC and TCC

12. The Executive Secretary explained that no special projects have been proposed thus far.

6.2 NPFC Secondment and Intern for 2019

13. The Executive Secretary explained that the Secretariat has opened the applications for the 2019-2020 NPFC Internship Program and presented five candidates for the consideration of the FAC (NPFC-2019-FAC03-WP03).

Recommendation: That the Commission hire three interns for the 2019 NPFC Internship Program and select the top three candidates based on the ranking in NPFC-2019-FAC03-WP03.

6.3 Amendments to Administrative Compendium

14. The Executive Secretary presented proposed amendments to Regulation 8.2 of the Staff Regulations to avoid a situation in which the intended benefits for staff dependents in the case of mortality of the staff member are negated by customary Japanese practice in relation to accommodation contracts (NPFC-2019-FAC03-WP04). The FAC considered and modified the proposed amendments.

Recommendation: That the Commission adopt the proposed amendments to Regulation 8.2 of the Staff Regulations (Annex F).

6.4 360-Degree Performance Review

15. The Executive Secretary presented the draft plan for implementing a 360-degree performance review (NPFC-2019-FAC03-WP05). The FAC reviewed and revised the draft plan.

Recommendation: That the Commission adopt the plan for implementing a 360-degree performance review (Annex G) and task the Secretariat with implementing the review from January 2020 onwards.

Agenda Item 7. Other Matters

16. No other matters were discussed.

Agenda Item 8. Recommendations to the Commission

17. The FAC recommended the following to the Commission:

(Agenda Item 5)

(a) That the Commission adopt the revised work plan for 2019 (Annex D).

(b) That the Commission adopt the adjusted budget for 2019 and the proposed budget for 2020 (Annex E).

(Agenda Item 6)

(c) That the Commission hire three interns for the 2019-2020 NPFC Internship Program and select the top three candidates based on the ranking in NPFC-2019-FAC03-WP03.

(d) That the Commission adopt the proposed amendments to Regulation 8.2 of the Staff Regulations (Annex F).

(e) That the Commission adopt the plan for implementing a 360-degree performance review (Annex G) and task the Secretariat with implementing the review from January 2020 onwards.

(Agenda Item 9)

(f) That the Commission provide guidance in determining the date and location of the next

FAC meeting.

Agenda Item 9. Next Meeting

18. ***Recommendation:*** That the Commission provide guidance in determining the date and location of the next FAC meeting.

Agenda Item 10. Adoption of the Report

19. The report was adopted by consensus.

Agenda Item 11. Close of the Meeting

20. The FAC meeting closed at 16:27 on 15 July 2019.

Annexes

Annex A – Agenda
Annex B – List of Documents
Annex C – List of Participants
Annex D – Secretariat's Work Plan for 2019
Annex E – Draft Commission Budgets, 2019-2022
Annex F – Proposed Amendment to Staff Regulations
Annex G – Plan to implement a 360-degree Performance Review

Please refer to the NPFC website for the complete annexes.

NPFC

5th Commission Meeting

16-18 July 2019
Tokyo, Japan
Meeting Report

Agenda

Agenda Item 1. Opening of Meeting
- 1.1 Welcome Address
- 1.2 Appointment of Rapporteur
- 1.3 Adoption of Agenda
- 1.4 Meeting Arrangement

Agenda Item 2. Membership of the Commission

Agenda Item 3. Report from the Secretariat

Agenda Item 4. Report of the 4th Scientific Committee meeting

Agenda Item 5. Report of the 4th Technical and Compliance Committee meeting

Agenda Item 6. Report of the 3rd Finance and Administration Committee meeting

Agenda Item 7. Conservation and Management Measures
- 7.1 Review of the CMMs and the recommendations by the Committees
- 7.2 Amendments/addition of CMMs

Agenda Item 8. Adoption of budget
- 8.1 Proposed budget for 2020
- 8.2 Indicative budget for 2021 and 2022

Agenda Item 9. Data Management and Security
- 9.1 Progress in Development of NPFC Data Management System
- 9.2 NPFC Information Security Guidelines

Agenda Item 10. Cooperation with other organizations
- 10.1 PICES
- 10.2 NPAFC
- 10.3 FAO ABNJ
- 10.4 Other Organizations

Agenda Item 11. Other matters
- 11.1 Strategic Plan for the Commission
- 11.2 Selection of the Chair and Vice Chair
- 11.3 Secondment and Intern for 2019
- 11.4 Press Release
- 11.5 Performance Review of the Commission
- 11.6 Others

Agenda Item 12. Date and Place of next meeting

Agenda Item 13. Adoption of the report

Agenda Item 14. Close of Meeting

MEETING REPORT

Agenda Item 1. Opening of the Meeting

1. The 5th Meeting of the North Pacific Fisheries Commission (NPFC) took place in Tokyo, Japan on 16-18 July 2019, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, Chinese Taipei, the United States of America, and Vanuatu. The European Union (EU), Panama, the Food and Agriculture Organization of the United Nations (FAO), the North Pacific Anadromous Fish Commission (NPAFC), the North Pacific Marine Science Organization (PICES), the Deep Sea Conservation Coalition (DSCC), Global Fishing Watch (GFW), the Pew Charitable Trusts, World Wildlife Fund (WWF), and the Organization for Regional and Inter-regional Studies (ORIS) of Waseda University attended as observers. The meeting was opened by Mr. Kenji Kagawa (Japan), who served as the Commission Chair.

1.1 Welcome Address

2. Mr. Masaki Hoshina, Deputy Director-General, Fisheries Agency of Japan, gave a welcome address (Annex A). He welcomed the participants to Japan and highlighted the role played by the NPFC to promote the sustainable use of the resources in the NPFC Convention Area. In particular, Mr. Hoshina noted the marked decline in Pacific saury stock in recent years, especially in the exclusive economic zones of coastal Members, in part due to the development of high seas Pacific saury fisheries in recent years. He encouraged the NPFC to develop effective measures to address this decline, including the introduction of a catch limit as part of the NPFC's Conservation and Management Measure (CMM) for Pacific Saury. Lastly, Mr. Hoshina emphasized the importance of Pacific saury as a resource for all Members, especially Japan, where it is a familiar part of everyday Japanese lifestyles.

1.2 Appointment of Rapporteur

3. Mr. Alexander Meyer was appointed as the Rapporteur.

1.3 Adoption of Agenda

4. The agenda was adopted without revision (Annex B). The List of Documents and Participants List are attached (Annexes C, D).

1.4 Meeting Arrangement

5. The Chair outlined the procedural matters for the holding of the meeting.

Agenda Item 2. Membership of the Commission

6. The Republic of Korea, as the Depositary of the NPFC, provided an update on the status of the Convention. Since the previous NPFC meeting, the total number of Members remains at eight. The EU has applied for accession to the NPFC Convention and Panama has applied for Co-operating non-Contracting Party (CNCP) status.

7. The EU was invited to give a presentation to explain its intentions in applying for accession to the Convention (NPFC-2019-COM05-OP01). In response to the request made by the Commission at its previous meeting, the EU submitted a detailed fishing plan and corresponding impact assessment in March 2019. The EU intends to operate one trawler that will fish for chub mackerel. The EU believes that this is a modest fishing plan that can be accommodated based on its latest scientific knowledge. It also submitted, in March 2019, data on its historical catches in the Convention Area. As a Member, the EU would ensure the sustainability of fisheries as a top priority, contribute to the efforts of the NPFC to ensure the recovery of stocks in the Convention Area and conduct a stock assessment for chub mackerel, and abide by all of the NPFC's CMMs. The EU is willing to show restraint and flexibility in relation to fishing activities, and is open to discussing any aspects of its fishing plan. The EU stands ready to contribute to the important work of NPFC in terms of science, compliance and financial contributions, including voluntary contributions.

8. The EU provided all of the information that the Commission requested at its last meeting and provided its application to become a Contracting Party to the Commission and to the TCC more than 60 days in advance of the TCC meeting as requested by the Commission.

9. The Commission considered the EU's application. The Commission noted that the application was consistent with Article 24 of the Convention and the information requested by the Commission at its last meeting. All but one Member supported accession by the EU. Some Members noted that the Convention specifically addresses the possibility for EU accession in the terms used in Article 1, and in the provisions in Article 24(2)(a). Several Members also noted that accession by the EU would be consistent with other provisions of the Convention,

specifically Article 3(l) and Article 8, Part III, Paragraph 3 of the UN Fish Stocks Agreement.

10. The Commission invited the EU to submit an application for accession to the Commission prior to its next meeting with the information requested by Russia and other Members, and that this application allow time for consideration by the SC, TCC, and any other appropriate subsidiary bodies. The Commission tasked the SC, the TCC, and any of their relevant subsidiary bodies to review the application provided by the EU and to provide any comments to the Commission for its consideration.

11. Russia noted its objection to EU accession and provided a statement in writing as provided for in Article 24(3) of the Convention (Annex E).

12. The EU made a follow-up statement to the Commission's response (Annex F).

13. Panama was invited to give a presentation to explain its intentions in applying for CNCP status. As a CNCP, Panama would be fully committed to complying with all NPFC regulations and CMMs. Panama believes that transparency in fisheries management is the key to combatting illegal, unreported and unregulated (IUU) fishing and enhancing economic benefits for citizens and fishing communities. To that end, Panama has signed a Memorandum of Cooperation with Global Fishing Watch for the sharing of fisheries-related data. Similarly, Panama would be committed to sharing with the NPFC all its data related to transshipment, which would contribute to addressing gaps in the management of transshipment in the NPFC Convention Area, an issue regarding which some Members have expressed concern. Once the NPFC establishes a regional Vessel Monitoring System (VMS), Panama would also share its VMS data with the NPFC. Lastly, under its national ocean policy, Panama will endeavor to conserve marine resources and maintain the health of the oceans of the world.

14. The Commission considered the application and approved Panama's CNCP status for one year from the entry into force of said status.

Agenda Item 3. Report from the Secretariat

15. The Secretariat presented an annual report on the Commission's activities for the intersessional period between the 4th Commission Meeting of July 2018 and this current Commission meeting. (NPFC-2019-AR Secretariat (Rev. 1)).

Agenda Item 4. Report of the 4th Scientific Committee meeting

16. The Chair of the Scientific Committee (SC), Dr. Joji Morishita (Japan), summarized the

outcomes of the 4th SC meeting (NPFC-2019-SC04 Final Report) for discussion by the Commission.

17. The Commission adopted the report and the recommendations of the SC (Annex G).

Agenda Item 5. Report of the 4th Technical and Compliance Committee meeting

18. The Chair of the Technical and Compliance Committee (TCC), Dr. Robert Day (Canada), summarized the outcomes of the 4th TCC meeting (NPFC-2019-TCC04 Final Report) for discussion by the Commission.

19. Regarding the development of a standard to address the issues of suspected IUU vessels using the same name as legally-authorized fishing vessels, database searchability, and information sharing, the Commission requested the TCC and the Small Working Group (SWG) on Operational Enforcement to conduct a review of best practices and provide a solution.

20. The Commission developed and adopted a CMM for a Compliance Monitoring Scheme (Annex O), taking into account the progress made by TCC04.

21. The Commission developed and adopted a CMM on VMS (Annex N). The CMM on VMS will enter into force upon completion of the requisite elements including engagement of consultants, contracting process and system development as necessary. The Chair of TCC will notify Members by way of a Chair's circular 60 days prior to the VMS entering into force.

22. The issue of manual reporting in the event of a mobile transceiver unit (MTU) malfunction was noted by some Members. The SWG for VMS is tasked to seek technical solutions in coordination with the VMS vendor to achieve the manual reporting requirements in the event of a malfunction. This provision will be reviewed at TCC05. The SWG will further develop guidance on MTU requirements in Annex 1 to address MTU malfunction.

23. The Commission agreed to extend the Interim Registry until 31 August 2020. The Interim Registry shall be used only by non-Members who are not CNCPs.

24. The Commission requested the Secretariat to draft an updated Terms of Reference for the TCC to allow TCC Chairs and Vice-Chairs to serve for a maximum of three terms of two years each.

25. The Commission adopted the report and the recommendations of the TCC (Annex H).

Agenda Item 6. Report of the 3rd Finance and Administration Committee meeting

26. The Chair of the Finance and Administration Committee (FAC), Dr. Bai Li (China), summarized the outcomes of the 3rd FAC meeting (NPFC-2019-FAC03 Final Report) for discussion by the Commission.

27. The Commission adopted the report and the recommendations of the FAC (Annex I).

Agenda Item 7. Conservation and Management Measures

7.1 Review of the CMMs and the recommendations by the Committees

28. Based on a review of the CMMs and the recommendations by the SC and the TCC, the Commission adopted CMM 2019-01 (Annex J) to revise the Interim Registry, CMM 2019-02 to Establish a List of Vessels Presumed to Have Carried out IUU Activities in the NPFC Convention Area (Annex K), CMM 2019-05 for Bottom Fisheries and Protection of VMEs in the NW Pacific Ocean (Annex L), CMM 2019-06 for Bottom Fisheries and Protection of VMEs in the NE Pacific Ocean (Annex M), CMM 2019-12 for a Regional Vessel Monitoring System (Annex N), CMM 2019-13 for a Compliance Monitoring Scheme (Annex O), and the NPFC IUU Vessel List for 2019 (Annex P).

7.2 Amendments/addition of CMMs

29. Japan presented a proposal to amend CMM 2018-07 for Chub Mackerel to ensure that effort in terms of numbers of vessels and catch are not increased until the stock assessment has been completed (NPFC-2019-COM05-WP01).

30. The Commission reviewed and revised the proposal and adopted the revised CMM (Annex Q).

31. Japan presented a proposal to amend CMM 2018-08 for Pacific Saury to set the total allowable catch in the Convention Area based on the Executive Summary of TWG PSSA 04-Final Report and cease fishing for Pacific saury east in certain parts of the Convention Area (NPFC-2019-COM05-WP02).

32. The Commission reviewed and revised the proposal and adopted the revised CMM (Annex R).

33. Japan presented a proposal for the establishment of a CMM for Three Pelagic Species – Japanese Sardine, Neon Flying Squid, and Japanese Flying Squid, to place limitations on effort and catch at historical levels until the stock assessment has been completed (NPFC-2019-COM05-WP013).

34. The Commission reviewed and revised the proposal and adopted the CMM for Two Pelagic Species – Japanese Sardine and Japanese Flying Squid (Annex S).

35. Canada presented a proposal for the establishment of a CMM for Sablefish in the Northeastern Pacific Ocean, to put in place effective management measures for the existing sablefish fishery in the Northeastern Pacific Ocean and implement a precautionary approach (NPFC-2019-COM05-WP07).

36. The Commission reviewed and revised the proposal and adopted the CMM (Annex T).

Agenda Item 8. Adoption of Budget

8.1 Proposed budget for 2020

37. The Commission adopted the adjusted budget for 2019 and the proposed budget for 2020 as submitted by the FAC (NPFC-2019-FAC03 Final Report).

8.2 Indicative budget for 2021 and 2022

38. The Commission considered the indicative budget for the years 2021 and 2022 as submitted by the FAC (NPFC-2019-FAC03 Final Report).

Agenda Item 9. Data Management and Security

9.1 Progress in Development of NPFC Data Management System

39. The Secretariat presented an update on the progress in the development of the NPFC data management system (NPFC-2019-COM05-IP05). The major system developments for the previous fiscal year include completion of the Electronic Annual Report, enhancement of the NPFC Collaboration site, creation of the basic spatial map for VME and Bottom Fisheries and Pacific Saury Catch and Effort, development and release of the new Meeting Management System via the NPFC website, completion of the High Seas and Boarding Inspection Page, and the commissioning of a vendor to develop a small-scale HR and administration system. As for ongoing developments, the Secretariat is working with a vendor to develop the NPFC Data Warehouse to integrate all data submitted by Members and allow for specific data to be used for automatic reporting and analysis as permitted by Members.

9.2 NPFC Information Security Guidelines

40. The Commission reviewed the status of the development of NPFC Information Security Guidelines, noting that such guidelines should cover both scientific and compliance aspects. The Commission endorsed the Interim Regulations for Management of Scientific Data and Information developed and adopted by the SC (NPFC-2019-COM05-WP08). The Commission

requested the TCC to continue to develop guidelines from a compliance perspective and present draft guidelines to the next Commission meeting.

Agenda Item 10. Cooperation with Other Organizations

41. The Secretariat provided an update on cooperation with other organizations and suggestions for future collaborative work (NPFC-2019-COM05-WP09).

10.1 PICES

42. The Secretariat explained the NPFC-PICES Framework for Enhanced Scientific Collaboration in the North Pacific which was drafted by the PICES-NPFC Study Group (SG). The SG has identified two high priority areas for cooperation: stock assessment support and vulnerable marine ecosystems (VMEs). The SG has discussed potential mechanisms for collaboration such as joint workshops and symposia, observer/expert participation in each other's meetings, joint working groups, etc. The Framework was adopted by SC04 and endorsed by the Commission. SC04 also endorsed the holding of a joint PICES-NPFC workshop related to Pacific saury at the PICES Annual Meeting in October 2019 and nominated Dr. Bai Li to attend the workshop on behalf of the NPFC as an invited speaker.

10.2 NPAFC

43. The Secretariat explained that the NPFC and the NPAFC signed a Memorandum of Cooperation (MOC) on 13 May 2019. Cooperation will be focused on matters of common interest including exchange of data and information, collaboration on research efforts on species of mutual interest and implementation of CMMs. In response to a request from the NPAFC, the NPFC may share certain information about the presence of salmon bycatch or retention of salmon with the NPAFC, on a voluntary basis. Another follow-up from the MOC could be NPFC participation in a multinational research survey in the North Pacific planned in 2021 under the International Year of Salmon project of NPAFC to collect new data on species of NPFC's interests. SC04 nominated Dr. Chris Rooper to represent the NPFC at the NPAFC-PICES workshop to develop an integrated research program for the survey. The Science Manager will also take part as a co-convener.

10.3 FAO ABNJ

44. The Secretariat explained the ongoing cooperation between the NPFC and the FAO ABNJ Deep Seas Project. The project's first phase is coming to an end and the second phase will commence in 2021. In the first phase, the NPFC and FAO successfully held a joint workshop on VMEs in March 2018 and a comprehensive FAO report of the workshop has been completed and is ready for publication by FAO in 2019. The project also provided travel support for the

NPFC Science Manager to attend the Northwest Atlantic Fisheries Organization (NAFO) Scientific Council in May-June 2019, as part of the project's capacity-building program. As the objective of the project is consistent with that of the NPFC Convention, continued cooperation in the second phase of the project would be beneficial to the NPFC to advance the management of deep-sea fisheries and protection of marine ecosystems.

10.4 Other Organizations

45. Towards the development of an official cooperation agreement between the NPFC and the WCPFC, the Secretariat attended the 15th Regular Meeting of WCPFC held in 2018 as an observer and exchanged views on future cooperation with WCPFC in areas of mutual interest. The NPFC and WCPFC have agreed to raise the issue of cooperation to their respective Commissions for consideration by their Members. Cooperation would focus on compliance operations and procedures, and recent automatic identification system (AIS) exercises with GFW on alleged IUU fishing operations and transshipment, where some fishing vessels and carriers are authorized by both regional fisheries management organizations (RFMOs).

46. The Secretariat presented a proposal from the South Pacific Regional Fisheries Management Organization (SPRFMO) to develop a formal Memorandum of Understanding (MOU) between NPFC and SPRFMO. The Commission recognized that SPRFMO has a similar mandate to that of the NPFC and, as a relatively new RFMO, may share similar issues and challenges, but determined that it requires more information about SPRFMO before it can make a decision on whether or not to enter into an MOU. The Commission requested any Member who also participates in SPRFMO to represent NPFC as an observer at SPRFMO meetings and provide a report to the next Commission meeting.

47. The Secretariat reported that the Fisheries and Resources Monitoring System of FAO (FIRMS) submitted a proposal for an NPFC-FIRMS partnership agreement, which would facilitate access to a wide range of high-quality information on the status and trends of global marine fishery resources, fisheries, and their management, in order to provide decision-makers with necessary information to develop effective fisheries policies. SC04 reviewed the proposal and determined that it requires more information before it can make a recommendation. It therefore suggested that a representative from FAO FIRMS could attend the next SC meeting to give a detailed explanation.

48. The Secretariat suggested that the Commission consider a cooperation agreement with the Inter-American Tropical Tuna Commission (IATTC), mainly for cooperation on compliance, given that vessels, especially carrier vessels, are operating in both Convention Areas. There is

also the issue of the migration of tunas into the northeastern corner of the NPFC Convention Area and north of the IATTC Convention Area, creating a "gap area" where it is unclear who has responsibility for the management of these fisheries resources.

49. With regard to future opportunities for cooperation with other organizations, the Commission recognized the need to prioritize cooperation with RFMOs that have Convention Areas that are similar to or overlap with that of the NPFC, and to allow for the delivery of the Secretariat's core program.

Agenda Item 11. Other Matters

11.1 Strategic Plan for the Commission

50. The Secretariat presented the proposed process and timelines for the development of a Strategic Plan for the Commission (NPFC-2019-COM05-WP10). The Commission endorsed the proposal.

11.2 Selection of the Chair and Vice Chair

51. The Secretariat made available the practices of ten other RFMOs for appointing new chairs and three options for the election of a new Chair and Vice Chair of the Commission and its subsidiary bodies. The Commission did not have time to discuss the information.

52. The Commission selected Dr. Vladimir Belyaev (Russia) to serve as the new Chair and Mr. Shingo Ota (Japan) to serve as the new Vice Chair.

11.3 Secondment and Intern for 2018

53. The Secretariat presented the recommendations of the FAC regarding the applications for the 2019-2020 NPFC Secondment and Internship programs. The Commission endorsed the FAC recommendation to hire the top three internship candidates in the ranking prepared by the Secretariat. There were no applicants for secondment.

11.4 Press Release

54. The Secretariat presented a proposal for publishing press releases on the NPFC website to share information about the Commission and Committee meetings with the media and public, and a draft press release template (NPFC-2019-COM05-IP01). The Commission endorsed the proposal and template.

11.5 Performance Review of the Commission

55. The Secretariat presented a draft timeline and budget estimate for conducting a performance

review of the Commission (NPFC-2019-COM05-IP02). The Commission considered the proposal and agreed to hold further discussions at the next Commission meeting. The Commission requested the Secretariat to conduct a review of the methodology applied by other RFMOs in conducting their performance reviews, including the compositions of their review panels, and present this information at the next Commission meeting.

11.6 Others

56. As was previously discussed at COM03 and COM04, Russia reiterated its intention to resume its crab fisheries in the Convention Area. The Commission recognized Russia's intention to resume its crab fisheries in the Convention Area.

57. The Commission agreed that for the Chub mackerel MSE process, noted in the SC report, the working group would be co-led by a science and fisheries management representative and be comprised of participants including scientists, managers, and stakeholders, including industry and non-governmental organizations. The Commission also recognized that MSE is an iterative process that requires clear management objectives.

Agenda Item 12. Date and Place of Next Meeting

58. The following schedule and venues were recommended:
    a. TCC: 30 July-1 August in Japan;
    b. FAC: 3 August in Japan; and
    c. Commission: 4-6 August in Japan.

59. Russia expressed its intention to host the Commission meeting in 2021.

Agenda Item 13. Adoption of the Report

60. The report was adopted by consensus.

Agenda Item 14. Close of Meeting

61. The Chair expressed his honor to have served as the first Chair of the NPFC, his gratitude for the support of all Members and Observers, and his hope that the NPFC will enjoy continued success.

62. The Members thanked the Chair for his hard work and effective leadership.

63. The Commission meeting closed at 21:58 on 18 July 2019.

Annexes

Annex A – Opening Remarks by Japan
Annex B – Agenda
Annex C – List of Documents
Annex D – List of Participants
Annex E – Russia's statement
Annex F – EU statement
Annex G – Report of the 4th Scientific Committee Meeting
Annex H – Report of the 4th Technical and Compliance Committee Meeting
Annex I – Report of the 3rd Finance and Administration Committee Meeting
Annex J – CMM 2019-01 Conservation and Management Measure on Information Requirements for Vessel Registration
Annex K – CMM 2019-02 Conservation and Management Measure to Establish a List of Vessels Presumed to have carried out Illegal, Unreported and Unregulated Fishing Activities in the Convention Area of The North Pacific Fisheries Commission
Annex L – CMM 2019-05 Conservation and Management Measure for Bottom Fisheries and Protection of Vulnerable Marine Ecosystems in the Northwestern Pacific Ocean
Annex M – CMM 2019-06 Conservation and Management Measure for Bottom Fisheries and Protection of Vulnerable Marine Ecosystems in the Northeastern Pacific Ocean
Annex N – CMM 2019-12 Conservation and Management Measure on the Vessel Monitoring System (VMS)
Annex O – CMM 2019-13 Conservation and Management Measure for the Compliance Monitoring Scheme
Annex P – NPFC IUU Fishing Vessel List for 2019
Annex Q – CMM 2019-07 Conservation and Management Measure for Chub Mackerel
Annex R – CMM 2019-08 Conservation and Management Measure for Pacific Saury
Annex S – CMM 2019-11 Conservation and Management Measure for Japanese Sardine and Japanese Flying Squid
Annex T – CMM 2019-10 Conservation and Management Measure for Sablefish

Please refer to the NPFC website for the complete annexes.

https://www.npfc.int