



North Pacific Fisheries Commission Yearbook 2017





North Pacific Fisheries Commission

Yearbook 2017

Published by:

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

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

This publication may be cited in the following manner:

North Pacific Fisheries Commission. 2018. NPFC Yearbook 2017. 385 pp.
(Available at www.npfc.int)

North Pacific Fisheries Commission

2nd Annual Yearbook of Activities

FOREWORD

The phrase “Another year older, another year wiser” sums up my impressions about the second annual yearbook of the North Pacific Fisheries Commission. With each passing year comes additional wisdom and a better understanding of the world and society in general. I truly believe that we have built upon a good foundation through the success of our initial efforts and another year has made our Commission much stronger. As the Chairman of the North Pacific Fisheries Commission (NPFC), I would like to share with you our achievements in the past year as we look forward to keeping our pledge to ensure the long-term conservation and sustainable use of the fisheries resources and the protection of marine ecosystem of the North Pacific Ocean.

This publication details NPFC’s second year of operation covering major meetings hosted by Members to address various issues faced by the Commission, the main one being the sustainable management of the fishery resources and the protection of the ecosystems in which these resources occur.

It is indeed my pleasure to acknowledge the incredible dedication of the current Members of the NPFC in adopting and improving conservation and management measures to alleviate the impacts of deep sea bottom fishing in our Convention Area. The past year has shown sturdy growth and improvement in many aspects. This yearbook narrates the events and activities of the past year of the Commission, and I trust you will enjoy it as much as I did when reviewing our work in the year 2017.

Kenji Kagawa
Chairman
North Pacific Fisheries Commission

ACKNOWLEDGEMENT

As a testament of our unwavering commitment to our objective of ensuring the long-term conservation and sustainable use of the marine resources and protection of the marine environment in the Convention Area of the North Pacific Fisheries Commission, we have collated a year's worth of activities and ideas and bundled it all up in one easy to read book. However, such a gargantuan task would have been impossible to accomplish without the help of some very important people.

First, to all the Members of the North Pacific Fisheries Commission, who are the pillars of this organization, thank you very much for sharing your tremendous efforts and resources to contribute to the success of all the activities chronicled in this book.

I also express my utmost gratitude to Mr. Kagawa, Chairman of the Commission, for the support and guidance in getting myself and the Secretariat through the past year.

Thank you very much to the Chairs of the Scientific Committee, Technical and Compliance Committee, all working groups, small committees and corresponding groups for the arduous work on behalf of the Commission. I also must give recognition to my dedicated staff for their support and diligence beyond the call of duty to bring this remarkable year to a fruitful close.

Lastly, I would like to convey my sincerest thanks to Urban Connections for assisting the Commission during our meetings through Mr. Alex Meyer, our excellent Rapporteur, and the rest of their team for their ideas, support and patience in putting together this book.

Thank you all.

Dae-Yeon Moon
Executive Secretary
North Pacific Fisheries Commission



TABLE OF CONTENTS

| | |
|--|-----|
| INTRODUCTION..... | 1 |
| 1st Pacific Saury Stock Assessment Workshop..... | 5 |
| Ad-hoc Workshop for Chub Mackerel | 17 |
| 1 st Meeting of the Technical Working Group on Pacific Saury Stock Assessment | 25 |
| 2 nd Meeting of the Small Scientific Committee on Vulnerable Marine Ecosystems..... | 139 |
| 2 nd Meeting of the Small Scientific Committee on North Pacific Armorhead | 149 |
| 2 nd Meeting of the Small Scientific Committee on Pacific Saury | 157 |
| 2 nd Scientific Committee Meeting | 171 |
| 2 nd Meeting of the Technical and Compliance Committee..... | 207 |
| 1 st Meeting of the Finance and Administration Committee | 225 |
| 3 rd Commission Meeting..... | 279 |

North Pacific Fisheries Commission

2nd Annual Yearbook of Activities

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 biological ecosystems. As of the end of fiscal year 2017, 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. The Secretariat of the North Pacific Fisheries Commission (NPFC) 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.

In recent years, the chub mackerel (*Scomber japonicus*) fishery has become active in the NPFC Convention Area in the Northwestern Pacific Ocean. Similar with the Pacific saury, stock assessment for chub mackerel also determines if current conservation and management measures are enough to continue the sustainable use of these marine resources.

NPFC Personnel:

The personnel of the Secretariat and the Chairman are representatives of the multi-national and multi-cultural nature of the Commission. The Chairman is Kenji Kagawa of Japan, with the Executive Secretary being Dae-Yeon Moon of Korea. The Science Manager is Aleksandr Zavolokin of Russia and the Compliance Manager is Peter Flewwelling of Canada. The Executive Assistant

Yuko Yoshimura-Takamiya and the Data Coordinator Mervin Ogawa are both Japanese nationals. The Secretariat has also engaged a couple of consultants for a limited period of time to assist the Commission in finance and IT management.

Period of Coverage:

As this is the second yearbook, this publication picks up immediately after the last reported activity of the first yearbook and covers key activities and Commission meetings held from the 1st Pacific Saury Stock Assessment Workshop in December 2016 up to the 3rd Annual Commission Meeting in July 2017.

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

- a. held scientific committee meetings and workshops on the bottom fisheries, vulnerable marine ecosystems, chub mackerel and Pacific saury;
- b. held the second technical and compliance committee meeting resulting in the adoption of two new Conservation and Management Measures (CMM): one on Pacific saury, and the second on High Seas Boarding and Inspection Procedures;
- c. held the first finance and administration committee meeting and endorsed the revised budgets for 2017 and 2018;
- d. held the third Commission meeting and adopted the reports of the SC, TCC and FAC, including SC research plan, TCC work plan and Commission's budgets.

In addition, the Secretariat represented the Commission and its Members at the:

- a. Small Pelagic Symposium-PICES/ICES;
- b. Preparatory Conference Meetings for the development of the United Nations international, legally binding instrument (ILBI) on Biodiversity Beyond National Jurisdictions (BBNJ);
- c. Annual Meeting of the North Pacific Anadromous Fish Commission (NPAFC);
- d. Ocean Conference at the United Nations Headquarters in New York, USA;
- e. FAO's workshop on potential impacts of climate change on deep-sea ecosystems and the implications for the management of deep-sea fisheries;
- f. Global Fisheries Forum and Seafood Expo;
- g. North Pacific Marine Science Organization (PICES) Annual Meeting;
- h. IOTC Electronic Monitoring and Reporting Information System (E-MARIS)
- i. Building International Partnership to Enhance Science Based Ecosystem approaches in support of Regional Ocean Governance in the context of 2030 Agenda for Sustainable Development organized by GEF, IOC, UNDP, UNEP, and FAO.

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



1st Pacific Saury Stock Assessment Workshop

13-15 December 2016

Busan, Republic of Korea

Workshop Report



1st Pacific Saury Stock Assessment Workshop

AGENDA

Agenda Item 1. Opening of the Workshop

- 1.1 Introduction to the Workshop
- 1.2 Adoption of the Agenda
- 1.3 Meeting arrangements
- 1.4 Nomination of Rapporteur

Agenda Item 2. Current status of Pacific saury fisheries and its stock assessment

- 2.1 Brief review of the Pacific saury fisheries
- 2.2 Data availability and recent Pacific saury stock assessments

Agenda Item 3. Compilation and evaluation of data submitted prior to the workshop

Agenda Item 4. General framework for Pacific saury stock assessment

Agenda Item 5. CPUE standardization

- 5.1 Environmental variables to be used for CPUE standardization
- 5.2 Models to work towards finalizing CPUE standardization

Agenda Item 6. Exploration of stock assessment models

- 6.1 Potential stock assessment models (BSPM and others)
- 6.2 Initial parameterization and configuration for the potential models
- 6.3 Trial runs of the models

Agenda Item 7. Consideration of biological reference points and potential uncertainties

Agenda Item 8. Next steps towards finalizing Pacific saury stock assessment

Agenda Item 9. Other matters

Agenda Item 10. Adoption of the Report

Agenda Item 11. Concluding remarks and close of the Workshop

WORKSHOP REPORT

Agenda Item 1. Opening of the Workshop

1. The 1st Pacific Saury Stock Assessment Workshop took place in Busan, Korea and was attended by participants from China, Japan, Republic of Korea, the Russian Federation, Chinese Taipei, and the PICES as an observer.
2. Dr. Doo-Hae An, Director of Distant Water Fisheries Resources Division of the National Institute of Fisheries Science (NIFS) gave a welcome speech in which he mentioned that Korea is highly dependent on Pacific Saury resources of the North Pacific and also noted that efforts for resource management shall be crucial for sustainable use of Pacific saury stock.

1.1 Introduction to the Workshop

3. The Chair, Dr. Mitsuo Sakai, Japan, introduced the objective and main tasks of the Workshop and showed a flow chart for the provisional Pacific saury stock assessment.

1.2 Adoption of the Agenda

4. The agenda was adopted by consensus.

1.3 Meeting arrangements

5. The Secretariat gave the general administrative information for the Workshop.

1.4 Nomination of Rapporteur

6. Ms. Seung-Min Park and Mr. Sanggyu Shin were appointed as rapporteurs.

Agenda Item 2. Current status of Pacific saury fisheries and its stock assessment

2.1. Brief review of the Pacific saury fisheries

7. The Chair provided an overview of the Pacific saury biology in the North Pacific Ocean including distribution, life span, population structure as well as the fisheries characteristics.

8. Each Member gave a brief review of their respective Pacific saury fisheries. In-depth discussions were made based on the content of each presentation. These included stock identification related to stock structure, survey design of fisheries independent survey, fishing days, catches, decision-making procedures, the number of active vessels, fishing grounds, and search time. Chinese Taipei clarified the fishing pattern of their fishing fleets between the Southwest Atlantic Ocean and Northwest Pacific Ocean. China emphasized the importance of background information for CPUE standardization (regarding spatio-temporal changes in coverage of area, size and age composition, innovation of fishing technique as masked efforts), considering the different CPUE trends amongst Members.
9. Mr. Hong, the representative of the Korean stick-held dip net fishery industry expressed concerns on the rapid expansion of the number of fishing vessels, which seemed to be contrary to the NPFC Conservation and Management Measure (CMM 15-02). He requested the Commission make stronger efforts to prevent IUU fishing.

2.2 Data availability and recent Pacific saury stock assessment

10. Participants discussed data availability. Each member discussed how their fishing efforts were measured. The Chair suggested that all participants shall begin with the same base for data availability. Also additional biological information as well as location information collection used by each Member were presented. Participants agreed that they should specify information which participants could provide to the Working Group. Participants suggested two ways to proceed with CPUE standardization: exercising separate data sets, or using aggregated data. China highlighted that participants should seek ways to increase quality and transparency of CPUE standardization and stock assessment.
11. Participants made presentations regarding the NPFC documents NPFC-2016-WS PSSA01-WP08(Rev 1), NPFC-2016-WS PSSA01-WP03, NPFC-2016-WS PSSA01-WP05a and b, which were followed by in-depth discussions on model specification and reliability. The participants agreed that PSSA should develop a Protocol for CPUE standardization. China offered to draft this protocol.

Agenda Item 3. Compilation and evaluation of data submitted prior to the workshop

12. Participants reported that compilation could not be completed due to difficulties related to domestic procedures. Evaluation of data was discussed within Agenda Item 2.2

Agenda Item 4. General framework for Pacific saury stock assessment

13. A number of suggestions were made for CPUE standardization, stock assessment models and projections. Participants agreed that general framework should follow the terms of reference for Pacific saury stock assessment which were adopted by SC.

Agenda Item 5. CPUE standardization

5.1. Environmental variables to be used for CPUE standardization

14. Participants discussed environmental variables which constitute important factors for CPUE standardization. Participants identified as important environmental variables for stock assessment, sea surface temperature (SST), salinity, and moon phase, some of which can be obtained directly from fishing activities while others through satellite remote sensing or from commercial agents. Korea noted that surface temperature should be a priority at the current state. Japan mentioned about the difficulty in obtaining salinity from fishery vessels and the related data could only be utilized in the future. Russia introduced the experience of incorporating SST data into their CPUE standardization (Daily High-Resolution-Blended Analyses for Sea Surface Temperature, Reynolds et al., 2007); however, it was noted that such data were less helpful than expected in terms of CPUE standardization process, e.g. in reducing the residuals. Chinese Taipei pointed that *in situ* sea surface water temperature was used in their CPUE standardization process and also mentioned an ongoing study on the relationship between the environmental variables and Pacific saury stock.
15. The Chair noted that the comparison between simulated data and actual data has not been successfully done so far so data could be obtained from fishing vessels, satellite remote sensing, and assimilated models for modeling. The Chair proposed that common and agreeable data set be collected for the purpose of CPUE standardization and that China list potential environmental variables while continuing to discuss the current availability of those data. In this regard, China volunteered to provide long-term environmental data as the Chair presented his idea to use data actually provided by Members, if necessary. The Chair re-emphasized that environmental variables are crucial to CPUE data set and Members shall consider or decide the timeline for the common data for the NPFC, and he highlighted that the first step would be listing of potential effects for CPUE and present a table during the meeting period if possible.

5.2 Models to work towards finalizing CPUE standardization

16. With requirements of the participants, China presented a draft of proposed protocol for CPUE standardization (Annex A). Participants discussed model parameters which depended on catchability, gear selectivity, and fish availability. The protocol for CPUE standardization was adopted by PSSA workshop. Participants suggested the necessity of setting limitations for determining to include or exclude variables when selecting a model (e.g. less than 5%, 1%) since some data are not useful albeit important.
17. The Chair suggested three CPUE data sets: from Japan, Russia, and Chinese Taipei for the Pacific saury assessment, which were agreed upon by participants. The Chair also encouraged Korea to provide their standardized CPUE data sets.
18. Other types of abundance indices could be considered so long as they meet certain scientific criteria.

Agenda Item 6. Exploration of stock assessment models

19. China gave a presentation on development of a Bayesian state-space production model (BSPM), which incorporated functions for retrospective analyses and projections. China pointed out that at the early stage of model development more emphasis should be put on model parameterization. Japan proposed to exchange basic ideas for a modeling exercise. China highlighted the importance of transparency of a modeling process.
20. Participants acknowledged the necessity to make comparisons among various models. Chinese Taipei noted that catch data also constitutes an important element besides CPUE for stock assessment.
21. Japan gave a presentation on stock assessment of Pacific saury by BSPM, followed by discussions on presented formula based on inclusion either of process error or observation error. Japan gave another presentation on state-space population dynamics models to introduce intended extension of the models, to highlight the characteristics and merits of estimation methods, and to show planned presentation styles. China raised questions about stability of parameters and time period for different “q.”
22. Chinese Taipei gave a brief presentation on their BSPMs.
23. In discussion, participants suggested for all given parameters, they have to look at the difference in posterior and prior distribution and suggested approaches to proceed with stock assessment including base case scenario and others.
24. Participants agreed to use the state-space production model as the base model for stock assessment. Further discussions noted importance of process errors and observation errors, availability of CPUE, approaches to select CPUE, and data reliability. The Chair confirmed the use of the state-space production model.

Agenda Item 7. Consideration of biological reference points and potential uncertainties

25. China proposed that it is important to separate limit reference points and target reference points for the short term, while evaluating performance of reference points for longer term. Russia presented the use of the DLMtool for the stock assessment of data limited fisheries. Participants suggested they could take the MSY approach for the development of biological reference points (BRPs). China commented F_{MSY} could be a limit reference for fisheries mortality and B_{MSY} as target reference point for stock biomass.
26. Chinese Taipei and China both presented the interpretation of potential uncertainties: associated with input data (catch, CPUE, prior knowledge where available, etc.), estimation, models, implementation, and BRPs which should be incorporated into decision making process.

Agenda Item 8. Next steps towards finalizing Pacific saury stock assessment

27. The Chair confirmed that the stock assessment for Pacific saury should be finalized at the 1st meeting of the Technical Working Group on Pacific Saury Stock Assessment (TWG PSSA) in February 2017 and its report shall be submitted by 17 March, 2017 to SSC PS meeting in 2017.
28. Draft provisional agenda for the 1st TWG PSSA meeting, which will be held 20-22 February 2017 in Yokohama, Japan, was circulated to participants for discussion. Regarding Item 5 of that Agenda, China noted that time left for CPUE standardization finalization is limited. Russia suggested all participants ask permission to respective governments for data exchange. Participants agreed to make some revisions on Agenda Item 5 and 8. Chinese Taipei expressed concerns as fisheries data are considered confidential and government authorization shall be required in advance. China noted that data for standardizing CPUE should be provided to stock assessment participants to ensure transparency of the process. The Secretariat proposed to make confidentiality agreements to expedite data sharing process if participants agree on it.
29. Participants discussed about the provision of raw and aggregated data and considered limitations and possibilities. China highlighted stock assessment should be conducted with best available science and available data, and the Commission could develop a necessary protocol. Chinese Taipei emphasized that provisions of the raw data or aggregated data in this workshop were not authorized by their government and this issue should be discussed in the SC meeting. The Chair noted standardized CPUE data can be relatively easily provided compare to raw data. China clarified that both sufficient and detailed information should be provided for standardized CPUE data to secure transparency and credibility. The Chair suggested they need a template format. Participants agreed to come up with a protocol. Japan made a suggestion to have example for plots and tables, and Ms. Naya from Japan volunteered to provide it. China highlighted the importance of transparency in the CPUE standardization.
30. Japan disagreed to provide raw data for the following reasons: difficulty in obtaining government permission, time limitation and absence of “data exchanging protocol.” Russia noted that if there was a protocol on data exchange in the NPFC, then it would be applicable only to the Convention area, but the most part of national saury catch of Russia and Japan occurs in their EEZs and therefore the NPFC should encourage Fisheries Agencies to facilitate data exchange on a broader scale covering the whole area of fishing efforts. China highlighted stock assessment should be conducted with best available science and best available data to improve the confidence in the stock assessment results. The Commission may consider developing a necessary protocol. The Chair noted standardized CPUE data can be relatively easily provided compare to raw data, so for the provisional stock assessment in 2017, it would be better to begin with sharing the standardized CPUE data which will be provided by each participant with good consideration of the CPUE standardizing protocol. China highlighted

again the importance of transparency for the confidence in the quality of standardized CPUEs and subsequent stock assessment.

31. Participants discussed the proposed stock assessment protocol suggested by China. After discussions and accompanying revisions, all participants agreed on the proposed stock assessment protocol (Annex B). The Chair confirmed that the protocol could be modified or aggregated further until and after the TWG PSSA Meeting in February since the final recommendation shall be submitted to SC.

Agenda Item 9. Other matters

32. Korea presented a template (NPFC-2016-WS PSSA01-WP11a and b) for fisheries and biological data collection which included the following six categories of information: vessel, net, fishing lamp, time and location, Pacific saury catch, and by-catch together with a separate biological data collection section. Japan explained that there are too many Japanese fishing vessels which are too small in size to collect biological data. Japan pointed out each member has different fisheries style and asked when to start collection of the above information. The Chair noted two issues related to data collection templates: first, what information we need for stock assessment and, second, whether this information should be collected by fisheries or observers and whether NPFC should develop an observer program for data collection. The Chair proposed this data collection template to be deferred to the next meeting. Korea suggested to gather contact points of members so that smooth operation shall be made on fulfillment of data collection. The purpose of this template is to develop a compiled data base for Pacific saury stock assessment. Members nominated the following contact persons for a correspondence group on developing a data collection template: Siquan Tian, Satoshi Suyama, Eunjung Kim, Dmitriy Antonenko, and Wen-Bin Huang.
33. Participants discussed catch data sets available from FAO and NPFC data sets based on members' annual reports. Participants compared these two data sets and discussed which data could be used for stock assessment. Korea explained the differences between FAO and NPFC data sets and agreed to submit revised data to the Secretariat. Russia noted they would also provide data collected since the 1980s. Chinese Taipei clarified that FAO data for 2004 are not accurate and suggested to use NPFC data for the mentioned year. The Secretariat was tasked to distribute revised catch data to members. The participants agreed to tentatively use FAO long-term total catch data together with data provided by China.
34. The Chair clarified that for the next TWG PSSA meeting, members should submit CPUE standardization documents by 20 January 2017.

Agenda Item 10. Adoption of the Report

35. The report of the workshop was adopted by consensus.

Agenda Item 11. Concluding remarks and close of the Workshop

36. The workshop closed at 16:41 on 15 December 2016.

37. The participants thanked Korea for successfully hosting this workshop and the Chair for his able leadership and guidance during the meeting.

Annexes

Annex A – Protocol for CPUE standardization

Annex B – Stock assessment protocol

Protocol for CPUE standardization

The use of CPUE in a stock assessment implicitly assumes that CPUE is proportional to stock abundance/biomass. However, many factors other than stock abundance/biomass may influence CPUE. Thus any other factors, other than stock abundance/biomass, that may influence CPUE should be removed from the CPUE index. The process of reducing/removing the impacts of these factors on CPUE is referred to as CPUE standardization.

The following protocol is proposed for the CPUE standardization:

- (1) Conduct a thorough literature review to identify key factors (i.e., spatial, temporal, environmental, and fisheries variables) that may influence CPUE values;
- (2) Determine temporal and spatial scales for data grouping for CPUE standardization;
- (3) Plot spatio-temporal distributions of fishing efforts and catch to evaluate spatio-temporal patterns of fishing effort and catch;
- (4) Calculate correlation matrix to evaluate correlations between each pair of those variables;
- (5) Identify potential explanatory variables based on (1)-(4) to develop full model for the CPUE standardization;
- (6) Make statistical assumptions on the full models and fit the data to the assumed statistical models (i.e., GLM, GAM, Delta-lognormal GLM, Neural Networks, Regression Trees, Habitat based models, and Statistical habitat based models);
- (7) Select and evaluate the models using methods such as likelihood ratio, AIC, BIC or cross validation;
- (8) Evaluate if distributional assumptions are satisfied and if there is a consistent spatial/temporal distribution of residuals in CPUE standardization modeling;
- (9) Determine the optimal model to estimate yearly standardized CPUE and their associated uncertainty.
- (10) Plot nominal and standardized CPUEs over time.

Stock assessment protocol

We propose the following procedures to be included in the PS stock assessment:

- (1) Identify the data that will be available to the stock assessment;
- (2) Evaluate data quality and quantity and potential error sources (e.g., sampling errors, measurement errors, and associated statistical property (e.g., biased or random errors, statistical distribution) to ensure that the best available information is used in the assessment;
- (3) Select population models describing the dynamics of PS stock and observational models linking population variables with the observed variables;
- (4) Develop base case scenarios and alternative scenarios for sensitivity analyses;
- (5) Compile input data and prior distributions for the model parameterization for the base case and alternative scenarios;
- (6) For each scenario, fit the model to the data, diagnostics of model convergence, plot and evaluate residual patterns, compare prior and posterior distributions for key model parameters, and evaluate biological implications of the estimated parameters;
- (7) Develop retrospective analysis to verify whether any possible systematic inconsistencies exist among model estimates of biomass and fishing mortality
- (8) Identify final model configuration and model runs for each scenario;
- (9) For each scenario, estimate and plot exploitable stock biomass and fishing mortality (and their relevant credibility distributions) over time;
- (10) For each scenario, estimate biological reference points (e.g., MSY, Bmsy, Fmsy) and its associated uncertainty;
- (11) Identify target and limit reference points for stock biomass and fishing mortality;
- (12) Have the Kobe plot for each scenario;
- (13) Determine if the stock is “overfished” and “overfishing” occurs for the base and sensitivity

scenarios;

- (14) Finalize the base-case scenario;
- (15) Develop alternative ABCs for the projection (e.g., 5-year projection);
- (16) Conduct risk analysis for each level of ABC defined in Step (15) for the base-case scenario;
- (17) Develop decision tables with alternative state of nature;
- (18) Determine optimal ABCs based on decision tables developed in Step (17);
- (19) Provide scientific advice on stock status and appropriate catch level to SC through SSC PS.



Ad-hoc Workshop for Chub Mackerel

16-17 February 2017

Yokohama, Japan

Workshop Report



Ad-hoc Workshop for Chub Mackerel

AGENDA

Agenda Item 1. Opening of the workshop

Agenda Item 2. Selection of Chair and Rapporteur

Agenda Item 3. Adoption of Agenda

Agenda Item 4. Biology, life history, population dynamics and stock assessment of chub mackerel

Agenda Item 5. Chub mackerel fisheries

Agenda Item 6. Chub mackerel fisheries management

Agenda Item 7. Panel discussion on chub mackerel biology, fisheries and management

Agenda Item 8. Recommendations to the Scientific Committee

Agenda Item 9. Adoption of the Report

Agenda Item 10. Close of the Workshop

WORKSHOP REPORT

Agenda Item 1. Opening of the Workshop

1. The Ad-hoc Workshop for Chub Mackerel took place in Yokohama, Japan on 16-17 February 2017 at the National Research Institute of Fisheries Science (NRIFS), Japan Fisheries Research and Education Agency, and was attended by Members from China, Japan, the Republic of Korea, the Russian Federation, and Chinese Taipei.
2. The workshop was opened by Dr. Hiromu Zenitani (Director, Research Center for Fisheries Management, NRIFS, Japan), who served as the Workshop Coordinator, and outlined the objective and procedures for the meeting.
3. Mr. Hisashi Endo (Executive Director, Japan Fisheries Research and Education Agency) welcomed the participants and highlighted the rapidly increasing fishing of chub mackerel as a matter requiring the urgent attention of the North Pacific Fisheries Commission (NPFC). He expressed his hope that the workshop would serve as a good starting point for reviewing the conservation and measurement measure (CMM) for chub mackerel adopted in 2016 (CMM 2016-07), and for productive discussions and positive outcomes.

Agenda Item 2. Selection of Chair and Rapporteur

4. The Workshop Coordinator proceeded with the selection of the Chair and Rapporteur. Dr. Hiromu Zenitani was unanimously elected to chair the Workshop. Mr. Alexander Meyer was selected as Rapporteur.

Agenda Item 3. Adoption of Agenda

5. The agenda was adopted without amendment.

Agenda Item 4. Biology, Life History, Population Dynamics and Stock Assessment of Chub Mackerel

6. The session was chaired by Dr. Toshihide Iwasaki (Japan).
7. Japan presented on biology and life history of chub mackerel in the western North Pacific Ocean. The workshop was informed that the main distribution and spawning area of chub mackerel was inside Japan's exclusive economic zone. According to the presentation, the distribution area is expanding to the high seas because the biomass is at the recovery stage.
8. Japan presented on population dynamics of chub mackerel in the Northwestern Pacific Ocean. The workshop was informed that tremendous efforts had been made by coastal states historically for sustainable use of the stock. To promote the recovery of biomass, it is necessary to maintain an appropriate harvest rate. Further statistical analysis was suggested to improve the quality of survey.
9. Russia presented its review on biology, life history, population dynamics and stock assessment of chub mackerel. The stock biomass of chub mackerel in the Northwestern Pacific Ocean is recovering. However, it is much lower than that in the 1970s.
10. Chinese Taipei presented on the fishery, age, growth and reproduction of chub mackerel in the northeastern waters off Chinese Taipei. It was pointed out that chub mackerel that spawned in the waters off Chinese Taipei belonged to a different stock from the Northwestern Pacific stock. In recent years, the fishing mortality of chub mackerel has not decreased but catch per unit of effort has decreased. In 2013, conservation measures were introduced. However, the length of 50% maturity has still decreased. Further study is needed to understand the reason behind this decrease.
11. China presented a stock assessment and risk analysis of alternative management strategies for chub mackerel stock in the East China Sea and Yellow Sea using the Bayesian approach. China explained that it intended to conduct a stock assessment of chub mackerel in the Convention Area in the near future. The Members encouraged China to do so as soon as possible.
12. Japan presented a stock assessment of chub mackerel in the Northwestern Pacific Ocean. It was noted that more complete data and information, including age composition in the Convention Area, would enable a more accurate assessment of chub mackerel fisheries. Japan stressed the necessity not to increase the fishing mortality of chub mackerel from the level in 2014-2015.

Agenda Item 5. Chub Mackerel Fisheries

13. The session was chaired by Dr. Siquan Tian (China).

14. Japan presented on chub mackerel fisheries by Japan, and highlighted the historical, cultural, and socio-economic importance of this fishery. Japan explained the strong commitment made by fishermen in the form of voluntary management measures, such as day closure and monthly quotas, in addition to national management measures which included prohibition of light equipment. Japan hoped that the NPFC would respect these efforts and consider them as possible management measures in the future. Furthermore, Japan also highlighted the importance of ensuring that fishing intensity does not exceed a level that prevents the recovery of chub mackerel stock.
15. Russia presented on chub mackerel fisheries in Russia. Japan expressed concern over the number of Russian vessels engaged in chub mackerel fishing, referring to Article 1 of CMM 2016-07. Russia explained that the vessels engaged in chub mackerel fishing were operating outside the NPFC Convention Area.
16. China presented on the status of chub mackerel fisheries in China in the Northwestern Pacific Ocean in 2014-2015. Japan expressed concern over the rapid increase in Chinese catches of chub mackerel in the Convention Area. China explained measures it is taking to ensure compliance with the relevant NPFC CMMs.
17. Japan also expressed concern over the illegal, unreported and unregulated (IUU) fishing of chub mackerel, and China emphasized that such issues should be discussed by the Technical and Compliance Committee of the NPFC.

Agenda Item 6. Chub Mackerel Fisheries Management

18. The session was chaired by Dr. Oleg Katugin (Russia).
19. Japan presented on the management of chub mackerel in Japan, including management of total allowable catch, domestic fishing permits system, and voluntary management measures by fishermen. The Members shared concern regarding the increased activities of suspected IUU fishing vessels and its uncertainty to the stock assessment. Japan expressed strong concern that the expansion of high seas fishing of chub mackerel would disrupt the recovery trend of the resource achieved by those efforts.
20. Russia presented on the chub mackerel fishery management in Russia, which includes stock assessment in national and adjacent waters, producing forecasts on recommended catch, and catch control during the fishing season.

21. China presented on the chub mackerel fisheries management of China in NPFC waters. Japan was concerned by the recent increase in the number of Chinese vessels engaging in chub mackerel fishing, referring to CMM 2016-07. China explained measures it is taking to ensure compliance with the relevant NPFC CMMs.

Agenda Item 7. Panel Discussion on Chub Mackerel Biology, Fisheries and Management

22. A panel discussion was held on chub mackerel biology, fisheries and management. The key points of the discussion were as follows:
 - a. It is important to continue efforts to conduct a stock assessment of chub mackerel for the proper and sustainable management of chub mackerel stocks.
 - b. There is a need to improve collection of scientific data and fishing information. In this regard, Japan volunteered to take the lead in drafting a data list and work plan.
 - c. There are currently areas of uncertainty in the stock assessment that should be identified and quantified. In this regard, an estimation of IUU catch should be considered in the stock assessment.
 - d. Although there are still areas of uncertainty in the stock assessment, fishing activities are ongoing. It is therefore important to take precautionary management measures in parallel with work for the stock assessment.
 - e. Regarding the commencement of fishing activities by Members who have to date not engaged in the fishing of chub mackerel in the Convention Area, according to Article 1 of CMM 2016-07, Members are encouraged to refrain from expansion of the number of fishing vessels authorized to fish for chub mackerel until the stock assessment is complete.
 - f. Management measures for chub mackerel need to be strengthened based on scientific evaluation and information.

Agenda Item 8. Recommendations to the Scientific Committee

23. The following recommendations were made:
 - a. The workshop recognized the necessity to conduct stock assessment for chub mackerel, and requested the Scientific Committee of the NPFC to identify the appropriate venue for continuous discussion of this matter.
 - b. The workshop acknowledged that Japan and Russia have been conducting research for stock assessment and fisheries management and recommended that such scientific activity be further encouraged.
 - c. Taking into account Japan's knowledge and experience in scientific research, fisheries and fisheries management, the workshop recommended that Japan prepare a draft work plan for stock assessment, including a draft list of data.

- d. The workshop recalled the importance of eradicating IUU fisheries. In this regard, the workshop expressed concern over the uncertainty of catch data for stock assessment and recommended Members to provide the relevant information.
- e. The workshop recommended that the Scientific Committee in 2017 evaluates precautionary approaches on management of chub mackerel fisheries and develops optimal management measures, such as stricter measures.

24. In this regard, the workshop requested that the Secretariat inform these recommendations to the Scientific Committee through a circular.

Agenda Item 9. Adoption of the Report

25. The Ad-hoc Workshop for Chub Mackerel Draft Report was adopted by consensus.

Agenda Item 10. Close of the Workshop

26. The Ad-hoc Workshop for Chub Mackerel closed at 18:27 on 17 February 2017.

*Any products of this workshop, including presentations and reports, do not affect the legal position on the territorial rights of Members.



1st Meeting of the Technical Working Group on Pacific Saury Stock Assessment

20-22 February 2017

Yokohama, Japan

Meeting Report



1st Meeting of the Technical Working Group on Pacific Saury Stock Assessment

AGENDA

Agenda Item 1. Opening of the meeting

Agenda Item 2. Selection of Chair and Rapporteur

Agenda Item 3. Adoption of Agenda

Agenda Item 4. Brief overview of the framework, results of the 1st Pacific Saury Stock Assessment Workshop and intersessional work, if any

Agenda Item 5. Provision of close-to-completion standardized CPUE and catch for stock assessment

Agenda Item 6. Development of base case scenario for stock assessment

Agenda Item 7. Scenarios for sensitivity analysis

Agenda Item 8. Conduction of Pacific saury stock assessment for base case scenario and sensitivity scenarios

8.1 Stock biomass and fishing mortality and associated uncertainties

8.2 Biological reference points

8.3 Risk analyses of alternative catch levels

Agenda Item 9. How to present the stock assessment results for the SSC PS and SC

Agenda Item 10. Other matters

Agenda Item 11. Adoption of the Report

Agenda Item 12. Close of the Meeting

MEETING REPORT

Agenda Item 1. Opening of the Meeting

1. The 1st Meeting of the Technical Working Group on Pacific Saury Stock Assessment (TWG PSSA) took place in Yokohama, Japan on 20-22 February 2017 at the National Research Institute of Fisheries Science (NRIFS), Japan Fisheries Research and Education Agency (FRA), and was attended by Members from China, Japan, the Republic of Korea, the Russian Federation, and Chinese Taipei. The meeting was opened by the TWG PSSA leader Dr. Mitsuo Sakai (Japan). The Secretariat then outlined the meeting schedule and procedures.

Agenda Item 2. Selection of Chair and Rapporteur

2. The TWG PSSA leader proceeded with the selection of the Chair and Rapporteur. Dr. Sakai (Japan) was unanimously elected to chair the Workshop. Mr. Alexander Meyer was selected as Rapporteur with the assistance of Dr. Dharmamony Vijai (Japan).

Agenda Item 3. Adoption of Agenda

3. The agenda was adopted without amendment.

Agenda Item 4. Brief Overview of the Framework, Results of the 1st Pacific Saury Stock Assessment Workshop and Intersessional Work, if Any

4. The Chair presented an overview of the PSSA framework, the results of the 1st PSSA Workshop, and the tasks for the current TWG PSSA meeting referring to the PSSA Workshop Final Report and NPFC-2017-TWG PSSA01-WP06.
5. It was noted that suggestions on harvest control rules (HCR) should be included as part of discussions on conducting stock assessment (Agenda Item 8), and that HCR are needed to be able to make recommendations to the Small Scientific Committee on Pacific Saury (SSC PS). The Members agreed on the importance of discussing HCR but noted the difficulty in reaching an agreement due to the limited time available. The Members therefore agreed to first reach an agreement on the stock assessment, and then begin discussions of HCR, which can be continued by the SSC PS and the Scientific Committee (SC).

Agenda Item 5. Provision of Close-to-Completion Standardized CPUE and Catch for Stock Assessment

6. Japan presented on the standardization of catch per unit fishing effort (CPUE) data of Pacific saury caught by the Japanese stick-held dip net fishery during 1980 to 2015 (NPFC-2017-TWG PSSA01-WP01). Japan used generalized linear models (GLM) and generalized additive models (GAM) to standardize CPUE of Pacific saury, including spatial, temporal, vessel tonnage, and environmental variables. Cross validation analysis showed that GLM tended to be more suitable than GAM.
7. China encouraged Japan to investigate the small confidence intervals.
8. Japan presented biomass and model-standardized stock size index estimation of age-1 Pacific saury based on Japanese fisheries independent survey data (NPFC-2017-TWG PSSA01-WP02 (Rev. 1)). Japan estimated the biomass using area-swept method and the age-1 stock size index using the Delta-lognormal model, based on data from surveys conducted independently by Tohoku National Fisheries Research Institute. Japan highlighted that a combination of fisheries dependent information and fisheries independent data can provide a more reliable stock assessment, by mitigating the biases in the former and the uncertainties in the latter.
9. China questioned the representation of this data set in quantifying stock dynamics and encouraged Japan to continue to investigate issues related to this survey.
10. When asked whether migration of Pacific saury may produce inaccuracies in the data, Japan explained that migration mainly occurred in a south-north direction during the survey period and should therefore not impact the data in a significant way. Chinese Taipei pointed out the possibility that Pacific saury may migrate east-west during the survey period.
11. It was pointed out that covariates, such as survey methods and equipment, should be included in GLM.
12. It was suggested that Japan should study if there is any spatial correlation between survey stations.

13. It was suggested that Japan should quantify the model fit of the first stage of the model.
14. Korea presented its CPUE standardization data for Pacific saury (NPFC-2017-TWG PSSA01-WP03). Korea standardized the CPUE using GLM selected by Akaike Information Criteria (AIC), including year, month, gross register tonnage (grt), and region as variables. Korea found that the trends of the nominal and the standardized CPUE were similar, but the standardized CPUE fluctuated more than the nominal CPUE.
15. It was suggested that Korea should conduct a sensitivity analysis.
16. It was pointed out that the mapping of the Convention Area was incorrect and it was advised that Korea should revise its data using the correct Convention Area boundary. The participants recommended that the Secretariat provide shapefile of the Convention Area to the Members.
17. Chinese Taipei presented its CPUE standardization data for Pacific saury (NPFC-2017-TWG PSSA01-WP04 (Rev.1)). Chinese Taipei standardized CPUE using GLM selected by AIC, including year, month, SST, grt, and area as variables. The standardized CPUE shows a slight increase from 2001 to 2010, a sharp increase from 2010 to 2014, and a slight drop in 2015.
18. Japan noted that Chinese Taipei's CPUE was lower when sea surface water temperature (SSWT) was in the range of 11-13°C. However, in Japan's experience, 11-13°C SSWT is an optimal range for catching Pacific saury.
19. It was suggested that Chinese Taipei consider using GAM, in light of the non-linear relationship between SSWT and CPUE. Chinese Taipei explained that it decided to use GLM based on the good results achieved by Japan using GLM, but that it would also consider using GAM.
20. Russia presented its CPUE standardization for Pacific saury (NPFC-2017-TWG PSSA01-WP05). Russia standardized CPUE data using GLM selected by AIC, including year, month, year-month interaction, and identified vessels as variables.
21. It was suggested that Russia should examine the relationship between SST and CPUE and whether there was a time lag between the two.
22. Russia presented simulations comparing the performance of different models for estimating total abundance. Russia concluded that when the abundance of fish was not strictly connected with constant geographical features, including positional coordinates as a variable may lead to

misleading results. It was suggested that fishing behavior may need to be improved in the simulation.

23. China presented preliminary results from its CPUE standardization for Pacific saury. China standardized CPUE data using GLM and GAM, including date, fishing position, catch, SST, company, fishing vessel as variables.
24. Following the presentations, the Members held a general discussion. The key points of the discussion were as follows:
 - a. Members should conduct more model simulations, such as those presented by Russia, to improve our understanding of the performance of CPUE standardizations;
 - b. The difference in quality and measures in Members' standardizations makes it difficult to decide which CPUEs to include in a base case scenario or what weight to attribute to each CPUE. The confidence interval and coefficient of variation (CV) of each Members' CPUE, and how they are calculated, need to be clarified.

Agenda Item 6. Development of Base Case Scenario for Stock Assessment

25. China presented its efforts for stock assessment (NPFC-2017-TWG PSSA01-WP08). Eight scenarios with different combinations of data and priors were considered. China concluded that in the Convention Area Pacific saury was not overfished and overfishing is not occurring and that Pacific saury was not being fully exploited. In addition, China highlighted the importance of considering all information from different fishing grounds.
26. Chinese Taipei presented its efforts for stock assessment (NPFC-2017-TWG PSSA01-WP09). Four scenarios with different combinations of data and model configurations were considered. Chinese Taipei concluded that the Northwest Pacific saury was not overfished and overfishing is not occurring.
27. Japan presented its efforts for stock assessment (NPFC-2017-TWG PSSA01-WP07). Forty scenarios with different combinations of different data weighting, different production functions, hyperstability/hyperdepletion, and different prior distributions were explored. Japan concluded that the Northwest Pacific saury may not be overfished and overfishing may not be occurring.
28. The Working Group also discussed about plausible prior distributions for model parameters, which can be found in Annex A.

29. The Working Group also had a lengthy discussion of the caveats associated with using Japan's survey data because the survey q tended to have a value larger than 1, which suggests that the survey biomass may be overestimated due to possible herding by the trawl gear or extrapolating fish abundance to the unfished regions with less abundant Pacific saury.
30. The Working Group also discussed about the convergence issue and the numerical stability in the estimation of the posterior distribution.
31. The Working Group noted the uncertainties associated with the scale of the stock biomass estimate, which may influence the reliability of the absolute biomass estimate.
32. Following the presentations, the Working Group held a general discussion and further analyses. The Working Group noted that there remained uncertainty surrounding the catchability coefficient (q) of the Japanese survey data and therefore developed three base case scenarios, each with a different q prior, as outlined in the stock assessment report, to be completed by 15 March 2017.
33. The Working Group had a lengthy discussion to identify plausible base case scenarios. The Working Group recommended the following three scenarios be considered as the base case scenarios:
 - a. Including four sets of CPUEs and Japan survey data with survey catchability (q) prior defined from 0 to 1;
 - b. Including four sets of CPUEs and Japan survey data with survey catchability (q) prior being fixed at 1;
 - c. Including four sets of CPUEs and Japan survey data with survey catchability (q) prior being defined from 0 to larger than 1.

Agenda Item 7. Scenarios for Sensitivity Analysis

34. The Members agreed to conduct the following analyses and include the results in the stock assessment report, to be completed by 15 March 2017:
 - a. Analysis of the results in which the Japanese survey data are not included;
 - b. Comparison of the results across the different model configurations of China, Japan, and Chinese Taipei for the three base case scenarios and the scenario in which the Japanese survey data are not included;
 - c. Analysis of the sensitivity to the mean value of r for the lognormal prior distribution in Chinese Taipei's model.

Agenda Item 8. Conduction of Pacific Saury Stock Assessment for Base Case Scenario and Sensitivity Scenarios

Agenda Item 8.1 Stock biomass and fishing mortality and associated uncertainties

Agenda Item 8.2 Biological reference points

Agenda Item 8.3 Risk analyses of alternative catch levels

35. The Members agreed to complete the Pacific saury stock assessment for base case scenario and sensitivity scenarios and include the results in the stock assessment report, to be completed by 15 March 2017.

Agenda Item 9. How to Present the Stock Assessment Results for the SSC PS and SC

36. The Members held a discussion on how to present the stock assessment results for the SSC PS and the SC. The Working Group developed a common template for the stock assessment report and agreed to complete the report by 15 March 2017.

Agenda Item 10. Other Matters

37. The Working Group agreed to recommend initiating discussions at the upcoming SSC PS meeting and SC meeting.

Agenda Item 11. Adoption of the Report

38. The report of the TWG PSSA was adopted by consensus.

Agenda Item 12. Close of the Meeting

39. The TWG PSSA closed at 18:55 on 22 February 2017.

Annexes

Annex A – Pacific Saury Stock Assessment

*Any products of this working group, including presentations and reports, do not affect the legal position on the territorial rights of Members.

PACIFIC SAURY STOCK ASSESSMENT

1. Executive Summary

This report provides an analysis and evaluation of the current status of Pacific saury (*Cololabis saira*) stock in the North Pacific Ocean through the stock assessment procedures by employing the Bayesian state-space biomass dynamic model. The saury is widely distributed from the subarctic to the subtropical regions of the North Pacific Ocean, while their fishing grounds are limited to the west of 165 °E. However, the main fishing grounds differ among Members (China, Japan, Korea, Russia and Chinese Taipei,). For example, the Convention Area is the main fishing ground for China, Korea and Chinese Taipei while Japan and Russia fish mainly in their own EEZs. This report summarizes the results of the meeting of the Technical Working Group for Pacific saury stock assessment (TWG PSSA), held at Yokohama from 20-22 February 2017 and further analyses made by TWG PSSA

TWG-PSSA conducted stock assessment analysis by employing the Bayesian state-space biomass dynamic models. The models account for process and model errors in addition to observation errors in the biomass indices such as standardized CPUE series for commercial fisheries by Members as well as fishery-independent survey by Japan. Based on the TWG PSSA recommendations (Paragraph 33), following three base-case scenarios differing in survey catchability (q) of the Japanese survey biomass index were explored: 1) including CPUEs and q prior defined from 0 to 1, 2) including CPUEs and q prior fixed at 1, 3) including CPUEs and q prior defined from 0 to larger than 1 (free q). A sensitivity analysis was conducted without using the Japanese survey biomass index (excluding survey q).

Comparison of estimated parameters by China, Japan and Chinese Taipei are shown in the Table 8-1. Mean MSY (x10,000 mt) evaluated by China, Japan and Chinese Taipei ranged from 50.65 to 59.35, 51.4 to 62.2, and 54.23 to 60.67 respectively. For the base-case scenario-3 (S3, free q), estimation of q value was above 1. B_{2016}/B_{MSY} (>1) and F_{2015}/F_{MSY} (<1) values calculated by all members showed a healthy trend.

Based on the model results, 1) China concluded that the exploitable biomass was above B_{MSY} and the current status of stock indicates that the Pacific saury was not overfished and is not experiencing overfishing. 2) Chinese-Taipei concluded that based on the current stock status Pacific saury did not appear to be overfished and is not experiencing overfishing. 3) Japan results shows that the biomass level is currently above the level of MSY for any scenarios and concluded that the continuation of the current catch level may not cause severe decline in the population size in the next decade, but recommended a status quo level or reduction of catch to keep the population size above the MSY level.

Table 8-1 Summary of the estimated key parameters and management quantities by China, Japan, and Chinese Taipei, based on three scenarios.

| Scenarios | Parameters | China | | Japan | | Chinese Taipei | |
|-------------------------------------|-------------------------------------|--------|--------|--------|--------|----------------|--------|
| | | mean | median | mean | median | mean | median |
| S1 (q 0-1) | K (10,000 mt) | 790.26 | 704.00 | 579.4 | 511.2 | 462.80 | 444 |
| | r | 1.03 | 0.77 | 0.965 | 0.704 | 0.73 | 0.61 |
| | Shape (s, Z, M) | 0.57 | 0.32 | 0.729 | 0.569 | 0.99 | 0.79 |
| | B ₁₉₈₀ /K | 0.14 | 0.32 | 0.185 | 0.175 | 0.19 | 0.18 |
| | MSY (10,000 mt) | 59.35 | 57.07 | 62.2 | 59.5 | 60.67 | 58.34 |
| | F _{MSY} | 0.19 | 0.18 | 0.251 | 0.248 | 0.33 | 0.32 |
| | B _{MSY} (10,000 mt) | 346.66 | 310.1 | 265.5 | 237.1 | 224.8 | 216.70 |
| | B ₁₉₈₀ (10,000 mt) | 105.98 | 97.91 | 102.7 | 91.8 | 88.38 | 82.92 |
| | B ₂₀₁₅ (10,000 mt) | 356.63 | 333.1 | 364.9 | 328.5 | 307 | 292.60 |
| | F ₁₉₈₀ | 0.25 | 0.24 | 0.269 | 0.259 | 0.36 | 0.34 |
| | F ₂₀₁₅ | 0.11 | 0.11 | 0.108 | 0.110 | 0.13 | 0.13 |
| | q5 (Biomass) | 0.77 | 0.79 | 0.779 | 0.815 | 0.82 | 0.85 |
| | B ₂₀₁₆ /K | 0.51 | 0.52 | 0.702 | 0.680 | 0.7 | 0.7 |
| | B ₂₀₁₆ /B _{MSY} | 1.16 | 1.18 | 1.529 | 1.463 | 1.44 | 1.44 |
| F ₂₀₁₅ /F _{MSY} | 0.64 | 0.58 | 0.522 | 0.433 | 0.43 | 0.4 | |
| S2 (q=1) | K (10,000 mt) | 615.85 | 527.80 | 466.6 | 414.3 | 390.8 | 381 |
| | r | 1.13 | 0.89 | 1.022 | 0.765 | 0.76 | 0.65 |
| | Shape (s, Z, M) | 0.56 | 0.33 | 0.74 | 0.49 | 1.08 | 0.85 |
| | B ₁₉₈₀ /K | 0.14 | 0.14 | 0.173 | 0.167 | 0.19 | 0.18 |
| | MSY (10,000 mt) | 54.48 | 52.91 | 56.4 | 54.9 | 57.19 | 55.05 |
| | F _{MSY} | 0.22 | 0.22 | 0.281 | 0.279 | 0.36 | 0.35 |
| | B _{MSY} (10,000 mt) | 268.16 | 237.40 | 213.5 | 197.6 | 192.30 | 189.10 |
| | B ₁₉₈₀ (10,000 mt) | 78.66 | 75.43 | 75.4 | 72.3 | 72.39 | 69.77 |
| | B ₂₀₁₅ (10,000 mt) | 261.56 | 260.00 | 264.2 | 263.5 | 246.50 | 243.70 |
| | F ₁₉₈₀ | 0.32 | 0.32 | 0.341 | 0.329 | 0.45 | 0.42 |
| | F ₂₀₁₅ | 0.14 | 0.14 | 0.139 | 0.137 | 0.16 | 0.16 |
| | q5 (Biomass) | 1 | 1 | 1 | 1 | 1 | 1 |
| | B ₂₀₁₆ /K | 0.5 | 0.52 | 0.657 | 0.641 | 0.68 | 0.68 |
| | B ₂₀₁₆ /B _{MSY} | 1.13 | 1.16 | 1.421 | 1.375 | 1.38 | 1.38 |
| F ₂₀₁₅ /F _{MSY} | 0.70 | 0.64 | 0.543 | 0.496 | 0.47 | 0.45 | |
| S3 (free q) | K (10,000 mt) | 457.96 | 409.8 | 310.70 | 267.80 | 223.8 | 200.1 |
| | r | 1.28 | 1.13 | 1.212 | 0.993 | 0.97 | 0.9 |
| | Shape (s, Z, M) | 0.56 | 0.36 | 0.827 | 0.676 | 0.17 | 1.68 |
| | B ₁₉₈₀ /K | 0.14 | 0.14 | 0.164 | 0.158 | 0.18 | 0.18 |
| | MSY (10,000 mt) | 50.65 | 48.66 | 51.40 | 49.70 | 54.23 | 53.04 |
| | F _{MSY} | 0.29 | 0.28 | 0.394 | 0.390 | 1 | 0.69 |
| | B _{MSY} (10,000 mt) | 200.97 | 178.80 | 144.30 | 125.50 | 117.8 | 108.80 |
| | B ₁₉₈₀ (10,000 mt) | 63.39 | 55.79 | 49.30 | 42.90 | 40.98 | 34.95 |
| | B ₂₀₁₅ (10,000 mt) | 210.86 | 189.20 | 169.80 | 147.90 | 131.4 | 113.70 |
| | F ₁₉₈₀ | 0.46 | 0.43 | 0.571 | 0.555 | 2.83 | 1.14 |
| | F ₂₀₁₅ | 0.21 | 0.19 | 0.244 | 0.244 | 0.59 | 0.37 |
| | q5 (Biomass) | 1.46 | 1.37 | 1.774 | 1.802 | 2.46 | 2.16 |
| | B ₂₀₁₆ /K | 0.51 | 0.51 | 0.623 | 0.604 | 0.66 | 0.67 |
| | B ₂₀₁₆ /B _{MSY} | 1.15 | 1.16 | 1.317 | 1.266 | 1.22 | 1.22 |
| F ₂₀₁₅ /F _{MSY} | 0.72 | 0.69 | 0.640 | 0.610 | 0.58 | 0.53 | |
| Sensitivity test S4 (no biomass) | K (10,000 mt) | 536.15 | 454.75 | 375.7 | 303.3 | 216 | 189.2 |
| | r | 1.25 | 1.07 | 1.143 | 0.939 | 0.96 | 0.89 |
| | Shape (s, Z, M) | 0.56 | 0.35 | 0.823 | 0.673 | 1.86 | 1.87 |
| | B ₁₉₈₀ /K | 0.14 | 0.31 | 0.167 | 0.16 | 0.18 | 0.18 |
| | MSY (10,000 mt) | 52.92 | 50.16 | 54.5 | 51.8 | 55.64 | 54.26 |
| | F _{MSY} | 0.27 | 0.26 | 0.365 | 0.359 | 1.07 | 0.76 |
| | B _{MSY} (10,000 mt) | 234.01 | 199.45 | 173.6 | 14.3 | 116.2 | 106.5 |
| | B ₁₉₈₀ (10,000 mt) | 70.52 | 61.14 | 60.3 | 48.4 | 39.57 | 33.63 |
| | B ₂₀₁₅ (10,000 mt) | 244.98 | 217.90 | 217.1 | 174.4 | 132 | 113.3 |
| | F ₁₉₈₀ | 0.43 | 0.39 | 0.51 | 0.492 | 2.99 | 1.23 |
| | F ₂₀₁₅ | 0.18 | 0.17 | 0.208 | 0.207 | 0.59 | 0.38 |
| | q5 (Biomass) | NA | NA | NA | NA | NA | NA |
| | B ₂₀₁₆ /K | 0.52 | 0.53 | 0.654 | 0.637 | 0.69 | 0.7 |
| | B ₂₀₁₆ /B _{MSY} | 1.17 | 1.19 | 1.384 | 1.34 | 1.25 | 1.26 |
| F ₂₀₁₅ /F _{MSY} | 0.69 | 0.65 | 0.59 | 0.562 | 0.54 | 0.5 | |

Contents

| | |
|---|----|
| 1.Executive Summary..... | 33 |
| 2.Introduction | 37 |
| 1)Distribution | 37 |
| 2)Migration | 37 |
| 3)Population structure | 37 |
| 4)Spawning season and grounds | 37 |
| 5)Food and feeding | 38 |
| 6)Age and growth | 38 |
| 7)Reproduction..... | 38 |
| 3.Fishery | 39 |
| 1)History of the Pacific saury fishery | 39 |
| 2)Status of NPFC Members' fisheries | 39 |
| (1)China | 39 |
| (2)Japan..... | 41 |
| (3)Korea | 45 |
| (4)Russia | 47 |
| (5)Chinese Taipei..... | 49 |
| 4.Data used for the stock assessment..... | 51 |
| 1)Fishery-dependent data | 51 |
| (1)Catch..... | 51 |
| (2)Abundance indices | 54 |
| 2)Fishery-independent data | 56 |
| 5.Bayesian state-space biomass dynamic model (model descriptions) | 57 |
| 1)Annual biomass dynamics:..... | 57 |
| 2)Base-case scenarios and sensitivity test: | 57 |
| 6.Priors | 59 |
| 1)Prior distribution..... | 59 |
| 2)Convergence to posterior distribution..... | 59 |
| 3)Diagnostics of model fitting | 59 |
| 4)Retrospective error..... | 59 |
| 7.Stock assessment..... | 61 |
| 1)Member stock assessment report: CHINA | 61 |
| (1)Assessment results for the base-case scenarios | 61 |
| (2)Diagnostics and caveats..... | 62 |
| (3)Biological reference points | 62 |

| | |
|--|-----|
| (4)Stock status (Kobe plots included here) | 63 |
| (5)Sensitivity analysis (for sensitivity analysis) | 63 |
| (6)Projection | 63 |
| (7)Conclusion/Summary | 64 |
| 2)Member stock assessment report: JAPAN | 93 |
| (1)Assessment results for the base-case scenarios | 95 |
| (2)Diagnostics and caveats..... | 97 |
| (3)Biological reference points | 99 |
| (4)Stock status (Kobe plots included here) | 102 |
| (5)Sensitivity analysis (without use of fishery-independent biomass estimates) | 103 |
| (6)Projection | 105 |
| (7)Conclusion/Summary | 107 |
| 3)Member stock assessment report: CHINESE TAIPEI..... | 108 |
| (1)Assessment results for the base-case scenarios | 108 |
| (2)Diagnostics and caveats..... | 110 |
| (3)Biological reference points | 110 |
| (4)Stock status..... | 110 |
| (5)Sensitivity analysis (for sensitivity analysis) | 110 |
| (6)Projection | 111 |
| (7)Conclusion/Summary | 111 |
| 8.Comparison | 133 |
| 9.References | 135 |

2. Introduction

Based on general assumption that there is one management stock in the Western North Pacific Ocean (WNPO), we present here the Pacific saury stock assessment in the WNPO. We applied a Bayesian statistical framework to estimate parameters of production models to assess the saury stock in the WNPO area using catch and effort from 1950 to 2015. The Bayesian method provided direct estimates of parameter uncertainty that were straightforward to interpret and were appropriate for risk analyses. The objectives of this study are to conduct a benchmark stock assessment for the Pacific saury in the WNPO; to develop Bayesian posterior distributions for quantities of management interest using the Markov chain Monte Carlo (MCMC) algorithm; to examine the sensitivity of the results of the assessment to changes in its prior assumptions; and to conduct a retrospective analysis of stock assessment estimates.

1) Distribution

Pacific saury (*Cololabis saira* Brevoort, 1856) has a wide distribution extending in the subarctic and subtropical areas of the North Pacific Ocean from inshore waters of Japan and Kuril Islands eastward to Gulf of Alaska and southward to Mexico. Pacific saury is a commercially important fish in the Western North Pacific Ocean (Parin, 1968; Hubbs and Wisner, 1980).

2) Migration

Saury migrates extensively between the feeding grounds in the Oyashio waters around Hokkaido and the Kuril Islands in summer and the spawning areas in the Kuroshio waters off southern Japan in winter (Fukushima, 1979; Kosaka, 2000). Pacific saury migrate not only in east-west directions, but also the north and south directions. The fishes distributed on the east of 160E migrate eastward in fall and reach waters off Japan after October in recent years (Suyama et al. 2012).

3) Population structure

Genetic study suggested that no genetic structuring groups in the Pacific saury population based on 141 individuals collected from five distant locales (East China Sea, Sea of Okhotsk, northwest Pacific, central North Pacific, and northeast Pacific) (Chow et al., 2009). It is important to note that there should be some distinction within the stock structure to take account of some regional differences as there are some regional important fisheries operating in some areas (i.e., WNPO).

4) Spawning season and grounds

The spawning season of the Pacific saury is relatively long, beginning in September and ending in June of the following year (Watanabe and Lo, 1989). The Pacific saury spawns over a vast area from the Japanese coastal waters to eastern offshore waters (Baitaliuk, 2013); the main spawning

grounds are considered to be located in the Kuroshio-Oyashio transition region in fall and spring and in the Kuroshio waters and the Kuroshio Extension waters in winter (Watanabe and Lo, 1989).

5) Food and feeding

The larvae of the Pacific saury prey on the nauplii of copepods and other small sized zooplankton. As they grow, they begin to prey on larger zooplankton such as krill (Odate 1977). The Pacific saury is preyed upon by large fish ranked higher in the food chain, such as *Thunnus alalunga* (Nihira 1988) and coho salmon, *Oncorhynchus kisutch* (Sato and Hirakawa, 1976) as well as by animals such as minke whale *Balaenoptera acutorostrata* (Konishi *et al.* 2009) and sea birds (Ogi, 1984).

6) Age and growth

Based on analysis of daily increments in otoliths after hatching the fish reach approximately 20 cm in knob length (distance from the tip of lower jaw to the posterior end of the muscular knob at the base of a caudal peduncle; hereafter as body length) in 6 or 7 months after hatching (Watanabe *et al.* 1988, Suyama *et al.*, 1992) with some variation in growth rate depending on the hatch month during this long spawning season (Kurita *et al.*, 2004) or geographical differences (Suyama *et al.* 2012b). The maximum lifespan is 2 years (Suyama *et al.* 2006). The age 1 fish grow to over 27 cm in body length by June and July when the research vessel surveys are conducted and reach over 29 cm in the fishing season between August and December (Suyama *et al.* 2006).

7) Reproduction

General minimum biological size of Pacific saury is about 25 cm in the field (Hatanaka 1956) or rearing experiments (Nakaya *et al.* 2010), although in very rare cases, saury may spawn at 22 cm length (Sugama, 1957; Hotta, 1960). Under rearing experiments, Pacific saury starts spawning 8 month after hatching, and it continues for about 3 months (Suyama *et al.*, 2016). Batch fecundity is about 1,000 to 3,000 (Kosaka, 2000).

3. Fishery

1) History of the Pacific saury fishery

Pacific saury fisheries in Japan have a long history as a local coastal fishery since 1544, but the industrialized fishery was developed in the early 1900s with motorization of fishing boats (Nakagami 2013). Stick-held dip net fishery using fishing lights was introduced in 1939 and the fishery has been further developed to date. The stick-held dip net fishery is a main fishing method for Pacific saury in Japan, harvesting 99% of the catch by the fishery. The Korea's saury fisheries was operated by gillnet since the late 1950s in Tsushima Warm Current region and by stick-held dip net since the early 1950s in the Kuroshio-Oyashio Current region (Gong and Suh 2013). Russian saury fishery by stick-held dip net was developed in the 1970s. Chinese Taipei started saury fishery in 1975 when the fishery had the first record of commercial catch (NPFC01-2016-AR Chinese Taipei Rev 2). China has been developing the saury fishery in the high seas since 2012 (NPFC-2016-WS PSSA01-WP01). In the eastern Pacific, small amounts of saury catch (224 kg) were recorded as incidental catch by Canadian commercial fisheries from 1997 to 2013 (Wade and Curtis 2015).

While Japanese and Russian vessels operate mainly within their EEZ, Chinese Taipei, Korean and Chinese vessels operate mainly in the high seas of the North Pacific.

2) Status of NPFC Members' fisheries

(1) China

(i) General fishing statistics:

Fishing days, number of vessels and annual catch amount (mt) are shown in Table 3-1.

Table 3-1 General fishing statistics of saury fishery of China.

| Year | Fishing Gear | Numbers of fishing vessels | Fishing days | Catch Amount (MT) |
|------|--------------------|----------------------------|--------------|-------------------|
| 2015 | Stick-held dip net | 42 | 3,816 | 48502.748 |
| 2014 | Stick-held dip net | 44 | 6,435 | 76129.44 |
| 2013 | Stick-held dip net | 19 | 2187 | 23191.3 |
| 2012 | Stick-held dip net | 2 | 274 | 2014.00 |

(ii) Vessel size:

The GT of vessels ranged from 971 MT to 1687 MT, most of them ranged from 1400MT to 1600MT.

(iii) Main fishing ground and season:

Fishery starts from June and finishes in November. Main fishing ground is shown in Figure 3-1.

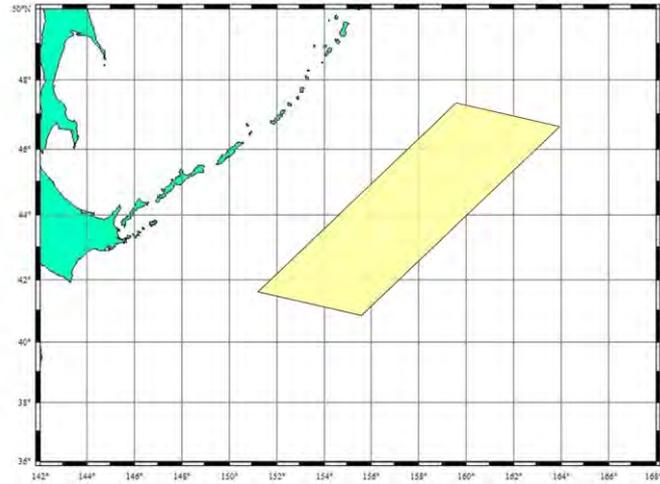


Figure 3-1. Main fishing ground of saury fishery of China.

(iv) Main fishing port:

Main fishing ports for saury fishery are Yantai, Xiamen, and Fuzhou.

(v) Utilization of products: Main utilization is for food.

(vi) Economic impacts: Not available.

(2) Japan

(i) General fishing statistics:

Fishing days, number of vessels and annual catch amount (mt) are shown in Table 3-2.

Table 3-2 General fishing statistics of saury fishery of Japan

| Year | Fishing Gear | Numbers of fishing vessels | Fishing days | Catch Amount (MT) | Other Fishing Gears | Catch Amount of Others (MT) |
|------|--------------------|----------------------------|--------------|-------------------|---------------------|-----------------------------|
| 2015 | Stick-held dip net | 208 | 9473 | 112264 | others* | Not available |
| 2014 | Stick-held dip net | 210 | 10116 | 226210 | others* | 1310 |
| 2013 | Stick-held dip net | 217 | 9099 | 155835 | others* | 1454 |
| 2012 | Stick-held dip net | 218 | 10737 | 218654 | others* | 2815 |
| 2011 | Stick-held dip net | 214 | 8023 | 213942 | others* | 1411 |
| 2010 | Stick-held dip net | 236 | 12700 | 205798 | others* | 1691 |
| 2009 | Stick-held dip net | 239 | 11281 | 306609 | others* | 4134 |
| 2008 | Stick-held dip net | 239 | 10531 | 346990 | others* | 7737 |
| 2007 | Stick-held dip net | 247 | 10910 | 290593 | others* | 5930 |
| 2006 | Stick-held dip net | 258 | 10182 | 239239 | others* | 5346 |
| 2005 | Stick-held dip net | 288 | 10151 | 229970 | others* | 4481 |
| 2004 | Stick-held dip net | 314 | 11963 | 199208 | others* | 5163 |
| 2003 | Stick-held dip net | 324 | 15700 | 255518 | others* | 9283 |
| 2002 | Stick-held dip net | 370 | 21255 | 199111 | others* | 6171 |
| 2001 | Stick-held dip net | 379 | 17212 | 263882 | others* | 5916 |
| 2000 | Stick-held dip net | 394 | 24931 | 210656 | others* | 5814 |

* others: Gill nets, set-net and by-catch

(ii) Main fishing ground and season:

The fishing grounds were mainly concentrated within Japanese EEZ in the Pacific Ocean, north of latitude 34°54'06" N. The fishing season begins in August in the area between the eastern coast of Hokkaido and the coast of Kuril Islands, then vessels move southwards to the area off the coasts of Aomori, Iwate, and Miyagi prefectures from late September to early October, and to the areas off the coasts of Fukushima, Ibaraki and Chiba prefectures in the late fishing season from November to December (Figure 3-2).

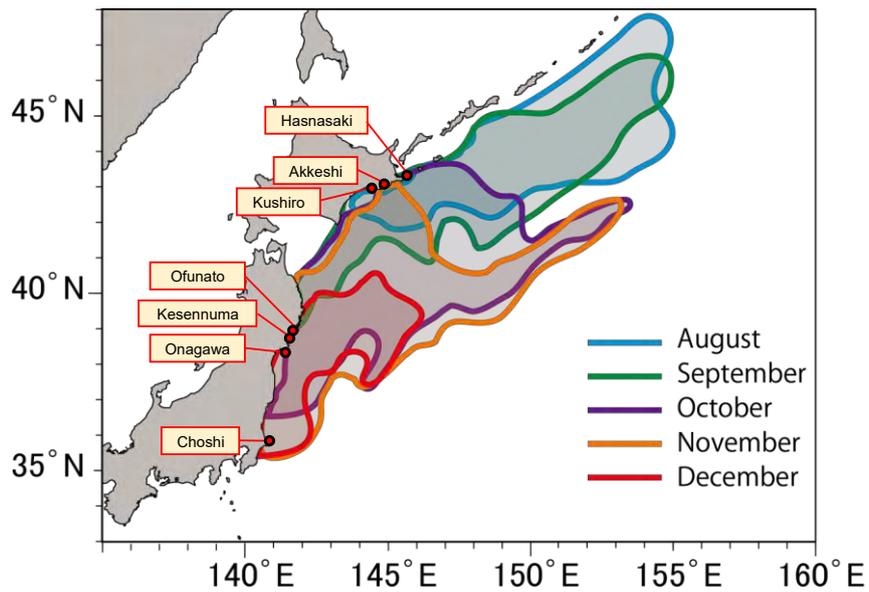


Figure 3-2. Monthly changes of the fishing grounds for Japanese Pacific saury stick-held dip nets fisheries which were licensed by the MAFF. This figure is based on data from 2006 to 2015. Main fishing ports are indicated.

Pacific saury stick-held dip net fishery which is licensed by the Minister of Agriculture, Forestry and Fisheries (MAFF), Japan is permitted from August to December. Additionally, albeit on a small scale, drift net Pacific saury fishery is conducted in July in waters off the coast of eastern Hokkaido, and small size of stick-held dip net fishery is conducted in the period between October and February of the following year off Mie and Wakayama prefectures, licensed by the prefectural governor. The Pacific saury is also caught in the set-net fishery in many areas including the Sea of Japan.

(iii) Vessel size (GRT):

The sizes of the Pacific saury stick-held dip net fishery vessels licensed by the Ministry of Agriculture, Forestry and Fisheries (MAFF) range from 10 to 200 gross registered tonnage (GRT). The major size of the fishing vessel has separated into two groups: large (more than 100 GT) and small (less than 50 GRT) in recent years. In 2015, a total of 151 (<50 GRT: 96, >100 GRT: 55) Pacific saury fishing vessels were in operation (Figure 3-3 and 3-4).

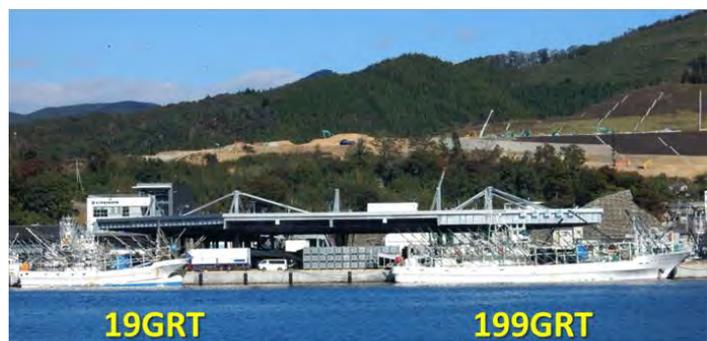


Figure 3-3. The smallest (Left; 19 gross tons) and largest (Right; 199 gross tons) Pacific saury stick-held dip net fishery vessels licensed by the Ministry of Agriculture, Forestry and Fisheries.

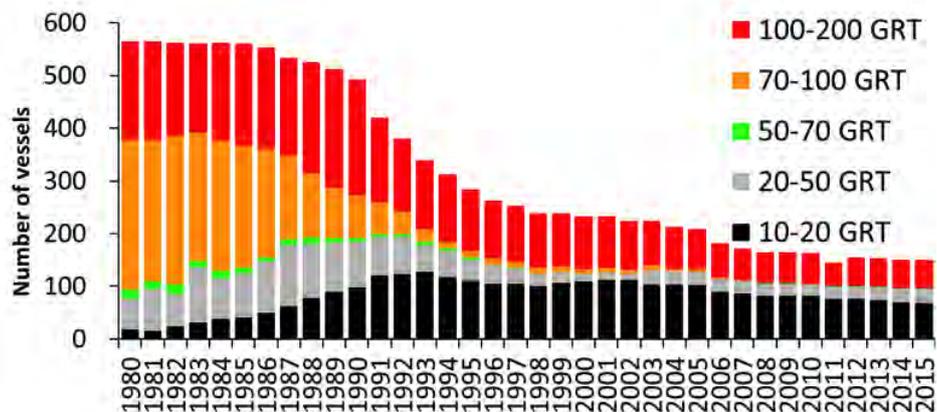


Figure 3-4. Number of the Pacific saury stick-held dip net fishery vessels by size in Japan between 1980 and 2015.

(iv) Main fishing port:

Fishing ports for saury fishery in Japan are Hanasaki, Akkeshi, Kushiro, Ofunato, Onagawa, Kesenuma and Choshi (Figure 3-2). Landing in these 7 fishing ports comprised 88 and 91 % of the total landing for Pacific saury in 2014 and 2015, respectively (Figure 3-5).

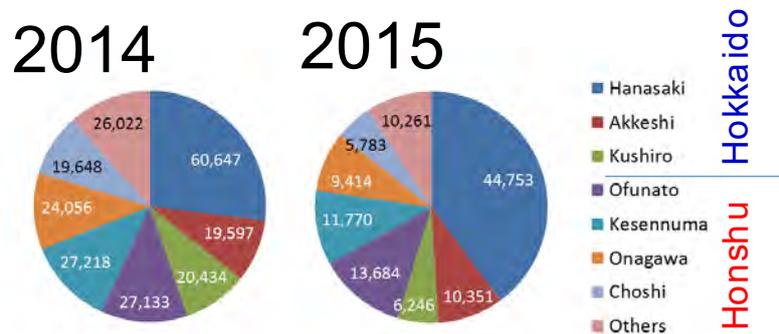


Figure 3-5. Landing (MT) in main fishing ports in 2014 and 2015.

(v) Utilization of products:

The most of the Pacific saury caught by Japanese fishing vessels are consumed domestically. About 40% (27.2 to 48.2% in 2003-2011) of fish are consumed fresh such as baked fish or sashimi. These are mainly age-1 fish. Other about 40% (33.3 to 53.4%) of fish are used in processed food such as cans, dried fish, salted fish or grilled fish with sweet soya sauce. The rest of fish (about 20% from 15.9 to 27.4%) are used as bait in fisheries, food for aquaculture or fertilizer (Figure 3-6).

(vi) Economic impacts:

The total landing amounts of Pacific saury are about 16 to 26 billion yen (155 to 252 million USD), and account for 4.0 to 8.1% of total Japan's fish production. There are processing factories and freeze stores near the port dealing mainly on Pacific saury. These factories support regional

economy and employments.

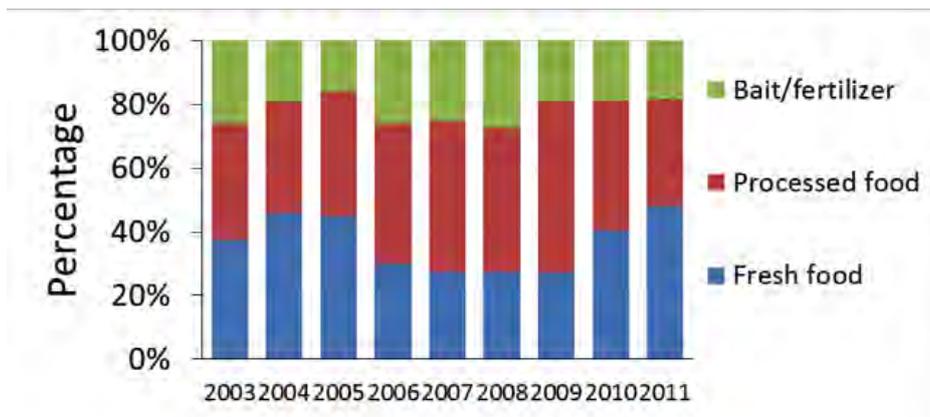


Figure 3-6. Utilization of Pacific saury by Japan from 2003 to 2011. Data based on MAFF statistics.

(3) Korea

(i) General fishing statistics:

Pacific saury (*Cololabis saira*) is the target species harvested by Korean distant water stick-held dip net fishery in the Northwest Pacific Ocean. It was in the 1960s when Korean research survey vessels from National Institute of Fisheries Science (NIFS, previously named NFRDI) have commenced saury fishing using stick-held dip net, while three commercial fishing vessels started fishing in the area in 1985. The largest catch was over 50 thousand tons in 1997. The lowest catch was 11 thousand tons in 2015 (Figure 3-7).

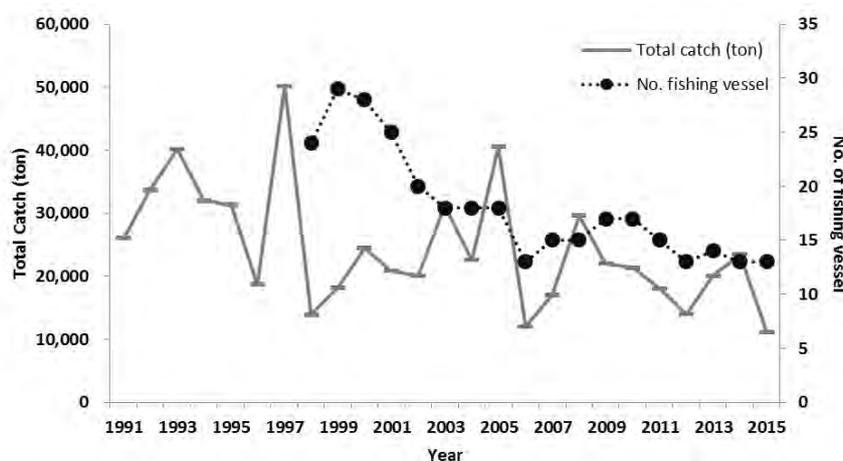


Figure 3-7. Total catch by Korean vessels and number of fishing vessels.

(ii) Main fishing ground and season:

Fishing season in Korea lasts from May to December, and major catch occurs in September and October (Figure 3-9).

(iii) Vessel size (GT):

The number of fishing vessels reached 29 in 1999 and has been decreasing thereafter.

The sizes of fishing vessels vary from 240 tons to 1037 tons. The average size of vessel was relatively stable until 2012, but increased in the last three years (Fig 3-10).

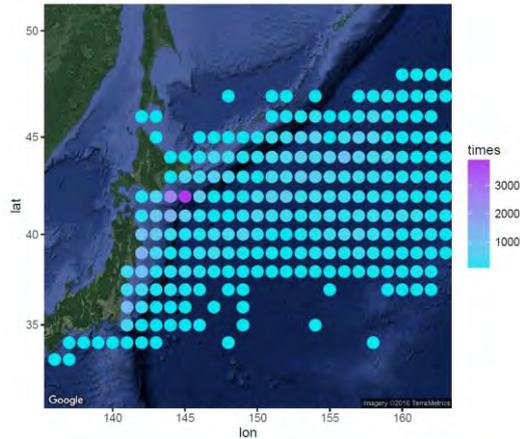


Figure 3-8. Accumulated fishing position over 30 years of Korean saury fishery.

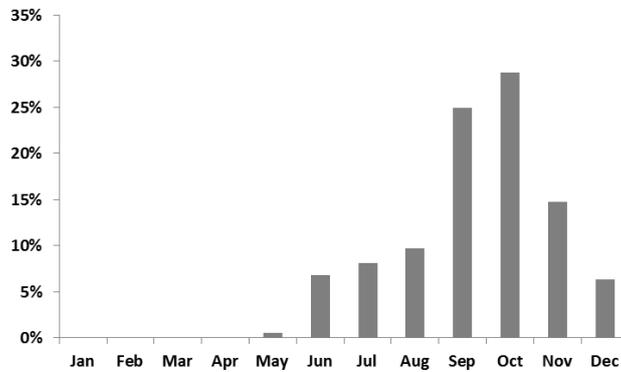


Figure 3-9. Catch rates of saury fishery of Korea by months (1985-2015)

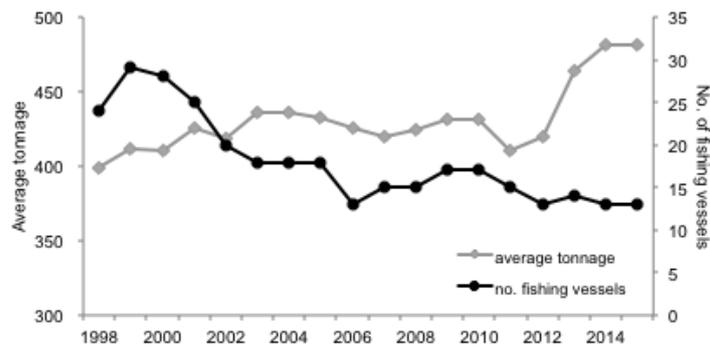


Figure 3-10. Average tonnage and number of fishing vessels

(iv) Main fishing port:

The main fishing port is Busan, which is the largest fishing port in Korea.

(v) Utilization of products:

Most of the saury catch were distributed and consumed domestically.

(vi) Economic impacts: Not available.

(4) Russia

(i) General fishing statistics:

Fishing days, number of vessels and annual catch amount (mt) are shown in Table 3-3.

Table 3-3. General fishing statistics of saury fishery in Russia.

| Year | Fishing Gear | Numbers of fishing vessels | Fishing days | Catch Amount (MT) |
|------|--------------------|----------------------------|--------------|-------------------|
| 2015 | Stick-held dip net | 45 | 1569 | 28878 |
| 2014 | Stick-held dip net | 62 | 3152 | 83367 |
| 2013 | Stick-held dip net | 65 | 2276 | 52933 |
| 2012 | Stick-held dip net | 58 | 2645 | 63105 |
| 2011 | Stick-held dip net | 51 | 2456 | 62064 |
| 2010 | Stick-held dip net | 46 | 1545 | 31686 |
| 2009 | Stick-held dip net | 51 | 1804 | 37693 |
| 2008 | Stick-held dip net | 49 | 2666 | 93866 |
| 2007 | Stick-held dip net | 57 | 2852 | 110692 |
| 2006 | Stick-held dip net | 49 | 2324 | 77691 |
| 2005 | Stick-held dip net | 48 | 2321 | 87602 |
| 2004 | Stick-held dip net | 37 | 2049 | 83735 |
| 2003 | Stick-held dip net | 48 | 1943 | 57646 |
| 2002 | Stick-held dip net | 63 | 1715 | 36602 |
| 2001 | Stick-held dip net | 41 | 1527 | 34616 |
| 2000 | Stick-held dip net | 28 | 845 | 14827 |
| 1999 | Stick-held dip net | 11 | 311 | 4576 |
| 1998 | Stick-held dip net | 14 | 205 | 3057 |
| 1997 | Stick-held dip net | 16 | 328 | 4493 |
| 1996 | Stick-held dip net | 18 | 434 | 6684 |
| 1995 | Stick-held dip net | 28 | 650 | 14283 |

(ii) Main fishing ground and season:

Fishery starts from June and finishes in November. Fishing grounds are shown in Figure 3-11.

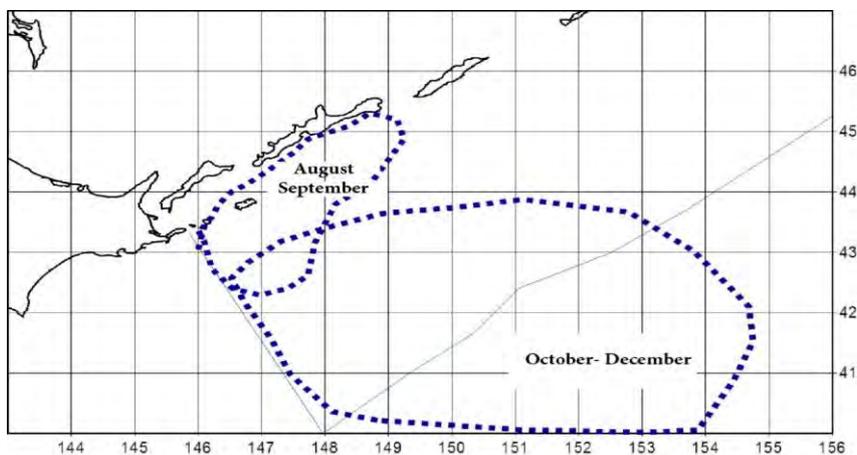


Figure 3-11. Main fishing grounds of Russia.

(iii) Vessel size (GT):

The GT of vessels ranged from 780 MT to 2500 MT, most of them ranged from 1100MT to 1300MT. The most common type of vessel in the saury fishery is shown in Figure 3-12.



Figure 3-12. The most common type of Russian vessel in the fishery of saury.

(iv) Main fishing port: Fishing ports for saury fishery in Russia are Yuzhno-Kurilsk, Korsakov, Vladivostok, Petropavlovsk-Kamchatskiy.

(v) Utilization of products:

Main utilization is for food.

(vi) Economic impacts: Not available.

(5) Chinese Taipei

(i) General fishing statistics:

Fishing days, number of vessels and annual catch amount (mt) are shown in Table 3-4.

Table 3-4. The fishing effort and annual catch for the Pacific saury fishery of Chinese Taipei from 2011 to 2015

| Year | No. of vessels | Fishing days | Catch (tons) |
|------|----------------|--------------|--------------|
| 2011 | 74 | 7,456 | 160,532 |
| 2012 | 85 | 7,349 | 161,514 |
| 2013 | 90 | 7,405 | 182,619 |
| 2014 | 91 | 7,709 | 229,937 |
| 2015 | 90 | 5,866 | 152,271 |

(ii) Main fishing ground and season:

General fishing grounds are mainly distributed from the subarctic domain to subarctic front of the northwestern Pacific including Oyashio front of the coastal waters including EEZs of Japan and Russia from 35 to 47°N and 141 to 178°E, which generally covered the saury migratory route (Figure 3-13). The fishing season of stick-held dip net fishery by Chinese Taipei begins mainly in July after the end of squid fishing season in the Southwest Atlantic Ocean, and ends in November (Figure 3-14) (NPFC-2016-WS PSSA01-WP04a).

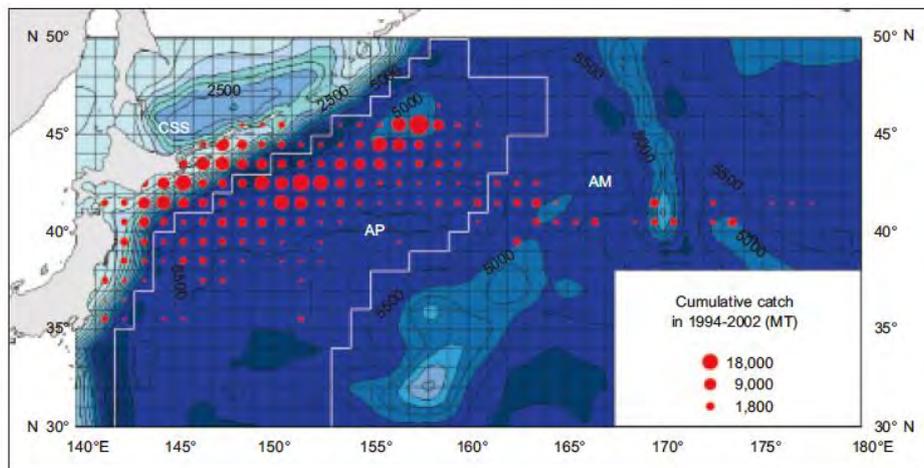


Figure 3-13. Fishing ground of saury fishery of Chinese Taipei (Huang et al 2007).

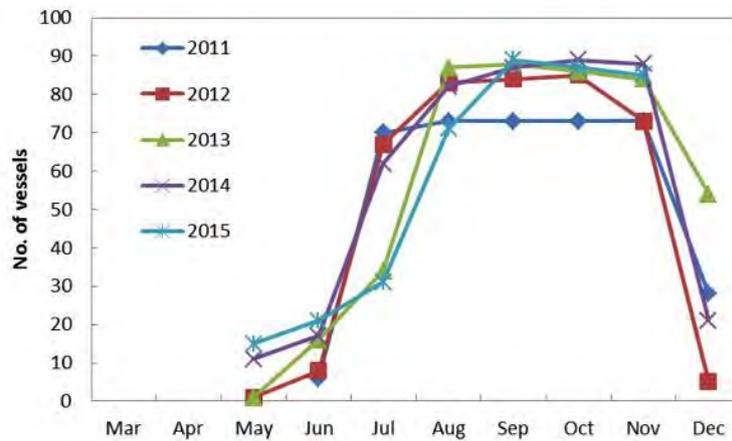


Figure 3-14. Monthly variations in number of operating vessels for the Pacific saury of Chinese Taipei in the Northwest Pacific from 2011 to 2015

(iii) Vessel size (GT):

Fishing vessel size in Chinese Taipei mostly ranged from 700 to 1000 tons with only a few vessels larger than 1000 tons (NPFC-2016-WS PSSA01-WP05b).

(iv) Main fishing port:

Fishing port for saury fishery is Kaohsiung.

(v) Utilization of products: Food and Fish bait (Sakai et al. 2014).

(vi) Economic impacts: Not available.

4. Data used for the stock assessment

1) Fishery-dependent data

(1) Catch

Fishery catch data from 1950-2015 for assessing WNPO saury were taken from the most recent summary of available fishery-dependent data (NPFC-2016-WS PSSA01-WP01; -WP02, -WP04a; -WP07; -WP09). Commercial catch statistics of Pacific saury by China, Japan, Korea, Russia, Chinese Taipei and Vanuatu in the WNPO area were collected from 1950 to 2015 (Table 4-1). More specifically, Japan, Chinese Taipei, Korea, China, Russia and Vanuatu directly provided catch data from 1995-2015, 1995-2015, 2007-2015, 2012-2015, 1995-2015, and 2015 to the North Pacific Fishery Commission (NPFC), respectively, and the historical catches for Japan, Chinese Taipei, Korea, and Russia from 1950-1994, 1989-1994, 1950-1994, and 1956- 1994 were collected from the Food and Agriculture Organization of the United Nations (FAO) dataset, respectively (NPFC-2016-WS PSSA01-Final Report). Japan included coastal and offshore stick-held dip net and other coastal gears (gill nets, set-net and by-catch). Chinese Taipei included distant stick-held dip net and other gears (trawlers, drift net and by-catch before 1996). Korea and China included the distant water stick-held dip net fisheries. Russia included offshore stick-held dip net fisheries. The main fishing ground based on the historical catch by each member are shown in Figure 4-1.

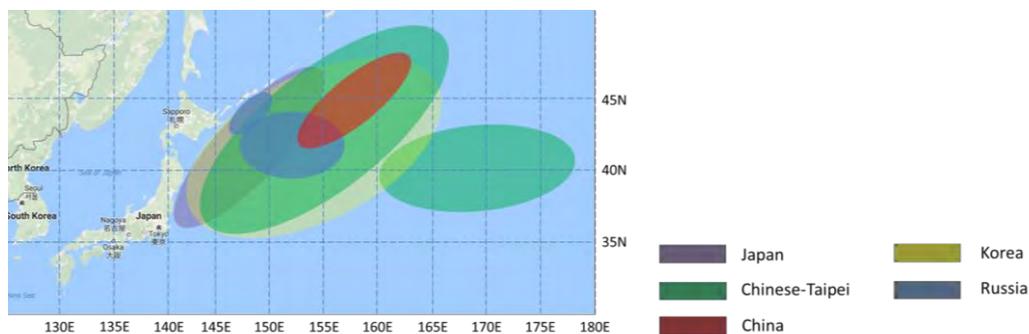


Figure 4-1. Main fishing grounds for the Pacific saury by NPFC members in the Western North Pacific Ocean. This figure was compiled based on the Working Papers NPFC-2016-WS PSSA01-WP07, NPFC-2016-WS PSSA01-WP04a, NPFC-2016-WS PSSA01-WP09, NPFC-2016-WS PSSA01-WP02, and NPFC-2016-WS PSSA01-WP01.

Table 4-1. Pacific saury catches (metric ton) in the Western North Pacific Ocean by members, 1950-2015;
 “-” indicates less than 1 metric ton.

| Year | China | Japan | Korea | Russia | Chinese-Taipei | Vanuatu | Total |
|------|-------|---------|--------|--------|----------------|---------|---------|
| 1950 | - | 200,000 | 3,500 | - | - | - | 203,500 |
| 1951 | - | 250,000 | 3,500 | - | - | - | 253,500 |
| 1952 | - | 250,000 | 3,800 | - | - | - | 253,800 |
| 1953 | - | 253,700 | 6,500 | - | - | - | 260,200 |
| 1954 | - | 292,700 | 8,200 | - | - | - | 300,900 |
| 1955 | - | 497,000 | 8,700 | - | - | - | 505,700 |
| 1956 | - | 327,800 | 14,700 | 200 | - | - | 342,700 |
| 1957 | - | 421,500 | 22,900 | 200 | - | - | 444,600 |
| 1958 | - | 575,100 | 20,700 | 300 | - | - | 596,100 |
| 1959 | - | 522,600 | 31,300 | 2,200 | - | - | 556,100 |
| 1960 | - | 287,100 | 14,900 | 12,900 | - | - | 314,900 |
| 1961 | - | 473,800 | 28,500 | 24,300 | - | - | 526,600 |
| 1962 | - | 483,200 | 38,900 | 44,800 | - | - | 566,900 |
| 1963 | - | 384,500 | 12,500 | 72,500 | - | - | 469,500 |
| 1964 | - | 210,700 | 25,400 | 26,700 | - | - | 262,800 |
| 1965 | - | 231,400 | 32,300 | 42,400 | - | - | 306,100 |
| 1966 | - | 241,800 | 39,400 | 44,600 | - | - | 325,800 |
| 1967 | - | 220,100 | 27,900 | 48,000 | - | - | 296,000 |
| 1968 | - | 140,200 | 29,900 | 51,000 | - | - | 221,100 |
| 1969 | - | 63,300 | 29,700 | 31,300 | - | - | 124,300 |
| 1970 | - | 93,100 | 25,000 | 44,800 | - | - | 162,900 |
| 1971 | - | 190,300 | 30,600 | 42,900 | - | - | 263,800 |
| 1972 | - | 196,600 | 38,500 | 46,500 | - | - | 281,600 |
| 1973 | - | 406,300 | 34,100 | 50,300 | - | - | 490,700 |
| 1974 | - | 135,462 | 31,723 | 50,900 | - | - | 218,085 |
| 1975 | - | 221,573 | 25,958 | 69,031 | - | - | 316,562 |
| 1976 | - | 105,419 | 42,121 | 40,005 | - | - | 187,545 |
| 1977 | - | 253,465 | 23,175 | 66,597 | - | - | 343,237 |
| 1978 | - | 360,213 | 21,744 | 77,965 | - | - | 459,922 |
| 1979 | - | 277,960 | 17,178 | 68,900 | - | - | 364,038 |
| 1980 | - | 187,155 | 12,395 | 38,600 | - | - | 238,150 |
| 1981 | - | 160,319 | 10,844 | 31,700 | - | - | 202,863 |

Continued

| | | | | | | | |
|------|--------|---------|--------|---------|---------|-------|---------|
| 1982 | - | 206,958 | 7,449 | 26,293 | - | - | 240,700 |
| 1983 | - | 239,658 | 4,597 | 7,606 | - | - | 251,861 |
| 1984 | - | 209,974 | 1,923 | 30,447 | - | - | 242,344 |
| 1985 | - | 245,944 | 4,393 | 23,423 | - | - | 273,760 |
| 1986 | - | 217,229 | 8,924 | 24,902 | - | - | 251,055 |
| 1987 | - | 197,084 | 6,779 | 23,484 | - | - | 227,347 |
| 1988 | - | 291,575 | 4,495 | 50,927 | - | - | 346,997 |
| 1989 | - | 246,821 | 3,367 | 68,368 | 12,036 | - | 330,592 |
| 1990 | - | 308,271 | 23,103 | 72,618 | 31,877 | - | 435,869 |
| 1991 | - | 303,567 | 26,034 | 49,943 | 19,473 | - | 399,017 |
| 1992 | - | 265,884 | 33,708 | 50,172 | 34,235 | - | 383,999 |
| 1993 | - | 277,461 | 40,144 | 48,145 | 36,435 | - | 402,185 |
| 1994 | - | 261,587 | 31,987 | 26,385 | 12,550 | - | 332,509 |
| 1995 | - | 273,510 | 31,321 | 25,140 | 13,772 | - | 343,743 |
| 1996 | - | 229,227 | 18,681 | 10,280 | 8,236 | - | 266,424 |
| 1997 | - | 290,812 | 50,227 | 7,091 | 21,887 | - | 370,017 |
| 1998 | - | 144,983 | 13,922 | 4,665 | 12,794 | - | 176,364 |
| 1999 | - | 141,011 | 18,138 | 4,808 | 12,541 | - | 176,498 |
| 2000 | - | 216,471 | 24,457 | 17,390 | 27,868 | - | 286,186 |
| 2001 | - | 269,797 | 20,869 | 40,407 | 39,750 | - | 370,823 |
| 2002 | - | 205,282 | 20,088 | 51,709 | 51,283 | - | 328,362 |
| 2003 | - | 264,804 | 31,219 | 57,104 | 91,515 | - | 444,642 |
| 2004 | - | 204,371 | 22,625 | 81,572 | 60,832 | - | 369,400 |
| 2005 | - | 234,451 | 40,509 | 87,456 | 111,491 | - | 473,907 |
| 2006 | - | 244,586 | 12,009 | 76,920 | 60,578 | - | 394,093 |
| 2007 | - | 296,521 | 16,976 | 119,433 | 87,277 | - | 520,207 |
| 2008 | - | 354,727 | 29,591 | 93,677 | 139,514 | - | 617,509 |
| 2009 | - | 310,744 | 22,001 | 35,213 | 104,219 | - | 472,177 |
| 2010 | - | 207,488 | 21,360 | 35,268 | 165,692 | - | 429,808 |
| 2011 | - | 215,353 | 18,068 | 62,311 | 160,531 | - | 456,263 |
| 2012 | 2,014 | 221,470 | 13,961 | 61,585 | 161,514 | - | 460,544 |
| 2013 | 23,191 | 149,204 | 20,055 | 47,212 | 182,619 | - | 422,281 |
| 2014 | 76,129 | 227,527 | 23,431 | 70,154 | 229,937 | - | 627,178 |
| 2015 | 48,503 | 112,264 | 11,204 | 23,964 | 152,271 | 6,600 | 354,806 |

(2) Abundance indices

Estimates of standardized fishery-dependent catch-per-unit effort (CPUE) of WNPO saury were available for Japanese offshore stick-held dip net fisheries, Chinese Taipei's distant water stick-held dip net fisheries, and Russian offshore stick-held dip net fisheries (Table 4-2). More specifically, generalized linear models (GLM) and generalized additive models (GAM) were used to standardize CPUE of Pacific saury stick-held dip net fishery data of 70-200 GRT vessels by Japan from 1980 to 2015 ($n = 36$) (Sakai et al., 2017). Four groups of variables were considered in the standardization: spatial variables (area and longitude), temporal variables (year and month), vessel tonnage and environmental variable (e.g., sea surface temperature, SST). The cross validation analysis suggested that GLM tended to be more suitable than GAM in analysis of CPUE.

For Chinese Taipei's distant water stick-held dip net fisheries, aggregated data by 1x1 degree grids, including year, month, sea water temperature, vessel tonnage, and area from 2001 to 2015 ($n = 15$) were used for CPUE standardization (Huang et al., 2017). Three GLM models were developed. Among the three models, model 2 is the best model since its Akaike information criterion (AIC) is the smallest.

Operational data in the Russian Exclusive Economic Zone in the Northwest Pacific Ocean from the Russian offshore stick-held dip net fisheries in 2000-2015 ($n = 16$) collected by Russian Vessel Monitoring System (VMS) were used for CPUE standardization (Kulik and Antonenko, 2017). Six GLM models were developed. Among the six models, model-4 with covariates of year, month, month-year interaction and vessel unique identifiers is the best model since its AIC is the smallest.

Table 4-2. Pacific saury standardized catch-per-unit-effort (CPUE) for the Western North Pacific Ocean stock by NPFC members, 1980-2015. “-” indicates no effort or data not available. “JPN” = Japan, “CT” = Chinese Taipei, “RS” = Russia.

| Year | JPN CPUE | CT CPUE | RS CPUE |
|------|----------|---------|---------|
| 1980 | 0.91 | - | - |
| 1981 | 0.73 | - | - |
| 1982 | 0.57 | - | - |
| 1983 | 0.97 | - | - |
| 1984 | 0.87 | - | - |
| 1985 | 1.50 | - | - |
| 1986 | 1.31 | - | - |
| 1987 | 1.15 | - | - |
| 1988 | 2.56 | - | - |
| 1989 | 3.60 | - | - |
| 1990 | 2.34 | - | - |
| 1991 | 3.51 | - | - |
| 1992 | 4.69 | - | - |
| 1993 | 3.83 | - | - |
| 1994 | 4.74 | - | - |
| 1995 | 3.30 | - | - |
| 1996 | 1.99 | - | - |
| 1997 | 4.02 | - | - |
| 1998 | 1.18 | - | - |
| 1999 | 1.00 | - | - |
| 2000 | 1.55 | - | 12.11 |
| 2001 | 2.56 | 1.73 | 12.86 |
| 2002 | 1.39 | 1.57 | 11.79 |
| 2003 | 2.64 | 2.30 | 20.22 |
| 2004 | 3.26 | 1.52 | 27.71 |
| 2005 | 6.07 | 1.92 | 26.01 |
| 2006 | 5.05 | 1.30 | 19.86 |
| 2007 | 6.54 | 2.04 | 25.39 |
| 2008 | 7.21 | 2.66 | 24.65 |
| 2009 | 4.49 | 1.48 | 14.01 |
| 2010 | 1.91 | 1.88 | 13.72 |
| 2011 | 3.00 | 2.35 | 17.88 |
| 2012 | 2.56 | 2.65 | 14.92 |
| 2013 | 1.71 | 3.09 | 15.10 |
| 2014 | 3.37 | 3.57 | 17.54 |
| 2015 | 1.71 | 3.29 | 18.17 |

2) Fishery-independent data

Tohoku National Fisheries Research Institute of Japan has been conducting the stock assessment surveys in June and July every year since 2003 in the areas from waters off the Japanese coast (143°E) to the Central Pacific (165°W) by research vessels (NPFC-2017-TWG PSSA01-WP02 (Rev. 1)). Based on the data of the surveys, biomass of Pacific saury was estimated by area swept method (Table 4-3). We used these data as biomass index obtained by fishery-independent survey.

Table 4-3. Estimated biomass of Pacific saury based on area swept method using the results of scientific research cruises.

| Year | Biomass (1,000t) | 2.5% | 97.5% | CV.round |
|------|---------------------|-------|-------|----------|
| 2003 | 5,024 | 3,216 | 6,819 | 0.189 |
| 2004 | 3,828 | 1,979 | 5,789 | 0.270 |
| 2005 | 4,073 | 2,601 | 5,706 | 0.195 |
| 2006 | 3,516 | 2,184 | 5,214 | 0.221 |
| 2007 | 2,831 | 1,680 | 4,006 | 0.209 |
| 2008 | 4,606 | 3,256 | 8,139 | 0.224 |
| 2009 | 3,756 | 2,106 | 5,804 | 0.255 |
| 2010 | 2,076 | 1,381 | 2,812 | 0.183 |
| 2011 | 2,485 | 1,830 | 3,214 | 0.153 |
| 2012 | 1,920 | 1,141 | 2,869 | 0.241 |
| 2013 | 2,823 | 1,698 | 4,173 | 0.233 |
| 2014 | 2,529 | 1,475 | 3,404 | 0.216 |
| 2015 | 2,272 | 1,468 | 3,109 | 0.195 |

5. Bayesian state-space biomass dynamic model (model descriptions)

1) Annual biomass dynamics:

$$B_t = B_{t-1} + rB_{t-1} \left(1 - \left(\frac{B_{t-1}}{K} \right)^M \right) - C_t$$

where B_{t-1} and C_{t-1} denote biomass and catch (landings), respectively, for year $t-1$. Carrying capacity, K , is the biomass of the population at equilibrium prior to commencement of the fishery; r is the intrinsic population growth rate; and M ($= Z, =s$) is the production shape parameter.

We assumed lognormal error structures and used a reparametrization ($P_t = B_t/K$) by expressing the annual biomass as a proportion of carrying capacity as in Millar and Meyer (1999). The state equations are rewritten as

$$P_t = \left(P_{t-1} + r_{t-1} \cdot P_{t-1} \left(1 - P_{t-1}^M \right) - \frac{C_{t-1}}{K} \right) \exp(u_t)$$

$$P_1 = \exp(u_1)$$

$$u_1 \sim N(\mu_{P_1}, \sigma_{P_1}^2)$$

$$u_t \sim N(0, \sigma^2) \quad t = 2, \dots, N$$

where t is year t , N is number of years, u_1 is a normal random variable with a mean of μ_{P_1} and variance $\sigma_{P_1}^2$ accounting for the uncertainty of initial condition. u_t is also a normal random variable with a mean of zero and variance σ^2 to account accounting for stochastic process dynamics.

The observation equations are

$$I_{i,t} = q_i K P_t \exp(\varepsilon_{i,t})$$

$$\varepsilon_{i,t} \sim N(0, \tau_i^2) \quad i = 1 \text{ to } 3; t = 1, \dots, N$$

where $I_{i,t}$ is the relative abundance of index i at time t ; q_i is the catchability coefficient for index i , which describes the effectiveness of each unit of fishing effort; and $\varepsilon_{i,t}$ is a normal random variable with a mean of zero and variance τ_i^2 to account accounting for the natural sampling variation of index i .

2) Base-case scenarios and sensitivity test:

Unfortunately, since little is known about the catchability (q) on stick-held dip net gear, we were limited to use least-informative prior for q .

Based on the recommended base-case scenarios, three base-case scenarios differing in catchability of the Japanese survey biomass index were explored and also sensitivity analysis was examined without using the Japanese survey biomass index.

- i) Base case model 1: Including four sets of CPUEs and Japan survey data with survey catchability (q) prior defined from 0 to 1; (note this Base case is the Base Case 2 for Japan)
- ii) Base case model 2: Including four sets of CPUEs and Japan survey data with survey catchability (q) prior being fixed at 1; (note this Base case is the Base Case 1 for Japan)
- iii) Base case model 3: Including four sets of CPUEs and Japan survey data with survey catchability (q) prior being defined from 0 to larger than 1.
- iv) Sensitivity model: The analysis for excluding the biomass index the Japanese survey (no survey q)

6. Priors

1) Prior distribution

The Bayesian analysis requires prior probability distributions for each of the model parameters. There were six parameters in the model: carrying capacity (K), intrinsic growth rate (r), catchability (q), initial biomass as a proportion of carrying capacity ($P1$ or B_1/K), process error variance (σ^2) and observation error variance (τ^2). Regarding assumption of the prior distribution in detail, refer to each member's stock assessment report in Section 7. Stock Assessment.

2) Convergence to posterior distribution

A critical issue in using MCMC methods is how to determine when random draws have converged to the posterior distribution. Convergence of the MCMC samples to the posterior distribution was checked by monitoring the trace and diagnosing the autocorrelation plot.

Gelman and Rubin (1992) and Heidelberger and Welch (1983) diagnostics as implemented in the R language (R Development Core Team, 2008) and the CODA package (Best et al., 1995) were also examined.

3) Diagnostics of model fitting

The predicted CPUE indices for each model were compared to the observed CPUE to determine model fit. Specifically, the root mean-squared error (RMSE) of the CPUE fit was used for the diagnostic of the model goodness of fit with lower RMSE indicating a better fit when comparing models with the same number of parameters. The goodness of fit among different models with same data structure was evaluated by Deviance information criterion (DIC) (Spiegelhalter et al., 2002). The standardized log-residuals from the CPUE fit were visually examined for time trends. The Shapiro-Wilk test was used to test the normality of the standardized log-residuals. The estimates of production model can be problematic when the data are not informative about whether the population has a high K and a low r or vice versa (Hilborn and Walters, 1992). The posterior correlation between model parameters was examined for the base-case model.

4) Retrospective error

Retrospective analysis was conducted to examine the consistency among successive model estimates of population size, or related assessment variables obtained as new data are gathered. Within-model retrospective analysis which trims the most recent 8 years of data in successive model runs were used to examine changes in the estimates of exploitable biomass. Modified Mohn's (1999) DR statistic was calculated as (Hurtado-Ferro et al., 2015):

$$DR = \frac{1}{npeels} \times \frac{B_{Y-y,tip} - B_{Y-y,ref}}{B_{Y-y,ref}}$$

where B denotes exploitable biomass, y denotes year, $npeels$ denotes the number of years that are dropped in successive fashion and the assessment rerun, Y is the last year in the full time series, tip denotes the terminal estimate from an assessment with a reduced time series, and ref denotes the assessment using the full time series.

7. Stock assessment

1) Member stock assessment report: CHINA

Based on preliminary analysis, 9 models differing in number of abundance indices and prior distribution of catchability and intrinsic growth rate were explored. All scenarios included total catch and all available CPUE indices from four members (Table CH7.1). Scenario 1-3 and 5-7 included biomass index from Japanese survey. Scenario 1-4 applied inverse-gamma distribution on catchability while scenario 5-8 used uniform distribution for catchability. Different ranges of catchability q_5 were considered among different scenarios, such as 0 to 1 (scenario 1 and 5), equal to 1 (scenario 2 and 6), and 0 to larger than 1 (scenario 3 and 8). Scenario 9 considered lognormal distribution of intrinsic growth rate instead of uniform distribution.

Posterior distributions were estimated and the convergence of the posterior distributions was examined with Gelman and Rubin statistics (Gelman and Rubin, 1992). MSY-based biological reference points were estimated from the generalized Bayesian state-space production model.

A Shapiro-Wilk normality test was used to examine the normality of the observation error. The root mean square error of the observation error was calculated to measure the model fit. A retrospective analysis was conducted to verify whether any possible systematic inconsistencies exist among the model estimates of biomass and fishing mortality based on increasing periods of data (Mohn, 1999). A sensitivity analysis of the model outputs to the number of indices and prior distributions were tested by excluding the biomass index from the Japanese survey and changing the prior distributions of catchability and intrinsic growth rate. The results of the sensitivity analysis helped to understand whether the assessment model was robust in capturing the changes of indices and priors.

Stochastic projections were applied to the assessment to show the possible changes in exploitable biomass. A five-year catch scenario was projected starting in 2016. The catch was set at 0.8, 0.9, 1.0, 1.1, and 1.2 multiples average catch of recent 5 years. A risk analysis was conducted to show how the probabilities of overfishing and becoming overfished change as projected catch changes in the future. The prediction skill of the model was evaluated using cross validation (Kell et al., 2016). The data from 1980 to 2010 were used to build the model and make predictions of biomass under reported annual catch from 2010 to 2015. The similarity between predicted biomass and observed CPUE and biomass indices was quantified with a linear regression model.

(1) Assessment results for the base-case scenarios

The posterior densities of model parameters showed that the densities were smooth and unimodal

for the base-case scenarios (Figure CH7.1, CH7.2, and CH7.3). Mean, median, and coefficient variance (CV) of posterior estimates of model parameters were summarized in Table CH7.2. The posterior distributions of the model parameters were adequately sampled with the MCMC simulations. All parameters showed well convergence of posterior distributions with Gelman and Rubin statistic for all parameters equal to 1.

The correlations among posterior estimates of key parameters were examined for base-case scenarios (Figure CH7.4, CH7.5, and CH7.6). The correlations were high between K , $BMSY$, and catchability, whereas the correlations between other parameters were relatively low. There was no correlation between most parameters and $P1$, s , and MSY .

(2) Diagnostics and caveats

All standardized log-residuals from the indices did not show significant temporal trends (Figure CH7.7, CH7.8, and CH7.9). All standardized log-residuals from the indices fit of the base-case scenarios did not fail the Shapiro-Wilk normality test ($p > 0.05$, Table CH7.3). The root mean square errors for the four CPUE indices showed the same pattern from different scenarios (Table CH7.3). The predicted indices showed a well fit to the CPUE from Russia and a lack of fit to the CPUE from Chinese Taipei. The deviance information criteria (DIC) values from different scenarios indicated that the minimum value of DIC was 440.63 (S2) and the maximum value of DIC was 460.07 (S1; Table CH7.3).

There was no obvious retrospective pattern in the estimates of exploitable biomass and fishing mortality (Figure CH7.10, CH7.11, and CH7.12). The Mohn's rho statistics for exploitable biomass of the three base-case scenarios were 0.17, 0.26, and 0.12 respectively. The Mohn's rho statistics for fishing mortality of the three base-case scenarios were -0.16, -0.23, and -0.03. Overall, the retrospective analysis suggested that there was no consistent pattern of bias in the estimates of the terminal exploitable biomass and fishing mortality.

(3) Biological reference points

The estimated mean and CV of maximum sustainable yield from the base-case scenarios 1, 2, and 3 were 593,500 mt (CV=0.28), 544,800 mt (CV=0.24), and 506,500 mt (CV=0.21; Table CH7.2). The estimated mean and CV of exploitable biomass to produce MSY from these three scenarios were 3,466,600 mt (CV=0.39), 2,681,600 mt (CV=0.39), and 2,009,700 mt (CV=0.48) respectively. The estimated fishing mortalities to produce MSY of the three base-case scenarios were 0.19 (CV=0.32), 0.22 (CV=0.28), and 0.29 (CV=0.37).

(4) Stock status (Kobe plots included here)

The temporal trends of Bratio (B/B_{MSY}) and Fratio (F/F_{MSY}) from the three base-case scenarios showed similar patterns (Figure CH7.13, CH7.14, and CH7.15). The estimated mean, median, and CV of exploitable biomass and fishing mortality from the base-case scenarios were listed in Table CH7.4, CH7.5 and CH7.6. The exploitable biomass of Pacific saury fluctuated above B_{MSY} between 1989 to 1997 and 2003 to 2015. The exploitable biomass was above B_{MSY} and stayed relatively stable during the last 5 years. The fishing mortality decreased from above F_{MSY} to under F_{MSY} during 1980 to 1986. The fishing mortality was under F_{MSY} and stayed relatively stable after 1986. The current status of stock indicated that the Pacific saury was not overfished or experiencing overfishing (Figure CH7.16, CH7.17, and CH7.18).

(5) Sensitivity analysis (for sensitivity analysis)

The sensitivity analysis for excluding the biomass index from the Japanese survey (S4) showed that the estimated mean of key parameters fell in between the results from S2 and S3 (Table CH7.7 and CH7.8). The absolute change in mean of key parameters ranged from 0.05% to 3.17% when distribution of catchability changed from inverse-gamma distribution to uniform distribution and q_5 was less than 1. The model results were robust to changes in distribution of catchability when q_5 equaled 1 (i.e. absolute changes in mean varied from 0.14% to 4.56%). The absolute change in mean of key parameters (i.e. 0.96% to 68.92%) exceeded 50% when catchability distribution changed from inverse-gamma distribution to uniform distribution and q_5 was free to be greater than 1. The absolute changes in means (1.65% to 66.08%) were also greater than 50% when catchability distribution was changed and biomass index was excluded from the model. Fishing mortality in 1980 and 2015 exhibited relatively high changes in mean, which were greater than 50%. The model outputs were robust to changes in distribution of r when r was changed from uniform distribution to lognormal distribution. The absolute changes in mean of key parameters were between 0.02% to 27.19%.

(6) Projection

The cross validation results from the three base-case scenarios showed similar patterns between predicted relative biomass and observed indices (Figure CH7.19, CH7.20, and CH7.21). The predicted relative biomass showed a positive correlation with observed CPUE from Japan, Russia, Korea, and biomass index from Japanese survey. The Adjusted R^2 of the simple linear regression model decreased from CPUE from Russia, Japan, biomass index, and CPUE from Korea (Figure CH7.19, CH7.20, CH7.21). The predicted relative biomass had a poor fit with the observed CPUE from Chinese Taipei.

A five-year projection was conducted through 2020 for three base-case scenarios. 0.8, 0.9, 1, 1.1,

and 1.2 of average catch over the last 5 years was assumed for the future projection. For scenario 1 with q_5 ranged from 0 to 1, the exploitable biomass would remain above BMSY through 2020 for all catch scenarios (Figure CH7.22). For scenario 2 and 3 with fixed q equaled to 1 and free q that could be greater than 1, the exploitable biomass were greater than BMSY under catch scenarios $0.8 \times \text{catch}$ till $1.1 \times \text{catch}$ (Figure CH7.23 and CH7.24). For catch scenarios $1.2 \times \text{catch}$ under model scenario 2 and 3, the stock had a greater than 50% probability of being overfished in 2018 and 2017 respectively (Table CH7.9).

(7) Conclusion/Summary

The current stock status indicated that the Pacific saury was not overfished or experiencing overfishing based on three base-case scenarios. The current catch level was not harmful to the Pacific saury population. This integrated Bayesian state-space stock assessment model for Pacific saury has been conducted with all available data. However, estimated catchability of biomass index from Japanese survey was greater than 1 when prior range of catchability was set from 0 to values greater than 1. Additional research on catchability of biomass index from Japanese survey is necessary. Other approach such as maximum likelihood could be used to compare model outputs with Bayesian approach in order to improve the stock assessment.

Table CH7.1. Prior assumptions of catchability and intrinsic growth rate from different scenarios.

| Scenarios | q1-q4 | q5 | r |
|-----------|----------------------|--------------------------|---|
| S1 | 1/q~Gamma(0.01,0.01) | 1/q~Gamma(0.01,0.01) > 1 | U(0,3) |
| S2 | 1/q~Gamma(0.01,0.01) | 1/q=1 | U(0,3) |
| S3 | 1/q~Gamma(0.01,0.01) | 1/q~Gamma(0.01,0.01) | U(0,3) |
| S4 | 1/q~Gamma(0.01,0.01) | - | U(0,3) |
| S5 | q~U(0,1) | q~U(0,1) | U(0,3) |
| S6 | q~U(0,1) | q=1 | U(0,3) |
| S7 | q~U(0,1) | q~U(0,5) | U(0,3) |
| S8 | q~U(0,1) | - | U(0,3) |
| S9 | 1/q~Gamma(0.01,0.01) | 1/q~Gamma(0.01,0.01) | logN(log(1.4)- $\sigma^2/2$, σ^2); CV=1 |

Table CH7.2. Summary of estimated mean, median, and CV of model parameters from base-case scenarios.

| Parameter | S1 | | | | S2 | | | | S3 | | | |
|------------------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|
| | Mean | SD | Median | CV | Mean | SD | Median | CV | Mean | SD | Median | CV |
| K (10000 mt) | 790.26 | 303.99 | 704.00 | 0.38 | 615.85 | 255.62 | 527.80 | 0.42 | 457.96 | 222.42 | 409.80 | 0.49 |
| r | 1.03 | 0.76 | 0.77 | 0.74 | 1.13 | 0.75 | 0.89 | 0.66 | 1.28 | 0.74 | 1.13 | 0.57 |
| q1 | 0.01 | 0.00 | 0.01 | 0.22 | 0.01 | 0.00 | 0.01 | 0.11 | 0.02 | 0.01 | 0.01 | 0.41 |
| q2 | 0.05 | 0.01 | 0.05 | 0.21 | 0.06 | 0.00 | 0.06 | 0.08 | 0.09 | 0.04 | 0.08 | 0.41 |
| q3 | 0.03 | 0.01 | 0.03 | 0.24 | 0.04 | 0.01 | 0.04 | 0.14 | 0.06 | 0.03 | 0.05 | 0.43 |
| q4 | 0.01 | 0.00 | 0.01 | 0.24 | 0.01 | 0.00 | 0.01 | 0.13 | 0.01 | 0.00 | 0.01 | 0.42 |
| q5 | 0.77 | 0.16 | 0.79 | 0.20 | 1.00 | 0.00 | 1.00 | 0.00 | 1.46 | 0.60 | 1.37 | 0.41 |
| σ^2 | 0.05 | 0.02 | 0.05 | 0.47 | 0.05 | 0.02 | 0.05 | 0.47 | 0.05 | 0.02 | 0.05 | 0.46 |
| τ_1^2 | 0.13 | 0.04 | 0.13 | 0.32 | 0.13 | 0.04 | 0.12 | 0.31 | 0.13 | 0.04 | 0.12 | 0.32 |
| τ_2^2 | 0.02 | 0.01 | 0.01 | 0.73 | 0.02 | 0.01 | 0.01 | 0.71 | 0.02 | 0.01 | 0.01 | 0.73 |
| τ_3^2 | 0.22 | 0.10 | 0.19 | 0.47 | 0.22 | 0.10 | 0.19 | 0.47 | 0.21 | 0.10 | 0.19 | 0.46 |
| τ_4^2 | 0.19 | 0.09 | 0.17 | 0.48 | 0.19 | 0.09 | 0.17 | 0.47 | 0.19 | 0.09 | 0.17 | 0.46 |
| τ_5^2 | 0.06 | 0.03 | 0.05 | 0.56 | 0.06 | 0.03 | 0.05 | 0.58 | 0.06 | 0.03 | 0.05 | 0.58 |
| P1 | 0.14 | 0.05 | 0.14 | 0.33 | 0.14 | 0.05 | 0.14 | 0.34 | 0.14 | 0.04 | 0.14 | 0.28 |
| s | 0.57 | 0.60 | 0.32 | 1.07 | 0.56 | 0.58 | 0.33 | 1.05 | 0.56 | 0.53 | 0.36 | 0.95 |
| MSY (10000 mt) | 59.35 | 16.60 | 57.07 | 0.28 | 54.48 | 12.99 | 52.91 | 0.24 | 50.65 | 10.81 | 48.66 | 0.21 |
| FMSY | 0.19 | 0.06 | 0.18 | 0.32 | 0.22 | 0.06 | 0.22 | 0.28 | 0.29 | 0.11 | 0.28 | 0.37 |
| BMSY (10000 mt) | 346.66 | 135.35 | 310.10 | 0.39 | 268.16 | 104.98 | 237.40 | 0.39 | 200.97 | 97.13 | 178.80 | 0.48 |
| B1980 (10000 mt) | 105.98 | 39.40 | 97.91 | 0.37 | 78.66 | 21.35 | 75.43 | 0.27 | 63.39 | 31.72 | 55.79 | 0.50 |
| B2015 (10000 mt) | 356.63 | 98.52 | 333.10 | 0.28 | 261.56 | 31.08 | 260.00 | 0.12 | 210.86 | 97.38 | 189.20 | 0.46 |
| F1980 | 0.25 | 0.08 | 0.24 | 0.33 | 0.32 | 0.08 | 0.32 | 0.26 | 0.46 | 0.21 | 0.43 | 0.46 |
| F2015 | 0.11 | 0.03 | 0.11 | 0.23 | 0.14 | 0.02 | 0.14 | 0.12 | 0.21 | 0.09 | 0.19 | 0.44 |
| P2015 | 0.48 | 0.12 | 0.49 | 0.25 | 0.47 | 0.13 | 0.49 | 0.28 | 0.48 | 0.11 | 0.48 | 0.22 |
| Bratio2015 | 1.10 | 0.29 | 1.11 | 0.26 | 1.07 | 0.29 | 1.09 | 0.27 | 1.08 | 0.24 | 1.08 | 0.22 |
| Fratio2015 | 0.64 | 0.26 | 0.58 | 0.41 | 0.70 | 0.26 | 0.64 | 0.37 | 0.72 | 0.21 | 0.69 | 0.30 |

Table CH7.3. Diagnostics of model fitting for base-case scenarios.

| Scenarios | Shapiro-Wilk test P-value | | | | | RMSE | | | | | DIC |
|-----------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | Index1 | Index2 | Index3 | Index4 | Index5 | Index1 | Index2 | Index3 | Index4 | Index5 | |
| S1 | 0.23 | 0.95 | 0.07 | 0.43 | 0.51 | 0.32 | 0.08 | 0.43 | 0.40 | 0.20 | 460.07 |
| S2 | 0.21 | 0.93 | 0.07 | 0.41 | 0.47 | 0.32 | 0.08 | 0.42 | 0.40 | 0.20 | 440.63 |
| S3 | 0.20 | 0.90 | 0.08 | 0.46 | 0.54 | 0.32 | 0.08 | 0.42 | 0.39 | 0.20 | 458.98 |

Note: Index1 to Index5 represent the CPUE indices from Japan, Russia, Korea, Chinese Taipei and biomass index from Japanese survey.

Table CH7.4. Estimated mean, CV, and median exploitable biomass (10000 mt) and fishing mortality from the scenarios 1.

| Year | Exploitable biomass (10000 mt) | | | Fishing mortality | | |
|------|--------------------------------|------|--------|-------------------|------|--------|
| | Mean | CV | Median | Mean | CV | Median |
| 1980 | 105.98 | 0.37 | 97.91 | 0.25 | 0.33 | 0.24 |
| 1981 | 103.77 | 0.35 | 96.46 | 0.22 | 0.31 | 0.21 |
| 1982 | 108.73 | 0.34 | 101.00 | 0.24 | 0.30 | 0.24 |
| 1983 | 124.94 | 0.34 | 116.50 | 0.22 | 0.30 | 0.22 |
| 1984 | 140.07 | 0.34 | 130.30 | 0.19 | 0.30 | 0.19 |
| 1985 | 170.18 | 0.34 | 158.10 | 0.18 | 0.30 | 0.17 |
| 1986 | 189.28 | 0.34 | 176.30 | 0.15 | 0.30 | 0.14 |
| 1987 | 218.96 | 0.34 | 204.10 | 0.11 | 0.30 | 0.11 |
| 1988 | 294.79 | 0.32 | 276.10 | 0.13 | 0.29 | 0.13 |
| 1989 | 355.74 | 0.33 | 332.30 | 0.10 | 0.30 | 0.10 |
| 1990 | 377.15 | 0.32 | 353.10 | 0.13 | 0.29 | 0.12 |
| 1991 | 423.95 | 0.33 | 397.50 | 0.10 | 0.30 | 0.10 |
| 1992 | 467.53 | 0.33 | 438.05 | 0.09 | 0.30 | 0.09 |
| 1993 | 467.08 | 0.33 | 435.80 | 0.09 | 0.30 | 0.09 |
| 1994 | 457.83 | 0.33 | 427.70 | 0.08 | 0.31 | 0.08 |
| 1995 | 402.47 | 0.33 | 377.00 | 0.09 | 0.30 | 0.09 |
| 1996 | 339.56 | 0.34 | 316.20 | 0.09 | 0.30 | 0.08 |
| 1997 | 326.59 | 0.33 | 304.60 | 0.12 | 0.30 | 0.12 |
| 1998 | 243.50 | 0.35 | 226.15 | 0.08 | 0.31 | 0.08 |
| 1999 | 228.79 | 0.33 | 213.30 | 0.08 | 0.30 | 0.08 |
| 2000 | 261.78 | 0.28 | 244.50 | 0.12 | 0.24 | 0.12 |
| 2001 | 290.72 | 0.27 | 271.00 | 0.14 | 0.23 | 0.14 |
| 2002 | 286.94 | 0.28 | 267.80 | 0.12 | 0.24 | 0.12 |
| 2003 | 454.04 | 0.27 | 424.10 | 0.10 | 0.23 | 0.10 |
| 2004 | 518.55 | 0.27 | 483.70 | 0.08 | 0.23 | 0.08 |
| 2005 | 545.91 | 0.27 | 508.30 | 0.09 | 0.23 | 0.09 |
| 2006 | 459.95 | 0.27 | 428.65 | 0.09 | 0.23 | 0.09 |
| 2007 | 507.27 | 0.27 | 472.40 | 0.11 | 0.23 | 0.11 |
| 2008 | 538.43 | 0.27 | 502.10 | 0.12 | 0.23 | 0.12 |
| 2009 | 370.07 | 0.28 | 344.70 | 0.14 | 0.23 | 0.14 |
| 2010 | 317.96 | 0.27 | 295.60 | 0.14 | 0.23 | 0.15 |
| 2011 | 369.65 | 0.27 | 344.50 | 0.13 | 0.23 | 0.13 |
| 2012 | 333.23 | 0.27 | 310.20 | 0.15 | 0.23 | 0.15 |
| 2013 | 353.22 | 0.27 | 328.50 | 0.13 | 0.23 | 0.13 |
| 2014 | 392.62 | 0.27 | 365.90 | 0.17 | 0.22 | 0.17 |
| 2015 | 356.63 | 0.28 | 333.10 | 0.11 | 0.23 | 0.11 |

Table CH7.5. Estimated mean, CV, and median exploitable biomass (10000 mt) and fishing mortality from the scenarios 2.

| Year | Exploitable biomass (10000 mt) | | | Fishing mortality | | |
|------|--------------------------------|------|--------|-------------------|------|--------|
| | Mean | CV | Median | Mean | CV | Median |
| 1980 | 78.66 | 0.27 | 75.43 | 0.32 | 0.26 | 0.32 |
| 1981 | 76.83 | 0.24 | 74.47 | 0.28 | 0.24 | 0.27 |
| 1982 | 80.84 | 0.23 | 78.48 | 0.31 | 0.23 | 0.31 |
| 1983 | 92.61 | 0.23 | 89.91 | 0.29 | 0.22 | 0.28 |
| 1984 | 103.81 | 0.23 | 101.00 | 0.25 | 0.23 | 0.24 |
| 1985 | 126.22 | 0.23 | 122.50 | 0.23 | 0.23 | 0.22 |
| 1986 | 140.32 | 0.23 | 136.40 | 0.19 | 0.23 | 0.18 |
| 1987 | 162.56 | 0.23 | 158.30 | 0.15 | 0.23 | 0.14 |
| 1988 | 220.33 | 0.22 | 215.10 | 0.17 | 0.22 | 0.16 |
| 1989 | 264.70 | 0.23 | 257.50 | 0.13 | 0.23 | 0.13 |
| 1990 | 281.77 | 0.22 | 275.60 | 0.16 | 0.22 | 0.16 |
| 1991 | 314.46 | 0.22 | 308.00 | 0.13 | 0.23 | 0.13 |
| 1992 | 345.90 | 0.22 | 338.90 | 0.12 | 0.23 | 0.11 |
| 1993 | 345.14 | 0.22 | 339.00 | 0.12 | 0.22 | 0.12 |
| 1994 | 337.87 | 0.23 | 330.50 | 0.10 | 0.23 | 0.10 |
| 1995 | 296.21 | 0.23 | 289.30 | 0.12 | 0.23 | 0.12 |
| 1996 | 250.12 | 0.23 | 244.10 | 0.11 | 0.23 | 0.11 |
| 1997 | 241.34 | 0.23 | 235.20 | 0.16 | 0.22 | 0.16 |
| 1998 | 178.06 | 0.23 | 173.60 | 0.10 | 0.23 | 0.10 |
| 1999 | 168.30 | 0.22 | 164.80 | 0.11 | 0.22 | 0.11 |
| 2000 | 193.46 | 0.13 | 191.70 | 0.15 | 0.13 | 0.15 |
| 2001 | 214.69 | 0.12 | 212.70 | 0.18 | 0.12 | 0.17 |
| 2002 | 211.13 | 0.13 | 208.40 | 0.16 | 0.13 | 0.16 |
| 2003 | 335.24 | 0.11 | 333.30 | 0.13 | 0.11 | 0.13 |
| 2004 | 382.43 | 0.11 | 381.30 | 0.10 | 0.11 | 0.10 |
| 2005 | 403.42 | 0.10 | 402.60 | 0.12 | 0.11 | 0.12 |
| 2006 | 337.82 | 0.11 | 336.00 | 0.12 | 0.11 | 0.12 |
| 2007 | 373.91 | 0.11 | 372.40 | 0.14 | 0.11 | 0.14 |
| 2008 | 396.93 | 0.11 | 395.10 | 0.16 | 0.11 | 0.16 |
| 2009 | 271.48 | 0.12 | 269.60 | 0.18 | 0.12 | 0.18 |
| 2010 | 233.42 | 0.11 | 231.50 | 0.19 | 0.11 | 0.19 |
| 2011 | 272.13 | 0.10 | 270.90 | 0.17 | 0.10 | 0.17 |
| 2012 | 245.29 | 0.11 | 243.20 | 0.19 | 0.11 | 0.19 |
| 2013 | 260.23 | 0.11 | 258.40 | 0.16 | 0.11 | 0.16 |
| 2014 | 289.92 | 0.11 | 287.90 | 0.22 | 0.10 | 0.22 |
| 2015 | 261.56 | 0.12 | 260.00 | 0.14 | 0.12 | 0.14 |

Table CH7.6. Estimated mean, CV, and median exploitable biomass (10000 mt) and fishing mortality from the scenarios 3.

| Year | Exploitable biomass (10000 mt) | | | Fishing mortality | | |
|------|--------------------------------|------|--------|-------------------|------|--------|
| | Mean | CV | Median | Mean | CV | Median |
| 1980 | 63.39 | 0.50 | 55.79 | 0.46 | 0.46 | 0.43 |
| 1981 | 61.89 | 0.50 | 54.58 | 0.40 | 0.46 | 0.37 |
| 1982 | 65.67 | 0.50 | 58.30 | 0.45 | 0.45 | 0.41 |
| 1983 | 75.42 | 0.51 | 66.31 | 0.41 | 0.46 | 0.38 |
| 1984 | 84.23 | 0.51 | 74.28 | 0.36 | 0.47 | 0.33 |
| 1985 | 102.27 | 0.50 | 90.77 | 0.33 | 0.47 | 0.30 |
| 1986 | 113.89 | 0.51 | 101.40 | 0.27 | 0.48 | 0.25 |
| 1987 | 132.28 | 0.51 | 118.25 | 0.21 | 0.48 | 0.19 |
| 1988 | 181.09 | 0.47 | 163.50 | 0.23 | 0.44 | 0.21 |
| 1989 | 218.10 | 0.48 | 196.00 | 0.18 | 0.45 | 0.17 |
| 1990 | 228.52 | 0.47 | 205.35 | 0.23 | 0.45 | 0.21 |
| 1991 | 256.48 | 0.48 | 229.40 | 0.19 | 0.45 | 0.17 |
| 1992 | 283.12 | 0.48 | 253.15 | 0.16 | 0.45 | 0.15 |
| 1993 | 282.11 | 0.49 | 252.25 | 0.17 | 0.45 | 0.16 |
| 1994 | 274.51 | 0.49 | 245.95 | 0.15 | 0.46 | 0.14 |
| 1995 | 241.74 | 0.49 | 215.70 | 0.17 | 0.46 | 0.16 |
| 1996 | 203.23 | 0.51 | 180.90 | 0.16 | 0.47 | 0.15 |
| 1997 | 196.20 | 0.50 | 174.05 | 0.23 | 0.46 | 0.21 |
| 1998 | 143.50 | 0.52 | 126.85 | 0.16 | 0.52 | 0.14 |
| 1999 | 135.80 | 0.50 | 121.05 | 0.16 | 0.49 | 0.15 |
| 2000 | 157.12 | 0.46 | 140.00 | 0.22 | 0.43 | 0.20 |
| 2001 | 174.51 | 0.45 | 156.90 | 0.25 | 0.42 | 0.24 |
| 2002 | 171.00 | 0.46 | 152.80 | 0.23 | 0.43 | 0.21 |
| 2003 | 272.11 | 0.45 | 245.60 | 0.19 | 0.41 | 0.18 |
| 2004 | 309.21 | 0.45 | 278.05 | 0.14 | 0.43 | 0.13 |
| 2005 | 327.45 | 0.45 | 297.05 | 0.17 | 0.41 | 0.16 |
| 2006 | 274.25 | 0.45 | 247.05 | 0.17 | 0.42 | 0.16 |
| 2007 | 303.59 | 0.45 | 275.20 | 0.20 | 0.42 | 0.19 |
| 2008 | 323.23 | 0.44 | 291.40 | 0.23 | 0.41 | 0.21 |
| 2009 | 220.32 | 0.46 | 197.50 | 0.26 | 0.43 | 0.24 |
| 2010 | 189.40 | 0.46 | 170.90 | 0.27 | 0.43 | 0.25 |
| 2011 | 221.08 | 0.45 | 199.30 | 0.24 | 0.41 | 0.23 |
| 2012 | 198.96 | 0.45 | 178.75 | 0.28 | 0.42 | 0.26 |
| 2013 | 210.87 | 0.45 | 190.55 | 0.24 | 0.42 | 0.22 |
| 2014 | 235.49 | 0.44 | 212.15 | 0.31 | 0.41 | 0.30 |
| 2015 | 210.86 | 0.46 | 189.20 | 0.21 | 0.44 | 0.19 |

Table CH7.7. Effect of prior distribution in priors and biomass index from Japanese survey on model parameters K, r, s, P1, P2015, q5, MSY, F_{MSY}, and B_{MSY}.

| Scenarios | | K (10000 mt) | r | s | P1 | P2015 | q5 | MSY (10000 mt) | FMSY | BMSY (10000 mt) |
|-----------|-----------|--------------|--------|-------|-------|-------|-------|----------------|-------|-----------------|
| S1 | Mean | 790.26 | 1.03 | 0.57 | 0.14 | 0.48 | 0.77 | 59.35 | 0.19 | 346.66 |
| | CV | 0.38 | 0.74 | 1.07 | 0.33 | 0.25 | 0.20 | 0.28 | 0.32 | 0.39 |
| S2 | Mean | 615.85 | 1.13 | 0.56 | 0.14 | 0.47 | 1.00 | 54.48 | 0.22 | 268.16 |
| | CV | 0.42 | 0.66 | 1.05 | 0.34 | 0.28 | 0.00 | 0.24 | 0.28 | 0.39 |
| S3 | Mean | 457.96 | 1.28 | 0.56 | 0.14 | 0.48 | 1.46 | 50.65 | 0.29 | 200.97 |
| | CV | 0.49 | 0.57 | 0.95 | 0.28 | 0.22 | 0.41 | 0.21 | 0.37 | 0.48 |
| S4 | Mean | 536.15 | 1.25 | 0.56 | 0.14 | 0.49 | - | 52.92 | 0.27 | 234.01 |
| | CV | 0.56 | 0.60 | 1.00 | 0.32 | 0.26 | - | 0.26 | 0.41 | 0.56 |
| S5 | Mean | 793.64 | 1.05 | 0.55 | 0.14 | 0.47 | 0.79 | 59.38 | 0.19 | 347.60 |
| | CV | 0.42 | 0.72 | 1.08 | 0.34 | 0.27 | 0.20 | 0.29 | 0.33 | 0.44 |
| | Change(%) | 0.43 | 2.73 | -2.49 | -1.56 | -1.58 | 2.86 | 0.05 | 1.13 | 0.27 |
| S6 | Mean | 587.77 | 1.11 | 0.58 | 0.14 | 0.49 | 1.00 | 54.40 | 0.23 | 258.53 |
| | CV | 0.42 | 0.67 | 1.01 | 0.33 | 0.26 | 0.00 | 0.24 | 0.27 | 0.41 |
| | Change(%) | -4.56 | -1.66 | 4.14 | 2.70 | 3.62 | 0.00 | -0.14 | 3.40 | -3.59 |
| S7 | Mean | 306.89 | 1.48 | 0.67 | 0.14 | 0.46 | 2.45 | 47.87 | 0.43 | 136.54 |
| | CV | 0.76 | 0.46 | 0.83 | 0.30 | 0.24 | 0.38 | 0.23 | 0.36 | 0.73 |
| | Change(%) | -32.99 | 15.70 | 19.85 | 0.96 | -3.81 | 67.82 | -5.48 | 48.27 | -32.06 |
| S8 | Mean | 347.01 | 1.41 | 0.66 | 0.14 | 0.48 | - | 49.02 | 0.40 | 154.14 |
| | CV | 0.74 | 0.51 | 0.85 | 0.31 | 0.25 | - | 0.24 | 0.41 | 0.71 |
| | Change(%) | -35.28 | 12.97 | 17.18 | 2.91 | -1.65 | - | -7.36 | 46.64 | -34.13 |
| S9 | Mean | 457.85 | 0.93 | 0.69 | 0.15 | 0.49 | 1.46 | 51.84 | 0.29 | 205.02 |
| | CV | 0.57 | 0.50 | 0.76 | 0.30 | 0.24 | 0.39 | 0.22 | 0.35 | 0.52 |
| | Change(%) | -0.02 | -27.19 | 23.72 | 3.46 | 2.48 | 0.04 | 2.36 | -0.36 | 2.02 |

Table CH7.8. Effect of prior distribution in priors and biomass index from Japanese survey on model parameters B, F, Bratio, and Fratio in a specific year.

| Scenarios | | B1980 (10000 mt) | B2015 (10000 mt) | F1980 | F2015 | Bratio2015 | Fratio2015 |
|-----------|-----------|------------------|------------------|-------|-------|------------|------------|
| S1 | Mean | 105.98 | 356.63 | 0.25 | 0.11 | 1.10 | 0.64 |
| | CV | 0.37 | 0.28 | 0.33 | 0.23 | 0.26 | 0.41 |
| S2 | Mean | 78.66 | 261.56 | 0.32 | 0.14 | 1.07 | 0.70 |
| | CV | 0.27 | 0.12 | 0.26 | 0.12 | 0.27 | 0.37 |
| S3 | Mean | 63.39 | 210.86 | 0.46 | 0.21 | 1.08 | 0.72 |
| | CV | 0.50 | 0.46 | 0.46 | 0.44 | 0.22 | 0.30 |
| S4 | Mean | 70.52 | 244.98 | 0.43 | 0.18 | 1.11 | 0.69 |
| | CV | 0.55 | 0.49 | 0.48 | 0.48 | 0.25 | 0.33 |
| S5 | Mean | 104.40 | 348.95 | 0.26 | 0.11 | 1.09 | 0.65 |
| | CV | 0.42 | 0.32 | 0.34 | 0.24 | 0.27 | 0.44 |
| | Change(%) | -1.49 | -2.15 | 3.03 | 3.17 | -1.31 | 2.51 |
| S6 | Mean | 77.48 | 260.23 | 0.33 | 0.14 | 1.10 | 0.68 |
| | CV | 0.27 | 0.12 | 0.27 | 0.12 | 0.26 | 0.36 |
| | Change(%) | -1.49 | -0.51 | 1.71 | 0.47 | 3.18 | -3.29 |
| S7 | Mean | 40.38 | 129.19 | 0.73 | 0.35 | 1.01 | 0.82 |
| | CV | 0.62 | 0.60 | 0.41 | 0.41 | 0.23 | 0.29 |
| | Change(%) | -36.30 | -38.73 | 58.60 | 68.92 | -6.87 | 13.53 |
| S8 | Mean | 45.67 | 153.27 | 0.67 | 0.30 | 1.06 | 0.77 |
| | CV | 0.62 | 0.60 | 0.46 | 0.48 | 0.24 | 0.33 |
| | Change(%) | -35.23 | -37.44 | 56.30 | 66.08 | -4.57 | 11.71 |
| S9 | Mean | 62.79 | 207.72 | 0.45 | 0.20 | 1.07 | 0.72 |
| | CV | 0.45 | 0.42 | 0.42 | 0.41 | 0.23 | 0.32 |
| | Change(%) | -0.94 | -1.49 | -2.46 | -0.86 | -1.60 | 0.13 |

Table CH7.9. Probability of being overfished ($B < B_{MSY}$) under different catch scenarios during 2016 to 2020 from three base-case scenarios.

| | | 2016 | 2017 | 2018 | 2019 | 2020 |
|----|-----------|------|------|------|------|------|
| S1 | 0.8×catch | 0.36 | 0.34 | 0.32 | 0.30 | 0.29 |
| | 0.9×catch | 0.38 | 0.36 | 0.35 | 0.34 | 0.33 |
| | 1.0×catch | 0.39 | 0.38 | 0.38 | 0.38 | 0.38 |
| | 1.1×catch | 0.40 | 0.41 | 0.41 | 0.42 | 0.42 |
| | 1.2×catch | 0.41 | 0.43 | 0.45 | 0.46 | 0.47 |
| S2 | 0.8×catch | 0.39 | 0.36 | 0.34 | 0.33 | 0.32 |
| | 0.9×catch | 0.40 | 0.39 | 0.38 | 0.37 | 0.37 |
| | 1.0×catch | 0.42 | 0.42 | 0.42 | 0.42 | 0.43 |
| | 1.1×catch | 0.44 | 0.45 | 0.47 | 0.48 | 0.49 |
| | 1.2×catch | 0.46 | 0.49 | 0.51 | 0.53 | 0.55 |
| S3 | 0.8×catch | 0.37 | 0.35 | 0.33 | 0.31 | 0.31 |
| | 0.9×catch | 0.40 | 0.39 | 0.39 | 0.39 | 0.39 |
| | 1.0×catch | 0.43 | 0.44 | 0.45 | 0.46 | 0.48 |
| | 1.1×catch | 0.46 | 0.49 | 0.52 | 0.54 | 0.56 |
| | 1.2×catch | 0.48 | 0.54 | 0.58 | 0.61 | 0.64 |

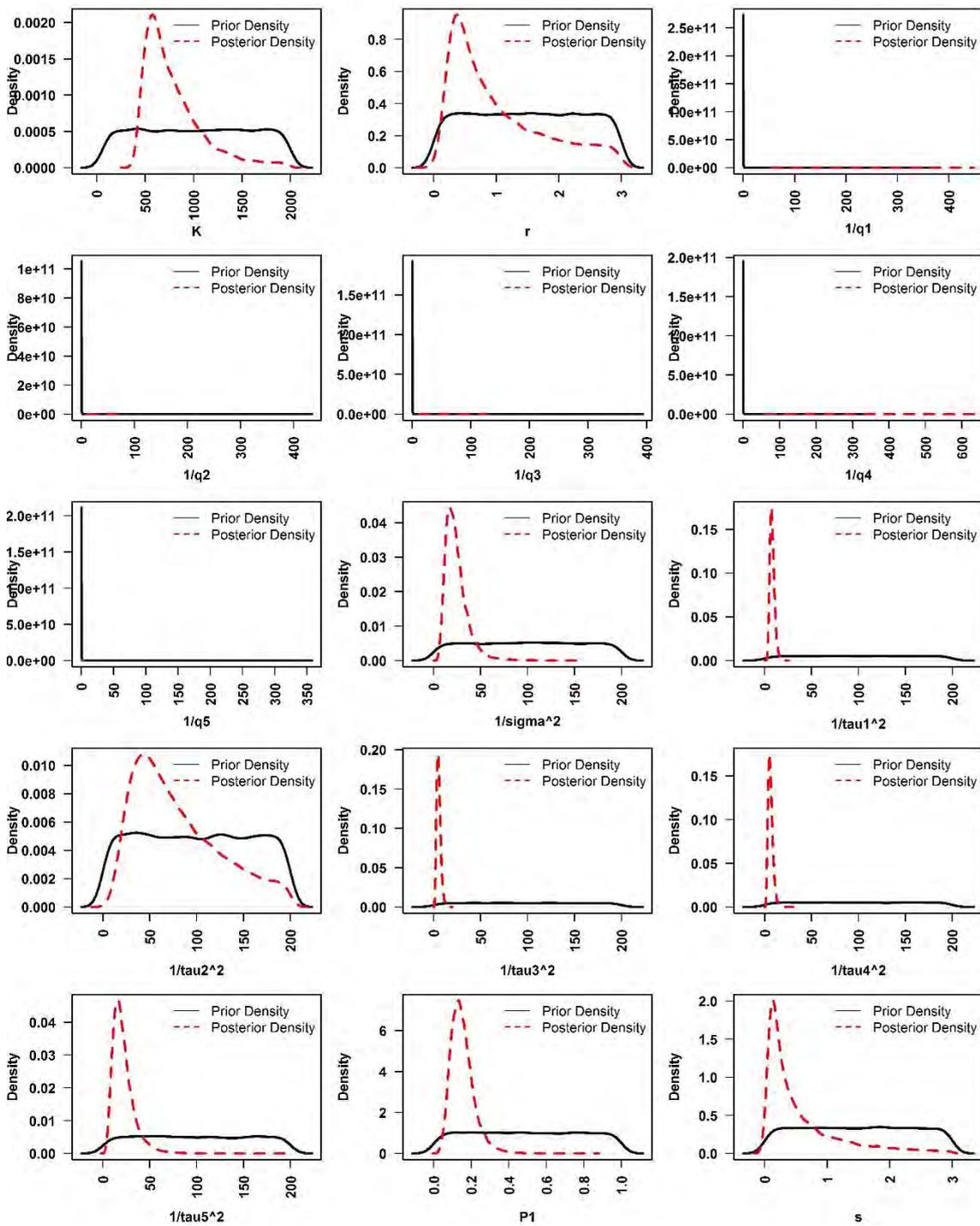


Figure CH7.1. Prior density (black solid lines) and posterior density (red dash lines) of model parameters from scenario 1.

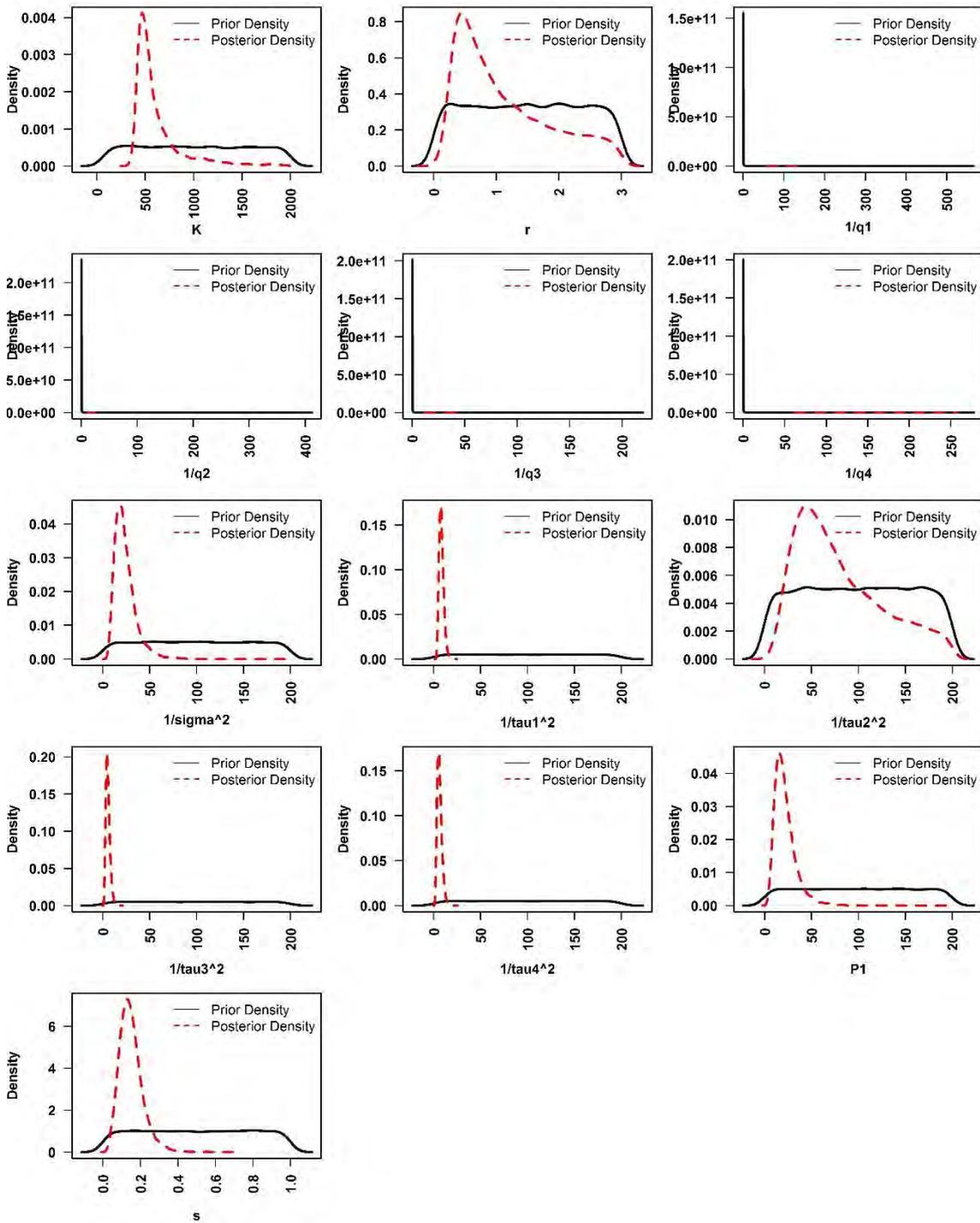


Figure CH7.2. Prior density (black solid lines) and posterior density (red dash lines) of model parameters from scenario 2.

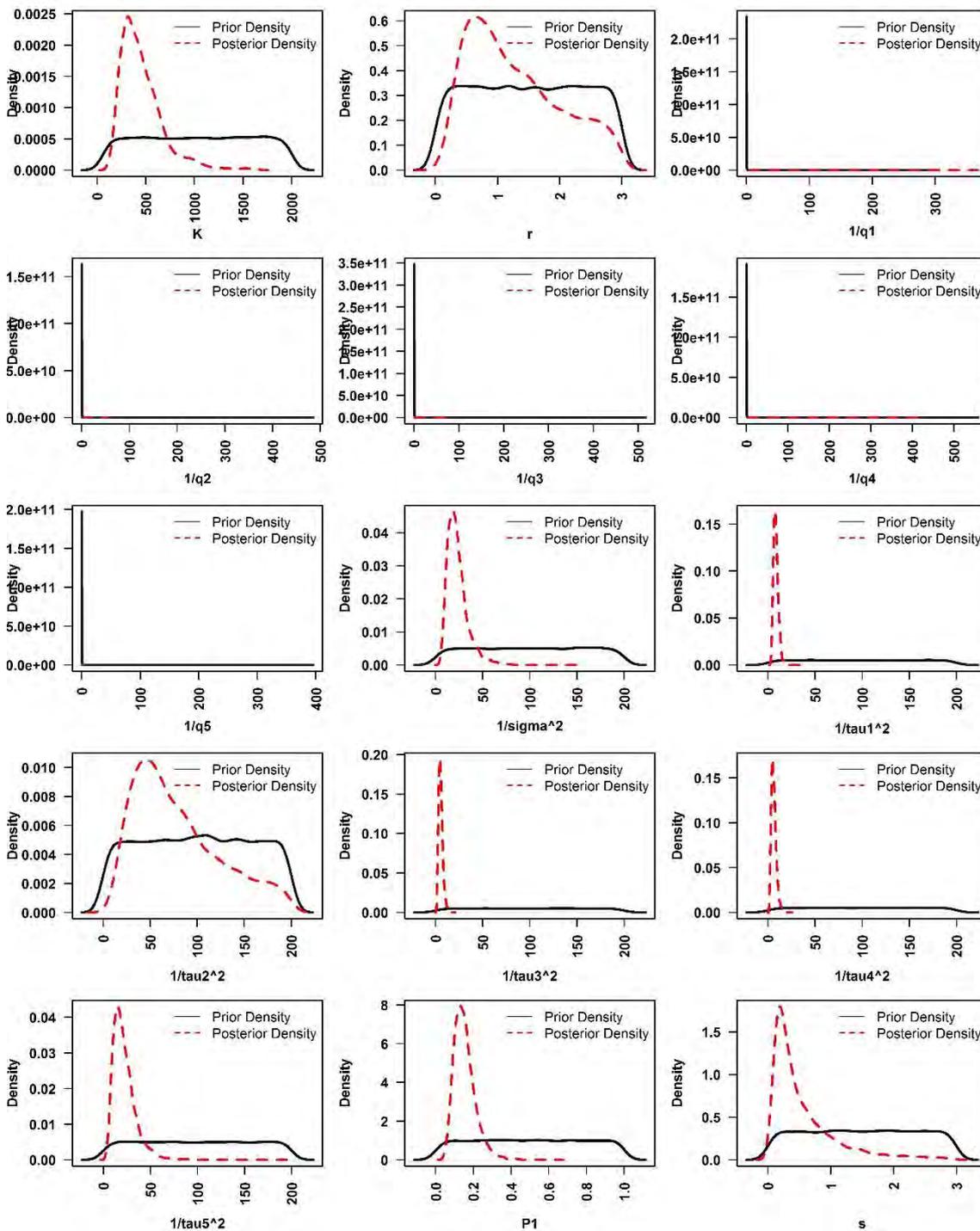


Figure CH7.3. Prior density (black solid lines) and posterior density (red dash lines) of model parameters from scenario 3.

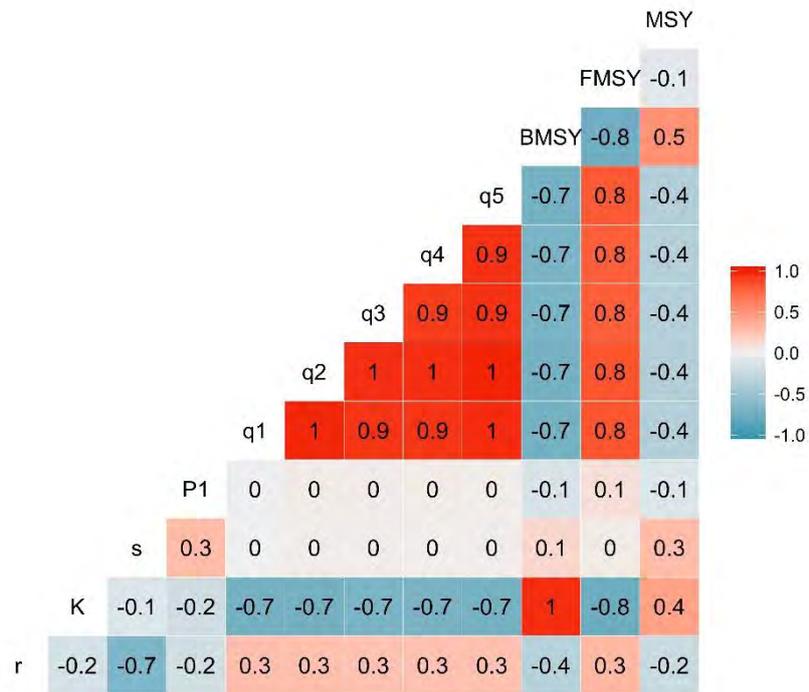


Figure CH7.6. Correlation matrix of posterior estimates for the scenario 3 model. Red background represents positive correlation and blue background represents negative correlation.

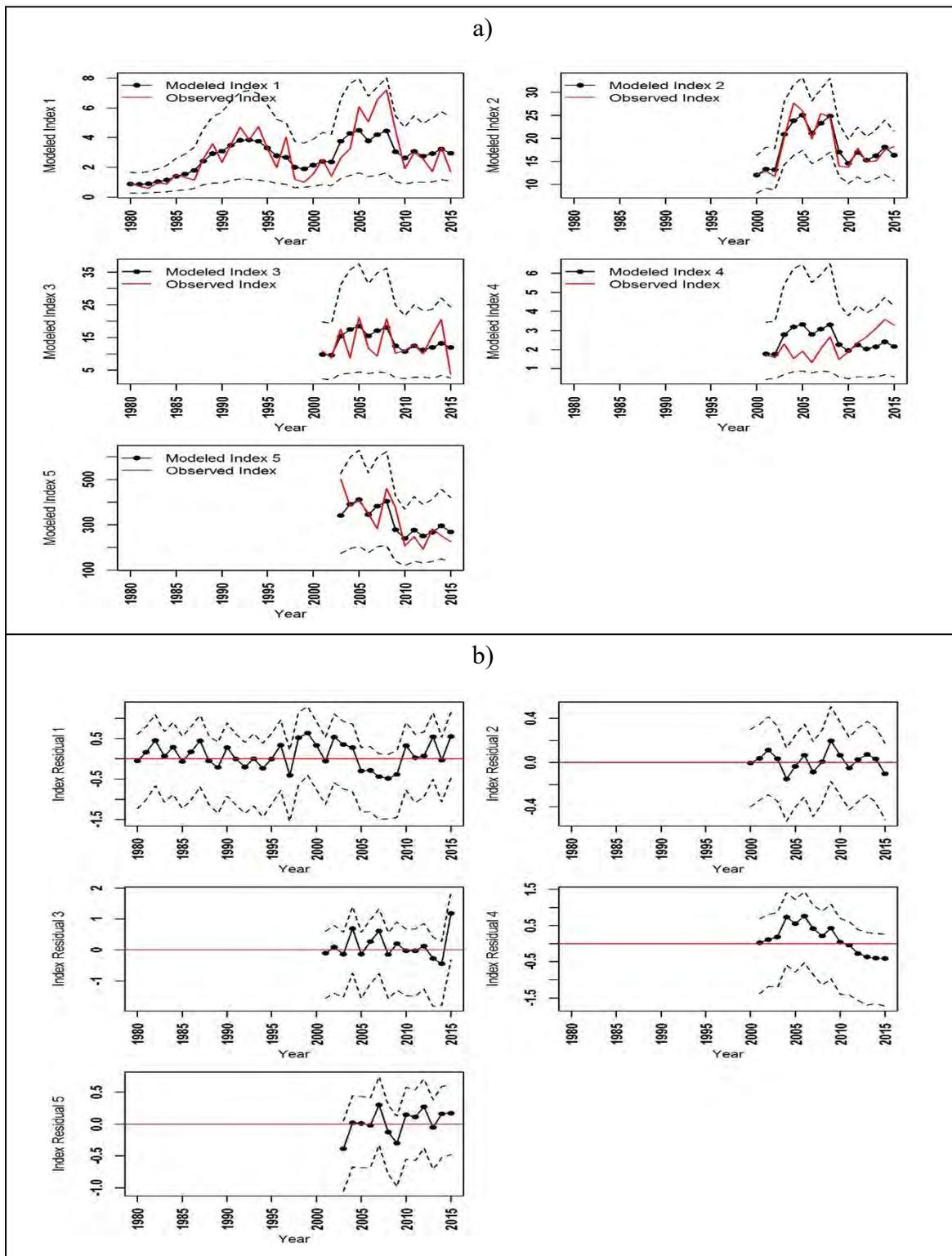


Figure CH7.7. (a) Temporal trend of observed and predicted CPUE indices and biomass index from scenario 1; (b) time-series of log-residuals of observed and predicted indices from scenario 1. Indices 1 to 5 represent CPUE indices from Japan, Russia, Korea, Chinese Taipei and biomass index from Japanese survey.

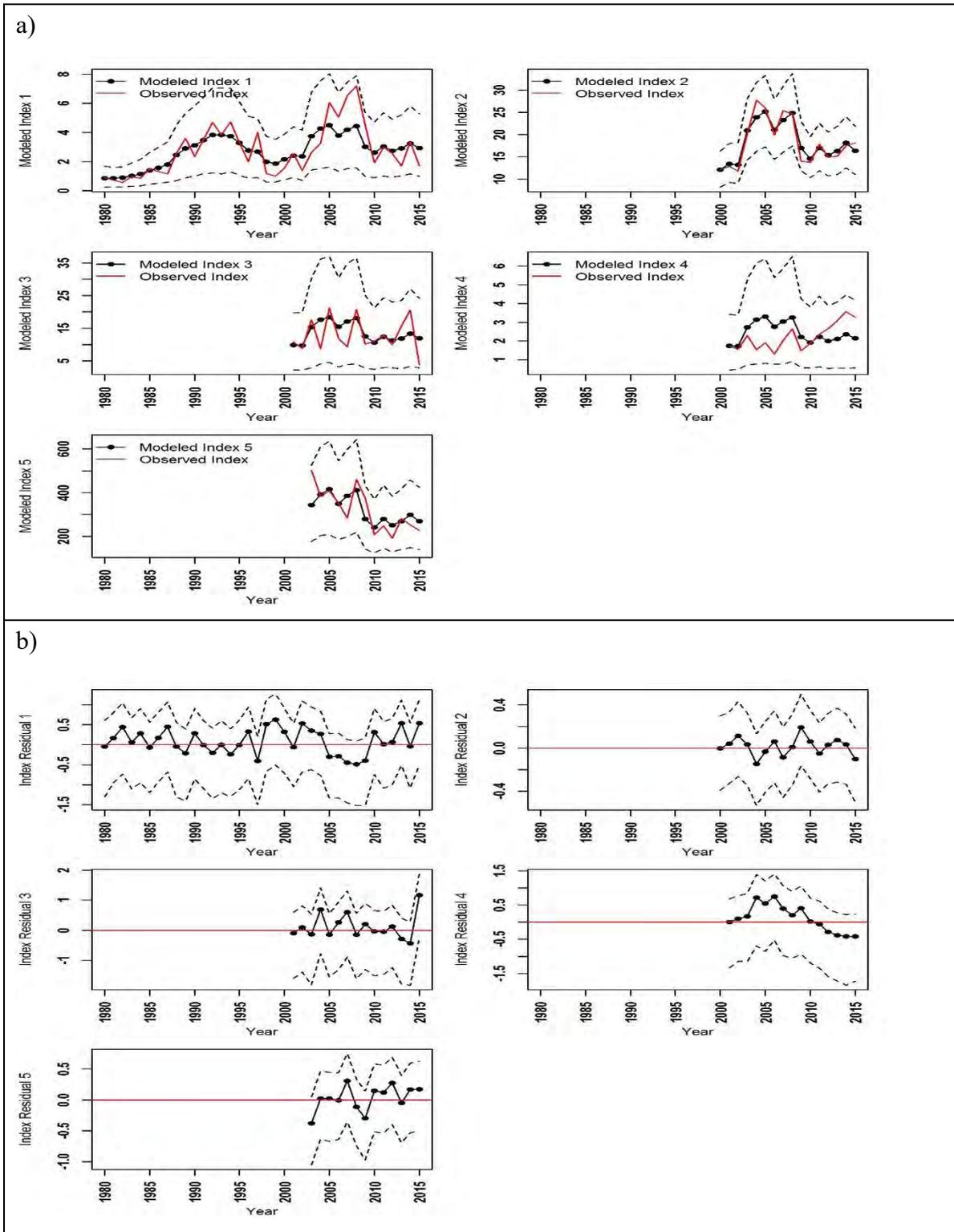


Figure CH7.8. (a) Temporal trend of observed and predicted CPUE indices and biomass index from scenario 2; (b) time-series of log-residuals of observed and predicted indices from scenario 2. Indices 1 to 5 represent CPUE indices from Japan, Russia, Korea, Chinese Taipei and biomass index from Japanese survey.

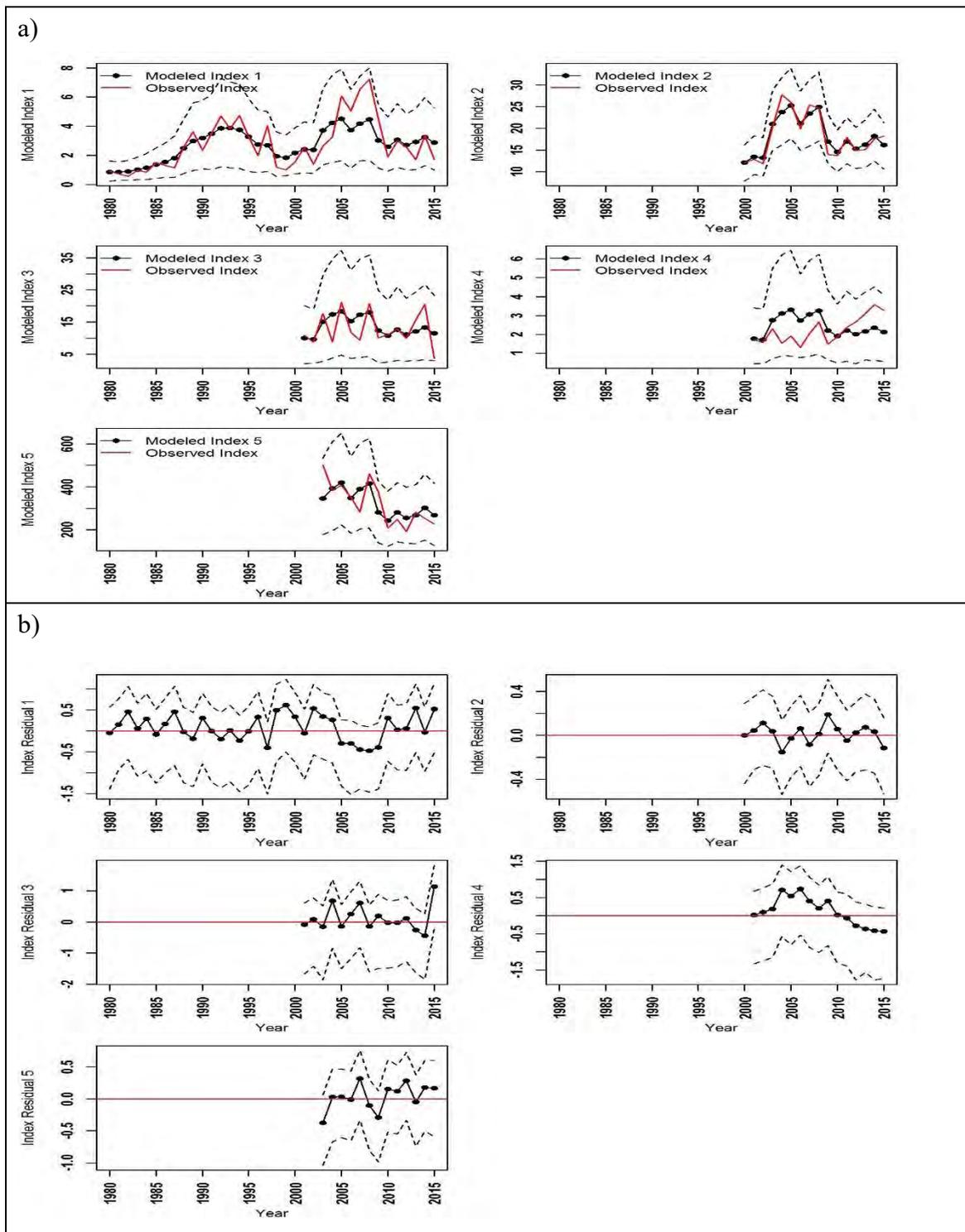


Figure CH7.9. (a) Temporal trend of observed and predicted CPUE indices and biomass index from scenario 3; (b) time-series of log-residuals of observed and predicted indices from scenario 3. Indices 1 to 5 represent CPUE indices from Japan, Russia, Korea, Chinese Taipei and biomass index from Japanese survey.

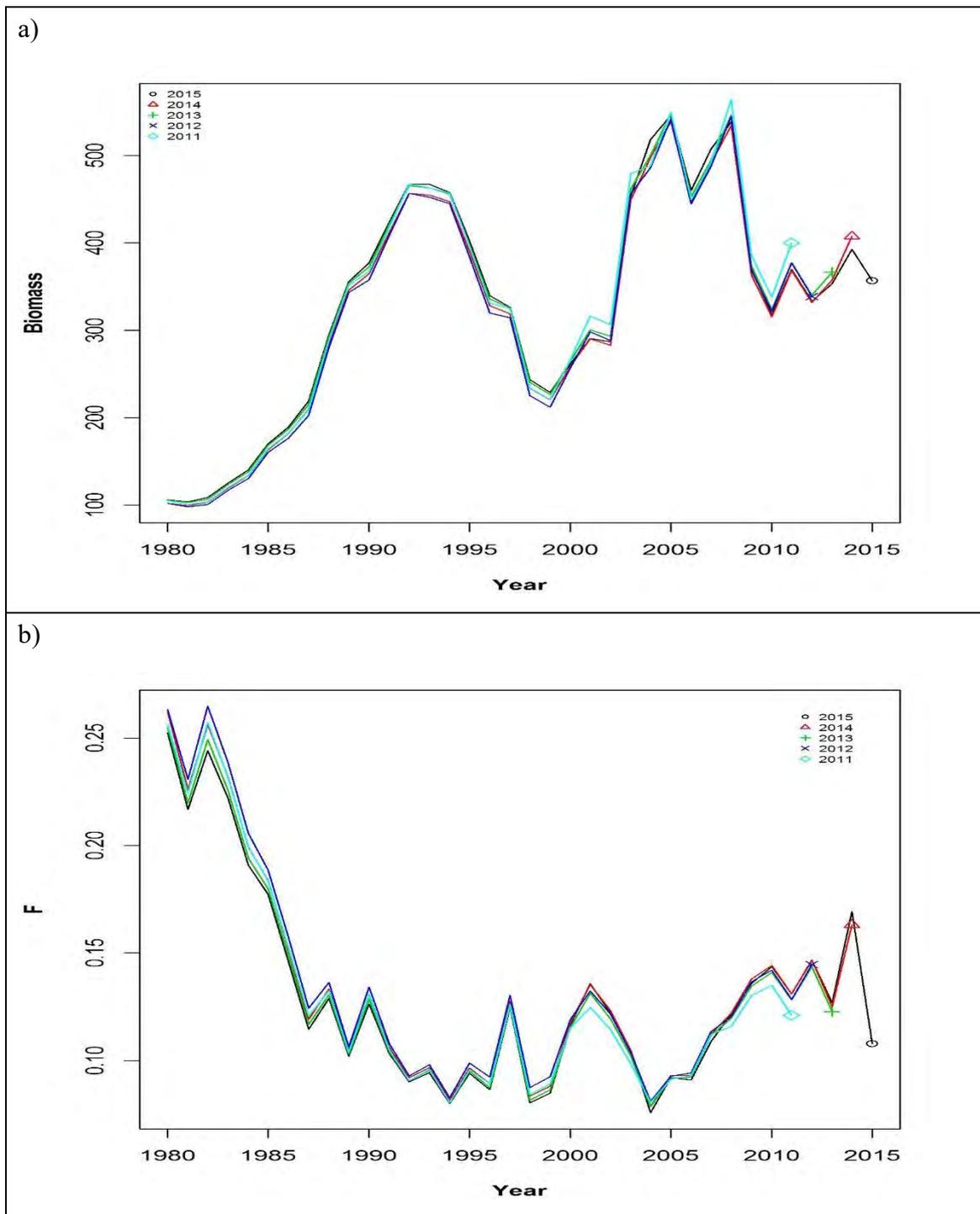


Figure CH7.10. Retrospective analysis from scenario 1 on changes in (a) exploitable biomass (×10000 mt) and (b) fishing mortality based on successive removals of five-year of assessment data and refits of the baseline production model.

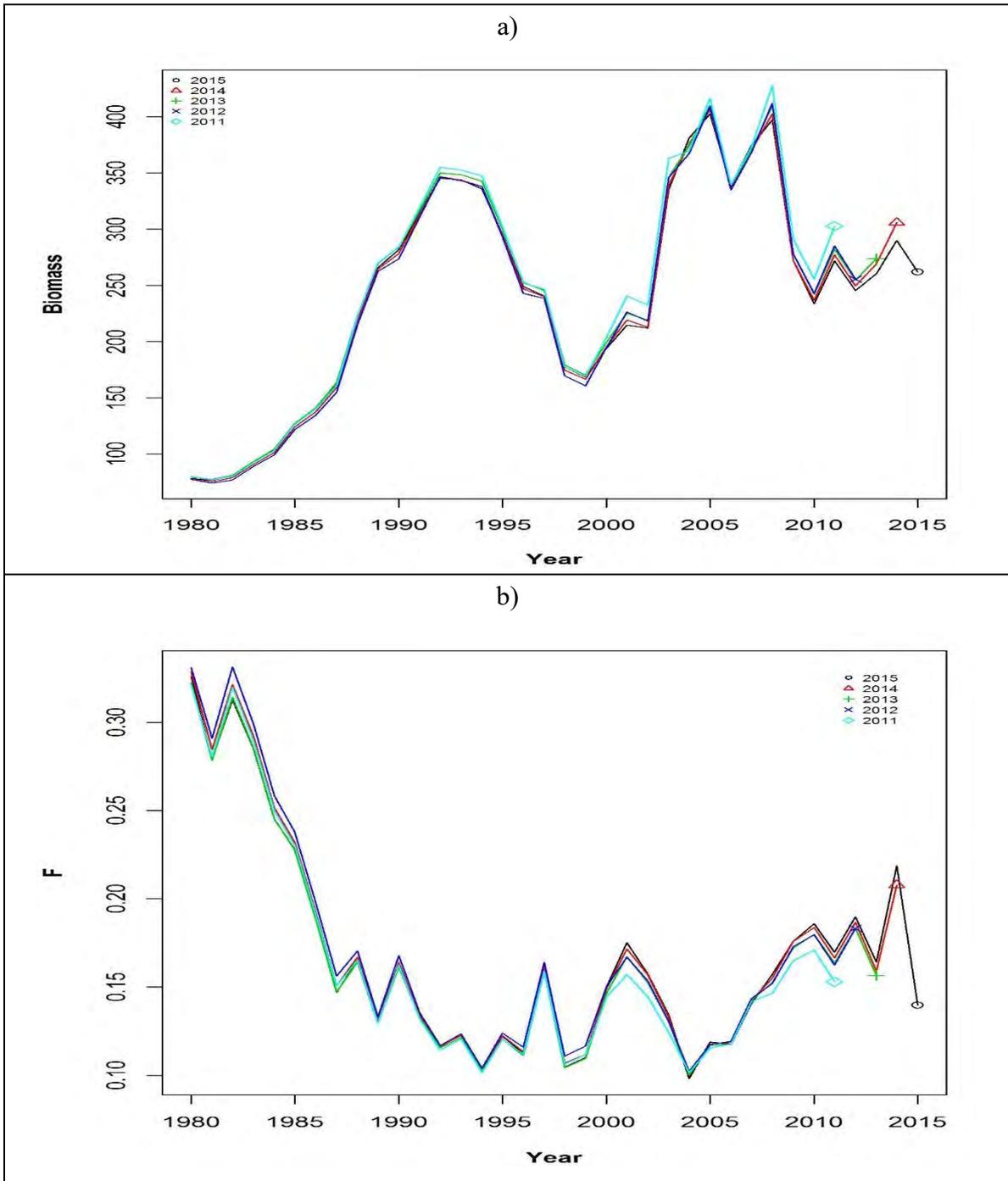


Figure CH7.11. Retrospective analysis from scenario 2 on changes in (a) exploitable biomass ($\times 10000$ mt) and (b) fishing mortality based on successive removals of five-year of assessment data and refits of the baseline production model.

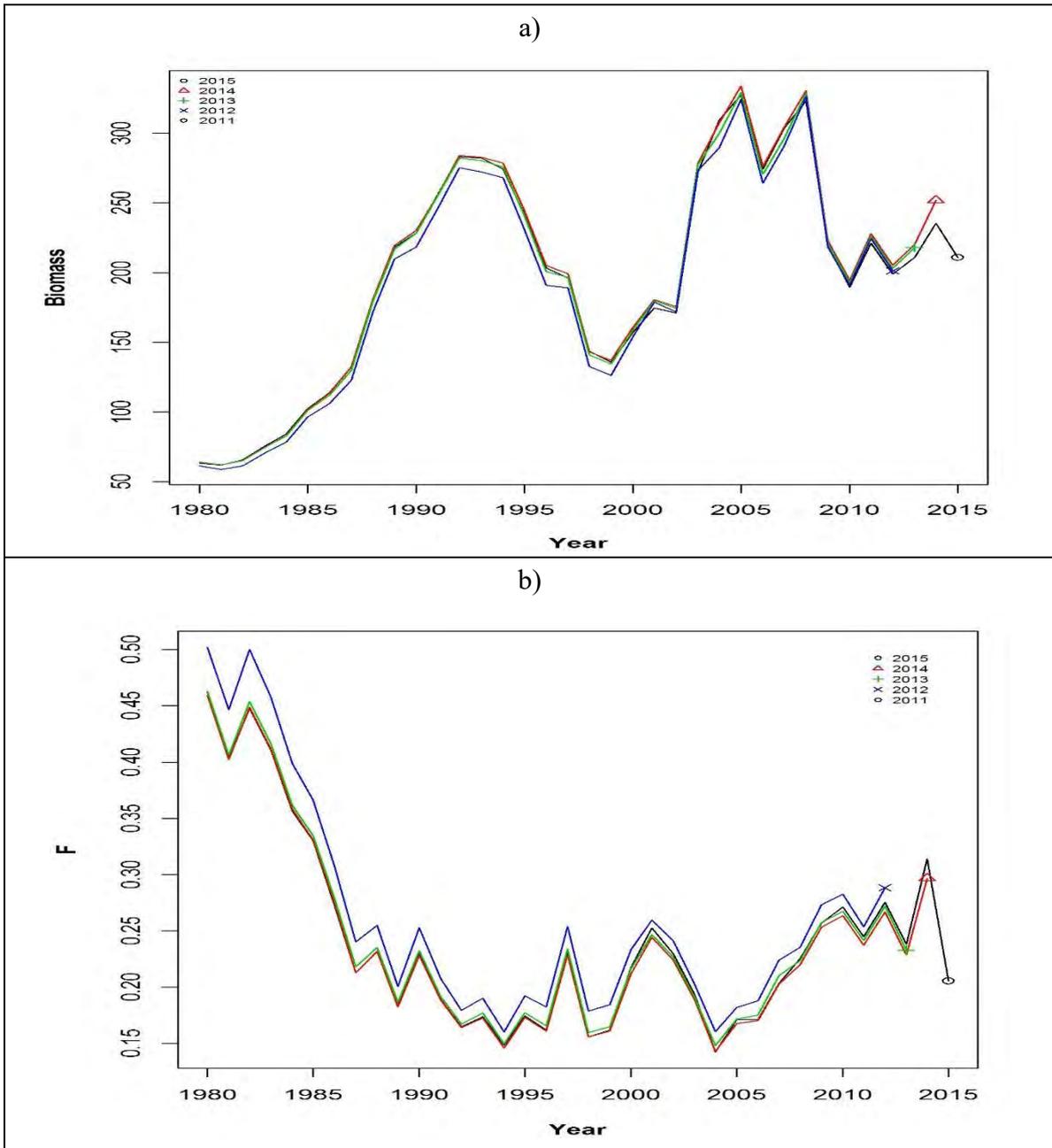


Figure CH7.12. Retrospective analysis from scenario 1 on changes in (a) exploitable biomass (×10000 mt) and (b) fishing mortality based on successive removals of five-year of assessment data and refits of the baseline production model.

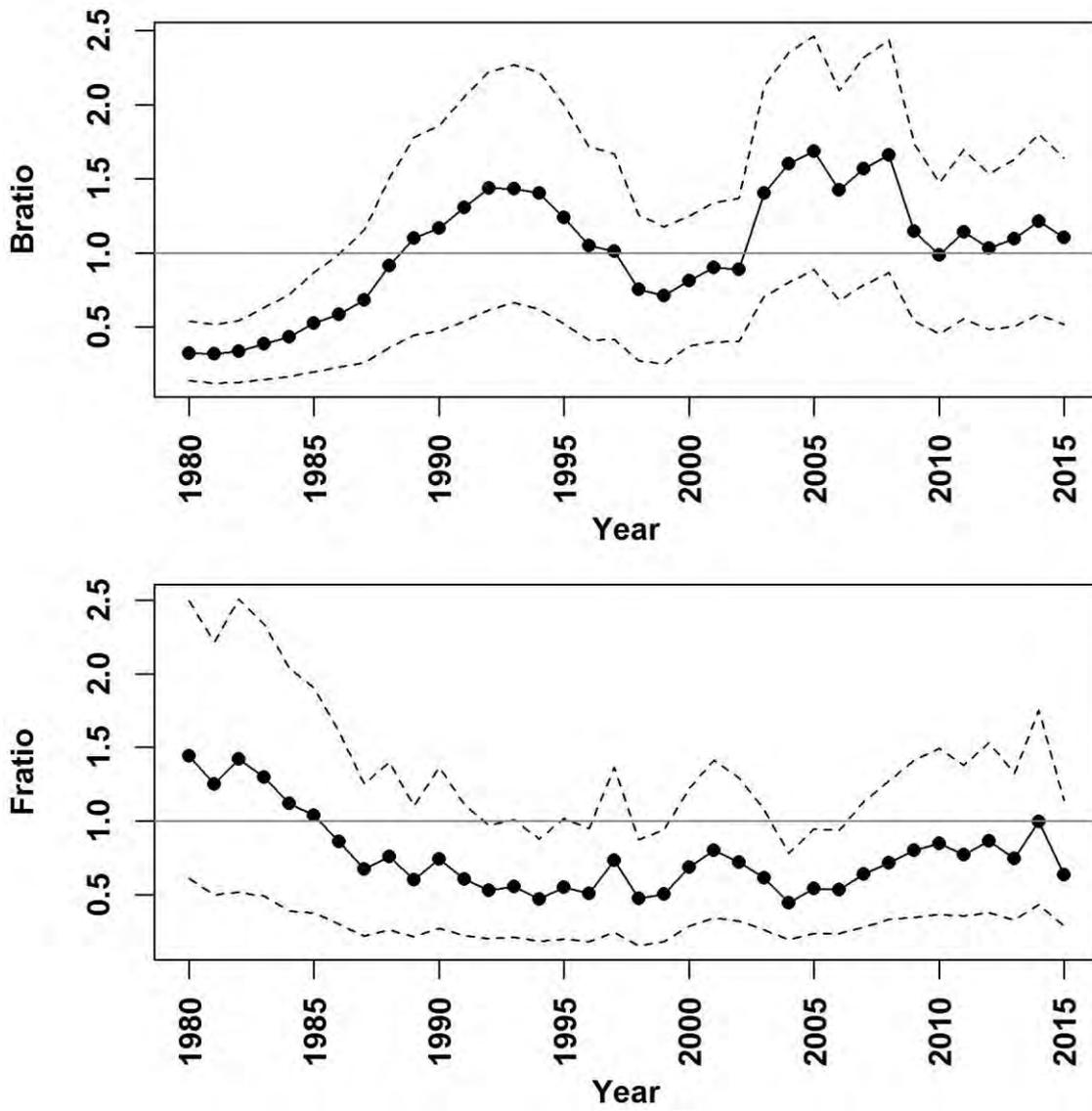


Figure CH7.13. Temporal trend of Bratio (B/B_{MSY}) and Fratio (F/F_{MSY}) from scenario 1. Estimated mean values from the posterior distribution (solid line) and 95% confidence interval (dash lines) are presented.

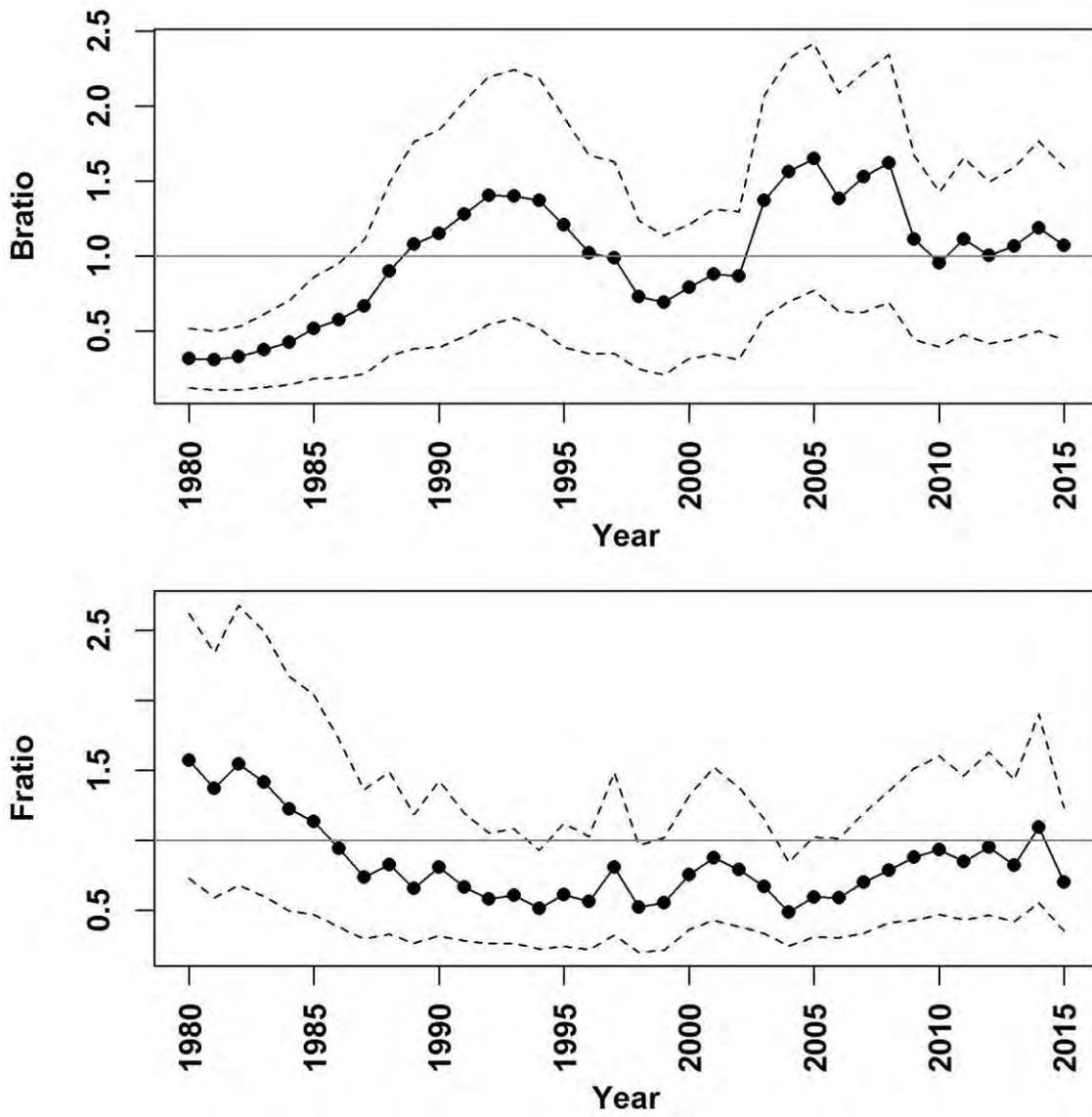


Figure CH7.14. Temporal trend of Bratio (B/B_{MSY}) and Fratio (F/F_{MSY}) from scenario 2. Estimated mean values from the posterior distribution (solid line) and 95% confidence interval (dash lines) are presented.

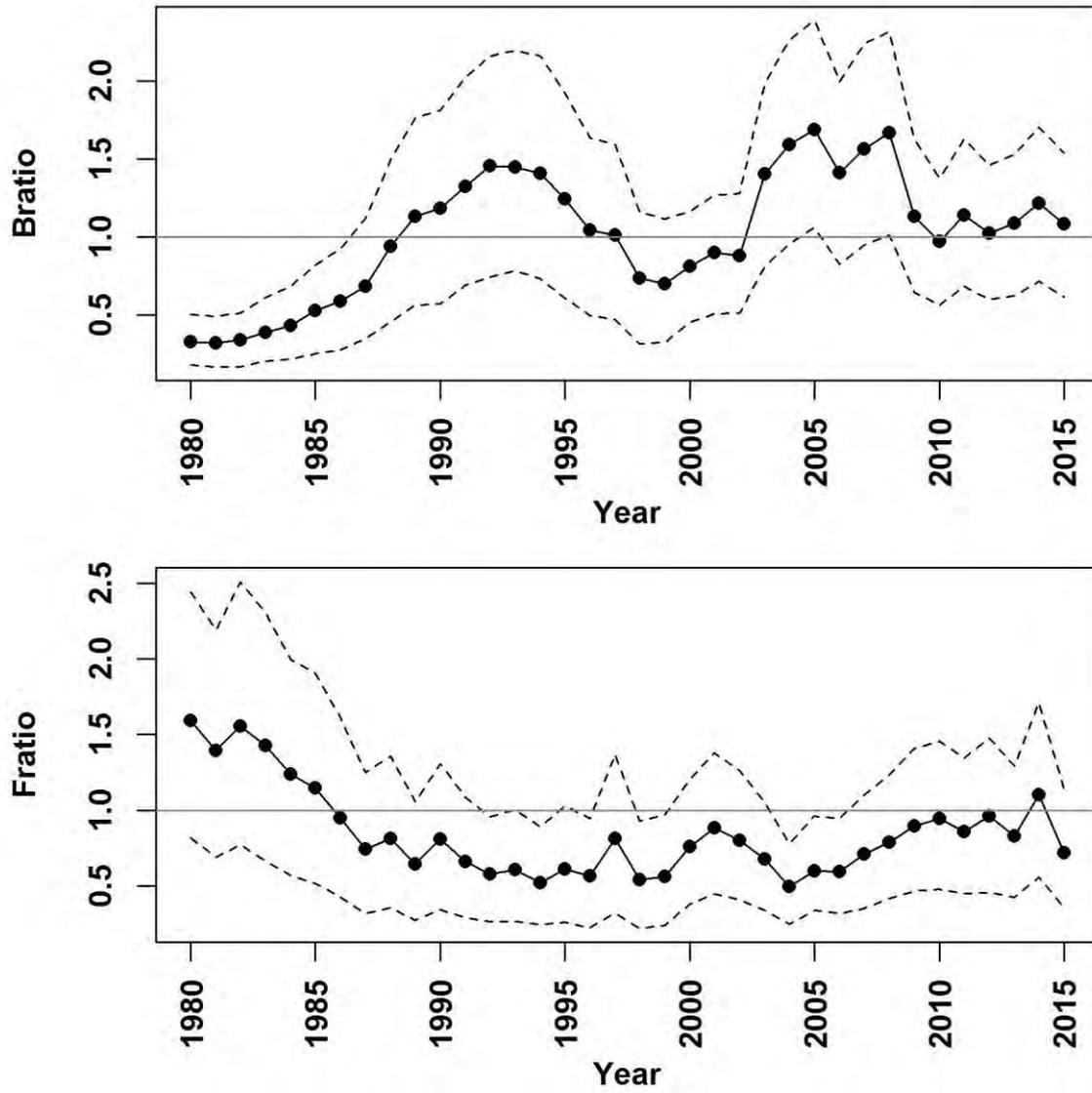


Figure CH7.15. Temporal trend of Bratio (B/B_{MSY}) and Fratio (F/F_{MSY}) from scenario 3. Estimated mean values from the posterior distribution (solid line) and 95% confidence interval (dash lines) are presented.

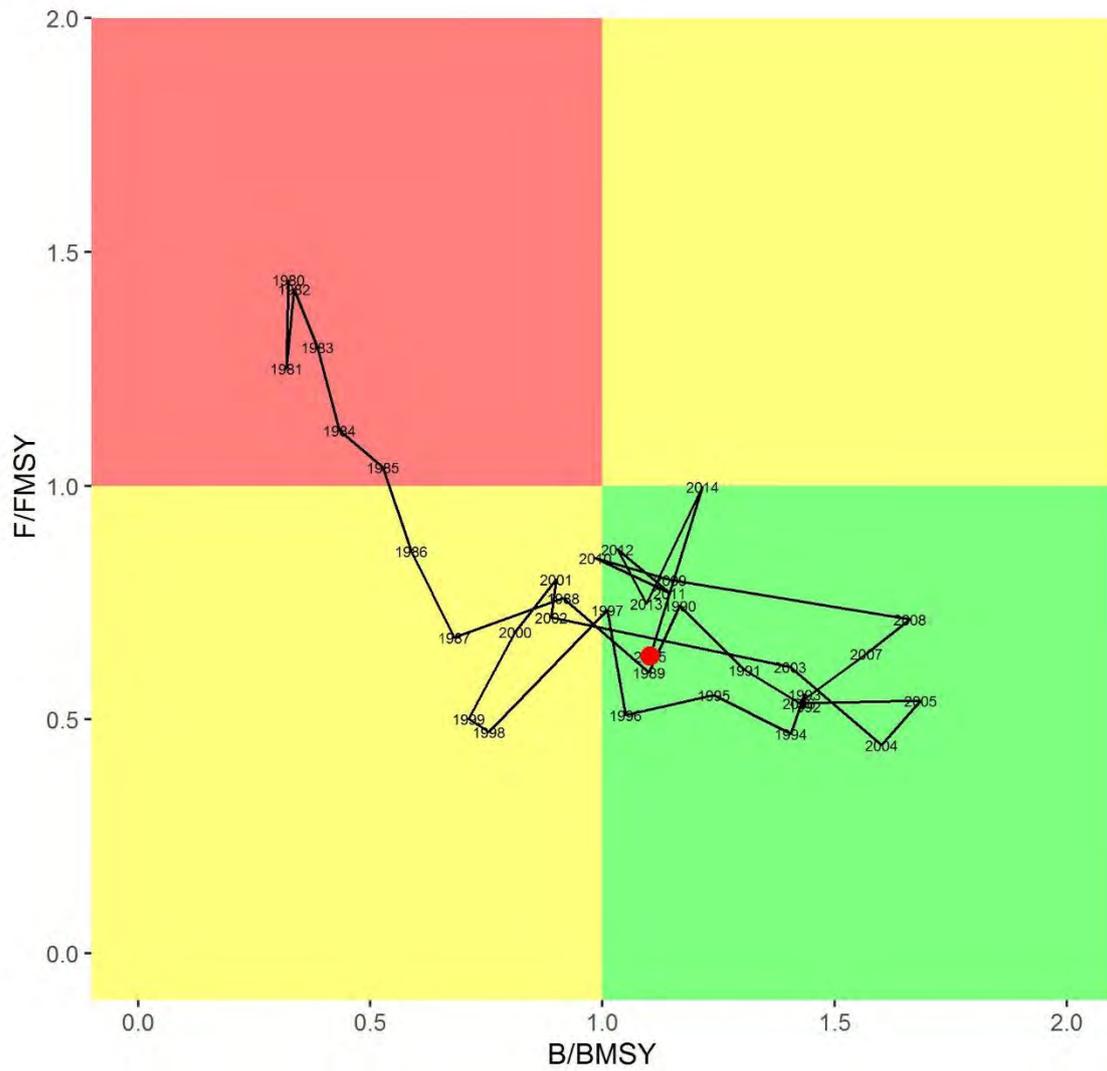


Figure CH7.16. Kobe diagram of scenario 1 shows the estimated trajectories of relative exploitable biomass (B/B_{MSY}) and relative fishing mortality (F/F_{MSY}) of Pacific saury during 1980 to 2015. The red dot represents the stock status in 2015.

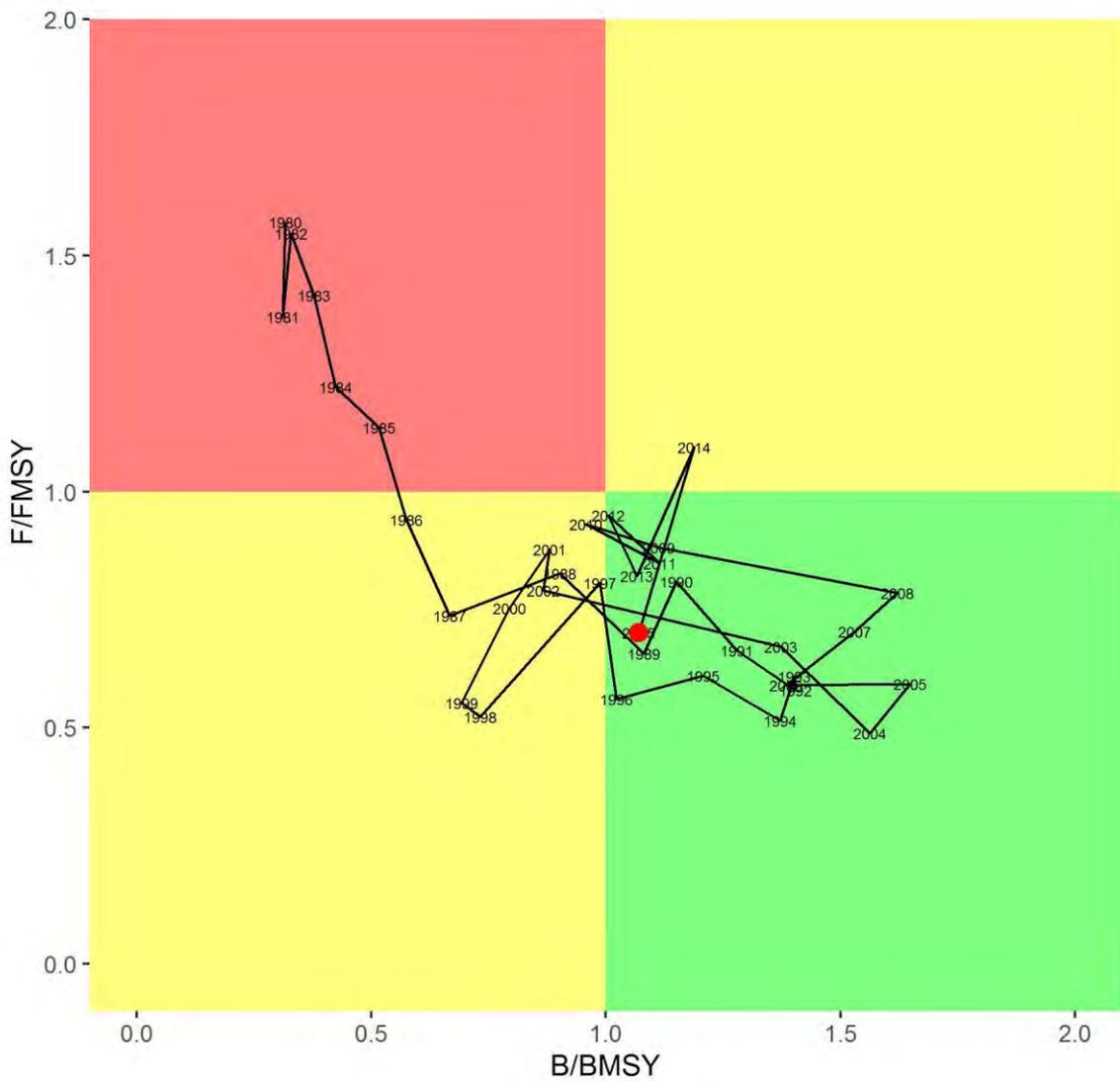


Figure CH7.17. Kobe diagram of scenario 2 shows the estimated trajectories of relative exploitable biomass (B/B_{MSY}) and relative fishing mortality (F/F_{MSY}) of Pacific saury during 1980 to 2015. The red dot represents the stock status in 2015.

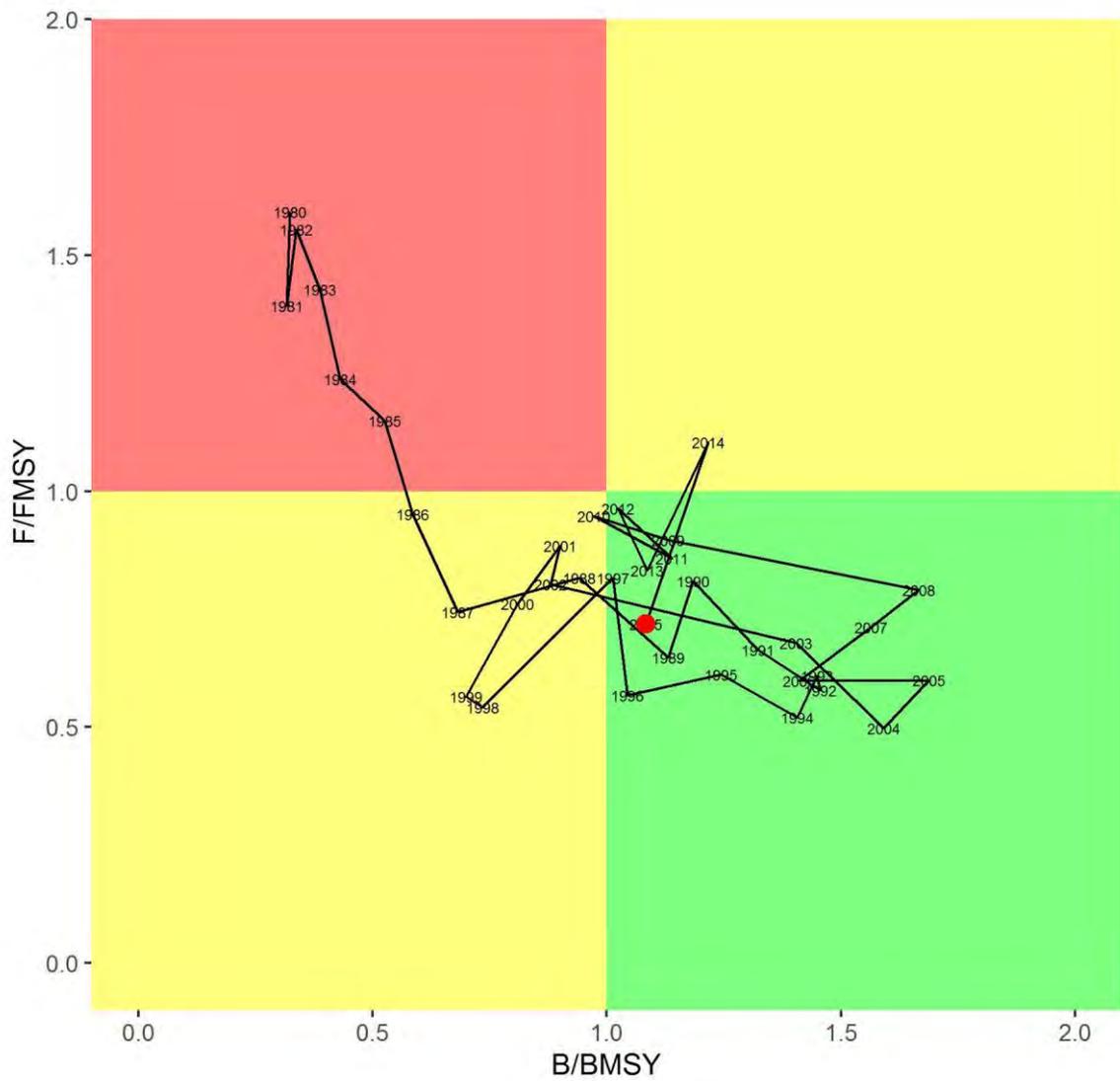


Figure CH7.18. Kobe diagram of scenario 3 shows the estimated trajectories of relative exploitable biomass (B/B_{MSY}) and relative fishing mortality (F/F_{MSY}) of Pacific saury during 1980 to 2015. The red dot represents the stock status in 2015.

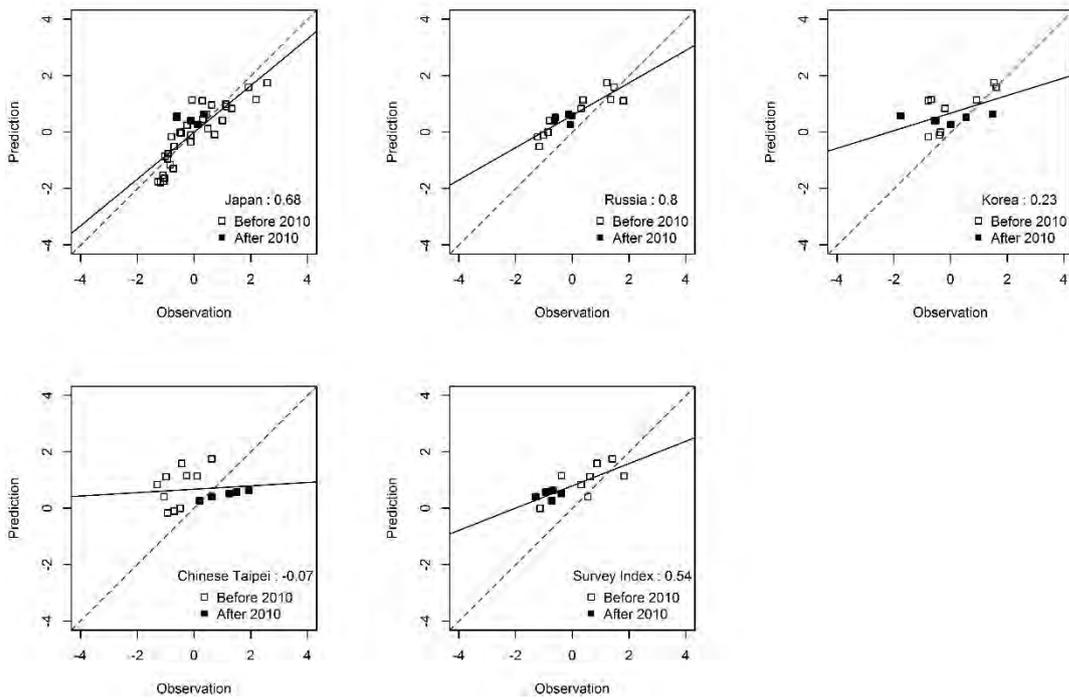


Figure CH7.19. Predicted relative biomass and observed CPUE indices and biomass index from different members under scenario 1. The values in the plots are adjusted R^2 from a linear regression model. The solid lines represent linear regression fit and the dash lines represent 1:1 line.

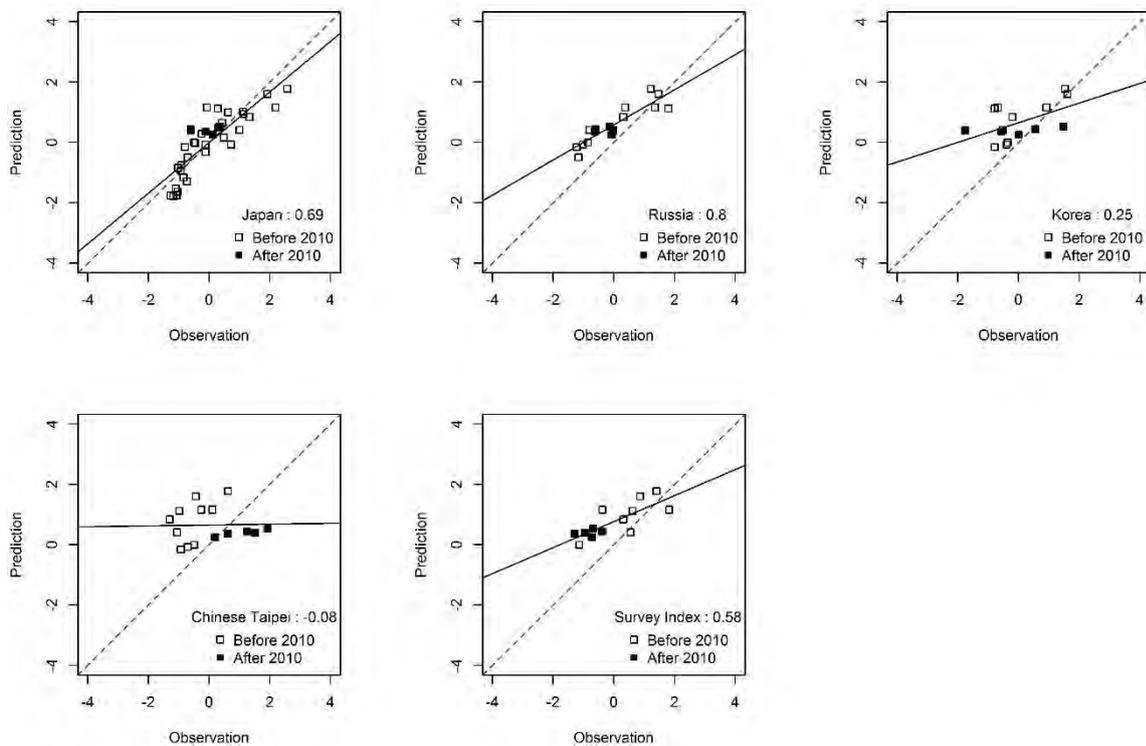


Figure CH7.20. Predicted relative biomass and observed CPUE indices and biomass index from different members under scenario 2. The values in the plots are adjusted R^2 from a linear regression model. The solid lines represent linear regression fit and the dash lines represent 1:1 line.

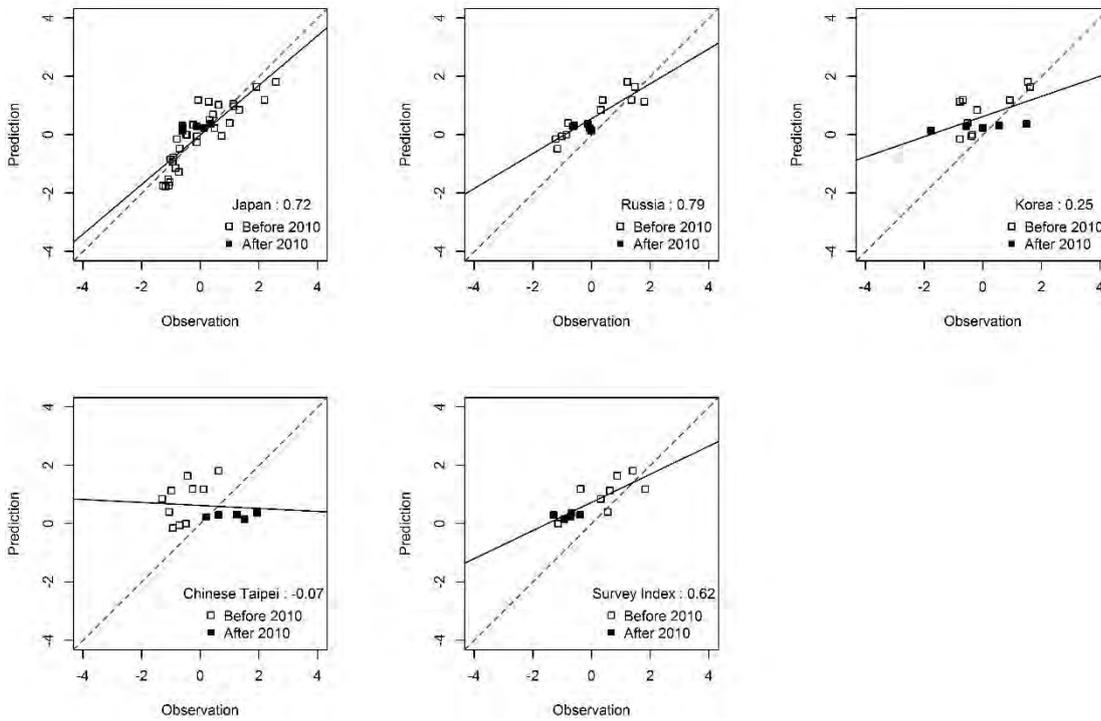


Figure CH7.21. Predicted relative biomass and observed CPUE indices and biomass index from different members under scenario 3. The values in the plots are adjusted R^2 from a linear regression model. The solid lines represent linear regression fit and the dash lines represent 1:1 line.

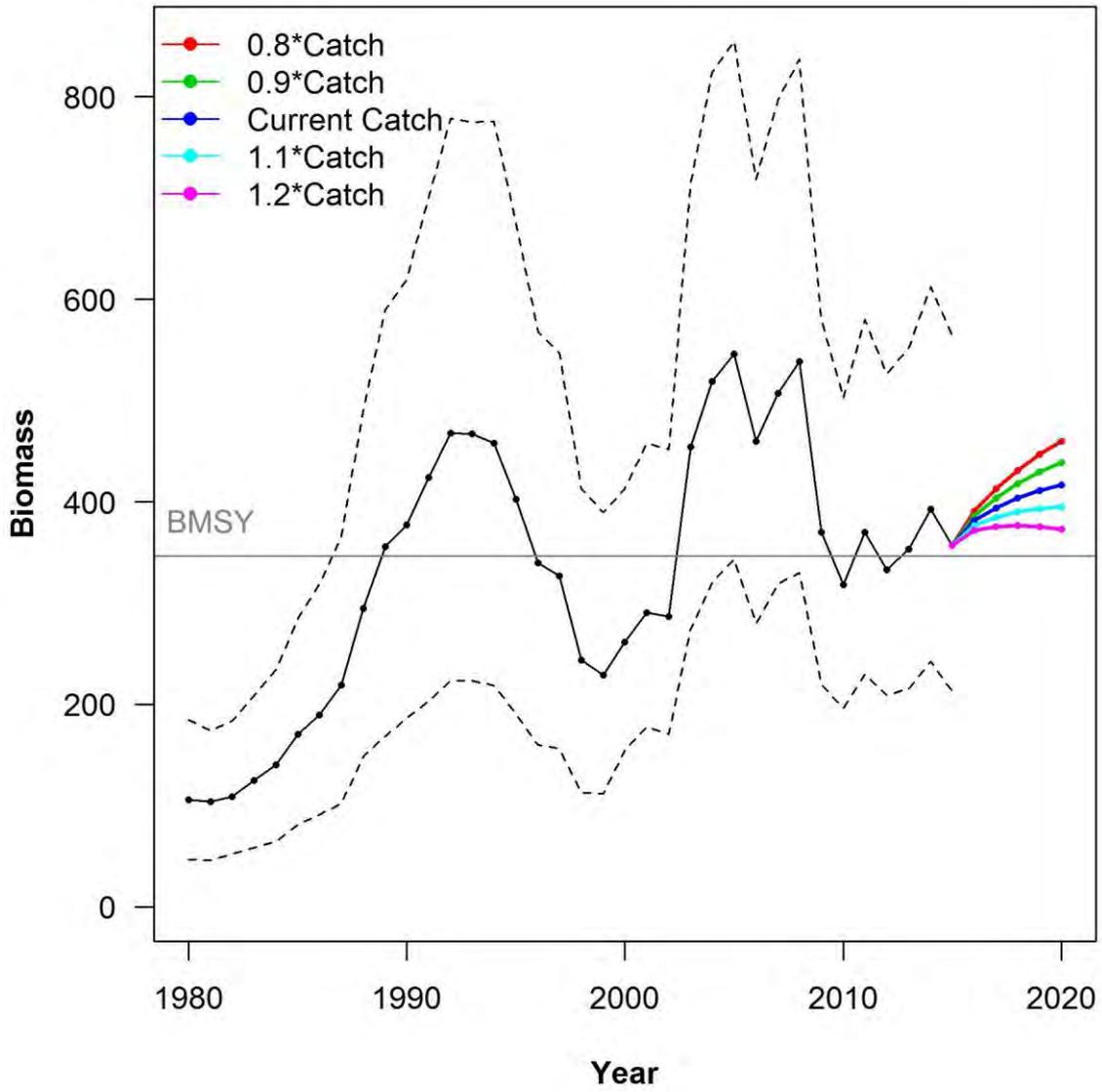


Figure CH7.22. Stochastic projection of expected exploitable biomass ($\times 10,000$ mt) of Pacific saury during 2016 - 2020 under scenario 1 with alternative catches.

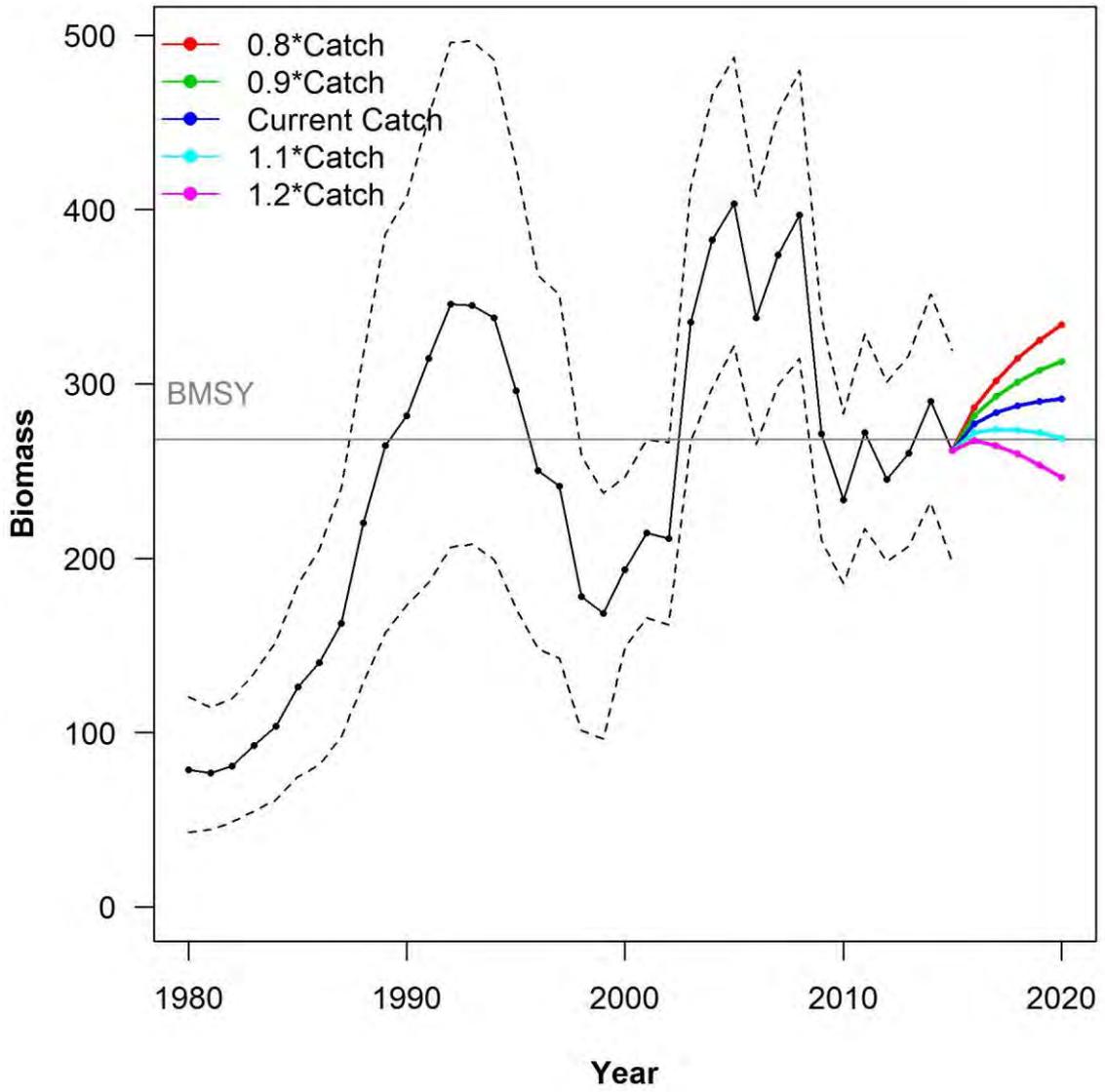


Figure CH7.23. Stochastic projection of expected exploitable biomass ($\times 10000$ mt) of Pacific saury during 2016 - 2020 under scenario 2 with alternative catches.

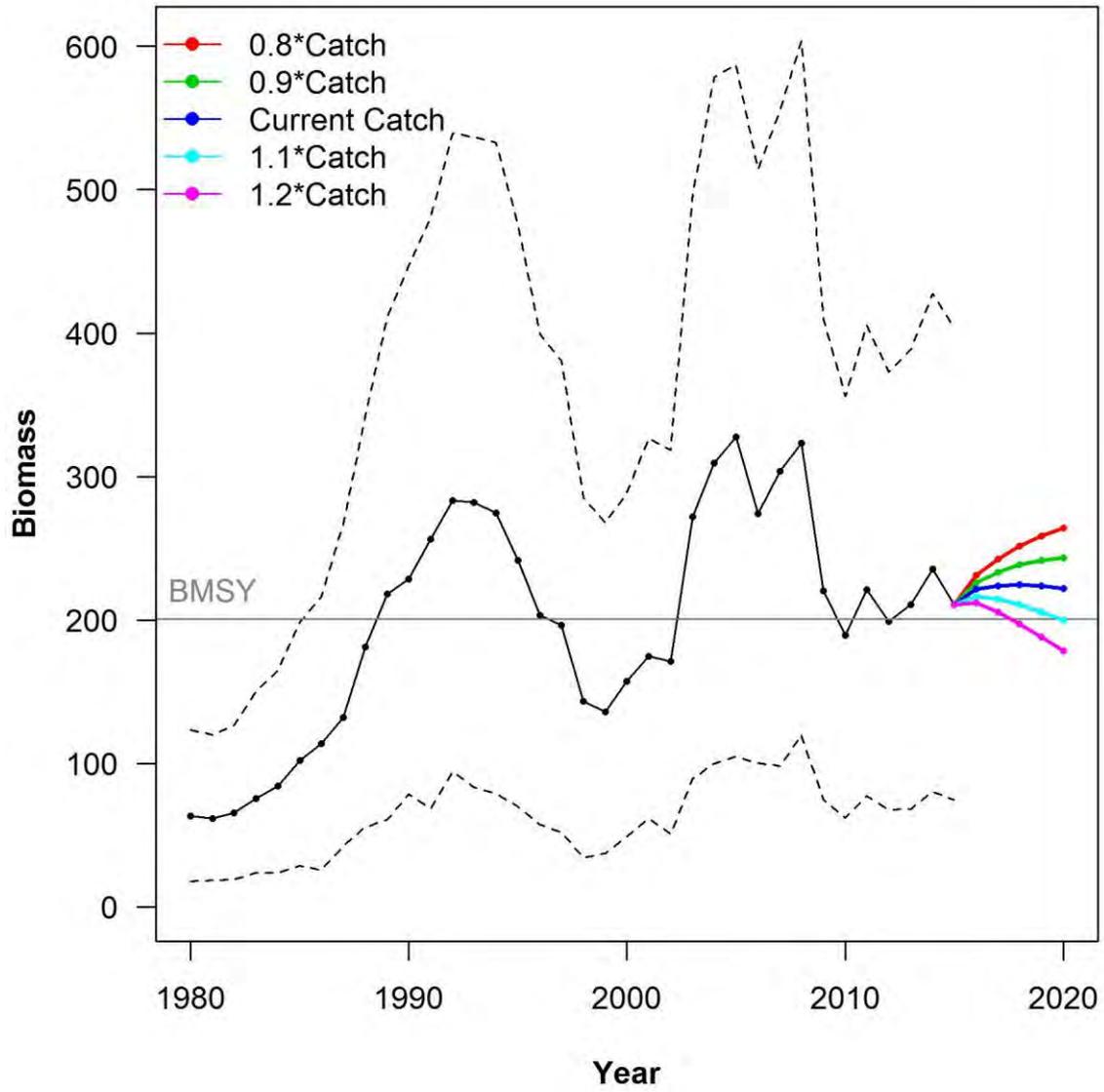


Figure CH7.24. Stochastic projection of expected exploitable biomass ($\times 10000$ mt) of Pacific saury during 2016 - 2020 under scenario 3 with alternative catch

2) Member stock assessment report: JAPAN

Stock assessment was conducted for the North Pacific saury (Kitakado et al. 2017, NPFC-2017-TWG PSAA01-WP07). Models employed in the analysis are the state-space biomass dynamic models. The models account for process and model errors in addition to observation errors in the biomass indices such as standardized CPUE series for commercial fisheries by Chinese Taipei, Japan, Korea and Russia, as well as fishery-independent survey by Japan. Given that the biomass indices observed are not synchronized possibly because of difference in spatial use of fishing and survey grounds, several options were considered for selection of the indices in the original analyses and developed a wide range of models/scenarios for assessing sensitivity to key assumptions such as types of production function, hyperstability/hyperdepletion, and priors.

In discussion of the 2017 February meeting, TWG PSSA agreed on the dataset and specification of assessment for the Pacific saury stock assessment group. Here, results of analyses were shown to meet the agreement.

The population dynamics is modelled by the following equations:

$$B_t = \{B_{t-1} + B_{t-1}f(B_{t-1}) - C_{t-1}\} e^{u_t}, \quad u_t \sim N(0, \tau^2)$$

$$f(B_t) = r \left[1 - \left(\frac{B_t}{K} \right)^z \right]$$

where

- B_t : the biomass at the beginning of year t
- C_t : the total catch of year t
- u_t : the process error in year t
- $f(B)$: the production function (Pella-Tomlinson)
- r : the intrinsic rate of natural increase
- K : the carrying capacity
- z : the degree of compensation

The multiple biomass indices are modelled as follows:

$$I_{t,f} = q_f B_t \exp(v_{t,f})$$

$$v_{t,f} \sim N(0, \sigma_f^2)$$

where

$I_{t,f}$: the biomass index in year t for biomass index f

q_f : the catchability coefficient for biomass index f

$v_{t,f}$: the error term (sum of model and observation errors) in year t for biomass index f

σ_f^2 : the observation error in year t for biomass index f

Parameters in the models were estimated via Bayesian methods with a Markov chain Monte Carlo simulation. With respect to prior distribution, independent flat priors were used as non-informative priors as default (Figure JPN-1).

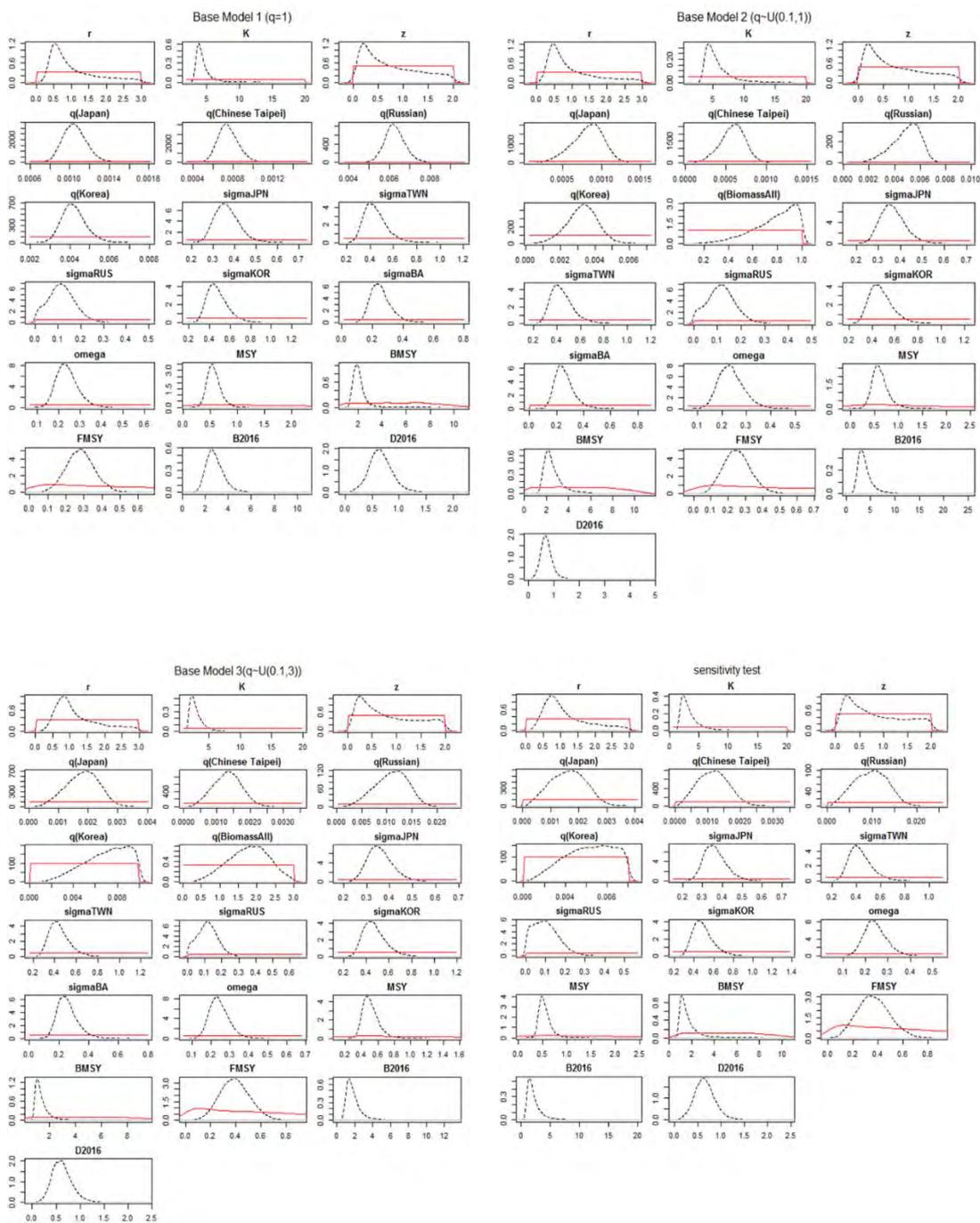


Figure JPN-1. Prior and posterior distributions for key parameters and management quantities under three base case scenarios (and sensitivity run).

(1) Assessment results for the base-case scenarios

Results for the three base scenarios were shown in Figure JPN-2, where estimated median trajectories (and 95% credible intervals) for population biomass and depletion level (biomass relative to the carrying capacity) under the three base case scenarios were presented. The results showed that the biomass level is currently above the level of MSY for any scenarios.

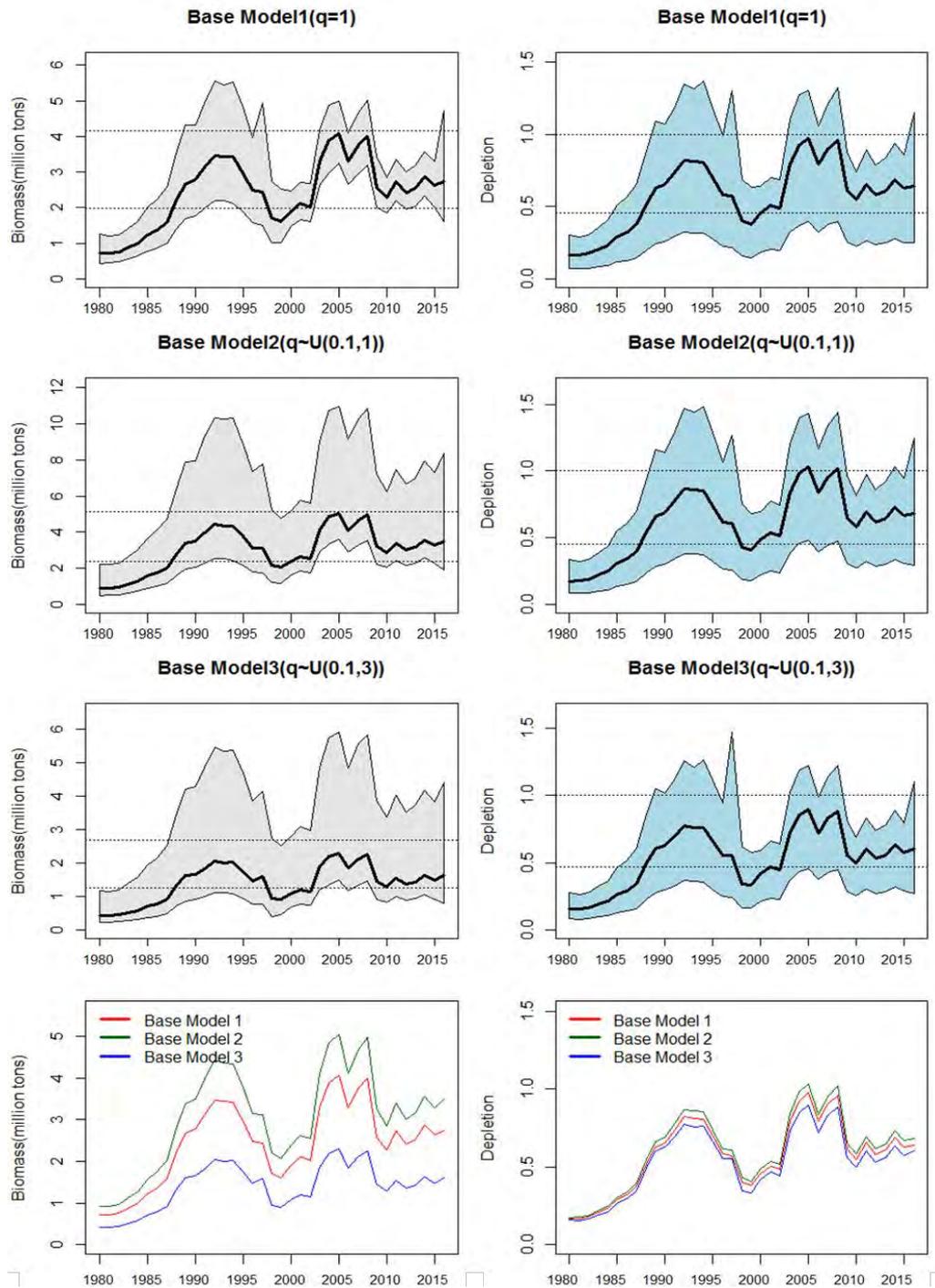


Figure JPN-2. Estimated median trajectories (and 95% credible intervals) for population biomass and depletion level (biomass relative to the carrying capacity) under the three base case scenarios. The two horizontal lines show the MSY level and carrying capacity.

(2) Diagnostics and caveats

The models were diagnosed with respect to shapes of posterior distributions (see Figure JPN-1), residual plots (see Figure JPN-3) and retrospective pattern (see Figure JPN-4). Standardized residual plots showed that the residuals are almost perfectly within the 95% range and the variance is homogeneous across years.

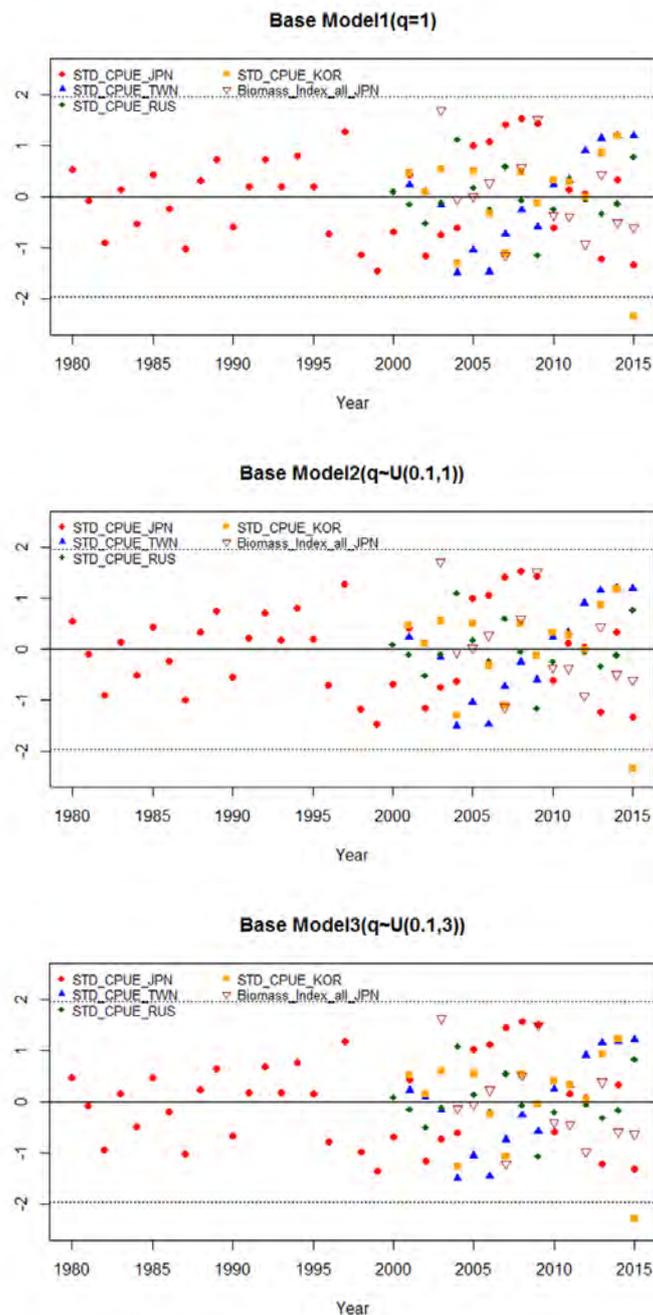


Figure JPN-3. Residual plots for CPUE and fishery-independent survey biomass index.

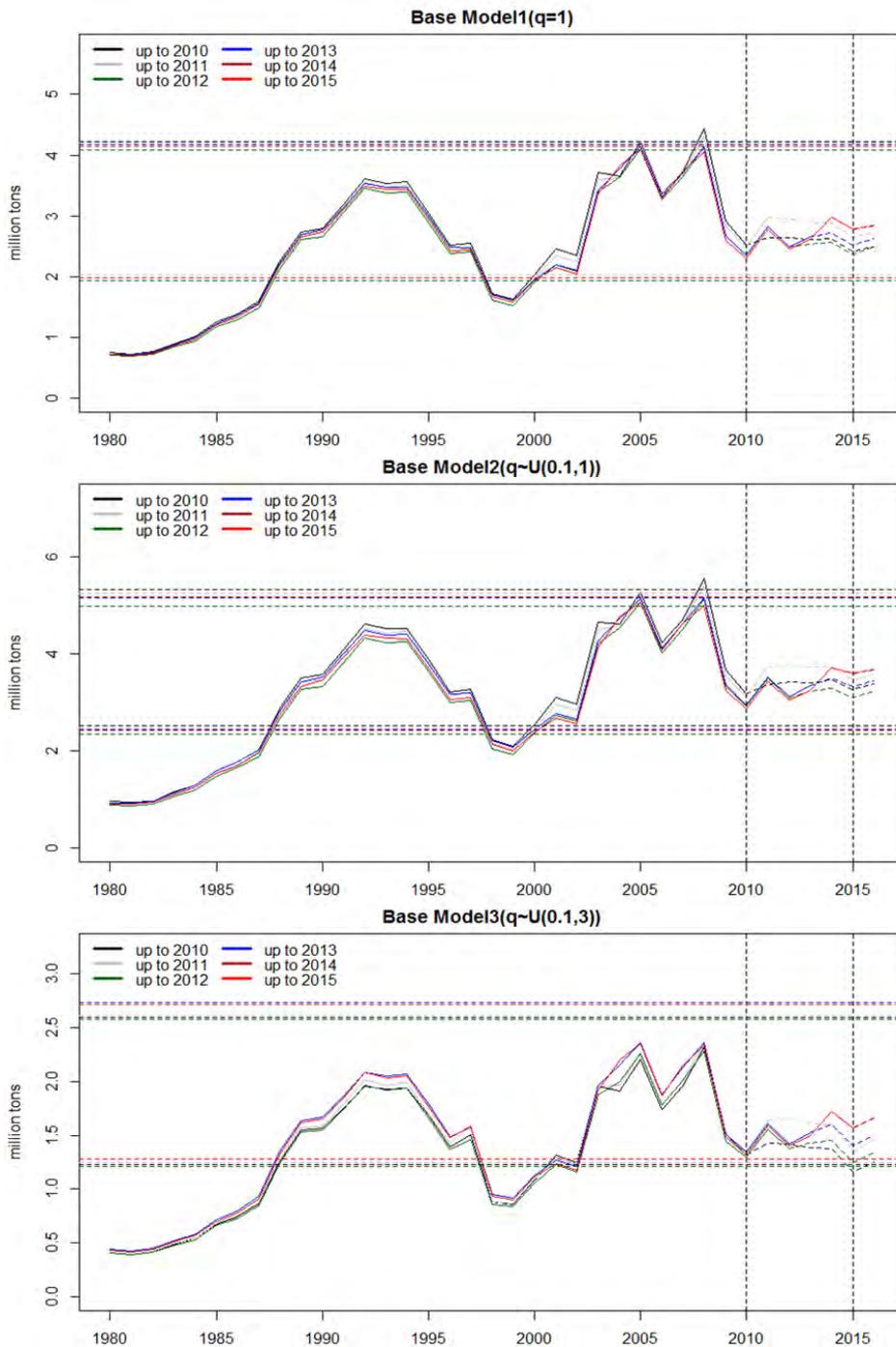


Figure JPN-4. Results of retrospective analysis. The solid lines are the median trajectories, and the horizontal lines are the median of carrying capacity and MSY level under different data period to be used. The horizontal lines show MSY level and carrying capacity and the vertical ones indicates the maximum range of retrospective period.

(3) Biological reference points

Table JPN-1 summarized the estimates of key parameters and management quantities for the base case scenarios. In addition, Table JPN-2 showed the mean, median and cv of yearly biomass for the base cases. Similar tables (Tables JPN-3 and -4) are shown for the sensitivity test, where no biomass information was used.

Table JPN-1. Summary of parameter estimates and management quantities under base cases.

| Base Case 1 ($q = 1$) | | | | | |
|-------------------------------|-------|--------|-------|-------|--------|
| Parameter | mean | median | CV | 2.5% | 97.5% |
| K | 4.666 | 4.143 | 0.411 | 3.156 | 10.121 |
| r | 1.022 | 0.765 | 0.654 | 0.309 | 2.733 |
| z | 0.740 | 0.590 | 0.736 | 0.090 | 1.902 |
| B1980/K | 0.173 | 0.167 | 0.334 | 0.074 | 0.305 |
| MSY | 0.564 | 0.549 | 0.233 | 0.348 | 0.863 |
| Fmsy | 0.281 | 0.279 | 0.282 | 0.130 | 0.443 |
| Bmsy | 2.135 | 1.976 | 0.370 | 1.375 | 4.339 |
| B1980 | 0.754 | 0.723 | 0.286 | 0.426 | 1.261 |
| B2015 | 2.642 | 2.635 | 0.124 | 2.02 | 3.299 |
| F1980 | 0.341 | 0.329 | 0.277 | 0.189 | 0.559 |
| F2015 | 0.139 | 0.137 | 0.128 | 0.109 | 0.179 |
| Coefficient for survey(q) | 1 | 1 | NA | 1 | 1 |
| B2016/K | 0.657 | 0.641 | 0.342 | 0.249 | 1.151 |
| B2016/Bmsy | 1.421 | 1.375 | 0.337 | 0.587 | 2.513 |
| F2015/Fmsy | 0.543 | 0.496 | 0.386 | 0.296 | 1.079 |

| Base Case 2 ($q \sim U(0,1)$) | | | | | |
|---------------------------------|-------|--------|-------|-------|-------|
| Parameter | mean | median | CV | 2.5% | 97.5% |
| K | 5.794 | 5.112 | 0.406 | 3.455 | 12.71 |
| r | 0.965 | 0.704 | 0.706 | 0.243 | 2.744 |
| z | 0.729 | 0.569 | 0.755 | 0.079 | 1.897 |
| B1980/K | 0.185 | 0.175 | 0.368 | 0.085 | 0.335 |
| MSY | 0.622 | 0.595 | 0.306 | 0.330 | 1.081 |
| Fmsy | 0.251 | 0.248 | 0.318 | 0.107 | 0.420 |
| Bmsy | 2.655 | 2.371 | 0.394 | 1.521 | 5.597 |
| B1980 | 1.027 | 0.918 | 0.476 | 0.490 | 2.240 |
| B2015 | 3.649 | 3.285 | 0.375 | 2.269 | 7.331 |
| F1980 | 0.269 | 0.259 | 0.358 | 0.106 | 0.486 |
| F2015 | 0.108 | 0.110 | 0.257 | 0.049 | 0.159 |
| q | 0.779 | 0.815 | 0.220 | 0.374 | 0.993 |
| B2016/K | 0.702 | 0.680 | 0.350 | 0.295 | 1.244 |
| B2016/Bmsy | 1.529 | 1.463 | 0.364 | 0.669 | 2.744 |
| F2015/Fmsy | 0.522 | 0.433 | 7.425 | 0.205 | 0.989 |

Table JPN-1 (continued).

Base Case 3 ($q \sim U(0.1,3)$)

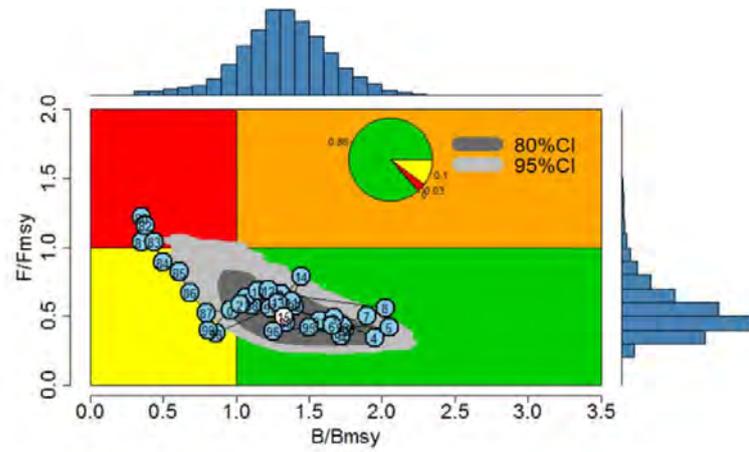
| Parameter | mean | median | CV | 2.5% | 97.5% |
|------------|-------|--------|-------|-------|-------|
| K | 3.107 | 2.678 | 0.499 | 1.677 | 7.244 |
| r | 1.212 | 0.993 | 0.536 | 0.409 | 2.797 |
| z | 0.827 | 0.676 | 0.689 | 0.122 | 1.940 |
| B1980/K | 0.164 | 0.158 | 0.297 | 0.084 | 0.275 |
| MSY | 0.514 | 0.497 | 0.209 | 0.357 | 0.763 |
| Fmsy | 0.394 | 0.390 | 0.301 | 0.174 | 0.639 |
| Bmsy | 1.443 | 1.255 | 0.458 | 0.829 | 3.193 |
| B1980 | 0.493 | 0.429 | 0.514 | 0.235 | 1.175 |
| B2015 | 1.698 | 1.479 | 0.468 | 0.912 | 3.808 |
| F1980 | 0.571 | 0.555 | 0.368 | 0.203 | 1.015 |
| F2015 | 0.244 | 0.244 | 0.320 | 0.095 | 0.396 |
| q | 1.774 | 1.802 | 0.302 | 0.694 | 2.754 |
| B2016/K | 0.623 | 0.604 | 0.339 | 0.267 | 1.101 |
| B2016/Bmsy | 1.317 | 1.266 | 0.323 | 0.613 | 2.288 |
| F2015/Fmsy | 0.640 | 0.610 | 0.311 | 0.339 | 1.116 |

Table JPN-2. Estimated biomass (million tons) with associated CVs under the three base case scenarios.

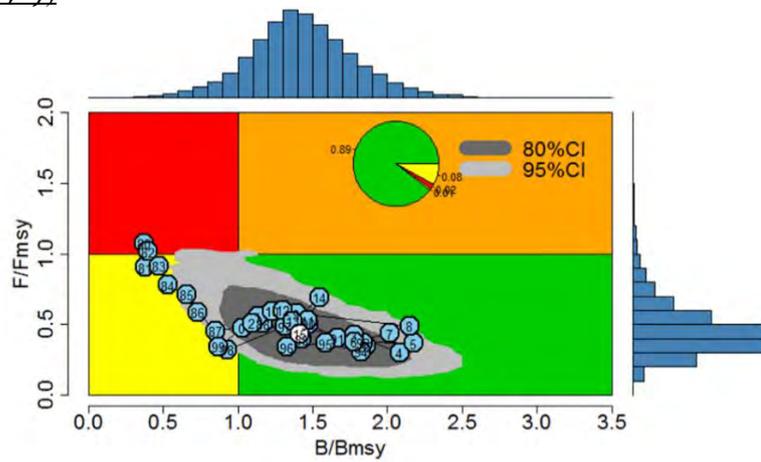
| Year | Base case 1 | | | Base case 2 (q~U(0.1,1)) | | | Base case 3 (q~U(0.1,3)) | | |
|------|-------------|--------|-------|--------------------------|--------|-------|--------------------------|--------|-------|
| | mean | median | cv | mean | median | cv | mean | median | cv |
| 1980 | 0.754 | 0.723 | 0.286 | 1.027 | 0.918 | 0.476 | 0.493 | 0.429 | 0.514 |
| 1981 | 0.745 | 0.717 | 0.258 | 1.023 | 0.919 | 0.458 | 0.48 | 0.414 | 0.514 |
| 1982 | 0.786 | 0.761 | 0.246 | 1.076 | 0.965 | 0.447 | 0.512 | 0.443 | 0.503 |
| 1983 | 0.914 | 0.887 | 0.243 | 1.258 | 1.131 | 0.445 | 0.59 | 0.51 | 0.519 |
| 1984 | 1.032 | 0.998 | 0.246 | 1.418 | 1.271 | 0.445 | 0.66 | 0.571 | 0.523 |
| 1985 | 1.27 | 1.226 | 0.247 | 1.745 | 1.568 | 0.443 | 0.816 | 0.707 | 0.519 |
| 1986 | 1.413 | 1.368 | 0.248 | 1.945 | 1.748 | 0.437 | 0.908 | 0.782 | 0.523 |
| 1987 | 1.642 | 1.59 | 0.249 | 2.243 | 2.014 | 0.428 | 1.059 | 0.917 | 0.509 |
| 1988 | 2.261 | 2.198 | 0.24 | 3.069 | 2.769 | 0.417 | 1.502 | 1.32 | 0.484 |
| 1989 | 2.749 | 2.665 | 0.247 | 3.746 | 3.369 | 0.428 | 1.829 | 1.612 | 0.489 |
| 1990 | 2.846 | 2.779 | 0.23 | 3.869 | 3.496 | 0.414 | 1.888 | 1.664 | 0.484 |
| 1991 | 3.214 | 3.13 | 0.234 | 4.399 | 3.96 | 0.425 | 2.102 | 1.828 | 0.501 |
| 1992 | 3.575 | 3.467 | 0.239 | 4.926 | 4.431 | 0.438 | 2.351 | 2.053 | 0.499 |
| 1993 | 3.538 | 3.437 | 0.239 | 4.856 | 4.366 | 0.436 | 2.299 | 1.997 | 0.502 |
| 1994 | 3.528 | 3.43 | 0.248 | 4.843 | 4.348 | 0.437 | 2.309 | 2.014 | 0.503 |
| 1995 | 3.056 | 2.962 | 0.246 | 4.186 | 3.761 | 0.436 | 2.003 | 1.75 | 0.5 |
| 1996 | 2.556 | 2.482 | 0.242 | 3.495 | 3.147 | 0.431 | 1.679 | 1.468 | 0.496 |
| 1997 | 2.592 | 2.444 | 0.317 | 3.518 | 3.118 | 0.458 | 1.843 | 1.587 | 0.509 |
| 1998 | 1.76 | 1.713 | 0.251 | 2.452 | 2.198 | 0.447 | 1.087 | 0.939 | 0.569 |
| 1999 | 1.652 | 1.612 | 0.234 | 2.287 | 2.066 | 0.432 | 1.042 | 0.904 | 0.528 |
| 2000 | 1.922 | 1.909 | 0.131 | 2.644 | 2.381 | 0.376 | 1.242 | 1.081 | 0.46 |
| 2001 | 2.127 | 2.105 | 0.123 | 2.926 | 2.625 | 0.378 | 1.377 | 1.197 | 0.455 |
| 2002 | 2.052 | 2.021 | 0.135 | 2.825 | 2.54 | 0.383 | 1.323 | 1.146 | 0.465 |
| 2003 | 3.332 | 3.31 | 0.116 | 4.582 | 4.116 | 0.372 | 2.149 | 1.874 | 0.453 |
| 2004 | 3.898 | 3.883 | 0.127 | 5.378 | 4.851 | 0.376 | 2.52 | 2.193 | 0.464 |
| 2005 | 4.074 | 4.065 | 0.108 | 5.605 | 5.041 | 0.37 | 2.634 | 2.292 | 0.451 |
| 2006 | 3.315 | 3.289 | 0.112 | 4.573 | 4.105 | 0.373 | 2.132 | 1.847 | 0.461 |
| 2007 | 3.776 | 3.763 | 0.114 | 5.197 | 4.673 | 0.371 | 2.442 | 2.122 | 0.457 |
| 2008 | 4.019 | 3.993 | 0.113 | 5.532 | 4.978 | 0.371 | 2.598 | 2.262 | 0.453 |
| 2009 | 2.618 | 2.582 | 0.14 | 3.614 | 3.255 | 0.388 | 1.676 | 1.453 | 0.475 |
| 2010 | 2.293 | 2.274 | 0.112 | 3.166 | 2.845 | 0.375 | 1.475 | 1.28 | 0.461 |
| 2011 | 2.742 | 2.731 | 0.108 | 3.782 | 3.397 | 0.367 | 1.772 | 1.538 | 0.456 |
| 2012 | 2.427 | 2.41 | 0.109 | 3.345 | 3.008 | 0.37 | 1.566 | 1.362 | 0.455 |
| 2013 | 2.556 | 2.534 | 0.114 | 3.528 | 3.158 | 0.375 | 1.648 | 1.432 | 0.456 |
| 2014 | 2.885 | 2.861 | 0.109 | 3.972 | 3.566 | 0.371 | 1.872 | 1.631 | 0.454 |
| 2015 | 2.642 | 2.635 | 0.124 | 3.649 | 3.285 | 0.375 | 1.698 | 1.479 | 0.468 |
| 2016 | 2.842 | 2.732 | 0.283 | 3.891 | 3.499 | 0.45 | 1.859 | 1.619 | 0.523 |

(4) Stock status (Kobe plots included here)

Base case 1 ($q = 1$)



Base case 2 ($q \sim U(0.1,1)$)



Base case 3 ($q \sim U(0.1,3)$)

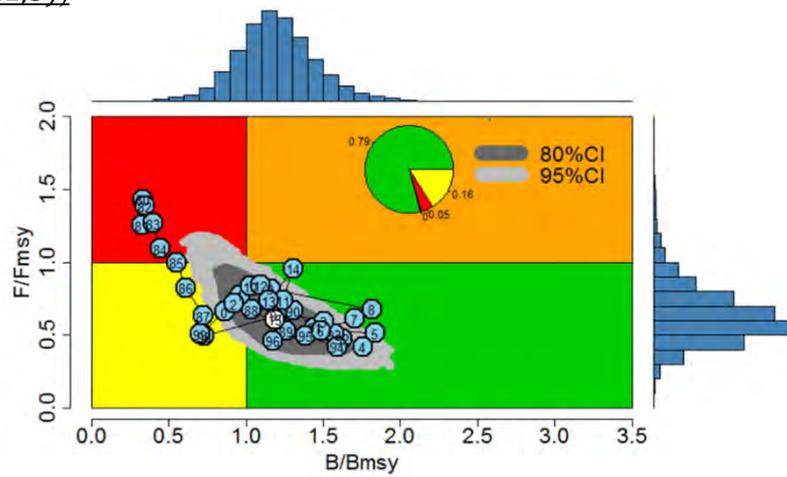


Figure JPN-5. Kobe plots under the base case scenarios.

(5) Sensitivity analysis (without use of fishery-independent biomass estimates)

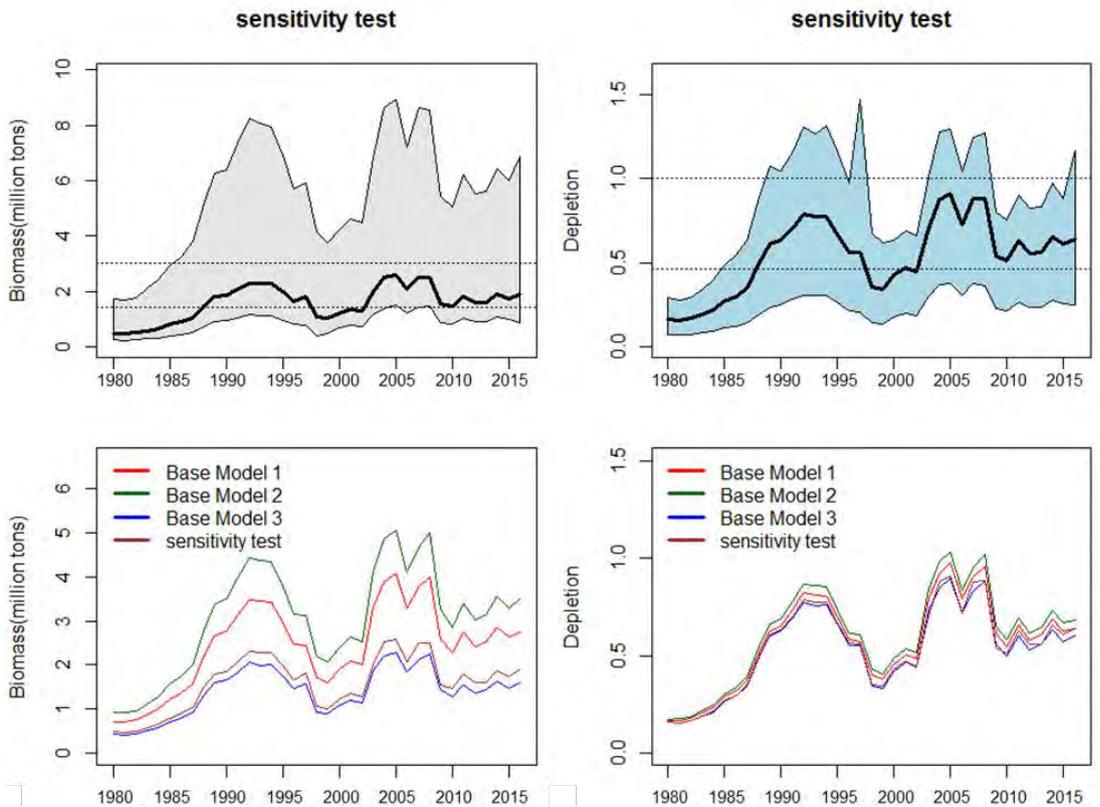


Figure JPN-6. Estimated trajectories for population biomass and depletion level for the sensitivity test, where only CPUE indices were used, and comparison with those under the three base case scenarios.

Table JPN-3. Parameter estimates and management quantities under the sensitivity test.

| | mean | median | CV | 2.50% | 97.50% |
|------------|-------|--------|-------|-------|--------|
| K | 3.757 | 3.033 | 0.631 | 1.716 | 11.14 |
| r | 1.143 | 0.939 | 0.566 | 0.331 | 2.76 |
| z | 0.823 | 0.673 | 0.696 | 0.105 | 1.941 |
| B1980/K | 0.167 | 0.16 | 0.332 | 0.073 | 0.294 |
| MSY | 0.545 | 0.518 | 0.271 | 0.359 | 0.902 |
| FMSY | 0.365 | 0.359 | 0.344 | 0.137 | 0.627 |
| BMSY | 1.736 | 1.413 | 0.59 | 0.846 | 4.879 |
| B1980 | 0.603 | 0.484 | 0.69 | 0.242 | 1.743 |
| B2015 | 2.171 | 1.744 | 0.653 | 0.978 | 6.009 |
| F1980 | 0.51 | 0.492 | 0.434 | 0.137 | 0.985 |
| F2015 | 0.208 | 0.207 | 0.393 | 0.06 | 0.369 |
| q | NA | NA | NA | NA | NA |
| B2016/K | 0.654 | 0.637 | 0.35 | 0.249 | 1.164 |
| B2016/Bmsy | 1.384 | 1.34 | 0.341 | 0.58 | 2.481 |
| F2015/Fmsy | 0.59 | 0.562 | 0.363 | 0.253 | 1.123 |

Table JPN-4. Estimated biomass with associated CVs under the sensitivity test.

| Year | Base case 1 | | | Base case 2 (q~U(0.1,1)) | | | Base case 3 (q~U(0.1,3)) | | | Sensitivity test | | |
|------|-------------|--------|-------|--------------------------|--------|-------|--------------------------|--------|-------|------------------|--------|-------|
| | mean | median | cv | mean | median | cv | mean | median | cv | mean | median | cv |
| 1980 | 0.754 | 0.723 | 0.286 | 1.027 | 0.918 | 0.476 | 0.493 | 0.429 | 0.514 | 0.603 | 0.484 | 0.69 |
| 1981 | 0.745 | 0.717 | 0.258 | 1.023 | 0.919 | 0.458 | 0.48 | 0.414 | 0.514 | 0.591 | 0.473 | 0.7 |
| 1982 | 0.786 | 0.761 | 0.246 | 1.076 | 0.965 | 0.447 | 0.512 | 0.443 | 0.503 | 0.627 | 0.5 | 0.694 |
| 1983 | 0.914 | 0.887 | 0.243 | 1.258 | 1.131 | 0.445 | 0.59 | 0.51 | 0.519 | 0.726 | 0.572 | 0.71 |
| 1984 | 1.032 | 0.998 | 0.246 | 1.418 | 1.271 | 0.445 | 0.66 | 0.571 | 0.523 | 0.816 | 0.647 | 0.721 |
| 1985 | 1.27 | 1.226 | 0.247 | 1.745 | 1.568 | 0.443 | 0.816 | 0.707 | 0.519 | 1.004 | 0.8 | 0.714 |
| 1986 | 1.413 | 1.368 | 0.248 | 1.945 | 1.748 | 0.437 | 0.908 | 0.782 | 0.523 | 1.119 | 0.889 | 0.726 |
| 1987 | 1.642 | 1.59 | 0.249 | 2.243 | 2.014 | 0.428 | 1.059 | 0.917 | 0.509 | 1.299 | 1.043 | 0.705 |
| 1988 | 2.261 | 2.198 | 0.24 | 3.069 | 2.769 | 0.417 | 1.502 | 1.32 | 0.484 | 1.817 | 1.485 | 0.653 |
| 1989 | 2.749 | 2.665 | 0.247 | 3.746 | 3.369 | 0.428 | 1.829 | 1.612 | 0.489 | 2.216 | 1.802 | 0.661 |
| 1990 | 2.846 | 2.779 | 0.23 | 3.869 | 3.496 | 0.414 | 1.888 | 1.664 | 0.484 | 2.288 | 1.859 | 0.661 |
| 1991 | 3.214 | 3.13 | 0.234 | 4.399 | 3.96 | 0.425 | 2.102 | 1.828 | 0.501 | 2.554 | 2.075 | 0.668 |
| 1992 | 3.575 | 3.467 | 0.239 | 4.926 | 4.431 | 0.438 | 2.351 | 2.053 | 0.499 | 2.869 | 2.307 | 0.679 |
| 1993 | 3.538 | 3.437 | 0.239 | 4.856 | 4.366 | 0.436 | 2.299 | 1.997 | 0.502 | 2.822 | 2.277 | 0.675 |
| 1994 | 3.528 | 3.43 | 0.248 | 4.843 | 4.348 | 0.437 | 2.309 | 2.014 | 0.503 | 2.819 | 2.282 | 0.683 |
| 1995 | 3.056 | 2.962 | 0.246 | 4.186 | 3.761 | 0.436 | 2.003 | 1.75 | 0.5 | 2.444 | 1.986 | 0.677 |
| 1996 | 2.556 | 2.482 | 0.242 | 3.495 | 3.147 | 0.431 | 1.679 | 1.468 | 0.496 | 2.051 | 1.66 | 0.678 |
| 1997 | 2.592 | 2.444 | 0.317 | 3.518 | 3.118 | 0.458 | 1.843 | 1.587 | 0.509 | 2.195 | 1.816 | 0.658 |
| 1998 | 1.76 | 1.713 | 0.251 | 2.452 | 2.198 | 0.447 | 1.087 | 0.939 | 0.569 | 1.364 | 1.077 | 0.771 |
| 1999 | 1.652 | 1.612 | 0.234 | 2.287 | 2.066 | 0.432 | 1.042 | 0.904 | 0.528 | 1.292 | 1.023 | 0.72 |
| 2000 | 1.922 | 1.909 | 0.131 | 2.644 | 2.381 | 0.376 | 1.242 | 1.081 | 0.46 | 1.526 | 1.228 | 0.651 |
| 2001 | 2.127 | 2.105 | 0.123 | 2.926 | 2.625 | 0.378 | 1.377 | 1.197 | 0.455 | 1.675 | 1.349 | 0.642 |
| 2002 | 2.052 | 2.021 | 0.135 | 2.825 | 2.54 | 0.383 | 1.323 | 1.146 | 0.465 | 1.592 | 1.275 | 0.653 |
| 2003 | 3.332 | 3.31 | 0.116 | 4.582 | 4.116 | 0.372 | 2.149 | 1.874 | 0.453 | 2.492 | 2.002 | 0.64 |
| 2004 | 3.898 | 3.883 | 0.127 | 5.378 | 4.851 | 0.376 | 2.52 | 2.193 | 0.464 | 3.124 | 2.516 | 0.655 |
| 2005 | 4.074 | 4.065 | 0.108 | 5.605 | 5.041 | 0.37 | 2.634 | 2.292 | 0.451 | 3.221 | 2.591 | 0.638 |
| 2006 | 3.315 | 3.289 | 0.112 | 4.573 | 4.105 | 0.373 | 2.132 | 1.847 | 0.461 | 2.588 | 2.069 | 0.65 |
| 2007 | 3.776 | 3.763 | 0.114 | 5.197 | 4.673 | 0.371 | 2.442 | 2.122 | 0.457 | 3.112 | 2.5 | 0.643 |
| 2008 | 4.019 | 3.993 | 0.113 | 5.532 | 4.978 | 0.371 | 2.598 | 2.262 | 0.453 | 3.122 | 2.511 | 0.639 |
| 2009 | 2.618 | 2.582 | 0.14 | 3.614 | 3.255 | 0.388 | 1.676 | 1.453 | 0.475 | 1.936 | 1.547 | 0.658 |
| 2010 | 2.293 | 2.274 | 0.112 | 3.166 | 2.845 | 0.375 | 1.475 | 1.28 | 0.461 | 1.824 | 1.463 | 0.65 |
| 2011 | 2.742 | 2.731 | 0.108 | 3.782 | 3.397 | 0.367 | 1.772 | 1.538 | 0.456 | 2.228 | 1.795 | 0.641 |
| 2012 | 2.427 | 2.41 | 0.109 | 3.345 | 3.008 | 0.37 | 1.566 | 1.362 | 0.455 | 1.986 | 1.594 | 0.644 |
| 2013 | 2.556 | 2.534 | 0.114 | 3.528 | 3.158 | 0.375 | 1.648 | 1.432 | 0.456 | 2.008 | 1.617 | 0.646 |
| 2014 | 2.885 | 2.861 | 0.109 | 3.972 | 3.566 | 0.371 | 1.872 | 1.631 | 0.454 | 2.337 | 1.885 | 0.635 |
| 2015 | 2.642 | 2.635 | 0.124 | 3.649 | 3.285 | 0.375 | 1.698 | 1.479 | 0.468 | 2.171 | 1.744 | 0.653 |
| 2016 | 2.842 | 2.732 | 0.283 | 3.891 | 3.499 | 0.45 | 1.859 | 1.619 | 0.523 | 2.351 | 1.9 | 0.684 |

(6) Projection

Future projection was conducted under the assumption of -20 to 20% increase/decrease from the average catch of most recent five years (2011-2015). The median trajectories are shown in Figure JPN-7. A more stochastic evaluation was given in Table JPN-5.

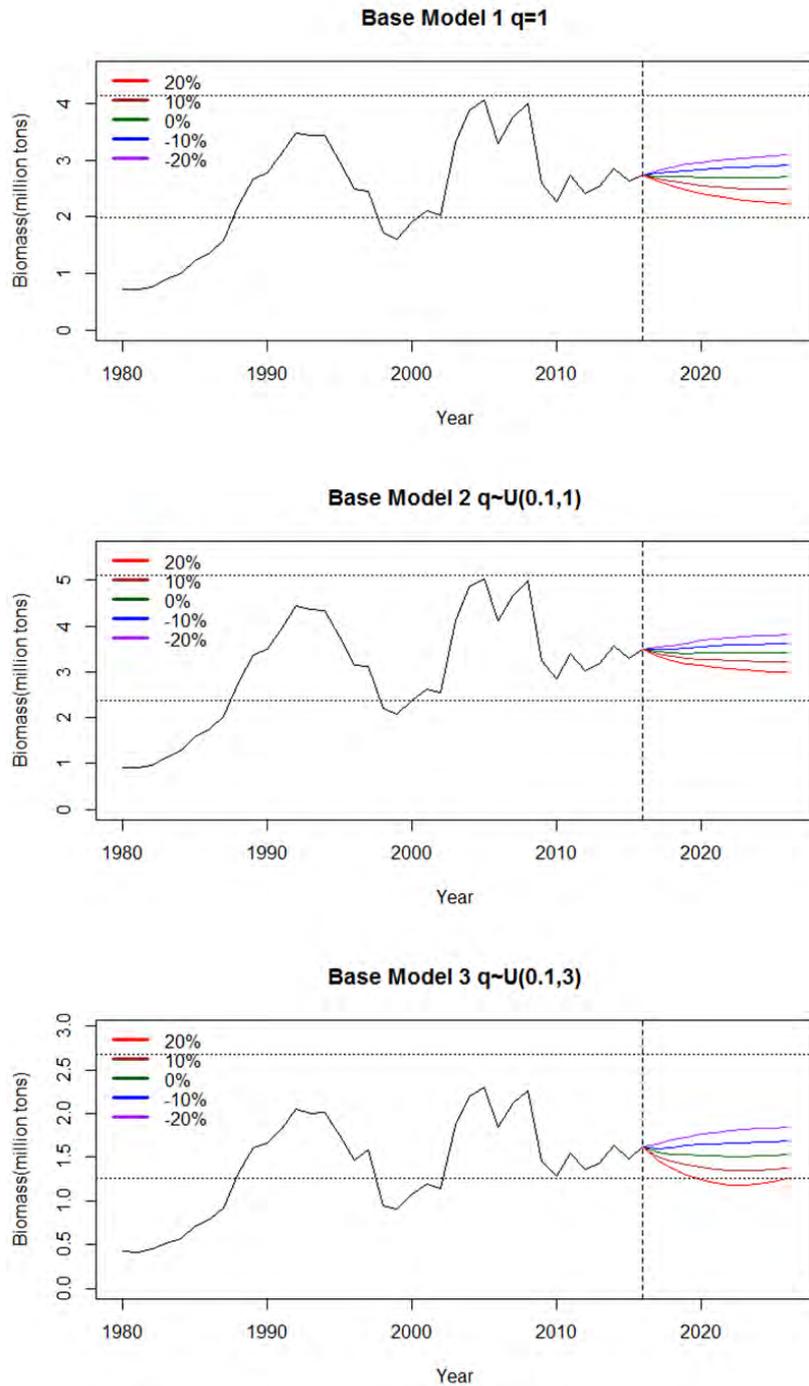


Figure JPN-7. Median trajectories under five different catch levels.

Table JPN-5. KOBE2 strategy matrix under the three base case scenarios.

Base case 1 ($q = 1$)

| Year | Catch fraction | Red | Orange | Yellow | Green | B<Bmsy | F>Fmsy |
|------|----------------|-------|--------|--------|-------|--------|--------|
| 2015 | | 3.0% | 0.4% | 10.2% | 86.5% | 13.1% | 3.4% |
| | 0.8 | 3.8% | 0.6% | 5.0% | 90.7% | 8.8% | 4.4% |
| | 0.9 | 6.5% | 1.4% | 4.4% | 87.7% | 10.9% | 7.9% |
| 2019 | 1 | 10.1% | 3.3% | 3.5% | 83.2% | 13.6% | 13.4% |
| | 1.1 | 14.3% | 6.9% | 2.5% | 76.3% | 16.8% | 21.2% |
| | 1.2 | 19.2% | 11.6% | 1.7% | 67.4% | 20.9% | 30.9% |

Base case 2 ($q \sim U(0.1,1)$)

| Year | Catch fraction | Red | Orange | Yellow | Green | B<Bmsy | F>Fmsy |
|------|----------------|-------|--------|--------|-------|--------|--------|
| 2015 | | 1.6% | 0.6% | 8.2% | 89.6% | 9.8% | 2.3% |
| | 0.8 | 2.6% | 0.8% | 3.7% | 93.0% | 6.2% | 3.4% |
| | 0.9 | 4.0% | 1.6% | 3.4% | 91.1% | 7.4% | 5.6% |
| 2019 | 1 | 6.1% | 3.3% | 2.8% | 87.9% | 8.9% | 9.4% |
| | 1.1 | 8.7% | 5.6% | 2.3% | 83.6% | 11.0% | 14.2% |
| | 1.2 | 11.5% | 9.3% | 1.8% | 77.4% | 13.3% | 20.9% |

Base case 3 ($q \sim U(0.1,3)$)

| Year | Catch fraction | Red | Orange | Yellow | Green | B<Bmsy | F>Fmsy |
|------|----------------|-------|--------|--------|-------|--------|--------|
| 2015 | | 4.5% | 0.2% | 16.0% | 79.3% | 20.5% | 4.7% |
| | 0.8 | 5.5% | 0.5% | 4.3% | 89.6% | 9.9% | 6.0% |
| | 0.9 | 11.3% | 1.6% | 3.5% | 83.5% | 14.8% | 12.9% |
| 2019 | 1 | 19.5% | 5.2% | 2.5% | 72.6% | 21.9% | 24.6% |
| | 1.1 | 29.1% | 10.5% | 1.4% | 58.5% | 30.5% | 39.5% |
| | 1.2 | 40.2% | 14.9% | 0.8% | 42.7% | 41.0% | 55.1% |

(7) Conclusion/Summary

Although the results are different between scenarios, they showed that the current median depletion level is above 60% of the carrying capacity and B-ratio and F-ratio are in the safe zone (green) with high probabilities. For considering management implications, population dynamics was projected for some scenarios with respect to the reduction, status quo, and increase from the current catch level. Continuation of the current catch level may not cause severe decline in the population size in the next decade, but a safer option is of course status quo level or reduction of catch to keep the population size above enough the MSY level. Given these results shown here, it is concluded that the current catch level is not harmful to the saury population although continued works/efforts for improving data and models would be required toward better stock assessment and development of management procedures based on the assessment.

3) Member stock assessment report: CHINESE TAIPEI

(1) Assessment results for the base-case scenarios

Description of Bayesian production model

Annual biomass dynamics:

$$B_t = B_{t-1} + rB_{t-1} \left(1 - \left(\frac{B_{t-1}}{K} \right)^M \right) - C_t$$

where B_{t-1} and C_{t-1} denote biomass and catch (landings), respectively, for year $t-1$. Carrying capacity, K , is the biomass of the population at equilibrium prior to commencement of the fishery; r is the intrinsic population growth rate; and M is the production shape parameter.

We assumed lognormal error structures and used a reparametrization ($P_t = B_t/K$) by expressing the annual biomass as a proportion of carrying capacity as in Millar and Meyer (1999). The state equations are rewritten as

$$P_t = \left(P_{t-1} + r_{t-1} \cdot P_{t-1} \left(1 - P_{t-1}^M \right) - \frac{C_{t-1}}{\nu} \right) \exp(u_t)$$

$$P_1 = \exp(u_1)$$

$$u_1 \sim N(\mu_{P_1}, \sigma_{P_1}^2)$$

$$u_t \sim N(0, \sigma^2) \quad t = 2, \dots, N$$

where t is year t , N is number of years, u_1 is a normal random variable with a mean of and variance to account accounting for the uncertainty of initial condition. u_t is also a normal random variable with a mean of zero and variance σ^2 to account accounting for stochastic process dynamics.

The observation equations are

$$I_{i,t} = q_i K P_t \exp(\varepsilon_{i,t})$$

$$\varepsilon_{i,t} \sim N(0, \tau_i^2) \quad i = 1 \text{ to } 3; t = 1, \dots, N$$

where $I_{i,t}$ is the relative abundance of index i at time t ; q_i is the catchability coefficient for index i , which describes the effectiveness of each unit of fishing effort; and $\varepsilon_{i,t}$ is a normal random variable with a mean of zero and variance to account accounting for the natural sampling variation of index i .

The Bayesian analysis requires prior probability distributions for each of the model parameters. These priors are summarized in Table CT1. It is common for fishery data to contain insufficient information to reliably estimate both the carrying capacity, K , and the intrinsic rate of increase, r . A solution to this is to incorporate less informative prior information with respect to one

of these parameters. In this study, we provided less informative prior with the mean value of r based on the demographic method of McAllister et al. (2001) and the estimated value of resilience from FishBase (Froese and Pauly, 2000). The prior distribution for r was a lognormal distribution with mean of and CV of 1 ($CV_r = (\exp(\sigma_r^2) - 1)^{1/2}$).

The prior chosen for K was uninformative, as little is known about the carrying capacity of WNPO saury population. We specified a vague prior for carrying capacity using a lognormal distribution with mean of $\log(150) - 0.5\sigma_K^2$ (1,000 mt) and CV of 1 to cover the reasonable range of predictions. This mean value was chosen to reflect the magnitude of exploitable biomass likely needed to support the observed fishery catches. The prior distribution for M was a gamma distribution with scale and shape parameters were equal with $\lambda = k = 2$. Therefore, the prior mean is equal to 1 and the CV is around 70%, which implied the production curve was centered on the symmetric Schaefer model as the default with adequate flexibility to estimate a non-symmetric production function if needed.

Unfortunately, since little is known about the catchability (q) on stick-held dip net gear, we were limited to use least-informative prior for q . The priors for the q were chosen to be a diffuse inverse-gamma distribution with scale parameter $\lambda = 0.01$ and shape parameter $k = 0.01$. Following Meyer and Millar (1999), we used inverse gamma prior for the process and observation error variances. The parameters were set to $\lambda = 4$ and $k = 0.1$ for the process error variance (σ^2), and $\lambda = 2$ and $k = 0.45$ for the observation variance (τ^2) priors. The initial state of the stock was described as a proportion of carrying capacity ($P1 = B_{1950}/K$). We specified an uninformative prior for $P1$ using a lognormal distribution with mean of 0.7 with a CV of 1 based on an assumption that the Pacific saury population was lightly exploited in 1980.

Based on the recommended base-case scenarios, three models differing in catchability of the Japanese survey biomass index were explored.

- i) Model 1: Including four sets of CPUEs and Japan survey data with survey catchability (q) prior defined from 0 to 1;
- ii) Model 2: Including four sets of CPUEs and Japan survey data with survey catchability (q) prior being fixed at 1;
- iii) Model 3: Including four sets of CPUEs and Japan survey data with survey catchability (q) prior being defined from 0 to larger than 1.

Trends in biomass (10,000 metric ton) and ratio of biomass to carrying capacity (K) (right panels) of the Western North Pacific saury based on the three base-case models and the Bayesian model average were shown in Figure CT1 and Table CT5.

(2) Diagnostics and caveats

The autocorrelation function plot indicated a thinning interval of 25 which was large enough to address potential autocorrelation in the MCMC runs. The visual inspection of trace plots of the major parameters showed the good mixing of the three chains (i.e., moving around the parameter space), also indicative of convergence of the MCMC chains. The Gelman and Rubin statistic for all parameters, including all variance terms, equaled 1, which indicated convergence of the Markov chains. Similarly, the Heidelberger and Welch test could not reject the hypothesis that the MCMC chains were stationary at the 95% confidence level for any of the parameters. Overall, these diagnostics indicated that the posterior distribution of the model parameters was adequately sampled with the MCMC simulations.

Plots of posterior densities of the parameters r , K , M , σ^2 , τ^2 , P_1 , survey catchability, MSY , B_{MSY} , and F_{MSY} were shown in Figures CT2, CT3 and CT4, together with their respective prior densities. The predicted CPUE indices for each model were compared to the observed CPUE to determine model fit. Plots of residual diagnostics by fishery and survey indices for the three base-case models were shown in Figures CT5, CT6, and CT7.

Retrospective analyses show that the time-series of exploitable biomass estimate with the removal of most 8 years of data in successive model runs match very well with the full time series assessment (Figure CT8).

(3) Biological reference points

Summaries of posterior quantiles of parameters and quantities of management interest of the three base-case models were provided in Tables CT2, CT3, and CT4.

(4) Stock status

Kobe phase plot for the three base-case models of the Western North Pacific saury from 1980 to 2015 with uncertainty for 2015 and the percentage of circles within each color quadrant were shown in Figures CT9 and CT10.

(5) Sensitivity analysis (for sensitivity analysis)

Sensitivity model (without the Japanese biomass survey index)

Plot of posterior densities of the parameters r , K , M , σ^2 , τ^2 , P_1 , survey catchability, MSY , B_{MSY} , and F_{MSY} was shown in Figure CT11, together with their respective prior densities. Plot of residual diagnostics by fishery indices was shown in Figure CT12. Summaries of posterior quantiles of parameters and quantities of management interest of the sensitivity model were provided in Table CT6. Trends in biomass (10,000 metric ton) and ratio of biomass to carrying capacity (K) were shown in Figure CT13 and Table CT5. Kobe phase plot of the sensitivity model was shown in

Figure CT10.

Analysis of the sensitivity to the mean value of the lognormal r prior distribution

The base-case model 2 was run with the mean values for the r prior changed by $\pm 25\%$ of their input value, e.g., $0.75 \times \text{value}$ and $1.25 \times \text{value}$. Trends in biomass (10,000 metric ton) for testing the sensitivity of the mean values of the lognormal r prior distribution in model 2 was shown in Figure 14.

(6) Projection

Stochastic projections of expected exploitable biomass (10,000 metric tons) of the Western North Pacific saury during 2016- 2019 under five fractions of average catch from 2011 to 2015 for the three base-case models were shown in Figure CT15.

(7) Conclusion/Summary

Exploitable biomass of Western North Pacific saury was relative stable and above BMSY since 2010 based on the three base-case scenarios. The Kobe plots showed that the current stock status does not appear to have been overfished or to have experienced overfishing and likely within the green quadrant ($\text{Prob}(B_{2015} > BMSY \text{ and } F_{2015} < FMSY)$ ranged from 57% to 94%). The risk analyses of status quo catch based on stock projections during 2016-2019 showed that there would be less chance of the stock being overfished (2% - 11%) or experiencing overfishing (5% - 14%) in 2019. Annual catches would need to increase to 1.2-fold of the status quo catch level to have a small or moderate risk of overfishing (17% - 48%). The stock assessment concludes that Western North Pacific saury is healthy and is sufficient to sustain recent exploitation levels. However, we recognized the catchability of Japanese biomass survey as one potential sources of uncertainty in stock assessment results and estimates of management quantities.

Table CT1. Summary of specified priors for Bayesian state-space model.

| Parameter | Description | Prior |
|------------|--|--|
| r | Intrinsic growth rate (yr^{-1}) | $r \sim \log N\left(\log(1.4) - \frac{\sigma_r^2}{2}, \sigma_r^2\right); CV_r = 1$ |
| K | Carrying capacity (10,000 mt) | $K \sim \log N\left(\log(150) - \frac{\sigma_K^2}{2}, \sigma_K^2\right); CV_K = 1$ |
| M | Production shape | $M \sim \text{Gamma}(2, 2)$ |
| q | Catchability | $1/q \sim \text{Gamma}(0.01, 0.01)$ |
| τ^2 | Observation error variance | $1/\tau^2 \sim \text{Gamma}(2, 0.45)$ |
| P_1 | Initial condition (B_1/K) | $P_1 \sim \log N\left(\log(0.7) - \frac{\sigma_{P_1}^2}{2}, \sigma_{P_1}^2\right); CV_{P_1} = 1$ |
| σ^2 | Process error variance | $1/\sigma^2 \sim \text{Gamma}(4, 0.1)$ |

$$CV_\theta = \left(\exp(\sigma_\theta^2) - 1\right)^{1/2}$$

Table CT2. Summary of posterior quantities of parameters derived from the base-case model 1 for the Pacific saury in the Western North Pacific Ocean.

| Parameter | Mean | Median | CV | 2.50% | 97.50% |
|--------------------|-------|--------|------|-------|--------|
| K | 462.9 | 444 | 0.21 | 327.5 | 711.9 |
| r | 0.73 | 0.61 | 0.59 | 0.3 | 1.86 |
| M | 0.99 | 0.79 | 0.74 | 0.18 | 3.01 |
| B_{1980}/K | 0.19 | 0.18 | 0.27 | 0.11 | 0.31 |
| MSY | 60.67 | 58.34 | 0.25 | 37.09 | 97.88 |
| F_{MSY} | 0.33 | 0.32 | 0.3 | 0.17 | 0.55 |
| B_{MSY} | 224.8 | 216.7 | 0.22 | 152.2 | 346.6 |
| B_{1980} | 88.38 | 82.92 | 0.33 | 47.38 | 161.1 |
| B_{2015} | 307 | 292.6 | 0.25 | 197 | 500.4 |
| F_{1980} | 0.36 | 0.34 | 0.4 | 0.16 | 0.7 |
| F_{2015} | 0.13 | 0.13 | 0.24 | 0.07 | 0.2 |
| Survey q | 0.82 | 0.85 | 0.16 | 0.52 | 0.99 |
| B_{2016}/K | 0.7 | 0.7 | 0.16 | 0.47 | 0.9 |
| B_{2016}/B_{MSY} | 1.44 | 1.44 | 0.16 | 1.01 | 1.91 |
| F_{2015}/F_{MSY} | 0.43 | 0.4 | 0.35 | 0.21 | 0.79 |

Table CT3. Summary of posterior quantities of parameters derived from the base-case model 2 for the Pacific saury in the Western North Pacific Ocean.

| Parameter | Mean | Median | CV | 2.50% | 97.50% |
|--------------------|-------|--------|------|-------|--------|
| K | 390.8 | 381 | 0.16 | 302.4 | 541 |
| r | 0.76 | 0.65 | 0.56 | 0.34 | 1.88 |
| M | 1.08 | 0.85 | 0.74 | 0.19 | 3.27 |
| B_{1980}/K | 0.19 | 0.18 | 0.26 | 0.11 | 0.3 |
| MSY | 57.19 | 55.05 | 0.23 | 36.88 | 89.9 |
| F_{MSY} | 0.36 | 0.35 | 0.28 | 0.2 | 0.6 |
| B_{MSY} | 192.3 | 189.1 | 0.16 | 140.9 | 261.1 |
| B_{1980} | 72.39 | 69.56 | 0.27 | 42.49 | |
| B_{2015} | 246.5 | 243.7 | 0.16 | 177.2 | 332.2 |
| F_{1980} | 0.45 | 0.42 | 0.36 | 0.22 | 0.82 |
| F_{2015} | 0.16 | 0.16 | 0.18 | 0.11 | 0.22 |
| Survey q | 1 | 1 | 1 | 1 | 1 |
| B_{2016}/K | 0.68 | 0.68 | 0.16 | 0.45 | 0.88 |
| B_{2016}/B_{MSY} | 1.38 | 1.38 | 0.15 | 0.97 | 1.79 |
| F_{2015}/F_{MSY} | 0.47 | 0.45 | 0.33 | 0.25 | 0.84 |

Table CT4. Summary of posterior quantities of parameters derived from the base-case model 3 for the Pacific saury in the Western North Pacific Ocean.

| Parameter | Mean | Median | CV | 2.50% | 97.50% |
|--------------------|-------|--------|------|-------|--------|
| K | 223.8 | 200.1 | 0.48 | 89.41 | 486.2 |
| r | 0.97 | 0.9 | 0.42 | 0.43 | 1.93 |
| M | 1.71 | 1.68 | 0.56 | 0.27 | 3.69 |
| B_{1980}/K | 0.18 | 0.18 | 0.21 | 0.12 | 0.27 |
| MSY | 54.23 | 53.04 | 0.18 | 38.56 | 77.44 |
| F_{MSY} | 1 | 0.69 | 1.1 | 0.25 | 5.32 |
| B_{MSY} | 117.8 | 108.8 | 0.42 | 51.04 | 237.3 |
| B_{1980} | 40.98 | 34.95 | 0.55 | 15.71 | 98.85 |
| B_{2015} | 131.4 | 113.7 | 0.57 | 41.2 | 320.1 |
| F_{1980} | 2.83 | 1.14 | 1.19 | 0.28 | 9.21 |
| F_{2015} | 0.59 | 0.37 | 1.67 | 0.12 | 1.98 |
| Survey q | 2.46 | 2.16 | 0.52 | 0.8 | 5.63 |
| B_{2016}/K | 0.66 | 0.67 | 0.18 | 0.41 | 0.88 |
| B_{2016}/B_{MSY} | 1.22 | 1.22 | 0.17 | 0.82 | 1.63 |
| F_{2015}/F_{MSY} | 0.58 | 0.53 | 0.46 | 0.27 | 1.16 |

Table CT5. Estimates of exploitable biomass (10,000 metric ton) derived from the three base-case models and the sensitivity model (without the Japanese biomass survey) for the Pacific saury in the Western North Pacific Ocean.

| Year | Model 1 | | | Model 2 | | | Model 3 | | | Sensitivity test | | |
|------|---------|--------|-----|---------|--------|-----|---------|--------|-----|------------------|--------|-----|
| | Mean | Median | CV | Mean | Median | CV | Mean | Median | CV | Mean | Median | CV |
| 1980 | 88.38 | 82.92 | 0.3 | 72.39 | 69.56 | 0.3 | 40.98 | 34.95 | 0.6 | 39.57 | 33.63 | 0.5 |
| 1981 | 91.84 | 86.57 | 0.3 | 74.51 | 71.92 | 0.3 | 41.02 | 34.76 | 0.6 | 39.64 | 33.45 | 0.6 |
| 1982 | 100.6 | 94.74 | 0.3 | 81.51 | 78.82 | 0.3 | 44.92 | 38.18 | 0.6 | 43.55 | 36.72 | 0.6 |
| 1983 | 116.2 | 109.2 | 0.3 | 93.75 | 90.65 | 0.3 | 50.56 | 42.39 | 0.6 | 48.9 | 40.71 | 0.6 |
| 1984 | 132.9 | 125 | 0.3 | 106.6 | 103.1 | 0.3 | 56.61 | 47.26 | 0.6 | 54.75 | 45.27 | 0.6 |
| 1985 | 160.5 | 150.9 | 0.3 | 129.2 | 124.8 | 0.3 | 68.24 | 56.91 | 0.6 | 65.98 | 54.49 | 0.6 |
| 1986 | 182.6 | 172.2 | 0.3 | 147.1 | 142.1 | 0.3 | 77.84 | 65.31 | 0.6 | 75.61 | 62.72 | 0.6 |
| 1987 | 213.9 | 201.9 | 0.3 | 173.5 | 168 | 0.3 | 93.92 | 80.09 | 0.6 | 91.72 | 77.45 | 0.6 |
| 1988 | 277 | 262.4 | 0.3 | 227 | 220.9 | 0.2 | 128.1 | 112 | 0.6 | 125.5 | 109.2 | 0.5 |
| 1989 | 324.8 | 308.4 | 0.3 | 267 | 260.3 | 0.2 | 152.6 | 134.1 | 0.5 | 149.8 | 131.4 | 0.5 |
| 1990 | 343.4 | 326.9 | 0.3 | 282.3 | 276.4 | 0.2 | 159.7 | 139.8 | 0.5 | 156.4 | 136.4 | 0.5 |
| 1991 | 374.2 | 355.8 | 0.3 | 305.8 | 299 | 0.2 | 169.3 | 146.9 | 0.6 | 164.5 | 142.3 | 0.5 |
| 1992 | 405.4 | 385.1 | 0.3 | 330.2 | 322.3 | 0.2 | 182.7 | 157.4 | 0.6 | 177 | 152.4 | 0.6 |
| 1993 | 403.6 | 383.7 | 0.3 | 328.5 | 320.6 | 0.2 | 180.6 | 155.6 | 0.6 | 175.3 | 150 | 0.6 |
| 1994 | 400.5 | 379.6 | 0.3 | 325.8 | 317.5 | 0.2 | 181.8 | 157.7 | 0.6 | 176.6 | 152.3 | 0.6 |
| 1995 | 364 | 346 | 0.3 | 296.8 | 289.9 | 0.2 | 169.7 | 147.7 | 0.5 | 166.2 | 144.5 | 0.5 |
| 1996 | 321 | 306 | 0.3 | 262.7 | 257.1 | 0.2 | 153.6 | 135.4 | 0.5 | 151.1 | 133.1 | 0.5 |
| 1997 | 326.3 | 299.9 | 0.4 | 274.8 | 252.7 | 0.3 | 193.7 | 175.6 | 0.4 | 195.8 | 178.1 | 0.4 |
| 1998 | 238 | 227 | 0.3 | 189.3 | 185.8 | 0.3 | 86.34 | 61.81 | 0.8 | 80.84 | 54.03 | 0.9 |
| 1999 | 229.9 | 218.4 | 0.3 | 184.7 | 180 | 0.3 | 89.74 | 70.13 | 0.7 | 85.44 | 64.23 | 0.8 |
| 2000 | 252.1 | 240.8 | 0.3 | 204.3 | 200.4 | 0.2 | 106.1 | 89.24 | 0.6 | 102.1 | 83.92 | 0.6 |
| 2001 | 281.3 | 269.1 | 0.3 | 228.4 | 225.1 | 0.2 | 122.3 | 105.9 | 0.6 | 118.1 | 101.3 | 0.6 |
| 2002 | 287.3 | 274.3 | 0.3 | 232.7 | 229.8 | 0.2 | 126.1 | 109.3 | 0.6 | 120.9 | 104.7 | 0.6 |
| 2003 | 392.2 | 375.3 | 0.2 | 317.6 | 314.8 | 0.2 | 173.7 | 151.9 | 0.5 | 158.3 | 138.4 | 0.5 |
| 2004 | 408.6 | 389.8 | 0.2 | 329.3 | 326.3 | 0.2 | 176.7 | 153.4 | 0.6 | 164.9 | 142.2 | 0.6 |
| 2005 | 462.9 | 441.9 | 0.2 | 374.1 | 370.4 | 0.2 | 202.4 | 176 | 0.5 | 192.8 | 166.7 | 0.5 |
| 2006 | 409.7 | 390.5 | 0.3 | 329.1 | 326 | 0.2 | 174.7 | 150.5 | 0.6 | 167.1 | 141.6 | 0.6 |
| 2007 | 433.9 | 413.5 | 0.2 | 349.8 | 346.1 | 0.2 | 187.8 | 162.3 | 0.6 | 184.6 | 157.8 | 0.6 |
| 2008 | 474 | 452.4 | 0.3 | 383.3 | 378.6 | 0.2 | 205.6 | 178.7 | 0.6 | 194.8 | 168.5 | 0.6 |
| 2009 | 356.9 | 340.5 | 0.3 | 286.4 | 284 | 0.2 | 149.8 | 128.4 | 0.6 | 140.5 | 118.6 | 0.6 |
| 2010 | 311.2 | 296.7 | 0.2 | 250.7 | 248.1 | 0.1 | 134.4 | 116.8 | 0.6 | 135 | 116.4 | 0.6 |
| 2011 | 337.5 | 321.6 | 0.2 | 272.6 | 269.5 | 0.1 | 148 | 129.6 | 0.5 | 151 | 131.8 | 0.5 |
| 2012 | 322.5 | 307.8 | 0.2 | 260.6 | 257.6 | 0.1 | 141.7 | 123.9 | 0.5 | 147.5 | 128.4 | 0.5 |
| 2013 | 341.8 | 325.5 | 0.2 | 275.7 | 272.9 | 0.2 | 150.1 | 131.1 | 0.5 | 151.7 | 132.1 | 0.5 |
| 2014 | 371 | 353.8 | 0.2 | 300.4 | 296.7 | 0.2 | 166.1 | 146.3 | 0.5 | 171 | 149.7 | 0.5 |
| 2015 | 307 | 292.6 | 0.3 | 246.5 | 243.7 | 0.2 | 131.4 | 113.7 | 0.6 | 132 | 113.3 | 0.6 |
| 2016 | 322.1 | 308.1 | 0.2 | 260.8 | 259.1 | 0.2 | 146.9 | 130.5 | 0.5 | 148.1 | 131.5 | 0.5 |

Table CT6. Summary of posterior quantities of parameters derived from the sensitivity model (without the Japanese biomass survey) for the Pacific saury in the Western North Pacific Ocean.

| Parameter | Mean | Median | CV | 2.50% | 97.50% |
|--------------------|-------|--------|------|-------|--------|
| K | 216 | 189.2 | 0.49 | 88.29 | 478.7 |
| r | 0.96 | 0.89 | 0.4 | 0.43 | 1.86 |
| M | 1.86 | 1.87 | 0.53 | 0.3 | 3.87 |
| B_{1980}/K | 0.18 | 0.18 | 0.2 | 0.12 | 0.27 |
| MSY | 55.64 | 54.26 | 0.18 | 39.3 | 79.63 |
| F_{MSY} | 1.07 | 0.76 | 1.08 | 0.26 | 6.91 |
| B_{MSY} | 116.2 | 106.5 | 0.43 | 50.77 | 235.7 |
| B_{1980} | 39.57 | 33.63 | 0.54 | 15.63 | 95.37 |
| B_{2015} | 132 | 113.3 | 0.58 | 41.49 | 329.2 |
| F_{1980} | 2.99 | 1.23 | 1.15 | 0.29 | 9.21 |
| F_{2015} | 0.59 | 0.38 | 1.66 | 0.11 | 1.94 |
| Survey q | NA | NA | NA | NA | NA |
| B_{2016}/K | 0.69 | 0.7 | 0.18 | 0.43 | 0.9 |
| B_{2016}/B_{MSY} | 1.25 | 1.26 | 0.16 | 0.84 | 1.66 |
| F_{2015}/F_{MSY} | 0.54 | 0.5 | 0.46 | 0.25 | 1.1 |

Table CT7. Projected probabilities of stock status phases of the Western North Pacific saury in 2019 under five fractions of average catch from 2011 to 2015 for the three base-case models.

| Model | Catch fraction | $B < B_{MSY}$ and $H > H_{MSY}$ | $B > B_{MSY}$ and $H > H_{MSY}$ | $B < B_{MSY}$ and $H < H_{MSY}$ | $B > B_{MSY}$ and $H < H_{MSY}$ | $B < B_{MSY}$ | $H > H_{MSY}$ |
|-------|----------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|---------------|---------------|
| 1 | 0.8 | 0.00 | 0.00 | 0.00 | 0.99 | 0.01 | 0.01 |
| | 0.9 | 0.01 | 0.01 | 0.00 | 0.97 | 0.01 | 0.02 |
| | 1 | 0.02 | 0.03 | 0.00 | 0.95 | 0.02 | 0.05 |
| | 1.1 | 0.03 | 0.06 | 0.00 | 0.90 | 0.03 | 0.09 |
| | 1.2 | 0.05 | 0.11 | 0.00 | 0.83 | 0.06 | 0.17 |
| 2 | 0.8 | 0.01 | 0.00 | 0.01 | 0.98 | 0.01 | 0.01 |
| | 0.9 | 0.02 | 0.01 | 0.01 | 0.96 | 0.02 | 0.03 |
| | 1 | 0.04 | 0.04 | 0.01 | 0.92 | 0.04 | 0.08 |
| | 1.1 | 0.06 | 0.09 | 0.00 | 0.85 | 0.06 | 0.14 |
| | 1.2 | 0.10 | 0.15 | 0.00 | 0.74 | 0.10 | 0.25 |
| 3 | 0.8 | 0.02 | 0.00 | 0.01 | 0.97 | 0.03 | 0.02 |
| | 0.9 | 0.04 | 0.01 | 0.01 | 0.93 | 0.06 | 0.05 |
| | 1 | 0.11 | 0.03 | 0.01 | 0.86 | 0.11 | 0.14 |
| | 1.1 | 0.22 | 0.07 | 0.00 | 0.70 | 0.22 | 0.29 |
| | 1.2 | 0.38 | 0.10 | 0.00 | 0.52 | 0.38 | 0.48 |

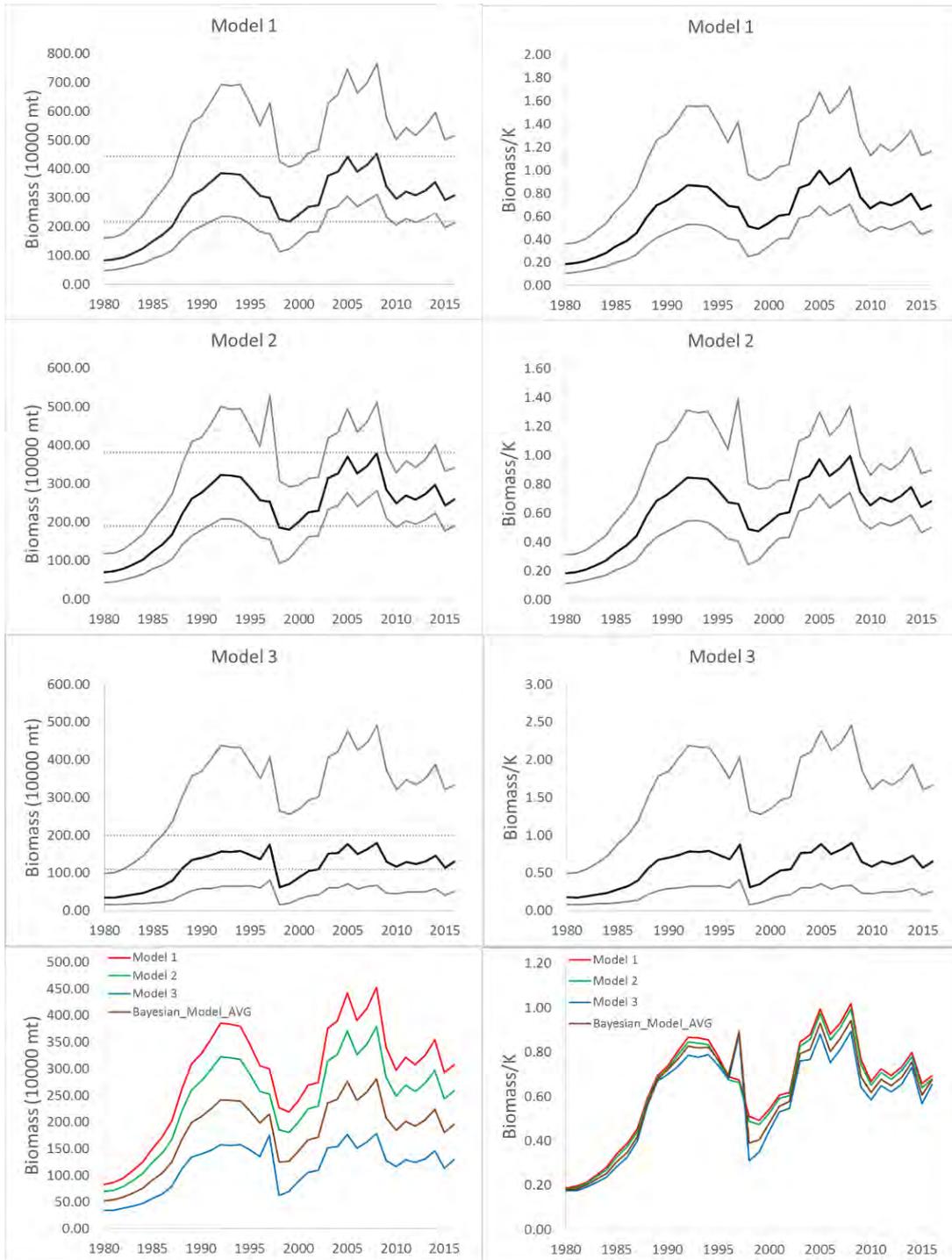


Figure CT1. Trends in biomass (10,000 metric ton) (left panels) and ratio of biomass to carrying capacity (K) (right panels) of the Western North Pacific saury based on the three base-case models and the Bayesian model average. Gray lines denote the 95% confidence interval. The upper and lower horizontal dashed lines denote the carrying capacity and B_{MSY} , respectively.

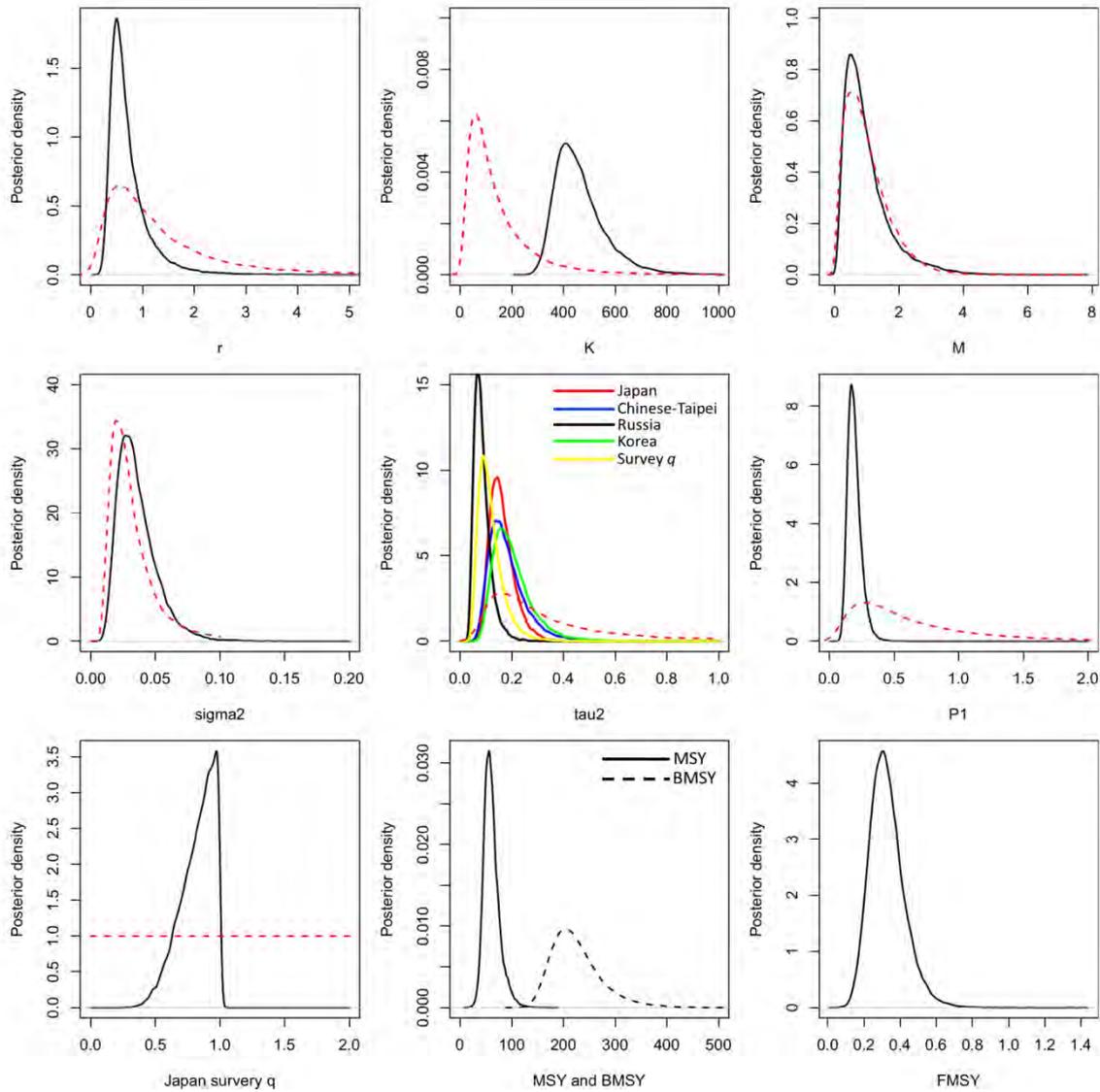


Figure CT2. Kernel density estimates of the posterior and prior (red dashed lines) distributions of various model and management parameters for the base-case model 1 for the Pacific saury in the Western North Pacific Ocean.

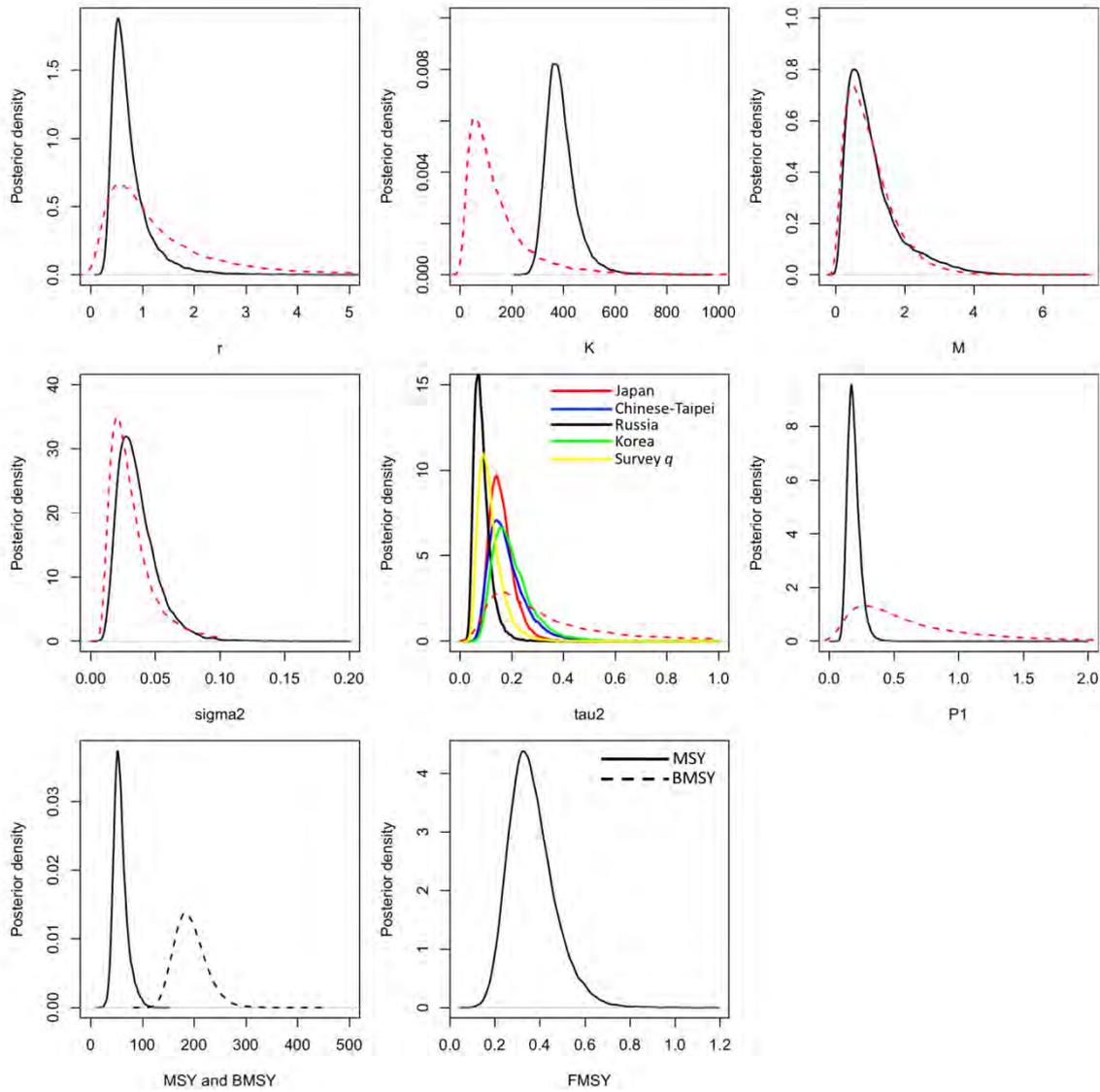


Figure CT3. Kernel density estimates of the posterior and prior (red dashed lines) distributions of various model and management parameters for the base-case model 2 for the Pacific saury in the Western North Pacific Ocean.

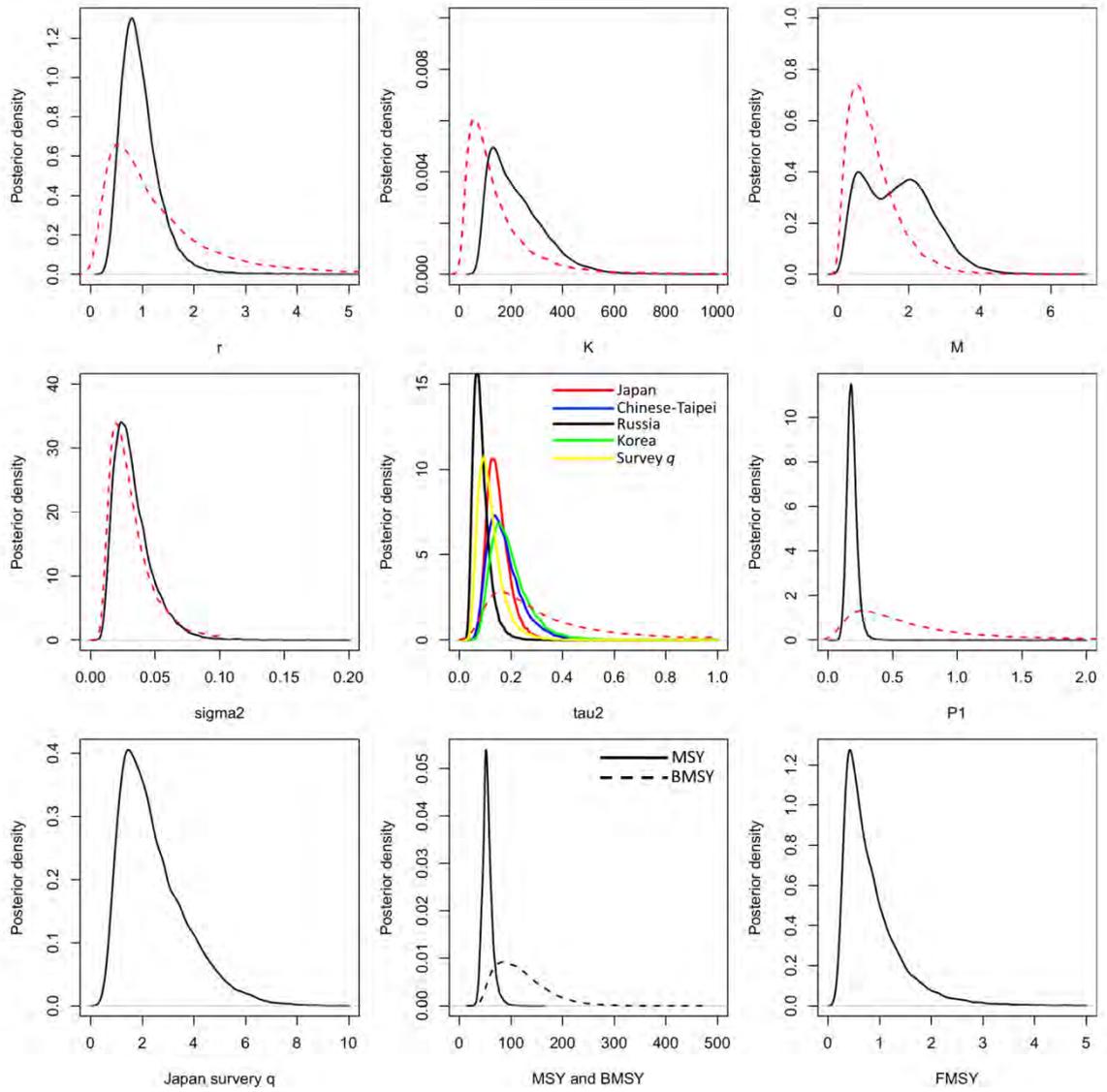


Figure CT4. Kernel density estimates of the posterior and prior (red dashed lines) distributions of various model and management parameters for the base-case model 3 for the Pacific saury in the Western North Pacific Ocean.

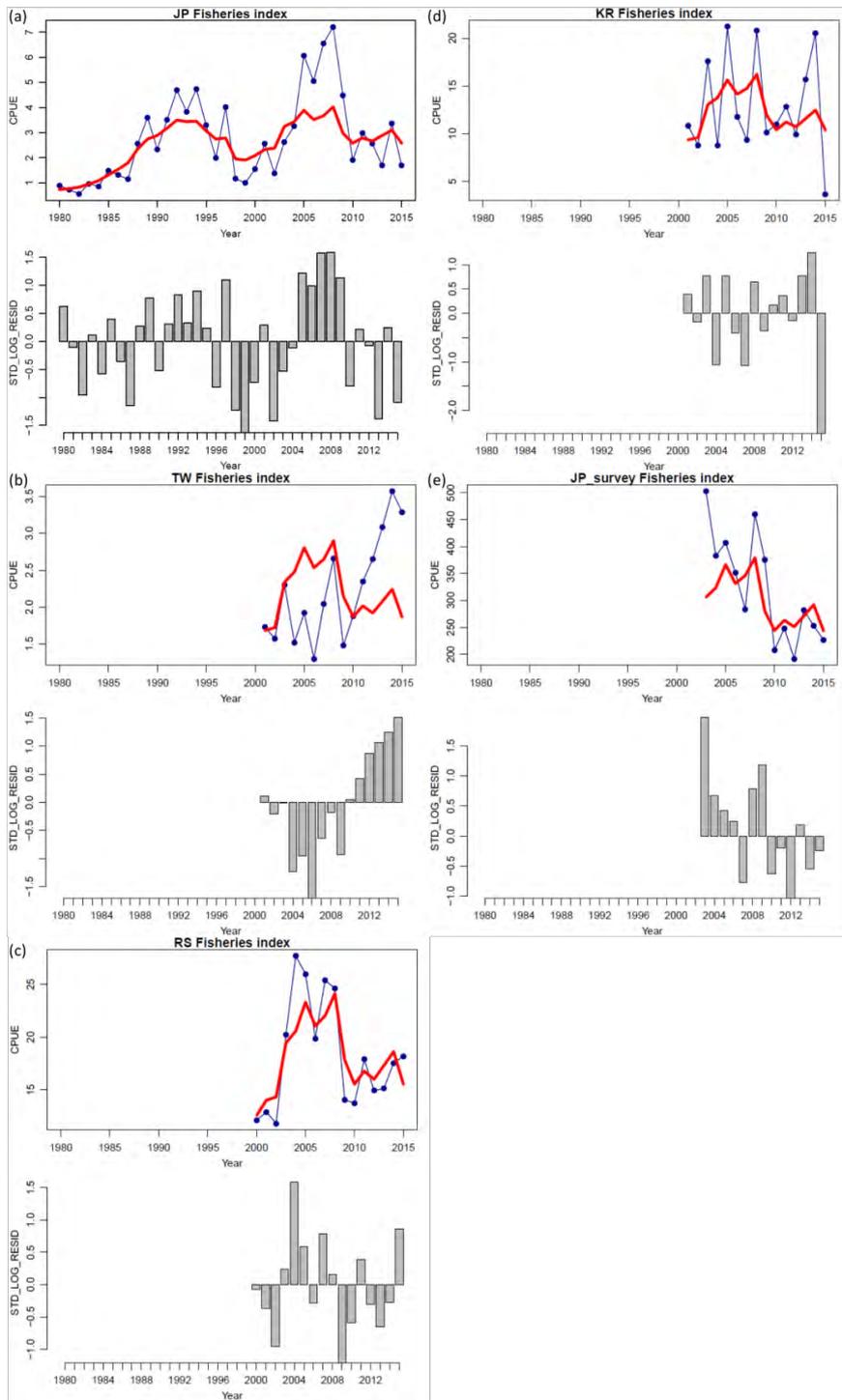


Figure CT5. Time-series of observed (blue circle-line) and predicted (red solid line) catch per unit effort (CPUE) of Western North Pacific saury and standardized log-residuals for the indices of Japan (a), Chinese-Taipei (b), Russia (c), Korea (d), and the Japanese biomass survey (e) derived from the base-case model 1.

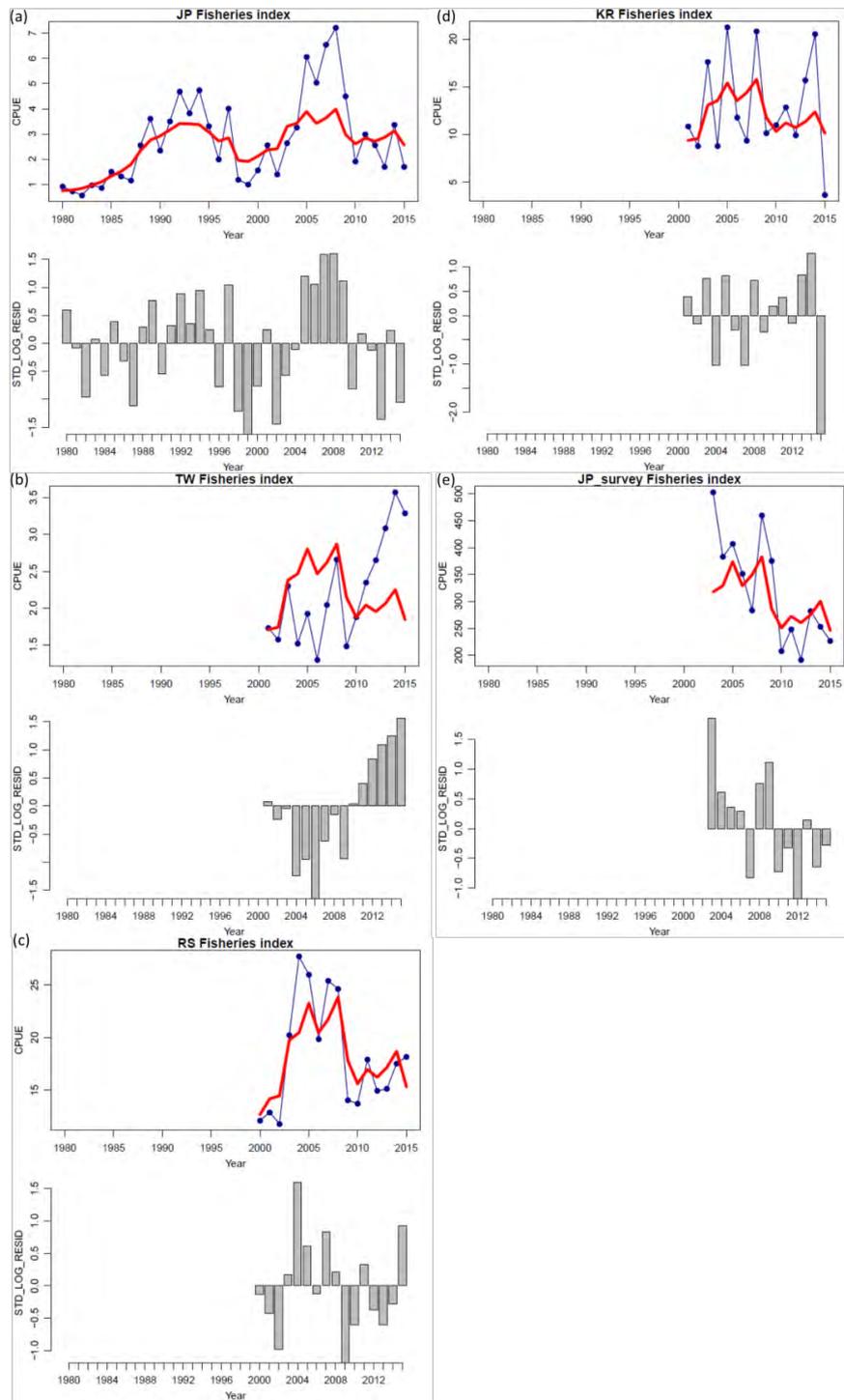


Figure CT6. Time-series of observed (blue circle-line) and predicted (red solid line) catch per unit effort (CPUE) of Western North Pacific saury and standardized log-residuals for the indices of Japan (a), Chinese-Taipei (b), Russia (c), Korea (d), and the Japanese biomass survey (e) derived from the base-case model 2.

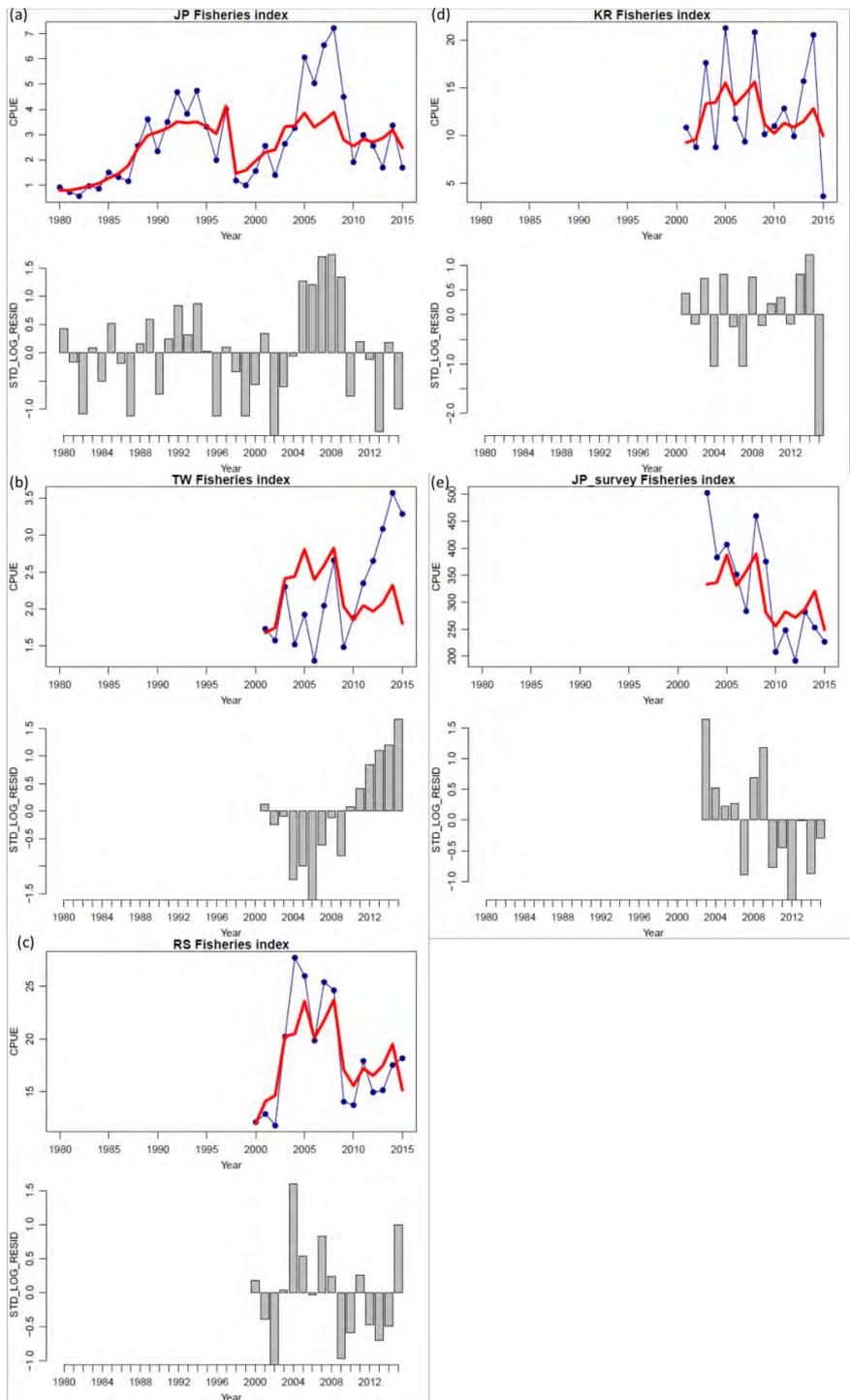


Figure CT7. Time-series of observed (blue circle-line) and predicted (red solid line) catch per unit effort (CPUE) of Western North Pacific saury and standardized log-residuals for the indices of Japan (a), Chinese-Taipei (b), Russia (c), Korea (d), and the Japanese biomass survey (e) derived from the base-case model 3.

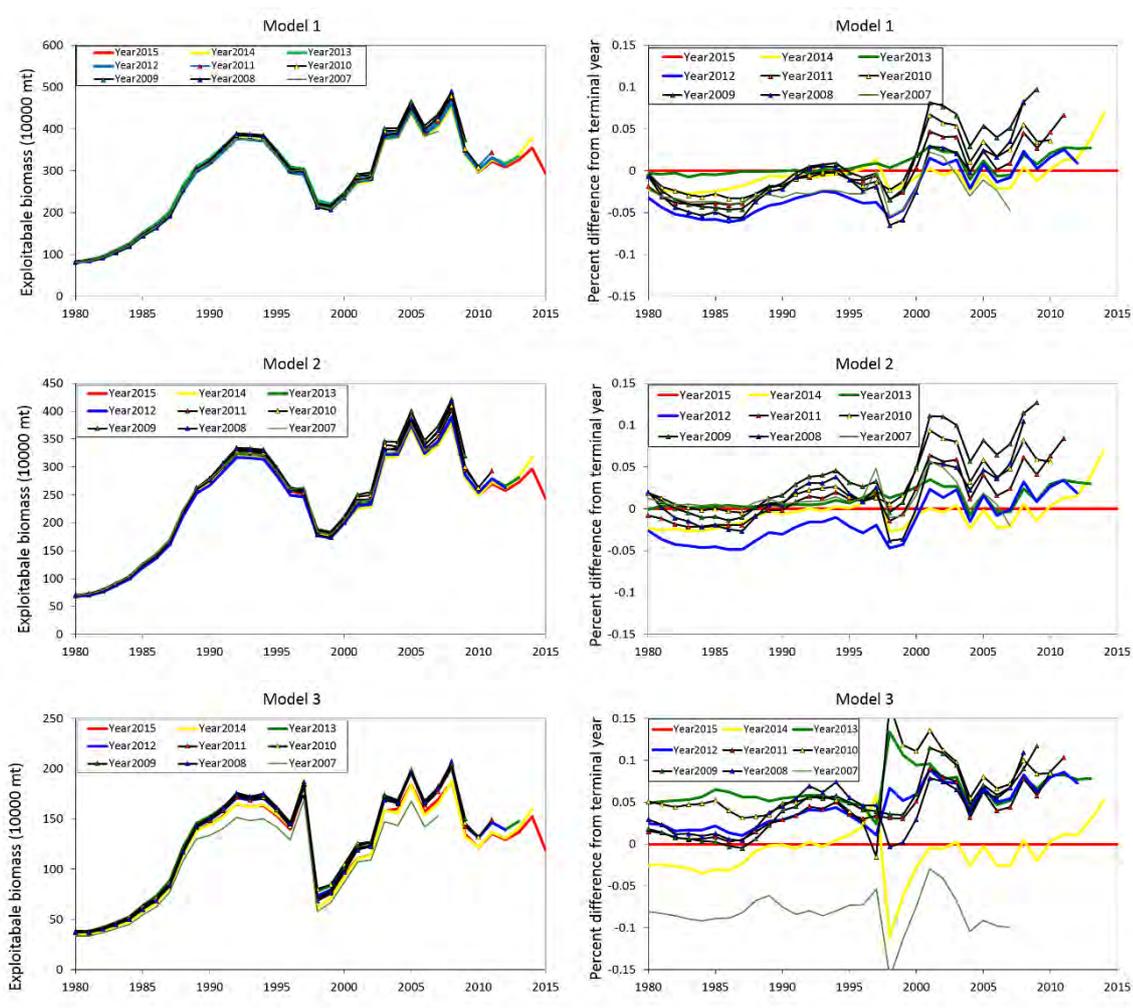


Figure CT8. Eight-years within-model retrospective plots of the absolute change in biomass (left panels) and percent difference from terminal year (right panels) for the Western North Pacific saury based on the three base-case models.

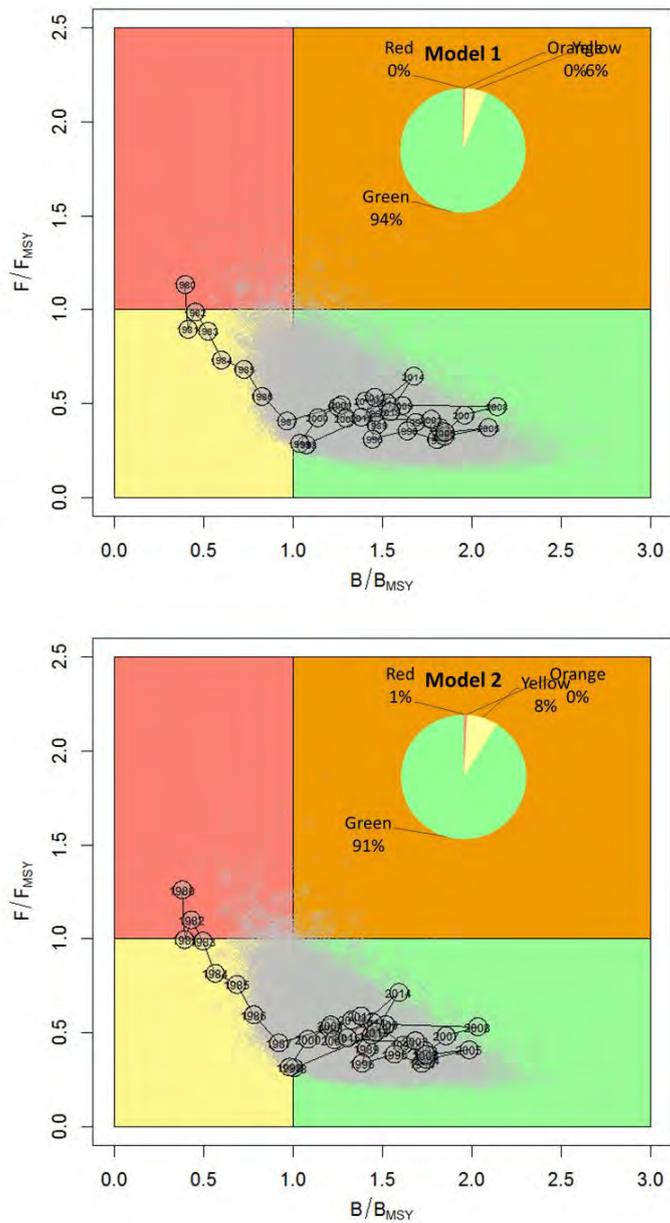


Figure CT9. Kobe phase plot for the base-case models 1 and 2 of the Western North Pacific saury from 1980 to 2015 with uncertainty for 2015 (gray circles) and the percentage of circles within each color quadrant.

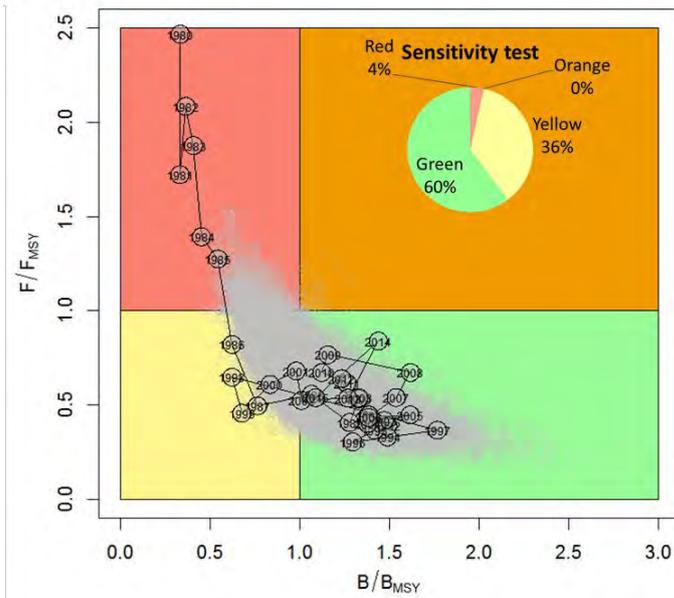
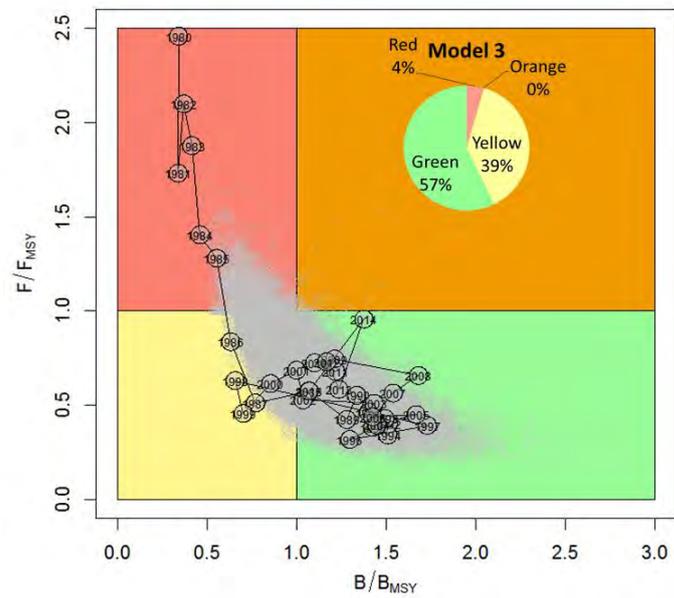


Figure CT10. Kobe phase plot for the base-case model 3 and the sensitivity model (without the Japanese biomass survey) of the Western North Pacific saury from 1980 to 2015 with uncertainty for 2015 (gray circles) and the percentage of circles within each color quadrant.

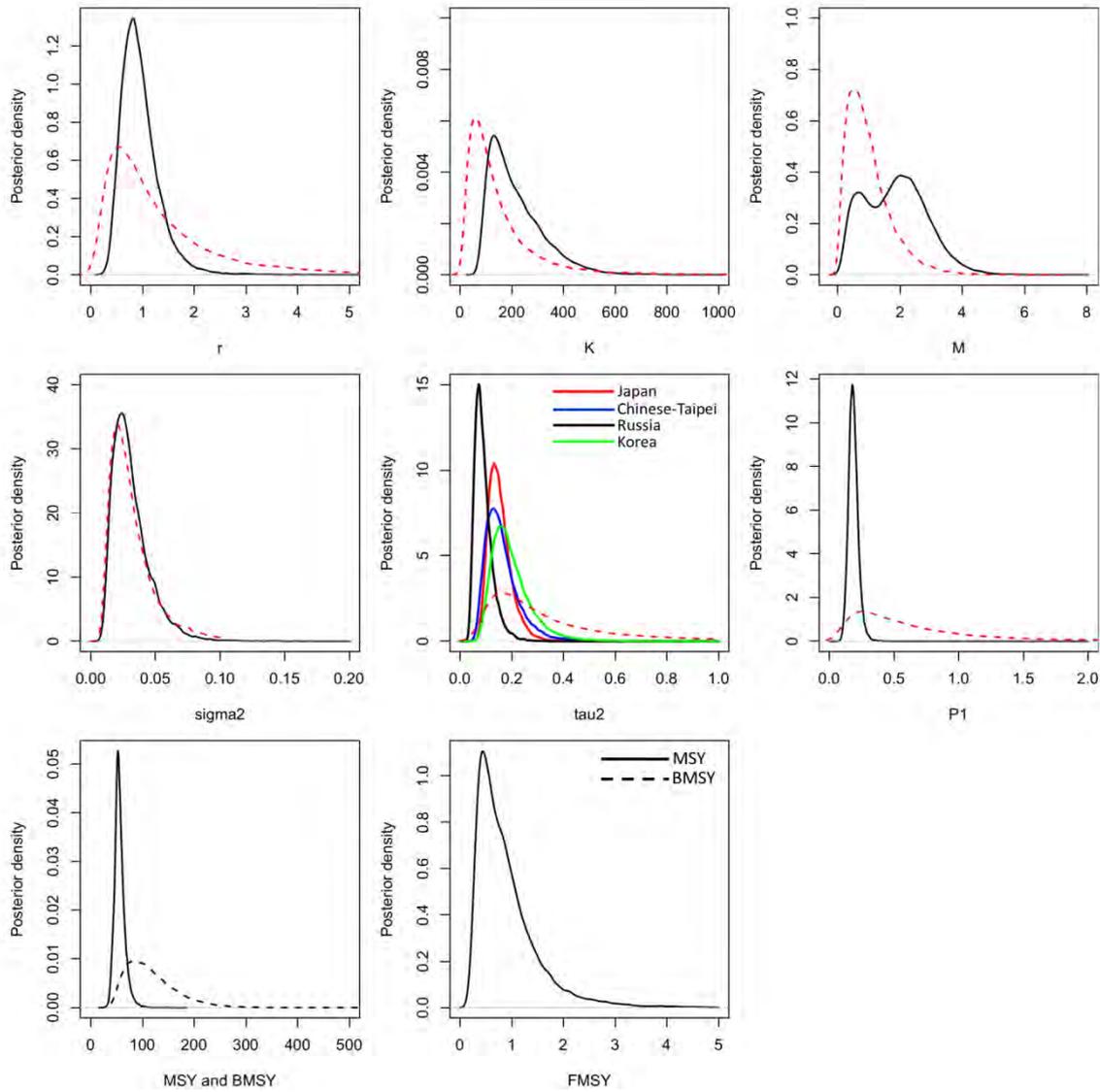


Figure CT11. Kernel density estimates of the posterior and prior (red dashed lines) distributions of various model and management parameters for the sensitivity model (without the Japanese biomass survey) for the Pacific saury in the Western North Pacific Ocean.

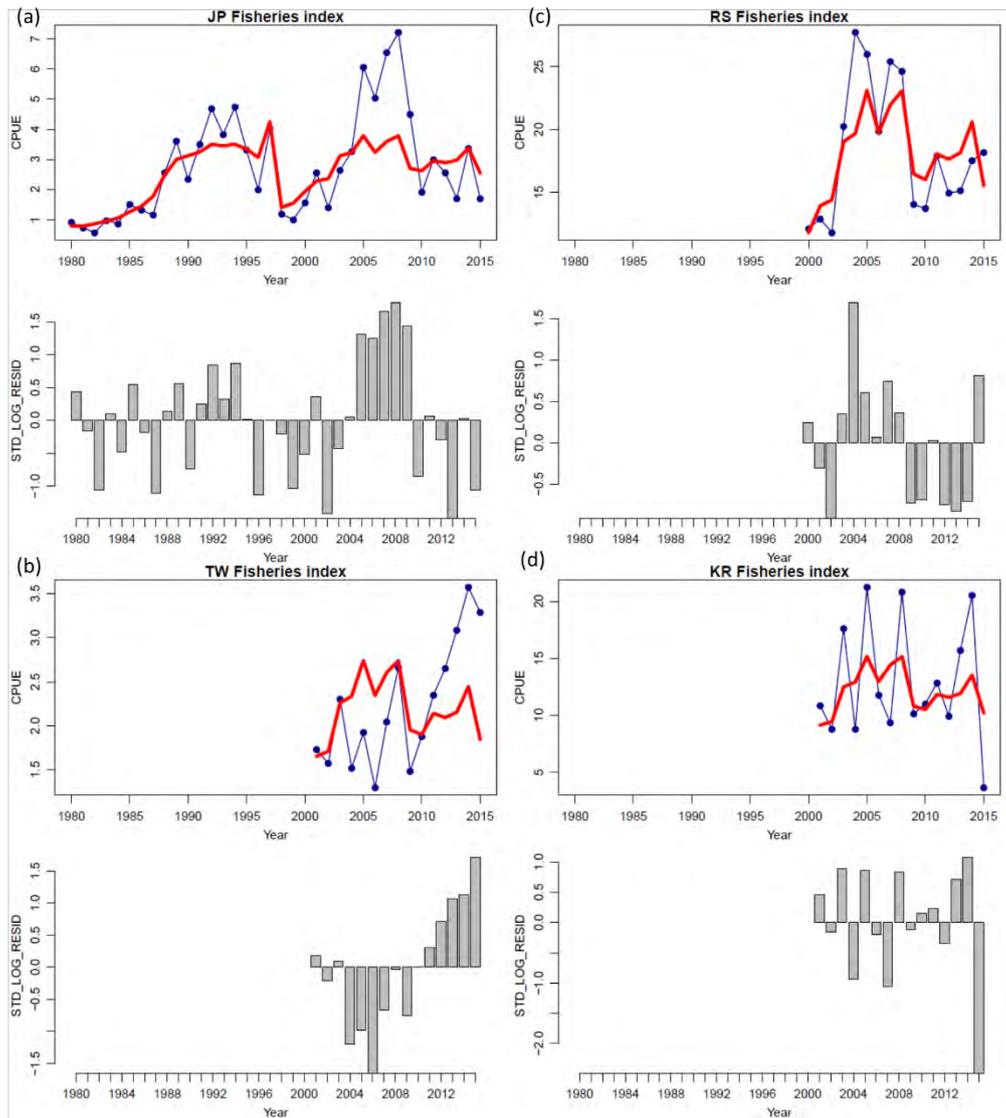


Figure CT12. Time-series of observed (blue circle-line) and predicted (red solid line) catch per unit effort (CPUE) of Western North Pacific saury and standardized log-residuals for the indices of Japan (a), Chinese-Taipei (b), Russia (c), and Korea (d) derived from the sensitivity model (without the Japanese biomass survey).

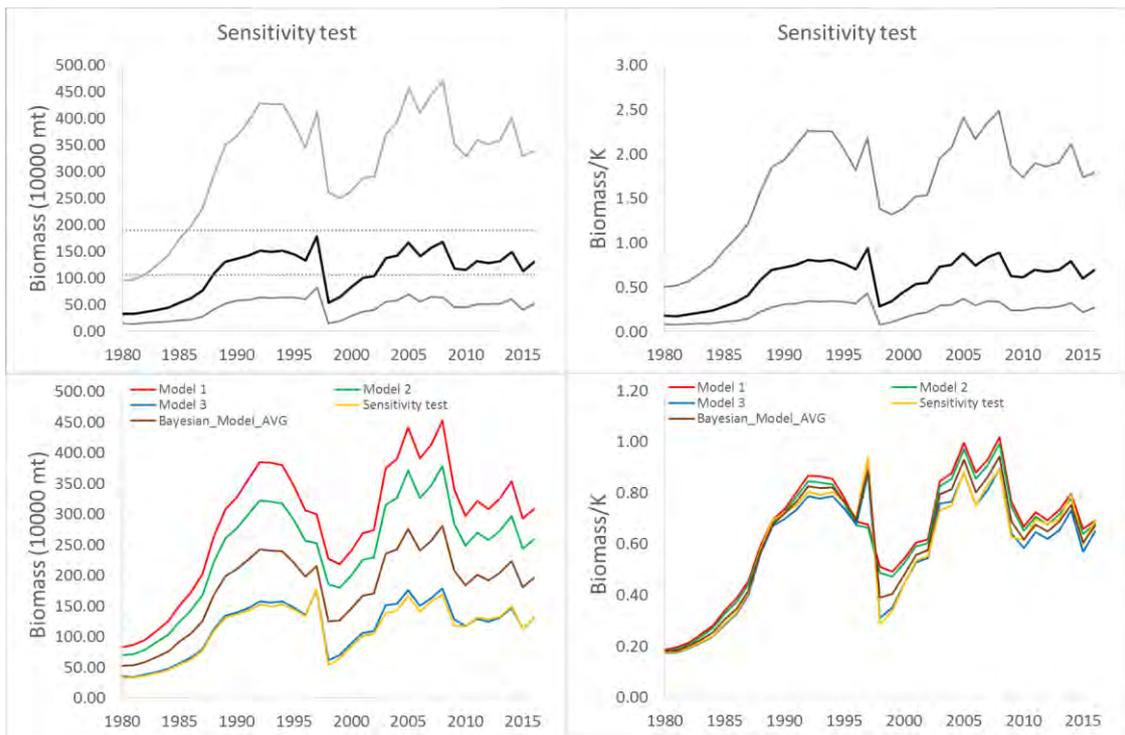


Figure CT13. Trends in biomass (10,000 metric ton) (left panels) and ratio of biomass to carrying capacity (K) (right panels) of the Western North Pacific saury based on the three base-case model, sensitivity model, and the Bayesian model average. Gray lines denote the 95% confidence interval. The upper and lower horizontal dashed lines denote the carrying capacity and B_{MSY} , respectively.

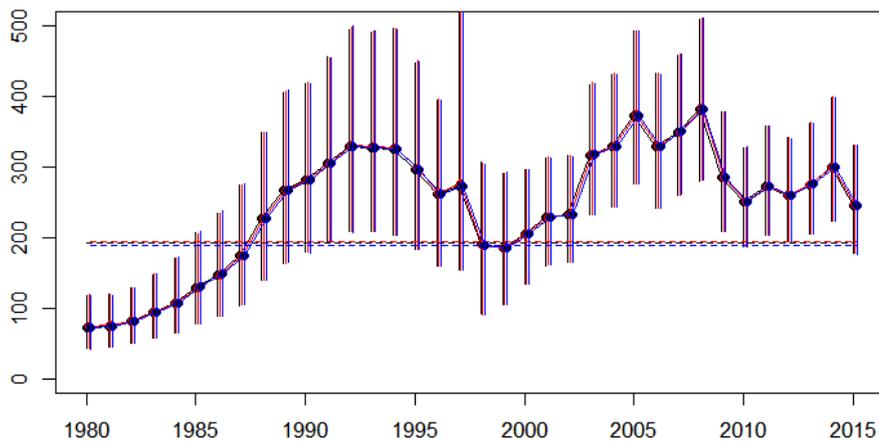


Figure CT14. Trends in biomass (10,000 metric ton) for testing the sensitivity of the mean values of the lognormal r prior distribution in model 2. The black, red, and blue colors denote the runs with fractions of 0.75, 1 and 1.25 of the mean value 1.4, respectively.

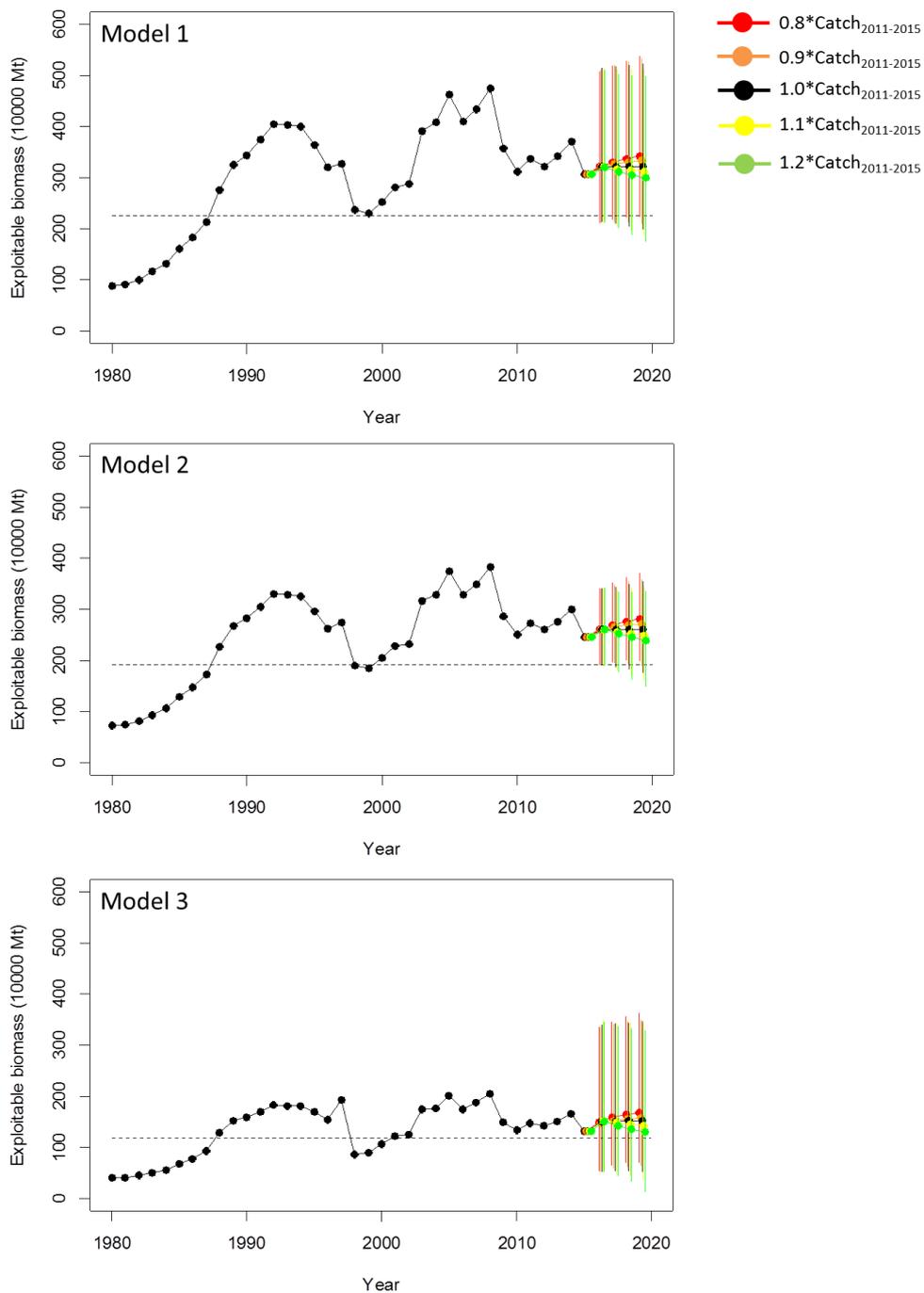


Figure CT15. Stochastic projections of expected exploitable biomass (10,000 metric tons) of the Western North Pacific saury during 2016- 2019 under five fractions of average catch from 2011 to 2015 for the three base-case models. The horizontal dashed lines denote the B_{MSY} . The vertical lines denote the 95% confidence intervals.

8. Comparison

Table 8-1 summarized the estimated key parameters and management quantities by each member (China, Japan, and Chinese Taipei), based on the recommended base-case scenarios, three models differing in catchability (q : 0-1, 1 and free) of Japanese survey biomass index and also based on sensitivity test, where no biomass information was used.

Table 8-1. Summary of the estimated key parameters and management quantities by China, Japan, and Chinese Taipei, based on three scenarios.

| Scenarios | Parameters | China | | Japan | | Chinese Taipei | |
|-------------------------------------|-------------------------------------|--------|--------|--------|--------|----------------|--------|
| | | mean | median | mean | median | mean | median |
| S1 (q 0-1) | K (10,000 mt) | 790.26 | 704.00 | 579.4 | 511.2 | 462.80 | 444 |
| | r | 1.03 | 0.77 | 0.965 | 0.704 | 0.73 | 0.61 |
| | Shape (s, Z, M) | 0.57 | 0.32 | 0.729 | 0.569 | 0.99 | 0.79 |
| | B ₁₉₈₀ /K | 0.14 | 0.32 | 0.185 | 0.175 | 0.19 | 0.18 |
| | MSY (10,000 mt) | 59.35 | 57.07 | 62.2 | 59.5 | 60.67 | 58.34 |
| | F _{MSY} | 0.19 | 0.18 | 0.251 | 0.248 | 0.33 | 0.32 |
| | B _{MSY} (10,000 mt) | 346.66 | 310.1 | 265.5 | 237.1 | 224.8 | 216.70 |
| | B ₁₉₈₀ (10,000 mt) | 105.98 | 97.91 | 102.7 | 91.8 | 88.38 | 82.92 |
| | B ₂₀₁₅ (10,000 mt) | 356.63 | 333.1 | 364.9 | 328.5 | 307 | 292.60 |
| | F ₁₉₈₀ | 0.25 | 0.24 | 0.269 | 0.259 | 0.36 | 0.34 |
| | F ₂₀₁₅ | 0.11 | 0.11 | 0.108 | 0.110 | 0.13 | 0.13 |
| | q5 (Biomass) | 0.77 | 0.79 | 0.779 | 0.815 | 0.82 | 0.85 |
| | B ₂₀₁₆ /K | 0.51 | 0.52 | 0.702 | 0.680 | 0.7 | 0.7 |
| | B ₂₀₁₆ /B _{MSY} | 1.16 | 1.18 | 1.529 | 1.463 | 1.44 | 1.44 |
| F ₂₀₁₅ /F _{MSY} | 0.64 | 0.58 | 0.522 | 0.433 | 0.43 | 0.4 | |
| S2 (q=1) | K (10,000 mt) | 615.85 | 527.80 | 466.6 | 414.3 | 390.8 | 381 |
| | r | 1.13 | 0.89 | 1.022 | 0.765 | 0.76 | 0.65 |
| | Shape (s, Z, M) | 0.56 | 0.33 | 0.74 | 0.49 | 1.08 | 0.85 |
| | B ₁₉₈₀ /K | 0.14 | 0.14 | 0.173 | 0.167 | 0.19 | 0.18 |
| | MSY (10,000 mt) | 54.48 | 52.91 | 56.4 | 54.9 | 57.19 | 55.05 |
| | F _{MSY} | 0.22 | 0.22 | 0.281 | 0.279 | 0.36 | 0.35 |
| | B _{MSY} (10,000 mt) | 268.16 | 237.40 | 213.5 | 197.6 | 192.30 | 189.10 |
| | B ₁₉₈₀ (10,000 mt) | 78.66 | 75.43 | 75.4 | 72.3 | 72.39 | 69.77 |
| | B ₂₀₁₅ (10,000 mt) | 261.56 | 260.00 | 264.2 | 263.5 | 246.50 | 243.70 |
| | F ₁₉₈₀ | 0.32 | 0.32 | 0.341 | 0.329 | 0.45 | 0.42 |
| | F ₂₀₁₅ | 0.14 | 0.14 | 0.139 | 0.137 | 0.16 | 0.16 |
| | q5 (Biomass) | 1 | 1 | 1 | 1 | 1 | 1 |
| | B ₂₀₁₆ /K | 0.5 | 0.52 | 0.657 | 0.641 | 0.68 | 0.68 |
| | B ₂₀₁₆ /B _{MSY} | 1.13 | 1.16 | 1.421 | 1.375 | 1.38 | 1.38 |
| F ₂₀₁₅ /F _{MSY} | 0.70 | 0.64 | 0.543 | 0.496 | 0.47 | 0.45 | |
| S3 (free q) | K (10,000 mt) | 457.96 | 409.8 | 310.70 | 267.80 | 223.8 | 200.1 |
| | r | 1.28 | 1.13 | 1.212 | 0.993 | 0.97 | 0.9 |
| | Shape (s, Z, M) | 0.56 | 0.36 | 0.827 | 0.676 | 0.17 | 1.68 |
| | B ₁₉₈₀ /K | 0.14 | 0.14 | 0.164 | 0.158 | 0.18 | 0.18 |
| | MSY (10,000 mt) | 50.65 | 48.66 | 51.40 | 49.70 | 54.23 | 53.04 |
| | F _{MSY} | 0.29 | 0.28 | 0.394 | 0.390 | 1 | 0.69 |
| | B _{MSY} (10,000 mt) | 200.97 | 178.80 | 144.30 | 125.50 | 117.8 | 108.80 |
| | B ₁₉₈₀ (10,000 mt) | 63.39 | 55.79 | 49.30 | 42.90 | 40.98 | 34.95 |
| | B ₂₀₁₅ (10,000 mt) | 210.86 | 189.20 | 169.80 | 147.90 | 131.4 | 113.70 |
| | F ₁₉₈₀ | 0.46 | 0.43 | 0.571 | 0.555 | 2.83 | 1.14 |
| | F ₂₀₁₅ | 0.21 | 0.19 | 0.244 | 0.244 | 0.59 | 0.37 |
| | q5 (Biomass) | 1.46 | 1.37 | 1.774 | 1.802 | 2.46 | 2.16 |
| | B ₂₀₁₆ /K | 0.51 | 0.51 | 0.623 | 0.604 | 0.66 | 0.67 |
| | B ₂₀₁₆ /B _{MSY} | 1.15 | 1.16 | 1.317 | 1.266 | 1.22 | 1.22 |
| F ₂₀₁₅ /F _{MSY} | 0.72 | 0.69 | 0.640 | 0.610 | 0.58 | 0.53 | |
| Sensitivity test S4 (no biomass) | K (10,000 mt) | 536.15 | 454.75 | 375.7 | 303.3 | 216 | 189.2 |
| | r | 1.25 | 1.07 | 1.143 | 0.939 | 0.96 | 0.89 |
| | Shape (s, Z, M) | 0.56 | 0.35 | 0.823 | 0.673 | 1.86 | 1.87 |
| | B ₁₉₈₀ /K | 0.14 | 0.31 | 0.167 | 0.16 | 0.18 | 0.18 |
| | MSY (10,000 mt) | 52.92 | 50.16 | 54.5 | 51.8 | 55.64 | 54.26 |
| | F _{MSY} | 0.27 | 0.26 | 0.365 | 0.359 | 1.07 | 0.76 |
| | B _{MSY} (10,000 mt) | 234.01 | 199.45 | 173.6 | 14.3 | 116.2 | 106.5 |
| | B ₁₉₈₀ (10,000 mt) | 70.52 | 61.14 | 60.3 | 48.4 | 39.57 | 33.63 |
| | B ₂₀₁₅ (10,000 mt) | 244.98 | 217.90 | 217.1 | 174.4 | 132 | 113.3 |
| | F ₁₉₈₀ | 0.43 | 0.39 | 0.51 | 0.492 | 2.99 | 1.23 |
| | F ₂₀₁₅ | 0.18 | 0.17 | 0.208 | 0.207 | 0.59 | 0.38 |
| | q5 (Biomass) | NA | NA | NA | NA | NA | NA |
| | B ₂₀₁₆ /K | 0.52 | 0.53 | 0.654 | 0.637 | 0.69 | 0.7 |
| | B ₂₀₁₆ /B _{MSY} | 1.17 | 1.19 | 1.384 | 1.34 | 1.25 | 1.26 |
| F ₂₀₁₅ /F _{MSY} | 0.69 | 0.65 | 0.59 | 0.562 | 0.54 | 0.5 | |

9. References

- Baitaliuk, A. A., Orlov, A. M., & Ermakov, Y. K. (2013). Characteristic features of ecology of the Pacific saury *Cololabis saira* (Scomberesocidae, Beloniformes) in open waters and in the northeast Pacific Ocean. *Journal of ichthyology*, 53(11), 899-913.
- Best, N.G., Cowles, M.K., Vines, S.K., 1995. CODA Manual Version 0.30. MRC, Biostatistics Unit, Cambridge, pp. 41.
- Chang, Y.J., Brodziak, J., O'Malley, J., Lee, H., DiNardo, G., Sun, C. 2015. Model selection and multi-model inference for Bayesian surplus production models: a case study for Pacific blue and striped marlin. *Fish. Res.* 166:129-139.
- Chow S, Suzuki N, Brodeur RD, Ueno Y (2009) Little population structuring and recent evolution of the Pacific saury (*Cololabis saira*) as indicated by mitochondrial and nuclear DNA sequence data. *J Exp Mar Biol Ecol* 369:17–21.
- Froese, R., Pauly, D. 2000. FishBase 2000: concepts, design and data sources. ICLARM, Los Baños, Laguna, Philippines. 344 p.
- Fukushima, S. 1979. Synoptic analysis of migration and fishing conditions of saury in northwest Pacific Ocean. *Bull. Tohoku Reg. Fish. Res. Lab.* 41, 1-70.
- Gelman, A., Rubin, D.B., 1992. Inference from iterative simulation using multiple sequences. *Stat. Sci.* 7, 457-511.
- Gong Y., Suh Y.S. (2013). Effect of climate-ocean changes on the abundance of Pacific saury. *J Environ Biol.* 2013 Jan;34(1):23-30.
- Hatanaka M (1956) Biological studies on the population of the saury, *Cololabis saira* (Brevoort). Part 1. Reproduction and growth. *Tohoku J Agric Res* 6:227–269.
- Heidelberger, P., Welch, P.D., 1983. Simulation run length control in the presence of an initial transient. *Oper. Res.* 31, 1109-1144.
- Hilborn, R., Walters, C.J., 1992. Quantitative fisheries stock assessment: choice, dynamics and uncertainty. Chapman and Hall, New York, pp. 570.
- Hotta H (1960) On the analysis of the population of the Pacific saury (*Cololabis saira*) based on the scales and the otolith characters, and their growth. *Bull Tohoku Reg Fish Res Lab* 16:41–64.
- Huang, H., Chang, Y.J., Hsieh, C.H. 2017. Summary of CPUE standardization report from Chinese Taipei. NPFC-2017-TWG PSSA01-WP04.
- Hubbs CL, Wisner RL (1980) Revision of the sauries (Pisces, Scomberesocidae) with descriptions of two new genera and one new species. *Fish Bull US* 77:521–566.
- Hurtado-Ferro, F., Szuwalski, C.S., Valero, J.L., Anderson, S.C., Cunningham, C.J., Johnson, K.F., Licandeo, R., McGilliard, C.R., Monnahan, C.C., Muradian, M.L., Ono, K., Vert-Pre, K.A., Whitten, A.R., Punt, A.E. 2015. Looking in the rear-view mirror: bias and retrospective patterns in integrated, age structured stock assessment models. *ICES J. Mar. Sci.* 72(1): 99–110.
- Kell, L.T., Kimoto, A., and Kitakado, T., 2016. Evaluation of the prediction skill of stock assessment using hindcasting. *Fisheries Research.* 183: 119-127.

- Kidokoro, H., Suyama, S., Sakai, M., Naya, M., ViJai, D. 2017. Biomass and stock size index estimation of age-1 Pacific saury based on fisheries independent survey data by Japan. NPFC- 2017-TWG PSSA01-WP02.
- Konishi, K., Tamura, T., Isoda, T., Okamoto, R., Hakamada, T., Kiwada, H., & Matsuoka, K. (2009). Feeding strategies and prey consumption of three baleen whale species within the Kuroshio-Current extension. *J North Atl Fish Sci*, 42, 27-40.
- Kosaka, S. (2000). Life history of the Pacific saury *Cololabis saira* in the northwest Pacific and considerations on resource fluctuations based on it. *Bulletin of Tohoku National Fisheries Research Institute* 63, 1–96.
- Kulik, V., Antonenko, D. 2017. CPUE standardization for the Pacific saury in the Russian EEZ in the Northwest Pacific Ocean. NPFC-2017-TWG PSSA01-WP05.
- Kurita Y, Nemoto Y, Oozeki Y, Hayashizaki K, Ida H (2004) Variations in patterns of daily changes in otolith increment widths of 0+ Pacific saury, *Cololabis saira*, off Japan by hatch date in relation to the northward feeding migration during spring and summer. *Fish Oceanogr* 13(Suppl. 1):54–62.
- Lunn, D., Thomas, A., Best, N., Spiegelhalter, D., 2000. WinBUGS: a Bayesian modelling framework: concepts, structure, and extensibility. *Stat. Comput.* 10, 325-337.
- McAllister, M.K., Pikitch, E.K., Babcock, E.A. 2001. Using demographic methods to construct Bayesian priors for the intrinsic rate of increase in the Schaefer model and implications for stock rebuilding. *Can. J. Fish. Aquat. Sci.* 58: 1871-1890.
- Meyer, R., Millar, R.B., 1999. BUGS in Bayesian stock assessments. *Can. J. Fish. Aquat. Sci.* 56, 1078-1087.
- Mohn, R., 1999. The retrospective problem in sequential population analysis: An investigation using cod fishery and simulated data. *ICES J. Mar. Sci.* 56, 473-488.
- Nakagami, M. (2013). *Kinnen no sanma shigen to gyogyo no doko* “Recent status of Pacific saury stock and fisheries”. *Suisanshinko* vol 552, *Tokyo Suisanshinkoukai*. pp52 (in Japanese).
- 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. *Fish Sci* 76:45–53.
- Nihira A., (1988) Predator—Prey interaction Between Albacore *Thunnus alalunga* (Bonne terre) and Pacific Saury *Cololabis saira*, in the area of Emperor seamount Chain in the North Western Pacific Ocean. *Bull.Ibaraki Pref.Fish.Exp.Stat.* 26,125-136.
- NPFC PSWG. 2016. National Summary Report of China. NPFC-2016-WS PSSA01-WP01. December 2016, Busan, Korea, 13-25.
- NPFC PSWG. 2016. National Summary Report of Chinese-Taipei. NPFC-2016-WS PSSA01-WP04a. December 2016, Busan, Korea, 13-25.
- NPFC PSWG. 2016. National Summary Report of Japan. NPFC-2016-WS PSSA01-WP07. December 2016, Busan, Korea, 13-25.
- NPFC PSWG. 2016. National Summary Report of Korea. NPFC-2016-WS PSSA01-WP09. December 2016, Busan, Korea, 13-25.

- NPFC PSWG. 2016. National Summary Report of Russia. NPFC-2016-WS PSSA01-WP02. December 2016, Busan, Korea, 13-25.
- NPFC PSWG. 2016. Report of the 1st Pacific Saury Stock Assessment Workshop. NPFC-2016-WS PSSA01-Final Report. December 2016, Busan, Korea, 13-25.
- Odate, K. (1977) On the feeding habits of the Pacific saury, *Cololabis saira* (BREVOORT). Bull. Tohoku Reg. Fish. Res. Lab., 38, 75–88.
- Ogi, H. (1984) Feeding ecology of the Sooty Shearwater in the western subarctic North Pacific Ocean. Marine Birds: Their Feeding Ecology and Commercial Fisheries Relationships, ed. by D. N. Nettleship et al. Canadian Wildlife Service Special Publication, Ottawa, 78-84.
- Parin, N. V. (1968) Scomberesocidae (Pisces, Synentognathi) of the eastern Atlantic Ocean. Atlantide Rep. 10, 275-290.
- R Development Core Team. 2008. R: a language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.
- Sakai, M., Naya, M., Suyama, S., Kidokoro, H., ViJai, D., Kitakado, T. 2017. Standardization of CPUE data of Pacific saury (*Cololabis saira*) caught by the Japanese stick-held dip net fishery during 1980 to 2015. NPFC-2017-TWG PSSA01-WP01.
- Sakai, M., Suyama, S. and Abo, J. (2014) Current status of saury and squid fisheries in Chinese Taipei J. Marine Fisheries Engineering, 118, 37-50. (in Japanese)
- Sato T. and Hirakawa H. (1976) Studies on food habit of coho salmon in the Northwestern Pacific Ocean. Bull. Fukushima Pref. Fish. Exp. Stat. 4, 25-31.
- Spiegelhalter, D.J., Thomas, A., Best, N.G., Carlin, B.P., vander Linde, A., 2002. Bayesian measures of model complexity and fit. J. R. Stat. Soc. B 64, 583-640.
- Sturtz, S., Ligges, U., Gelman, A., 2005. R2WinBUGS: A package for running WinBUGS from R. J. Stat. Soft. 12.
- Sugama K (1957) Analysis of population of the saury (*Cololabis saira* Brevoort) on the basis of character of otolith-I. Bull Hokkaido Reg Fish Res Lab 16:1–12.
- Suyama S, Kurita Y, Ueno Y (2006) Age structure of Pacific saury *Cololabis saira* based on observations of the hyaline zones in the otolith and length frequency distributions. Fish Sci 72:742–749.
- Suyama, S., Nakagami, M., Naya, M., & Ueno, Y. (2012a). Migration route of Pacific saury *Cololabis saira* inferred from the otolith hyaline zone. Fisheries Science, 78(6), 1179-1186.
- Suyama, S., Nakagami, M., Naya, M., & Ueno, Y. (2012b). Comparison of the growth of age-1 Pacific saury *Cololabis saira* in the Western and the Central North Pacific. Fisheries science, 78(2), 277-285.
- Suyama, S., Shimizu, A., Isu, S., Ozawa, H., Morioka, T., Nakaya, M., Nakagawa T. ·Murakami N. ·Ichikawa T. · Ueno, Y. (2016). Determination of the spawning history of Pacific saury *Cololabis saira* from rearing experiments: identification of post-spawning fish from histological observations of ovarian arterioles. Fisheries Science, 82(3), 445-457.

- Tian, Y., Ueno, J., Suda, M., Akamine, T. 2004. Decadal variability in the abundance of Pacific saury and its response to climatic/oceanic regime shifts in the northwestern subtropical Pacific during the last half century. *J. Mar. Syst.* 52, 235-257.
- Wade, J., and Curtis, J.M.R. (2015). A review of data sources and catch records for Pacific saury (*Cololabis saira*) in Canada. *Can. Manuscr. Rep. Fish. Aquat. Sci.* 3058: iv + 20 p.
- Watanabe Y, Butler JL, Mori T (1988) Growth of Pacific saury, *Cololabis saira*, in the northeastern and northwestern Pacific Ocean. *Fish Bull US* 86:489–498.
- Watanabe Y, Lo NCH (1989) Larval production and mortality of Pacific saury, *Cololabis saira*, in the northwestern Pacific Ocean. *Fish Bull US* 87:601–613.



2nd Meeting of the Small Scientific Committee on Vulnerable Marine Ecosystems

17-18 April 2017
Shanghai, China
Meeting Report



2nd Meeting of the Small Scientific Committee on Vulnerable Marine Ecosystems

AGENDA

- Agenda Item 1. Opening of the meeting
- Agenda Item 2. Adoption of Agenda
- Agenda Item 3. Meeting arrangements
- Agenda Item 4. Member's research activities on VME
- Agenda Item 5. Review of the CMMs 2016-05 and 2016-06 for bottom fisheries and protection of vulnerable marine ecosystems
 - 5.1 Encounter Protocol
 - 5.2 Other scientific issues
 - 5.3 Drafting Revision for CMM 2016-06
- Agenda Item 6. Review of identifications of VMEs and assessment of significant adverse impact on VMEs
- Agenda Item 7. Suggestions for the SC Research Plan and 5-year Work Plan
- Agenda Item 8. Other matters
 - Selection of next Chair
 - Coral taxa guide for observers
- Agenda Item 9. Recommendations to the Scientific Committee
- Agenda Item 10. Next meeting
- Agenda Item 11. Adoption of the Report
- Agenda Item 12. Close of the Meeting

MEETING REPORT

Agenda Item 1. Opening of Meeting

1. The 2nd Meeting of the Small Scientific Committee on Vulnerable Marine Ecosystems (SSC VME) took place in Shanghai, China on 17-18 April 2017, and was attended by Members from Canada, China, Japan, the Republic of Korea, and the Russian Federation. The meeting was opened by Dr. Loh-Lee Low who served as the SSC VME Chair.

Agenda Item 2. Adoption of Agenda

2. The Secretariat explained that an observer paper had been submitted by the Food and Agriculture Organization (FAO). Members acknowledged that the paper will be presented by the Secretariat on behalf of the FAO under Agenda Item 8. Other Matters.
3. Japan proposed beginning Agenda Item 4. Member's Research Activities on VME with an overview of all the research conducted by Japan, encompassing papers NPFC-2017-SSC VME02-IP01-02 and NPFC-2017-SSC VME02-WP01-05. The Members agreed to Japan's proposal.
4. The revised agenda was adopted.

Agenda Item 3. Meeting Arrangements

5. Science Manager Dr. Aleksandr Zavolokin outlined the meeting schedule and Mr. Alexander Meyer was selected as Rapporteur.

Agenda Item 4. Member's Research Activities on VME

6. Participants made reports with respect to their research activities on VMEs. Japan submitted 7 documents and Korea submitted 1 document. Russia presented 1 document, which was treated as an information paper due to its late submission. Specific highlights are noted below.

7. Japan presented an overview of the research it had conducted towards proposing a scheme to assess and manage potential impacts of bottom fisheries on VMEs in the western part of the Convention Area. Japan informed participants about the activities of the Corresponding Group on Encounter Protocol comparing the VME encounter protocols of different RFMOs (NPFC-2017-SSC VME02-IP01) and also the application of association analysis for identifying indicator taxa of VMEs in the Emperor Seamounts area (NPFC-2017-SSC VME02-IP02). Japan noted that there is a necessity for different encounter protocols between existing fishery grounds and unfished areas. Japan also pointed out that the identification of fished and unfished areas were the foundation of significant adverse impact assessment (SAI) and conservation measures, and recommended encounter protocols, scientific surveys and VME closures as measures for existing fishery grounds. Furthermore, Japan recommended that a more precautionary approach be taken with regard to unfished areas.
8. Japan presented on existing fishing grounds and unfished areas (NPFC-2017-SSC VME02-WP01). Japan studied historical fishery activity and pointed out that fishery activity has been occurring in the Emperor Seamounts for 50 years since 1967. Japan also presented data on trawl and gillnet activities, and the depth of fishery activities. Japan concluded that the fished seamounts in the western part of the Convention Area are located between 31°N and 45°N, and that the existing fishing grounds are the flat tops and upper slopes up to a depth of 1500 m. Japan recommended that similar analysis be made for other bottom fishing fleets operating in the Emperor Seamounts, and that once existing fishing areas were defined explicitly, Members should share maps and the official names of the fished seamounts.
9. Participants noted the differences in the identification of vessel position among Members, but acknowledged that at this stage it may not be necessary to unify position identification.
10. Participants discussed the possibility of Japan conducting similar analysis using the data of other Members. Japan explained that from a technical standpoint, this would be possible. However, further discussions would be required on issues of data sharing and confidentiality.
11. Korea asked about the target species in the study. Japan explained that all vessels primarily targeted North Pacific armorhead and that the actual target species might change depending on the abundance of North Pacific armorhead.
12. Japan presented on fishery bycatch and survey data for corals and sponges (NPFC-2017-SSC VME02-WP02). Japan studied the frequency and intensity of fisheries bycatches of VME

indicator taxa to confirm actual levels of interactions between bottom fisheries and potential VMEs within existing fishing grounds. The research was aimed at addressing issues identified at the 1st SSC VME meeting, namely studying the differences in bycatch frequencies among different fishing fleets and conducting further statistical analysis of the bycatch data. The study found Gorgonacea to be dominant in both commercial fisheries and scientific surveys in terms of frequency. By weight, Gorgonacea was dominant in commercial catches, while sponge composition percentage increased due to the weight of the water content. The study also found similar patterns in the frequency distribution of non-zero bycatch weights of the VME indicator taxa across trawl, gillnet, and surveys, and the lack of flexion points suggests that encounters with dense patches of VME indicator taxa were not detected. The study also found a large discrepancy between the occurrence rate of non-zero catches by commercial fisheries and scientific surveys.

13. China pointed out that Japan had presented aggregated data that assumed a constant weight composition of species each year and asked whether there may be annual weight compositions that impact the representativeness of Japan's data. Japan believed that there was no clear trend of weight fluctuations in existing fishing grounds, but acknowledged that it should conduct further analyses to confirm if its belief was correct. As for unfished areas, Japan agreed that annual changes in bycatch weight could be a big factor in exploratory fishery.
14. The Members also discussed the identification of outliers and whether the survey data were truly representative of the conditions on the sea floor. China suggested employing resampling techniques. The Members also noted that outlier information may have important implications for determining encounter protocols and fishing rules.
15. Japan presented on potential impacts of Japanese bottom fisheries on VMEs within fished seamounts (NPFC-2017-SSC VME02-WP03 (Rev 1)). In the study, Japan characterized benthic communities observed on fished seamounts, identifying six clusters. Japan analyzed the fine-scale geographical overlap of bottom fishing activities and potential VME indicator taxa to identify potential VME risk sites. Japan then narrowed down the sites through risk scoring, and subsequently through further visual re-confirmation of these sites. Two sites were identified as being very likely to be at risk and two others as requiring further study. Japan concluded that while the density of potential VME indicator taxa was very low and no potential VME sites were detected within the main fishing grounds, dense patches of large colonies of Gorgonacea and Scleractinia were observed in a few locations at the outer edge of the main fishing grounds on fished seamounts. Japan suggested that small-scale spatial protection of potential risk sites, coupled with development of encounter protocols, be conducted for

preventing unanticipated fisheries interactions. In addition, Japan proposed that Members hold discussion for establishing an SAI assessment process and encouraged Members engaged in bottom fisheries in the Emperor Seamounts to collaborate in the assessment. Japan also called for improvement of exploratory fishery protocols for unfished areas.

16. China pointed out that in this study as well, the risk level could be averaged out using aggregated data. China suggested that annual effects of fishing operations need to be further explored. Japan acknowledged that the study only presented an aggregated snapshot and that it was necessary to be aware of historical fishery activity and potential overlap. Nevertheless, Japan believed that the study was meaningful in terms of identifying VME sites that were potentially at risk under the current fishing activities.
17. Korea presented on the bycatch of cold water corals by Korean trawl fisheries in the Emperor Seamounts from 2013-2016 (NPFC-2017-SSC VME02-WP06). The Koko Seamount was identified as the area with the highest average weight per haul and also the site of the largest bycatch of 5.12 kg. The composition of taxa changed over the study period, with Antipatharia being the dominant taxa in 2013 and 2014, and Gorgonacea in 2015 and 2016. Korea is also working on compiling a VME coral field guide based on the specimens identified in the Emperor Seamounts.
18. The Members agreed on the importance of distinguishing between live and dead coral in bycatches and the different implications each has. Japan volunteered to share its practices for distinguishing between live and dead coral with the other Members.
19. The participants discussed reasons why the dominant species changed over the course of the study period. The participants recognized that, although differences in composition may not be resolved, similar taxa had been identified in each Member's study, and that these taxa were in line with the four orders of indicator VME designated by the NPFC.
20. Russia reported on bycatch data from the Russian vessel in the NPFC Convention Area in 2016 (NPFC-2017-SSC VME02-IP03). The fact that the bycatch of invertebrates did not exceed several kilograms during the entire fishing season using longlines and that VME indicator species were absent in longline catches suggests that longline fishing did not impact VMEs on the Emperor Seamounts in existing fishery grounds.
21. Japan presented the results of the bottom environmental survey of the Emperor Seamount chain trawl fishing grounds in 2016 (NPFC-2017-SSC VME02-WP04). Japan conducted the survey

to confirm the spatial extent of the known coral assemblages using 1000 m-class remotely-operated vehicle, namely the Scleractinian assemblage on the Colahan Seamount and the gorgonian *Paragorgia* sp. assemblage on the northwest bank of the Koko Seamount, as well as to confirm the existence of VMEs in the area of the large bycatch operation. The study found *S. variabilis* sparsely distributed on the north ridge at depths between 770 m and 850 m in the Colahan Seamount. It also found that on the northwest bank of the Koko Seamount, the distribution of *Paragorgia* sp. was larger than previously known, and that Oxeye oreo also used this area as a habitat. Furthermore, the study confirmed that the same corals as bycatch corals were distributed sparsely in the area where the bycatch exceeded 10 kg, but there was no evidence to indicate that the bycatch corals were distributed intensively.

22. Japan presented the results from its multi-beam bathymetric survey of the Emperor Seamounts (NPFC-2017-SSC VME02-WP05). Japan conducted a multi-beam acoustic study in the Emperor Seamounts, combined with ground truth observation studies, to create detailed high-resolution seabed maps and contribute to predicting the existence of VMEs and assessing the impact of bottom fisheries on VMEs. The survey clarified the detailed bottom topography of the Emperor Seamounts, and attempted to estimate the sediment map. Furthermore, the threshold range of the backscatter of each sediment type obtained at Kammu Seamount showed nearly the same value as the results obtained at the other seamounts, suggesting the effectiveness of the sediment classification by the acoustic study. Data obtained from these analyses are currently being applied to the distribution prediction of cold-water corals in the Emperor Seamounts.
23. The Members agreed on the value of the topography and sediment-type data and discussed how this data could be shared. Japan explained that on the technical side there were difficulties posed by the size of the data. In addition, there are issues of data ownership that need to be addressed as well. Japan noted that information security guidelines would be proposed by the Secretariat for discussion at the upcoming SC meeting.

Agenda Item 5. Review of the CMMs 2016-05 and 2016-06 for Bottom Fisheries and Protection of Vulnerable Marine Ecosystems

5.1 Encounter Protocol

5.2 Other Scientific Issues

5.3 Drafting Revision for CMM 2016-06

24. The Members reviewed CMMs 2016-05 and 2016-06 and discussed whether or not it was necessary to revise them.

25. The Members agreed to maintain the current wording of the CMMs related to the encounter protocol but acknowledged that, in the long term, it could be further refined. In particular, the uniform threshold of 50 kg of cold water corals in one gear retrieval, regardless of species or gear, was identified as lacking a scientific basis. The Members have been advancing scientific research and gathering data towards further refining the encounter protocol, and will continue to do so.
26. Japan proposed that more detailed technical guidance was needed with regard to the exploratory fishery protocol.
27. Canada presented the revisions to CMM 2016-06 by WebEx regarding fished seamounts in the Northeastern Pacific Ocean (NPFC-2017-SSC VME02-WP07), references to annexes 3-5 as well as editorial corrections. The participants endorsed the proposal. Furthermore, the Members encouraged Canada to conduct an updated review of its fisheries in the Northeastern Pacific Ocean and present the findings to the SSC VME in the near future, in order to contribute to the future SAI assessment activities discussed at the current SSC VME meeting.

Agenda Item 6. Review of Identifications of VMEs and Assessment of SAI on VMEs

28. The Members reviewed the current identifications of VMEs and assessment of SAI on VMEs, and discussed whether or not it was necessary to revise them.
29. The Members agreed that, at this point in time, the four current indicator VME species were sufficient for fished seamounts of the western Convention Area. They identified Porifera and Hydrocorals as potential VME indicator taxa. However, further scientific analysis is needed to determine whether or not this is necessary.
30. The Members agreed to prepare a consolidated SAI assessment report for the NPFC Convention Area. Furthermore, in order to hold more in-depth discussions, the Members proposed holding a workshop on SAI assessment.

Agenda Item 7. Suggestions for the SC Research Plan and 5-year Work Plan

31. The Members discussed suggestions for the SC Research Plan, referring to NPFC-2017-SC02-WP01 and NPFC-2017-SC02-WP05 and agreed to implement research in the seven work areas identified by the SC in its Research Plan. The Members also began developing a preliminary 5-year work plan for each of the VME work areas, including the holding of a workshop on SAI assessment and a workshop on VME data analysis.

Agenda Item 8. Other Matters

32. The Members discussed a proposal presented by the Science Manager of the NPFC on behalf of the FAO regarding the holding of a workshop to support the VME data analysis of the NPFC, in relation to the Sustainable Fisheries Management and Biodiversity Conservation of Deep Sea Living Resources in Areas Beyond National Jurisdiction Project (NPFC-2017-SSC VME02-OP01). The Members supported the proposal in principle but believed that there remained questions about the nature and organization of the workshop that could only be clarified through discussion with the FAO. Therefore, the Members requested that further discussion of the proposal and any decision thereon be deferred to the Scientific Committee (SC) meeting.
33. The Members discussed Japan's suggestion on special project fund items for VME scientific projects (NPFC-2017-SC02-WP06) and agreed to forward the proposal to produce a common NPFC VME field guide to the SC for approval. The Members also discussed the importance of a GIS database for the spatial management of bottom fisheries and VMEs but decided to defer discussions to the SC, noting that this matter pertained to the broader issue of NPFC database management systems. In addition, the Members request that the Financial and Administration Committee (FAC) establish a guideline for proposal, review and implementation of projects submitted by NPFC subsidiary bodies and/or Members.
34. The Members selected Ms. Bai Li (China) as the new Chair and acknowledged the great efforts of Dr. Loh-Lee Low to date as Chair of the SSC VME.

Agenda Item 9. Recommendations to the SC

35. The SSC VME recommends the following to the SC:
 - a. VME taxa – no change, but continue research on inclusion of other VME indicators in future and produce a common NPFC VME field guide.
 - b. Encounter threshold – no change, but continue research toward identifying more scientifically-valid thresholds.
 - c. Move-on rule – no change.
 - d. Reporting requirements – no change.
 - e. CMM for the Northwestern Pacific Ocean – no change, as adopted by the 2nd Commission meeting.
 - f. CMM for the Northeastern Pacific Ocean – endorse revised CMM 2016-06 as proposed by Canada.

- g. Exploratory Fishery Protocol in the North Pacific Ocean – refer to SC for consideration of more detailed technical guidance.
- h. SAI assessment – propose a workshop to further assess SAI (2017-2018).
- i. VME data collection standards – no change, but hold a workshop for further discussions.
- j. Data sharing – refer to SC for development of data sharing policy.
- k. Spatial management of bottom fisheries and VMEs – Discuss establishing GIS database.

Agenda Item 10. Next Meeting

- 36. The Members request the guidance of the SC for determining the date and location of the next meeting.

Agenda Item 11. Adoption of the Report

- 37. The draft report was adopted by consensus.

Agenda Item 12. Close of the Meeting

- 38. The SSC VME meeting closed at 17:51 on 18 April 2017.



2nd Meeting of the Small Scientific Committee on North Pacific Armorhead

19-20 April 2017
Shanghai, China
Meeting Report



2nd Meeting of the Small Scientific Committee on North Pacific Armorhead

AGENDA

- Agenda Item 1. Opening of the meeting
- Agenda Item 2. Adoption of Agenda
- Agenda Item 3. Meeting arrangements
- Agenda Item 4. Review of fisheries through presentation of Annual Reports
- Agenda Item 5. Progress in the development of stock assessments and adaptive management approach for North Pacific Armorhead
- Agenda Item 6. Data collection/reporting by observers and fishers
- Agenda Item 7. Review of the CMMs 2016-05 and 2016-06 for bottom fisheries and protection of vulnerable marine ecosystems
- Agenda Item 8. Suggestions for the SC Research Plan and 5-year Work Plan
- Agenda Item 9. Other matters
 - Selection of next Chair
- 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 Meeting

1. The 2nd Meeting of the Small Scientific Committee on North Pacific Armorhead (SSC NPA) took place in Shanghai, China on 19-20 April 2017, and was attended by Members from China, Japan, the Republic of Korea, and the Russian Federation, and the United States of America had an advisor present. The meeting was opened by Dr. Taro Ichii (Japan) who served as the SSC NPA Chair.

Agenda Item 2. Adoption of Agenda

2. Japan proposed presenting information paper NPFC-2017-SSC NPA02-IP01 and working papers NPFC-2017-SSC NPA02-WP01, 02 (Rev. 1), 04, 05, and 06 (Rev. 1) under Agenda Item 5. Progress in the Development of Stock Assessments and Adaptive Management Approach for North Pacific Armorhead (NPA), rather than Agenda Item 4. Review of Fisheries through Presentation of Annual Reports, under which they were originally listed.
3. The agenda was adopted.

Agenda Item 3. Meeting Arrangements

4. The Science Manager Dr. Aleksandr Zavolokin outlined the meeting schedule and Mr. Alexander Meyer was selected as Rapporteur.

Agenda Item 4. Review of Fisheries through Presentation of Annual Reports

5. Korea presented its 2016 annual report on bottom fisheries. A total of 50 tons of NPA were caught in 2016 by trawl.
6. Japan presented its 2016 annual report on bottom fisheries. A total of 199 tons of NPA were caught in 2016 by trawl and gillnet, the lowest amount caught by Japan since 2002.

7. Russia informed participants that the Russian vessel that operated on the Emperor Seamounts did not catch NPA in 2016.
8. The Chair summarized that a total of 249 tons of NPA were caught in the Convention Area in 2016 which is the lowest harvest since 2002. The participants also discussed the prospects for NPA recruitment in 2017. A high catch is not foreseen.
9. Japan noted that the taxonomic resolution of the current summary footprint for bottom fisheries is not sufficient for monitoring the activity of bottom fisheries and urged development of data templates for bottom fisheries.

Agenda Item 5. Progress in the Development of Stock Assessments and Adaptive Management Approach for North Pacific Armorhead

10. Japan presented its proposal for formulating an adaptive management plan for NPA. Japan noted that Members' views on the adaptive management plan currently proposed by Japan were divergent and believed that the currently proposed plan was too complicated. Japan pointed out that it would be difficult to manage and introduce NPA under the currently proposed plan, and there was no agreed stock assessment method. Therefore, Japan proposed an adaptive management plan composed of the four basic steps of plan, act, monitor, and evaluate, conducted in collaboration among fishermen, fishery managers, and scientists. Japan also noted that the current fishing mortality was too high and emphasized the need for clear management objectives. In that regard, Japan advocated setting short-term targets, such as not overharvesting recruits and conserving sufficient spawners, and long-term targets, such as the recovery of resource levels to a certain historical level by a set year in the future.
11. Korea advocated adopting a precautionary approach in light of the low recruitment levels of NPA.
12. The participants suggested that the depletion model is one of the practical methods for the preliminary stock assessment for NPA under the current stage.
13. Japan presented on the application of the directed Catch per Unit Effort (CPUE) method to multispecies bottom fisheries in the Emperor Seamounts region for monitoring of stock status and fishing activity (NPFC-2017-SSC NPA02-WP02 (Rev 1)). Japan applied the directed CPUE method on multispecies bottom trawl fisheries in the Emperor Seamounts region in a study spanning 2009 to 2016 to correct the amount of directed fishing effort on each species for potential targeting effects in order to achieve a valid index of stock abundance. The study

compared nominal and directed CPUE for NPA and splendid alfonsino, and found that targeting of splendid alfonsino was determined by NPA abundance. Based on these results, Japan concluded that reduction of first priority stock causes the increase of directed efforts to alternative stocks and that output control for the first priority stock may also cause the increased fishing pressure to alternative stocks. Therefore, the side effects of stock fluctuation and managements measures of the first priority species on other species should be monitored. In addition, directed CPUE is a reasonable index of abundance especially for alternatively targeted species.

14. The participants noted the importance of standardizing CPUE, and discussed the inclusion of variables such as vessel identification and spatial information in the CPUE standardization.
15. Japan presented on the relationship between NPA recruitment and marine environment (NPFC-2017-SSC NPA02-WP01). Japan conducted particle tracking experiments to estimate the movement route and surrounding environment of the larvae. Japan aimed to analyze the relationship between the trend of catch and marine environment index (Pacific Decadal Oscillation (PDO)), the range of dispersion between strong and weak year classes, and water temperature experienced by larvae between year classes, in order to consider the causal relation between variation of recruitment quantity and marine environment. Japan did not find a clear causal relationship between variation of recruitment quantity of NPA and marine environment. However, the initial migratory route of this species dispersing to the eastern North Pacific Ocean was reproduced by particle tracking experiments. Moreover, habitat temperature may be the key to the recruitment mechanism. In future, Japan aims to conduct particle tracking experiments considering surface wind, to grasp the marine environmental change of nursery areas, and to investigate the relationship between habitat temperature and growth/survival mechanism.
16. China suggested that the results could be affected by particle depth and the corresponding physical effects. China also recommended that Japan include larvae mortality and validate the results using survey data in further analyses.
17. China pointed out that due to the lifecycle of NPA, larvae inhabited the surface waters, while caught fish inhabited the bottom layer. Therefore when comparing marine environment, as measured by PDO, and catch, a time lag should be applied.
18. Japan presented a report of its scientific survey on bottom fish and prey organisms in the southern Emperor Seamounts (NPFC-2017-SSC NPA02-WP04, 05, and 06 (Rev1)). Japan

conducted a scientific survey of prey organisms on Colahan and C-H Seamounts using echosounders, combined with mid-water trawls and fishing rod surveys in areas where strong echoes were found. Based on the study Japan concluded that such acoustic surveys have the potential to obtain stock data relatively quickly. However, identification of the species and information on size composition are needed. In the study, Japan was able to obtain acoustic data and related biological information in the C-H Seamount, and demonstrated the ability to survey NPA acoustically in the daytime. In addition, Japan was able to obtain the average target strength data per fish using J-QUEST χ , which is needed for the precise conversion of acoustic values to the density of fish. Therefore, Japan believes it is possible to estimate NPA stock on the flattops in the daytime, assuming that the acoustic response indicates the presence of NPA.

19. Korea suggested that the difference in fish distribution between daytime and nighttime and between the Colahan and C-H Seamounts warranted further investigation.

Agenda Item 6. Data Collection/Reporting by Observers and Fishers

20. Japan proposed a template for collecting scientific observer data from NPFC bottom fisheries in the western part of the Convention Area (NPFC-2017-SSC NPA02-WP03) and requested that Members conduct a feasibility test of the template.
21. Korea highlighted the importance of set-by-set/haul-by-haul observer data collection in the bottom fisheries since it is defined in NPFC CMM 2016-05.
22. The participants noted the need for considering the difficulty in data collection in addition to the scientific necessity of the data.
23. Korea proposed templates for collecting data on bottom fisheries in the NPFC Convention Area for observers and for fishermen, respectively, and requested that Members establish a correspondence group to develop the data template.
24. The participants recommend conducting intersessional work to develop templates for data collection and reporting by observers and fishers.

Agenda Item 7. Review of the CMMs 2016-05 and 2016-06 for Bottom Fisheries and Protection of Vulnerable Marine Ecosystems

25. The participants reviewed CMMs 2016-05 and 2016-06 and discussed whether or not it was necessary to revise them.

26. The participants proposed that CMM 2016-05 be revised to include more precise geographical information regarding the “Southeastern part of Koko seamount” in Paragraph 4, H (COM03-Annex E).
27. The participants agreed that, besides the aforementioned revision, no further revision of the CMMs 2016-05 and 2016-06 was currently necessary. However, the participants expressed concern over the current levels of NPA stock and noted that the current CMM 2016-05 may be insufficient for ensuring the sustainability of the NPA stock in the Convention Area.

Agenda Item 8. Suggestions for the SC Research Plan and 5-year Work Plan

28. The participants discussed suggestions for the SC Research Plan (NPFC-2017-SC02-WP01) and the 5-year work plan (NPFC-2017-SC02-WP05). The participants revised the NPA section of the 5-year work plan (SC02-Annex D) and agreed to discuss the item “conduct affiliated research” in more detail at the next meeting of the SSC NPA. The participants also agreed to the areas of work related to NPA proposed in the SC Research Plan.
29. The participants noted that the monitoring and assessment of NPA alone was insufficient for ensuring the sustainability of bottom fisheries. The participants recommend that the SC consider broadening the scope of the SSC NPA to encompass bottom fish stocks in the Convention Area, not only NPA.
30. The Members discussed Japan’s suggestion on special project fund items for bottom fisheries projects (NPFC-2017-SC02-WP06). The Members discussed the importance of establishing a geographic information system for the spatial management of bottom fisheries and VMEs but decided to defer discussions to the SC, noting that this matter pertained to the broader issue of NPFC database management systems.

Agenda Item 9. Other Matters

31. The participants agreed to the extension of the term of the current Chair, Dr. Taro Ichii.

Agenda Item 10. Recommendations to the Scientific Committee

32. The SSC NPA recommends the following to the SC:
 - a. Consider broadening the scope of the SSC NPA to encompass bottom fish stocks in the Convention Area, not only NPA.
 - b. Conduct intersessional work to develop templates for data collection and reporting by observers and fishers through a Corresponding Group nominated at the SC meeting
 - c. Endorse the revised CMM 2016-05 (COM03-Annex E), which now includes more precise geographical information.

- d. No further revision related to NPA is currently needed for CMMs 2016-05 and 2016-06. However, in light of the low levels of NPA catch, additional measures for the NPA stock may be needed in the future.
- e. Include the suggestions for the 5-year work plan (SC02-Annex D) in the Research Plan.
- f. Discuss establishing a geographic information system for the spatial management of bottom fisheries and VMEs.
- g. Consider the adoption of an Adaptive Management process (plan, act, monitor, evaluate) for NPA through the collaboration of scientists, managers, and fishers.

Agenda Item 11. Next Meeting

- 33. The participants request the guidance of the SC for determining the date and location of the next meeting.

Agenda Item 12. Adoption of the Report

- 34. The draft report was adopted by consensus.

Agenda Item 13. Close of the Meeting

- 35. The SSC NPA meeting closed at 13:39 on 20 April 2017.



2nd Meeting of the Small Scientific Committee on Pacific Saury

21-22 April 2017

Shanghai, China

Meeting Report



2nd Meeting of the Small Scientific Committee on Pacific Saury

AGENDA

Agenda Item 1. Opening of the meeting

Agenda Item 2. Adoption of Agenda

Agenda Item 3. Meeting arrangements

Agenda Item 4. Review of fisheries through presentation of Annual Reports

Agenda Item 5. Stock status of Pacific saury

5.1 Reports of the previous meetings on Pacific saury stock assessment and recommendations

5.2 Pacific saury stock status

Agenda Item 6. Review of the CMM 15-02 for Pacific saury

6.1 Review of implementation of the CMM 15-02 and its effects to the stock

6.2 Any other actions required for the conservation and management

6.3 Advice and recommendations in accordance with Article 10 subparagraph 4(b)

Agenda Item 7. Data collection and management

7.1 Data collection templates (Corresponding Group)

7.2 Updated data on Pacific saury catches (Secretariat)

Agenda Item 8. Future Work and New Information

Agenda Item 9. Suggestions for the SC Research Plan and 5-year Work Plan

Agenda Item 10. Other matters

- Selection of next Chair

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 Meeting

1. The 2nd Meeting of the Small Scientific Committee on Pacific Saury (SSC PS) took place in Shanghai, China on 21-22 April 2017, and was attended by Members from China, Japan, the Republic of Korea, the Russian Federation, and Chinese Taipei, and the United States of America had an advisor present. Vanuatu attended as an observer. The meeting was opened by Dr. Toshihide Iwasaki (Japan) who served as the SSC PS Chair.
2. Dr. Xinjun Chen, Professor and Dean of the College of Marine Science, Shanghai Ocean University, offered opening remarks on behalf of the host Member. Dr. Chen welcomed the participants and highlighted importance of ensuring the sustainability and healthy stock of Pacific saury. He expressed his hope that the meeting would yield fruitful discussions, and contribute to the conservation and management of Pacific saury.

Agenda Item 2. Adoption of Agenda

3. The participants proposed a new agenda item, Agenda Item 8. Future Work and New Information. Under the aforementioned agenda item, Russia proposed to present its alternative stock assessment, and Japan proposed to present its future working plan.
4. Korea proposed the presentation of its report on the Pacific saury data collection template under Agenda Item 7. Data Collection and Management.
5. The revised agenda was adopted.

Agenda Item 3. Meeting Arrangements

6. The Science Manager Dr. Aleksandr Zavolokin outlined the meeting schedule and Mr. Alexander Meyer was selected as Rapporteur.

Agenda Item 4. Review of Fisheries through Presentation of Annual Reports

7. The participants reviewed their respective Pacific saury fisheries in the Convention Area and EEZs referring to NPFC01-2017-AR-Annual Summary Footprint – Pacific saury.
8. Vanuatu reported that its total catch of Pacific saury in 2016 was 7,331 tons. Vanuatu had 4 vessels in the Convention Area in 2016.
9. China noted that Japan's catch data for 2014 were still preliminary. Japan explained that the preliminary data were based on port data and that it needed the ocean log books to finalize the data. China suggested that Japan compare the preliminary and final data for all years up to and including 2013 to verify the quality of the preliminary data.
10. Total catch of Pacific saury in 2016 was 362 thousand tons which is similar to 2015.

Agenda Item 5. Stock Status of Pacific Saury

5.1 Reports of the previous meetings on Pacific saury stock assessment and recommendations

5.1.1 Previous meeting reports

11. The Chair of the Technical Working Group on Pacific Saury Stock Assessment (TWG PSSA), Dr. Mitsuo Sakai (Japan), presented the reports of the Pacific Saury Stock Assessment workshop (WS PSSA) and TWG PSSA meeting, as well as recommendations made by the TWG PSSA (NPFC-2017-TWG PSSA01-Final Report).
12. The TWG PSSA Chair reported that the WS PSSA, held in Busan from 13 to 15 December 2016, reviewed the Pacific saury fisheries status and assessment, agreed to a catch per unit effort (CPUE) standardization protocol, agreed on the Bayesian state-space biomass dynamic model as a base model, agreed to a maximum sustainable yield (MSY) approach with FMSY and BMSY as reference points, approved a stock assessment protocol, and agreed that Members should submit CPUE standardization documents.
13. The TWG PSSA Chair reported that the 1st TWG PSSA meeting, held in Yokohama from 20 to 22 February 2017, explored three base-case scenarios with differing survey catchability of the Japanese survey biomass index and conducted a sensitivity analysis without using the Japanese survey biomass index.
14. TWG-PSSA coordinated stock assessment analysis by employing the Bayesian state-space biomass dynamic models. The models account for process error in addition to observation error in the biomass indices such as standardized CPUE series for commercial fisheries submitted

by Members as well as fishery-independent survey by Japan. Based on the TWG PSSA recommendations (Paragraph 33), following three base-case scenarios differing in survey catchability (q) of the Japanese survey biomass index were explored: 1) including CPUEs and q prior defined from 0 to 1, 2) including CPUEs and q prior fixed at 1, 3) including CPUEs and q prior defined from 0 to larger than 1 (free q). The TWG PSSA also had a lengthy discussion of the caveats associated with using Japan's survey data because the survey q tended to have a value larger than 1, which suggests that the survey biomass may be overestimated due to possible herding by the trawl gear or extrapolating fish abundance to the unfished regions with less abundant Pacific saury. Therefore, a sensitivity analysis was conducted without using the Japanese survey biomass index (excluding survey q).

5.1.2 Review of stock status report

15. Along with the specification agreed in the 1st TWG PSSA meeting, China, Japan, and Chinese Taipei conducted analyses. Comparison of the estimated parameters by three Members is shown in the Table in Annex A. Mean MSY (x10,000 mt) evaluated by China, Japan and Chinese Taipei ranged from 50.65 to 59.35, 51.4 to 62.2, and 54.23 to 60.67 respectively. B2016/BMSY (>1) and F2015/FMSY (<1) values calculated by all members showed a healthy stock status.
16. Based on the model results, 1) China concluded that the exploitable biomass was above BMSY and the current fishing mortality is below FMSY, suggesting that the Pacific saury was not overfished and is not experiencing overfishing. 2) Chinese-Taipei concluded that the current stock status Pacific saury does not appear to have been overfished or to have experienced overfishing and is likely within the green quadrant. The stock assessment concludes that Western North Pacific saury is healthy and is sufficient to sustain recent exploitation levels. 3) Japan's results show that the current biomass level is likely above the level of BMSY for all scenarios and the current fishing intensity level is likely lower than FMSY for all scenarios.
17. The participants discussed the inclusion of environmental factors in the stock assessment. The participants noted that a number of environmental factors were incorporated in the CPUE standardization, but acknowledged that it was necessary to determine the main environmental factors.
18. Korea suggested that predation information should be included in the stock assessment. China suggested that ecosystem changes need to be monitored, and that if there were any dramatic increase in predation that impacted stock, predator abundance needs to be considered in the stock assessment.

5.2 Pacific saury stock status

19. The SSC PS concluded that despite small variations among the three stock assessments and among the three base-case scenarios it is likely that the Pacific saury stock is not overfished with median B2016/BMSY varying from 1.16 to 1.46 and it is likely that overfishing is not occurring with median F2015/FMSY varying from 0.40 to 0.69. The sensitivity run, which excludes the survey data, also supports this conclusion with median B2016/BMSY varying from 1.19 to 1.34 and median F2015/FMSY varying from 0.50 to 0.65.

Agenda Item 6. Review of the CMM 15-02 for Pacific saury

6.1 Review of implementation of the CMM 15-02 and its effects to the stock

20. The participants reviewed CMM 2015-02 and discussed whether or not it was necessary to revise it.
21. The participants recommend maintaining CMM 2015-02 in its current form and not expanding fishing efforts in 2018.

6.2 Any other actions required for the conservation and management

22. The participants suggested that more data on the impact of illegal, unreported and unregulated (IUU) fishing and bycatch, and catch discarding on Pacific saury stock in the North Pacific Ocean were needed.

6.3 Advice and recommendations in accordance with Article 10 subparagraph 4(b)

23. Japan presented information for considering a time/area-based CMM for Pacific saury (NPFC-2017-SSC PS02-WP02). In light of the sudden decrease in the biomass of Pacific saury in 2010 in the area west of 162°E, as identified by surface trawling research cruises, Japan decided to analyze the migration ecology of Pacific saury. Based on comparison of the survey data in June-July and August-December, Japan suggested that, as a precautionary step, Members should consider conservation of age-0 fish by not extending commercial fishery grounds to the area in which age-0 fish are abundantly distributed.
24. Chinese Taipei commented that the distribution of age-0 fish required further research.
25. The participants encouraged the conducting of further research to better understand the Pacific saury spatial/temporal dynamics by age in the North Pacific Ocean.

Agenda Item 7. Data Collection and Management

7.1 Data collection templates (Corresponding Group)

26. On behalf of the Corresponding Group, Korea presented the updated data collection templates (NPFC-2017-SSCPS02-WP05).
27. The participants discussed the proposed data collection templates, but were unable to reach a consensus. The participants agreed to modify the proposed data collection templates as necessary to meet the requirements for stock assessment and management.
28. Japan presented its proposed data collection and data format for age/size structured models for Pacific saury (NPFC-2017-SSC PS02-WP01). Japan emphasized the importance to collect age and size data for future stock assessment.

7.2 Updated data on Pacific saury catches (Secretariat)

29. The Science Manager presented updated data on Pacific saury catches (NPFC-2017-SSC PS02-WP03 (Rev 1)). He informed Members that this is the most accurate data set on Pacific saury catches which the Commission has to date and encouraged Members to further improve catch figures when possible. The revised data set including Vanuatu's catch for 2013-2016 shall be posted on the NPFC website (Members Area).

Agenda Item 8. Future Work and New Information

30. Russia presented alternative Pacific saury assessment methods (NPFC-2017-SSC PS02-WP04), namely using a stock production model incorporating covariates (ASPIC), a stochastic surplus production model in continuous time (SPiCT), and a production model in discrete time (COMBI4). ASPIC and COMBI4 produced similar results for B2016/BMSY and F2015/FMSY to those obtained by the TWG PSSA. SPiCT estimates, however, were less optimistic with regard to B2016/BMSY and F2015/FMSY and contained major uncertainties. Therefore, Russia suggested that all Members provide monthly estimates of CPUE indices and catches to improve inputs for SPiCT, the use of which can help to overcome at least the discrepancy of multidirectional tendencies in CPUE indices, which possibly occur due to the differences in time and consequently space for fishing operations among Members.
31. Chinese Taipei commented on the adequacy of using the continuous surplus production model and the inclusion of observation error in catch in the SPiCT model.
32. Japan presented a proposal for improving the current production model, towards conducting the second step stock assessment for Pacific saury (NPFC-2017-SSC PS02-WP01). Japan

suggested that age/size structured models could help improve the accuracy of the estimated number of age-1 individuals, estimate egg production based on proportion of maturity by age, and estimate the recruitment of age-0 fish in the following year. Japan proposed conducting research on the appropriateness of such models. To do so, the total number of individuals by age and the total number of fished individuals is needed. Japan therefore requested that Members collect such data. Furthermore, research on migration ecology and spatio-temporal analysis of distribution patterns are necessary for effective stock assessment and appropriate utilization of Pacific saury. Japan therefore proposed that Members report the number of fished individuals by age, month and fishing ground.

33. The participants agreed to continue conducting stock assessments with the Bayesian state-space bio-mass dynamics models (BSSBDMs), although the participants also agreed that BSSBDMs are provisional base models. Therefore, the participants agreed to conduct further research on ways to improve the base model, including examining age/size structured models, as well as the inclusion of additional data, such as biological factors, environmental factors, and catch discarding data, towards conducting benchmark stock assessments.
34. Korea suggested that an observer program could improve the accuracy of age and size data. Japan explained practical difficulties for Japan in conducting such a program. The Chair reminded that discussion of an observer program would be held at the SC meeting and advised that the discussion be deferred to the SC meeting.
35. The participants agreed to continue the work of the TWG PSSA and endorsed the terms of reference for the TWG PSSA for 2017-2021 (Annex B). The participants requested the approval of the selected Chair of the TWG PSSA, Dr. Toshihide Kitakado (Japan), as well as the time and place of the next meeting, be deferred to the SC meeting.
36. The participants agreed to independently peer review the Pacific saury stock assessment at a timing and format that are to be determined at a future SSC PS meeting.

Agenda Item 9. Suggestions for the SC Research Plan and 5-year Work Plan

37. The participants discussed suggestions for the SC Research Plan (NPFC-2017-SC02-WP01) and the 5-year work plan (NPFC-2017-SC02-WP05). The participants agreed to the areas of work related to Pacific saury proposed in the SC Research Plan in principle, adding minor editorial revisions (SC02 Annex D). The participants revised the Pacific saury section of the 5-year work plan (SC02 Annex D).

38. The participants discussed Japan's suggestion on special project fund items for Pacific saury projects (NPFC-2017-SC02-WP06). The participants recommend to SC to consider budget for meeting costs of TWG PSSA and travel cost for 1 or 2 participants of each Member. Rough costs were estimated at 20,000 USD per year to be further adjusted by FAC for further consideration by the Commission.

Agenda Item 10. Other matters

Selection of next Chair

39. The participants agreed to the extension of the term of the current Chair, Dr. Toshihide Iwasaki.

Agenda Item 11. Recommendations to the Scientific Committee

40. Noting the stock status of Pacific saury (Annex A), the SSC PS recommends the following to the SC:
- a. Maintain CMM 15-02 in its current form and do not expand fishing effort in 2018.
 - b. Collect more data on the impact of IUU fishing, bycatch, and catch discarding on Pacific saury stock in the North Pacific Ocean.
 - c. Conduct further research to better understand the Pacific saury stock structure in the North Pacific Ocean.
 - d. Modify the proposed data collection templates as necessary to meet the requirements for stock assessment and management.
 - e. Continue to update stock assessments with the provisional base production model.
 - f. Conduct further research on ways to improve the provisional base model, towards conducting benchmark stock assessments.
 - g. Continue the work of the TWG PSSA and endorse the terms of reference for the TWG PSSA for 2017-2021 (Annex B).
 - h. Endorse the new Chair of the TWG PSSA, Dr. Toshihide Kitakado, and identify the place and time of the next meeting.
 - i. Independently peer review the Pacific saury stock assessment at a timing and format that are to be determined at a future SSC PS meeting.
 - j. Include the suggestions for the areas of work and the 5-year work plan (Annex C) in the Research Plan.
 - k. Consider budget for meeting costs of TWG PSSA and travel cost for 1 or 2 participants of each Member. Rough costs were estimated at 20,000 USD per year to be further adjusted by FAC for further consideration by the Commission.

Agenda Item 12. Next Meeting

41. The participants request the guidance of the SC for determining the date and location of the

next meeting.

Agenda Item 13. Adoption of the Report

42. The report was adopted by consensus.

Agenda Item 14. Close of the Meeting

43. The SSC PS meeting closed at 17:28 on 22 April 2017.

Annexes

Annex A – Executive Summary of the Pacific saury stock assessment report

Annex B – Terms of Reference for the Technical Working Group on Pacific Saury Stock
Assessment

PACIFIC SAURY STOCK ASSESSMENT

1. Executive Summary

This report provides an analysis and evaluation of the current status of Pacific saury (*Cololabis saira*) stock in the North Pacific Ocean through the stock assessment procedures by employing the Bayesian state-space biomass dynamic model. The saury is widely distributed from the subarctic to the subtropical regions of the North Pacific Ocean, while their fishing grounds are limited to the west of 165 °E. However, the main fishing grounds differ among Members (China, Japan, Korea, Russia and Chinese Taipei,). For example, the Convention Area is the main fishing ground for China, Korea and Chinese Taipei while Japan and Russia fish mainly in their own EEZs. This report summarizes the results of the meeting of the Technical Working Group for Pacific saury stock assessment (TWG PSSA), held at Yokohama from 20-22 February 2017 and further analyses made by TWG PSSA

TWG-PSSA conducted stock assessment analysis by employing the Bayesian state-space biomass dynamic models. The models account for process and model errors in addition to observation errors in the biomass indices such as standardized CPUE series for commercial fisheries by Members as well as fishery-independent survey by Japan. Based on the TWG PSSA recommendations (Paragraph 33), following three base-case scenarios differing in survey catchability (q) of the Japanese survey biomass index were explored: 1) including CPUEs and q prior defined from 0 to 1, 2) including CPUEs and q prior fixed at 1, 3) including CPUEs and q prior defined from 0 to larger than 1 (free q). A sensitivity analysis was conducted without using the Japanese survey biomass index (excluding survey q).

Comparison of estimated parameters by China, Japan and Chinese Taipei are shown in the Table 8-1. Mean MSY ($\times 10,000$ mt) evaluated by China, Japan and Chinese Taipei ranged from 50.65 to 59.35, 51.4 to 62.2, and 54.23 to 60.67 respectively. For the base-case scenario-3 (S3, free q), estimation of q value was above 1. B_{2016}/B_{MSY} (>1) and F_{2015}/F_{MSY} (<1) values calculated by all members showed a healthy trend.

Based on the model results, 1) China concluded that the exploitable biomass was above B_{MSY} and the current status of stock indicates that the Pacific saury was not overfished and is not experiencing overfishing. 2) Chinese-Taipei concluded that based on the current stock status Pacific saury did not appear to be overfished and is not experiencing overfishing. 3) Japan results shows that the biomass level is currently above the level of MSY for any scenarios and concluded that the continuation of the current catch level may not cause severe decline in the population size in the next decade, but recommended a status quo level or reduction of catch to keep the population size above the MSY level.

Table 8-1 Summary of the estimated key parameters and management quantities by China, Japan, and Chinese Taipei, based on three scenarios.

| Scenarios | Parameters | China | | Japan | | Chinese Taipei | |
|-------------------------------------|-------------------------------------|--------|--------|--------|--------|----------------|--------|
| | | mean | median | mean | median | Mean | median |
| S1 (q 0-1) | K (10,000 mt) | 790.26 | 704.00 | 579.4 | 511.2 | 462.80 | 444 |
| | r | 1.03 | 0.77 | 0.965 | 0.704 | 0.73 | 0.61 |
| | Shape (s, Z, M) | 0.57 | 0.32 | 0.729 | 0.569 | 0.99 | 0.79 |
| | B ₁₉₈₀ /K | 0.14 | 0.32 | 0.185 | 0.175 | 0.19 | 0.18 |
| | MSY (10,000 mt) | 59.35 | 57.07 | 62.2 | 59.5 | 60.67 | 58.34 |
| | F _{MSY} | 0.19 | 0.18 | 0.251 | 0.248 | 0.33 | 0.32 |
| | B _{MSY} (10,000 mt) | 346.66 | 310.1 | 265.5 | 237.1 | 224.8 | 216.70 |
| | B ₁₉₈₀ (10,000 mt) | 105.98 | 97.91 | 102.7 | 91.8 | 88.38 | 82.92 |
| | B ₂₀₁₅ (10,000 mt) | 356.63 | 333.1 | 364.9 | 328.5 | 307 | 292.60 |
| | F ₁₉₈₀ | 0.25 | 0.24 | 0.269 | 0.259 | 0.36 | 0.34 |
| | F ₂₀₁₅ | 0.11 | 0.11 | 0.108 | 0.110 | 0.13 | 0.13 |
| | q5 (Biomass) | 0.77 | 0.79 | 0.779 | 0.815 | 0.82 | 0.85 |
| | B ₂₀₁₆ /K | 0.51 | 0.52 | 0.702 | 0.680 | 0.7 | 0.7 |
| | B ₂₀₁₆ /B _{MSY} | 1.16 | 1.18 | 1.529 | 1.463 | 1.44 | 1.44 |
| F ₂₀₁₅ /F _{MSY} | 0.64 | 0.58 | 0.522 | 0.433 | 0.43 | 0.4 | |
| S2 (q=1) | K (10,000 mt) | 615.85 | 527.80 | 466.6 | 414.3 | 390.8 | 381 |
| | r | 1.13 | 0.89 | 1.022 | 0.765 | 0.76 | 0.65 |
| | Shape (s, Z, M) | 0.56 | 0.33 | 0.74 | 0.49 | 1.08 | 0.85 |
| | B ₁₉₈₀ /K | 0.14 | 0.14 | 0.173 | 0.167 | 0.19 | 0.18 |
| | MSY (10,000 mt) | 54.48 | 52.91 | 56.4 | 54.9 | 57.19 | 55.05 |
| | F _{MSY} | 0.22 | 0.22 | 0.281 | 0.279 | 0.36 | 0.35 |
| | B _{MSY} (10,000 mt) | 268.16 | 237.40 | 213.5 | 197.6 | 192.30 | 189.10 |
| | B ₁₉₈₀ (10,000 mt) | 78.66 | 75.43 | 75.4 | 72.3 | 72.39 | 69.77 |
| | B ₂₀₁₅ (10,000 mt) | 261.56 | 260.00 | 264.2 | 263.5 | 246.50 | 243.70 |
| | F ₁₉₈₀ | 0.32 | 0.32 | 0.341 | 0.329 | 0.45 | 0.42 |
| | F ₂₀₁₅ | 0.14 | 0.14 | 0.139 | 0.137 | 0.16 | 0.16 |
| | q5 (Biomass) | 1 | 1 | 1 | 1 | 1 | 1 |
| | B ₂₀₁₆ /K | 0.5 | 0.52 | 0.657 | 0.641 | 0.68 | 0.68 |
| | B ₂₀₁₆ /B _{MSY} | 1.13 | 1.16 | 1.421 | 1.375 | 1.38 | 1.38 |
| F ₂₀₁₅ /F _{MSY} | 0.70 | 0.64 | 0.543 | 0.496 | 0.47 | 0.45 | |
| S3 (free q) | K (10,000 mt) | 457.96 | 409.8 | 310.70 | 267.80 | 223.8 | 200.1 |
| | r | 1.28 | 1.13 | 1.212 | 0.993 | 0.97 | 0.9 |
| | Shape (s, Z, M) | 0.56 | 0.36 | 0.827 | 0.676 | 0.17 | 1.68 |
| | B ₁₉₈₀ /K | 0.14 | 0.14 | 0.164 | 0.158 | 0.18 | 0.18 |
| | MSY (10,000 mt) | 50.65 | 48.66 | 51.40 | 49.70 | 54.23 | 53.04 |
| | F _{MSY} | 0.29 | 0.28 | 0.394 | 0.390 | 1 | 0.69 |
| | B _{MSY} (10,000 mt) | 200.97 | 178.80 | 144.30 | 125.50 | 117.8 | 108.80 |
| | B ₁₉₈₀ (10,000 mt) | 63.39 | 55.79 | 49.30 | 42.90 | 40.98 | 34.95 |
| | B ₂₀₁₅ (10,000 mt) | 210.86 | 189.20 | 169.80 | 147.90 | 131.4 | 113.70 |
| | F ₁₉₈₀ | 0.46 | 0.43 | 0.571 | 0.555 | 2.83 | 1.14 |
| | F ₂₀₁₅ | 0.21 | 0.19 | 0.244 | 0.244 | 0.59 | 0.37 |
| | q5 (Biomass) | 1.46 | 1.37 | 1.774 | 1.802 | 2.46 | 2.16 |
| | B ₂₀₁₆ /K | 0.51 | 0.51 | 0.623 | 0.604 | 0.66 | 0.67 |
| | B ₂₀₁₆ /B _{MSY} | 1.15 | 1.16 | 1.317 | 1.266 | 1.22 | 1.22 |
| F ₂₀₁₅ /F _{MSY} | 0.72 | 0.69 | 0.640 | 0.610 | 0.58 | 0.53 | |
| Sensitivity test S4 (no biomass) | K (10,000 mt) | 536.15 | 454.75 | 375.7 | 303.3 | 216 | 189.2 |
| | r | 1.25 | 1.07 | 1.143 | 0.939 | 0.96 | 0.89 |
| | Shape (s, Z, M) | 0.56 | 0.35 | 0.823 | 0.673 | 1.86 | 1.87 |
| | B ₁₉₈₀ /K | 0.14 | 0.31 | 0.167 | 0.16 | 0.18 | 0.18 |
| | MSY (10,000 mt) | 52.92 | 50.16 | 54.5 | 51.8 | 55.64 | 54.26 |
| | F _{MSY} | 0.27 | 0.26 | 0.365 | 0.359 | 1.07 | 0.76 |
| | B _{MSY} (10,000 mt) | 234.01 | 199.45 | 173.6 | 14.3 | 116.2 | 106.5 |
| | B ₁₉₈₀ (10,000 mt) | 70.52 | 61.14 | 60.3 | 48.4 | 39.57 | 33.63 |
| | B ₂₀₁₅ (10,000 mt) | 244.98 | 217.90 | 217.1 | 174.4 | 132 | 113.3 |
| | F ₁₉₈₀ | 0.43 | 0.39 | 0.51 | 0.492 | 2.99 | 1.23 |
| | F ₂₀₁₅ | 0.18 | 0.17 | 0.208 | 0.207 | 0.59 | 0.38 |
| | q5 (Biomass) | NA | NA | NA | NA | NA | NA |
| | B ₂₀₁₆ /K | 0.52 | 0.53 | 0.654 | 0.637 | 0.69 | 0.7 |
| | B ₂₀₁₆ /B _{MSY} | 1.17 | 1.19 | 1.384 | 1.34 | 1.25 | 1.26 |
| F ₂₀₁₅ /F _{MSY} | 0.69 | 0.65 | 0.59 | 0.562 | 0.54 | 0.5 | |

**Terms of Reference for the Technical Working Group on Pacific Saury Stock Assessment
(TWG PSSA) for 2017-2021**

1. To review fishery data
 - Catch series
 - Age/size composition data
 - Others
2. To review fishery-dependent and fishery-independent indices
 - Review/update the existing protocol
 - Review/update the indices
 - Recommendation of future works
3. To review and update biological information/data
 - Stock structure
 - Growth
 - Reproduction and maturity schedule
 - Natural mortality
 - Migration pattern
 - Others
4. To update the stock assessment using “provisional base models” (i.e. Bayesian state-space production models)
 - Review existing protocol
 - Simple update (including projection and evaluation of reference points as well as diagnosis)
 - Consideration of scenarios (for base and sensitivity)
 - Assessment of uncertainty and its implication of management
 - Evaluation/improvement (if necessary) the models
 - Recommendation of the research for future works
5. To explore stock assessment models other than existing “provisional base models”
 - Data invention/availability (including the identification of potential covariates)
 - Initial (and continued) discussion on age-/size/stage-structure models
 - Identification of lack of information/data and limits
 - Recommendation of the research for future works
6. To facilitate data- and code- sharing processes
7. To review/improve presentation of stock assessment results (including stock status summary report in a format to be determined by the Working Group)
8. To explore the design of MSE framework



2nd Scientific Committee Meeting

24-27 April 2017

Shanghai, China

Meeting Report



2nd Scientific Committee Meeting

AGENDA

Agenda Item 1. Opening of the meeting

Agenda Item 2. Adoption of Agenda

Agenda Item 3. Meeting arrangements

Agenda Item 4. Review of recommendations from the Small Scientific Committees (SSCs)
and Chub mackerel workshop

4.1 SSC on Vulnerable Marine Ecosystems

4.2 SSC on North Pacific Armorhead

4.3 SSC on Pacific Saury

4.4 Chub mackerel workshop

Agenda Item 5. Progress and update on stock assessment

5.1 Bottom fish

5.2 Pelagic fish and squids

Agenda Item 6. Progress in data collection, management and security

6.1 Data reporting templates (Korea)

6.2. Transshipment data (CMM 2016-03)

6.3 Observer Program

6.4 Data management policy

6.5 NPFC data management system (Secretariat)

Agenda Item 7. Scientific projects for 2017 and 2018

7.1 Stock assessments

7.2 Other projects

Agenda Item 8. 2017-2021 Research Plan

Agenda Item 9. Cooperation with other organizations

- ABNJ Deep Seas project, FAO
- NPAFC
- PICES

Agenda Item 10. Other matters

- Selection of next Chair and Vice Chair
- Information on Exploratory fishery targeting deep water crab (Russia)
- Structure of SC
- MCS related issues from SC to TCC

Agenda Item 11. Advice and recommendations to the Commission

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 Meeting

1. The 2nd Meeting of the Scientific Committee (SC) took place in Shanghai, China on 24-27 April 2017, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, and Chinese Taipei, and the United States of America had an advisor present. Vanuatu, the Food and Agriculture Organization of the United Nations (FAO), the North Pacific Anadromous Fish Commission (NPAFC), and the North Pacific Marine Science Organization (PICES) attended as observers. The meeting was opened by Dr. Joji Morishita (Japan) who served as the SC Chair.
2. Mr. Xinzhong Liu, Deputy Director-General of the Bureau of Fisheries, Ministry of Agriculture, offered opening remarks on behalf of the host Member. Mr. Liu welcomed the participants to Shanghai and expressed China's great honor to host the NPFC SC meeting. Mr. Liu explained China's efforts to enhance the conservation of marine resources in the North Pacific Ocean. In addition, Mr. Liu stated that scientific assessment was essential for the management and conservation of marine resources in the North Pacific Ocean, and explained that China attached great importance to and made great contribution to their long-term sustainable use. Finally, Mr. Liu congratulated the NPFC on its scientific achievements to date, including completion of its first stock assessment of Pacific saury, and expressed China's commitment and cooperation for the NPFC's future activities.
3. Prof. Jiamin Wu, Communist Party of China Secretary of Shanghai Ocean University, also offered welcome remarks on behalf of the host Member. Prof. Wu explained Shanghai Ocean University's history of contributing to fisheries research in China and internationally, and expressed his honor to contribute to the hosting of the SC meeting. Finally, Prof. Wu expressed his hope for the success of the meeting, and for constructive and fruitful discussions.
4. Vanuatu notified that it had prepared the instruments for ratification of the Convention and submitted the signed documents to the Embassy of the Republic of Korea, and that it looked forward to becoming a Member of the NPFC in the near future.

Agenda Item 2. Adoption of Agenda

5. The SC agreed to discuss Russia's request to conduct an exploratory fishery targeting deep water crab, as well as the structure of the SC, under Agenda Item 10. Other Matters.
6. The SC agreed to add the following sub-items under Agenda Item 9. Cooperation with Other Organizations: a presentation by the FAO with an update on the Areas Beyond National Jurisdiction (ABNJ) Deep Seas Project, a presentation by the NPAFC on its multinational survey in the North Pacific Ocean, and a presentation by PICES.
7. The Secretariat proposed presenting an update on the Biological Diversity Beyond Areas of National Jurisdiction (BBNJ) exercise after the report of the SSC on North Pacific Armorhead (Agenda Item 4.2).
8. The SC agreed to shift Agenda Item 7.2 Observer Program to Agenda Item 6.3
9. The SC agreed to revise the subject of Agenda Item 6.4 (previously Agenda Item 6.3 prior to the revision in the above paragraph) from "Data management policy (Japan)" to "Data management policy."
10. The revised agenda was adopted.

Agenda Item 3. Meeting Arrangements

11. The Science Manager Dr. Aleksandr Zavolokin outlined the meeting schedule and Mr. Alexander Meyer was selected as Rapporteur. Document List and Participants List are attached to the report.

Agenda Item 4. Review of Recommendations from the Small Scientific Committees (SSCs) and Chub Mackerel Workshop

4.1 SSC on Vulnerable Marine Ecosystems

12. The Chair of the SSC on Vulnerable Marine Ecosystems (SSC VME), Dr. Loh-Lee Low, summarized the outcomes and recommendations of the 2nd SSC VME meeting (SSC VME02-Final Report).
13. Canada explained that it was also conducting research on VMEs and hoped to publish this research in the near future.

14. Japan raised the issue of procedures for considering additional management measures such as spatial closure for potential VME risk sites. There will be further consideration of this issue following the 2018 VME workshop (Annex A, #1).
15. Korea explained that it was formulating a field VME identification guide and proposed that the Members conduct intersessional work to strive to complete the aforementioned guide in advance of the next SSC VME meeting. The SC agreed to discuss the proposal under Agenda Item 7. Scientific Projects for 2017 and 2018.
16. The FAO clarified that it wished to support the activities of the SSC VME by supporting a workshop, linked to the ABNJ project, whose nature and format are to be determined by the SC.
17. Regarding the holding of the VME workshop, Korea expressed the view that more fine-scale data may be necessary for the workshop.
18. The SC endorses the following recommendations based on the SSC VME02 report and recommends the shaded items to the Commission:
 - a. VME taxa – no change, but continue research on inclusion of other VME indicators in future and produce a common NPFC VME field guide.
 - b. Encounter threshold – no change, but continue research toward identifying more scientifically-valid thresholds.
 - c. Move-on rule – no change.
 - d. Reporting requirements – no change.
 - e. CMM for the Northwestern Pacific Ocean – no change, as adopted by the 2nd Commission meeting (Paragraph 22c.).
 - f. CMM for the Northeastern Pacific Ocean – endorse revised CMM 2016-06 as proposed by Canada.
 - g. Exploratory Fishery Protocol in the North Pacific Ocean – refer to SC for consideration of more detailed technical guidance.
 - h. SAI assessment – propose a workshop to further assess SAI (2017-2018).
 - i. VME data collection standards – no change, but hold a workshop for further discussions.
 - j. Data sharing – refer to SC for development of data sharing policy.
 - k. Spatial management of bottom fisheries and VMEs – Discuss establishing GIS database.

19. Regarding the recommendation under paragraph 18 item f. above, the SC proposed an additional editorial change to CMM 2016-06 in relation to the information to be used for determining the level of a historical average for fishing effort (COM03 Annex F).
20. Regarding the recommendations made by the SSC VME requesting further consideration/discussion by the SC, the SC recommends the following:
 - a. CMM for the Northeastern Pacific Ocean – endorse revised CMM 2016-06 as proposed by Canada with correction made by SC (COM03 Annex F).
 - b. Exploratory Fishery Protocol in the North Pacific Ocean – Develop terms of reference for the technical guidelines for the Exploratory Fishery Protocol at the next SSC VME meeting (Paragraph 72).
 - c. SAI assessment and VME data collection standards – Hold a joint VME workshop with support from the FAO’s ABNJ project, addressing both VME data and SAI assessment, in March 2018 in Japan, co-chaired by Dr. Masashi Kiyota and Dr. Loh-Lee Low.
 - d. Data sharing – That the SC discuss this further under Agenda Item 6. Progress in Data Collection, Management and Security.
 - e. Spatial management of bottom fisheries and VMEs – That the SC consider the provision of seed money for initial efforts towards developing a GIS database (Annex A, #3).

4.2 SSC on North Pacific Armorhead

21. The Chair of the SSC on North Pacific Armorhead (SSC NPA), Dr. Taro Ichii, summarized the outcomes and recommendations of the 2nd SSC NPA meeting (SSC NPA02-Final Report).
22. The SC endorses the following recommendations based on the SSC NPA02 report and recommends the shaded items to the Commission:
 - a. Broaden the scope of the SSC NPA to encompass bottom fish stocks in the Convention Area, not only NPA.
 - b. Conduct intersessional work to develop templates for data collection and reporting by observers and fishers through a Corresponding Group nominated at the SC meeting.
 - c. Endorse the revised CMM 2016-05 (COM03 Annex E), which now includes more precise geographical information.
 - d. No further revision related to NPA is currently needed for CMMs 2016-05 and 2016-06. However, in light of the low levels of NPA catch, additional measures for the NPA stock may be needed in the future.
 - e. Include the suggestions for the 5-year Research Plan (Annex B).
 - f. Discuss establishing a GIS database for the spatial management of bottom fisheries and VMEs.

- g. Consider the adoption of an Adaptive Management process (plan, act, monitor, evaluate) for NPA through the collaboration of scientists, managers, and fishers.
23. Regarding the recommendation under paragraph 22. item b. above, the SC agreed to hold further discussions under Agenda Item 6. Progress in Data Collection, Management and Security.
 24. Regarding the recommendations under paragraph 22. items d. and g. above, the SC requested that Japan prepare more specific plans and management objectives, with the cooperation of other Members.
 25. Regarding the recommendation under paragraph 22. item f. above, the SC agreed to consider the provision of seed money for initial efforts towards developing a GIS database (Annex A, #3), as noted in paragraph 20e.
 26. The NPFC Compliance Manager provided an update on the BBNJ exercise. The SC reaffirmed the importance of taking actions for the conservation and management of fisheries resources and marine ecosystems in the North Pacific Ocean.

4.3 SSC on Pacific Saury

27. The Chair of the SSC on Pacific Saury (SSC PS), Dr. Toshihide Iwasaki, summarized the outcomes and recommendations of the 2nd SSC PS meeting (SSC PS02-Final Report).
28. The SC endorses the following recommendations based on the SSC PS02 report and recommends the shaded items to the Commission:
 - a. Maintain CMM 15-02 in its current form and do not expand fishing efforts in 2018.
 - b. Collect more data on the impact of IUU fishing, bycatch, and catch discarding on Pacific saury stock in the North Pacific Ocean.
 - c. Conduct further research to better understand the Pacific saury spatial/temporal dynamics in the North Pacific Ocean.
 - d. Modify the proposed data collection templates as necessary to meet the requirements for stock assessment and management.
 - e. Continue to update stock assessments with the provisional base production model.
 - f. Conduct further research on ways to improve the provisional base model, towards conducting benchmark stock assessments.
 - g. Continue the work of the TWG PSSA and endorse the terms of reference for the TWG PSSA for 2017-2021 (Annex C).

- h. Endorse the new Chair of the TWG PSSA, Dr. Toshihide Kitakado, and identify the place and time of the next meeting.
 - i. Independently peer review the Pacific saury stock assessment at a time and in a format that are to be determined at a future SSC PS meeting.
 - j. Include the suggestions for the areas of work and the 5-year work plan (Annex B) in the Research Plan.
 - k. Consider budget for meeting costs of TWG PSSA and travel cost for 1 or 2 participants from each Member. Rough costs were estimated at 20,000 USD per year to be further adjusted by FAC for further consideration by the Commission (Annex A, #4).
29. In addition to the recommendations in paragraph 28 above, the SC recommends the following:
- a. Regarding management measures for Pacific saury, maintain CMM 15-02 in its current form and do not expand fishing efforts in 2018, or develop a new management measure based on the stock status and MSY mentioned in the SC and SSC reports, with a consideration of the uncertainties.
 - b. Continue to evaluate the quality of Japan's scientific survey data used in the stock assessment to reduce uncertainties associated with the stock assessment.
30. Regarding paragraph 28. item d. above, the SC agreed to hold further discussion under Agenda Item 6. Progress in Data Collection, Management and Security.
31. Regarding paragraph 28. item g. above, the SC endorsed the Terms of Reference in principle, but added the evaluation of the quality of the indices as a task under paragraph 2 and a minor editorial change to paragraph 8 of the Terms of Reference (Annex C).
32. Regarding paragraph 28. item i. above, the SC agreed to hold further discussion under Agenda Item 7. Scientific Projects for 2017 and 2018.
33. Regarding paragraph 28. item j. above, the SC endorsed the suggestions in principle, but added the evaluation of the quality of the data for the stock assessment as a task for 2018 (Annex B).
34. Regarding paragraph 28. item k. above, the SC agreed to further specify the proposal as covering travel costs for 2 participants.

4.4 Chub mackerel workshop

35. The Chair of the Chub mackerel workshop (WS CM), Dr. Hiromu Zenitani, summarized the outcome of the ad-hoc WS CM meeting (WS CM01-Final Report).

36. The SC reviewed the recommendations in the WS CM01 report and recommends the following:
- a. Establish a Technical Working Group on Chub Mackerel (TWG CM) for the purpose of stock assessment with a draft work plan and terms of reference to be determined.
 - b. The terms of reference *inter alia* could include the following items: data quantity, data quality, sources of uncertainty.
 - c. The SC was unable to evaluate precautionary approaches for the management of chub mackerel fisheries as CMM 2016-07 only came into effect in January 2017.
37. Japan stated that it intends to prepare a draft work plan for stock assessment, including a draft list of data.
38. China stated that such a draft work plan for stock assessment should be developed by the TWG on chub mackerel.

Agenda Item 5. Progress and Update on Stock Assessment

5.1 Bottom fish

39. In addition to the consideration of the SSC NPA report above, the SC discussed the following progress in the development of stock assessments for bottom fish:
- a. The SC recognized that the fishing of splendid alfonsino is occurring and encouraged Members engaged in such fishing to conduct a stock assessment of splendid alfonsino.
 - b. The SC recognized the comprehensive work done by the FAO to conduct a global review of alfonsino (NPFC-2017-SC02-IP02).
 - c. The SC recognized that the stock assessment framework for the NPA is developed based on its unique biology.

5.2 Pelagic fish and squids

40. The SC recognized the existence of priority species of the NPFC other than those for which the SC is currently conducting stock assessments. The SC agreed to continue to collect data and monitor the situations related to such species.

Agenda Item 6. Progress in Data Collection, Management and Security

6.1 Data reporting templates (Korea)

41. Korea presented its progress in developing standardized reporting templates as well as the progress of the corresponding group on Pacific saury data collection templates.
42. In order to complete the Pacific saury data collection template within the specific timeline in

Annex D, the SC encouraged the Member in disagreement with other Members to actively cooperate with Korea to reach a consensus.

43. The SC agreed to establish a corresponding group for developing data reporting templates for bottom fisheries and also reaffirm the existent corresponding group for pelagic fisheries. The SC encouraged Members to provide their data collection elements from each fishery to Korea for an efficient process to develop the data templates.

6.2. *Transshipment data (CMM 2016-03)*

44. The SC discussed data fields to be included in the transshipment summary provided by Members to the Secretariat, referring to NPFC-2017-SC02-IP04. Russia proposed the inclusion of IMO number in the summary.
45. The SC recognized the usefulness of transshipment data for stock assessment activities, mainly for the purpose of validating data. At this stage, other than the requirements described in Information Paper NPFC-2017-SC02-IP04, the SC does not have any additional requirements for the data currently being reported by Members. The SC also recognized that the collection of transshipment data was mainly an issue for the Technical & Compliance Committee (TCC) and the Commission, and that both have expressed interest in the matter. The SC therefore requests that the TCC and the Commission keep the SC informed of discussions and developments related to transshipment data, so that the SC can use the collected data for stock assessment activities.

6.3 *Observer Program*

46. The SC discussed plans to develop the North Pacific Ocean Fisheries Observer Program.
47. The SC recognized the necessity of the North Pacific Ocean Fisheries Observer Program and agreed to establish a corresponding group, headed by the Science Manager, for advancing work towards the development of such an Observer Program. The corresponding group will compile information regarding the existing observer programs of Members and those of other regional fisheries management organizations, to establish a basis for holding further discussions on developing the Observer Program.
48. The SC also recognized the importance of developing a standardized protocol and data collection templates, as well as training and outreach programs, for ensuring the same standard of data collection by all observers.

49. China, supported by some Members, suggested that Members provide technical reports on their existing Observer Programs in the Convention Area of NPFC to the SC for review and evaluation.
50. Japan stated that the Observer Program is one of many tools to collect information necessary to scientific work and dockside sampling is the main tool of collecting such information for pelagic fish in Japan.

6.4 Data management policy

51. The Science Manager presented a draft Information Security Guidelines including four categories of information in relation to risk of its disclosure, types of information, proposed regulations for each type, protection of data ownership and other issues related to data and publication handling by the NPFC (NPFC-2017-SC02-WP03 and NPFC-2017-SC02-IP01).
52. The SC recommends the establishment of a corresponding group that will work intersessionally with the TCC to further develop the draft Information Security Guidelines, based on NPFC-2017-SC02-WP03. The corresponding group will be jointly headed by the Science Manager and the Compliance Manager. The SC suggests that the corresponding group review this document and come to a consensus by the Commission meeting in July 2017.

6.5 NPFC data management system (Secretariat)

53. The IT consultant, Dr. Raymond Wu, presented on the project strategy and architecture of the NPFC data management system, including the business context, the system context, the architecture design, and the future roadmap (NPFC-2017-SC02-WP04 (Rev1)).
54. The SC discussed the proposed plans to establish a GIS database and asked to include spatial extensions into the benchmark process for the NPFC data management system. The IT consultant explained that this was feasible, but that further input from Members regarding specifications was required.
55. The SC discussed the desirability of connecting the NPFC data management system to other oceanographic databases with open data. The IT consultant explained that this was feasible.
56. In further elaborating this issue, Members are requested to direct any further inquiries regarding the NPFC data management system to the Secretariat.

Agenda Item 7. Scientific Projects for 2017 and 2018

7.1 Stock assessments

7.2 Other projects

57. The Science Manager presented the compiled document on scientific projects for 2017 and 2018 that were discussed above and approved by the SC, as well as suggestions submitted to the Secretariat (NPFC-2017-SC02-WP06) regarding a Chub mackerel meeting and consultant for Chub mackerel stock assessment.
58. The SC reviewed the proposed scientific projects for 2017 and 2018 and endorses the revised proposal for consideration by the Commission (Annex A).
59. The SC requests that the Finance and Administration Committee establish a common procedure for the submission, evaluation, and approval of proposals for scientific projects for further consideration by the Commission, as well as establishment of a Special Project Fund filled with unspent scientific funds and other sources.

Agenda Item 8. 2017-2021 Research Plan

60. The SC Chair presented the revised Research Plan (NPFC-2017-SC02-WP01 (Rev. 1)).
61. The SC reviewed and endorses the revised Research Plan (Annex B).

Agenda Item 9. Cooperation with Other Organizations

62. The FAO presented an update on the ABNJ Deep Seas Project, including progress in 2016 and upcoming project activities.
63. The NPAFC reported on the multinational survey it plans to conduct in the North Pacific Ocean in winter 2019 as part of the International Year of the Salmon (IYS) project and invited the NPFC to participate in, and contribute to the IYS project.
64. The SC highly recommended NPFC to take advantage of the multinational survey being conducted by the NPAFC, and to formulate a plan for a cooperative survey.
65. PICES presented an update on its activities and proposals for cooperation between PICES and the NPFC. PICES explained its interest in the effects of climate change/climate variation in the abundance and distribution of stocks in the North Pacific Ocean, and invited the NPFC to mutually cooperate in any of the existing PICES or NPFC projects. In particular, PICES invited the NPFC to serve as a co-sponsor or supporting organization for the 4th International Symposium on the Effect of Climate Change on the World's Oceans to be held in Washington

DC, USA on June 4-8, 2018.

66. The Science Manager reported on his attendance as NPFC representative at the International Symposium on Drivers of Dynamics of Small Pelagic Fish Resources organized by PICES and ICES on March 6-11, 2017, including potentially useful research and output, and major outcomes of interest to the NPFC (NPFC-2017-SC02-IP03). The Science Manager requested the guidance of the SC on potential areas for cooperation between NPFC and PICES to be discussed at the PICES Annual meeting in September 2017.
67. Members agreed to enhance cooperation with PICES as an intergovernmental scientific organization with similar membership, convention area and scientific interests to NPFC and encourage PICES to participate in the NPFC meetings.
68. The SC recommends to establish a joint NPFC-PICES group to identify potential areas of cooperation and work intersessionally to develop the terms of reference for the working group for consideration by the Commission in July 2017.
69. The SC recommends that Members engage in more proactive cooperation with other organizations.

Agenda Item 10. Other Matters

Selection of next Chair and Vice Chair

70. The SC agreed to extend the term of the current Chair, Dr. Joji Morishita, and the current Vice Chair, Dr. Janelle Curtis for a further two years each.

Information on Exploratory fishery targeting deep water crab

71. The SC discussed Russia's request to conduct an exploratory fishery targeting deep water crab, referring to NPFC-2017-SC02-WP02. Some Members expressed the view that Russia's request did not constitute an exploratory fishery as defined under Annex 1 of CMM 2016-05. However, the SC recognized that Russia's request involved the resumption of an existing fishery after several years (CMM 2016-05, Annex 2, Paragraph 5 (7)), and, as the SC is interested in the data from the aforementioned fishery, it requested that Russia collect extensive data in the course of conducting the fishery, assess SAI in accordance with CMM 2016-05 and submit this assessment to future SC meetings. The SC will review the reported assessment and determine whether or not the fishery is having an SAI on VMEs.
72. The SC also recognized that there may be a need to improve the Exploratory Fishery Protocol

and forwarded the draft terms of reference for the development of technical guidelines for improvement of the current Exploratory Fishery Protocol (Annex F) for the consideration of the relevant SSCs.

Structure of SC

73. Based on the discussion above, the SC has updated its structure, broadening the scope of SSC NPA to SSC on Bottom Fish and establishing the TWG on Chub mackerel.

MCS related issues from SC to TCC

74. Based on the discussion above, the SC identifies the following matters as MCS related issues for consideration by TCC:
- a. Maintain CMM 15-02 or develop a new CMM based on the stock assessment.
 - b. No revisions to CMM 2016-03 regarding transshipment data.
 - c. Endorse the revised CMM 2016-05 (COM03 Annex E).
 - d. Endorse the revised CMM 2016-06 (COM03 Annex F).
 - e. Nominate participants for the SC/TCC corresponding group on the NPFC Information Security Guidelines to work intersessionally prior to the TCC meeting in 2017.

Agenda Item 11. Advice and Recommendations to the Commission

75. The shaded paragraphs in this report constitute the recommendations by the SC to the Commission.

Agenda Item 12. Next Meeting

76. The SC recommends holding the next TWG PSSA meeting in Vladivostok on 6-8 December 2017.
77. The SC recommends holding the first TWG CM meeting in Vladivostok on 4-5 December 2017, prior to the TWG PSSA.
78. The SC recommends holding the VME workshop in Japan in March 2018.
79. The SC recommends holding the next SC and SSC meetings at a similar timing in 2018. The date and location will be notified by the Secretariat via correspondence.
80. A compilation of all meetings is annexed to this report (Annex E).

Agenda Item 13. Adoption of the Report

81. The report was adopted by consensus.

Agenda Item 14. Close of the Meeting

82. The SC meeting closed at 13:54 on 27 April 2017.

Annexes

Annex A – Scientific Projects proposed by the Scientific Committee

Annex B – 2017-2021 Research Plan

Annex C – Terms of Reference for the Technical Working Group on Pacific Saury Stock
Assessment

Annex D – Draft TORs of SSC-VME and SSC-Bottom Fish for the development of
technical guidelines that supplement exploratory fishery protocols

Annex E – NPFC Meetings 2017–2018

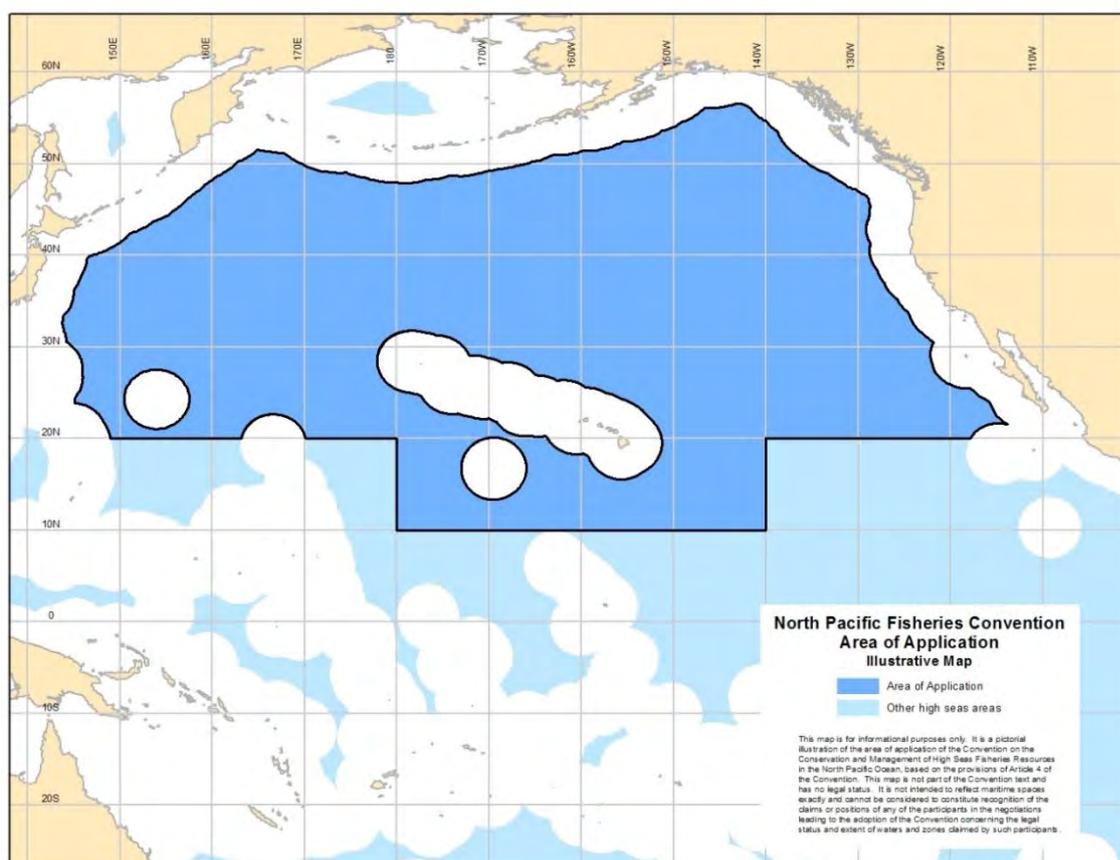
Scientific Projects proposed by the Scientific Committee

| # | Project | Time | Rough estimation of required funds |
|---|--|-----------------------------------|--|
| 1 | VME workshop (SAI + data) | 2018 | 1,240,000 JPY (about 10,000 USD) and also supported by ABNJ project, FAO |
| 2 | VME identification guide (printing and travel costs of key developers) | 2017 | 1,180,000 JPY (about 9,500 USD) |
| 3 | GIS database/module as a part of NPFC database management system for spatial management of bottom fisheries and VMEs | ?2018-2019 | For ArcGIS: 5,470,000 JPY – about 44 thousand USD (first year: license fee+ spatial analysis) and 1,120,000 JPY – about 9 thousand USD (subsequent year: maintenance fee per year). <u>Solutions other than ArcGIS should be considered.</u> |
| 4 | TWG PSSA meeting (meeting costs and travel cost for 2 participants of each Member) | Every year from 2017-2021 | 2,490,000 JPY (about 20,000 USD) |
| 5 | Expert to review Pacific saury stock assessment (probably consultant fee and travel cost) | TBD later | TBD |
| 6 | Observer Program | | TBD |
| 7 | Chub mackerel meeting (meeting costs and travel cost for 2 participants of each Member) | Every year, TBD by the Commission | 2,490,000 JPY (about 20,000 USD) |
| 8 | MSE workshop | TBD | TBD |
| 9 | Special Science Project Fund | | All unspent scientific funds to use for future projects identified above for 2018 and subsequent years. |

North Pacific Fisheries Commission Scientific Committee

2017-2021 Research Plan

1.0 CONTEXT



Illustrative Map of the North Pacific Fisheries Commission Convention Area

Article 10, Section 4(a) of the *Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean* states that the Scientific Committee (SC) will “recommend to the Commission a research plan including specific issues and items to be addressed by the scientific experts or by other organizations or individuals, as appropriate, and identify data needs and coordinate activities that meet those needs.”

An initial draft of this work plan was presented for review during the 4th Preparatory Conference and a subsequent discussion was held by a small working group to establish science priorities for the NPFC. This plan draws on those discussions and was updated by the SC Chair based on the progress made by NPFC since that Conference.

The development of multi-year science research or work plans is common across regional fisheries management organizations as well as domestic fisheries science agencies. This draft plan draws on such examples, and has been developed for consideration by the SC before it may be adopted by the Commission.

2.0 OBJECTIVES

The research plan is intended to guide the work of the Scientific Committee by identifying key research priorities and associated areas of work to be undertaken or maintained. The plan should also serve to: ensure efficient utilization of scarce resources within the Commission; inform Parties' domestic research planning as a means to complementing the Commission's science activities; and, help the Commission identify potential sources of external funding.

It is not intended as an exhaustive plan describing all research activities that may be carried out by Parties, nor is it intended to preclude work already taking place. The plan should support the Commission's primary objective (*Article 2* in the Convention), which 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 plan should also help the Scientific Committee fulfill its functions as specified in the Convention.

3.0 PRIORITY RESEARCH AREAS

In addition to discussions held during the Preparatory Conference (referenced above) followed by the Commission and Scientific Committee after their establishment, the identification of priority research areas draws largely from the Commission's Convention, which outlines specific functions for the Scientific Committee in *Article 10, Section 4*. These priority research areas are subject to the approval of the Commission, and may be revisited and/or revised as deemed appropriate by the Commission. Proposed five-year work plans for each priority area are available in the attached Annex I.

The proposed priority research areas are:

1. Stock assessments for target fisheries and bycatch species

2. Ecosystem approach to fisheries
3. Vulnerable Marine Ecosystems
4. Data collection, management and security

3.1 Stock Assessments

Rationale

Accurate stock assessments are critical in helping to ensure the long-term conservation and sustainable use of fisheries resources in the Convention Area. One of primary functions of the Commission is setting total allowable catch or total allowable level of fishing effort, and as per *Article 7-1(b)*, this is to be in “accordance with the advice and recommendations of the Scientific Committee”.

Consistent with this, *Article 10-4(b)* states that one of the functions of the Scientific Committee is to “regularly plan, conduct and review the scientific assessments of the status of fisheries resources in the Convention Area, identify actions required for their conservation and management, and provide advice and recommendations to the Commission”.

Finally, *Article 10-4(i)* states that the Committee shall also “develop rules and standards, for adoption by the Commission, for the collection, verification, reporting, and the security of, exchange of, access to and dissemination of data on fisheries resources, species belonging to the same ecosystem, or dependent upon or associated with the target stocks and fishing activities in the Convention Area”.

The Scientific Committee should endeavour to understand the current status and trends in production of populations of priority species as agreed by the 2nd Commission meeting in 2016, as well as factors that may affect future trends.

Areas of work

- **Development of baseline assessment of the status of priority stocks**
- **Review of existing data standards in relation to stock assessments (e.g. Annual Report template, future vessel monitoring system)**
- Stock delineation of important commercial species for the purpose of providing advice for the determination of management units

- For each commercial species, determination of data requirement, including data availability and data gaps; identification, where possible, of strategies to fill the data gaps, including for bycatch
- Development of a standardized method to provide advice to the Commission
- Development of assessment models by species and research as required to determine various assessment parameters

3.1.1. Pelagic fish stock assessment

Rationale

Pelagic fish and squids are primary fisheries resources for NPFC Members. They comprised more than 99% of total catch of species covered by the Convention. Many of them are migratory species with wide geographical distributions which include both EEZs of the North Pacific Rim countries and High Seas. Management of such stocks requires close cooperation among Members concerned to ensure sustainable use and conservation of fisheries resources.

Four fish species and two squid species were recognized by the Scientific Committee as priority species: Pacific saury *Cololabis saira*, Chub mackerel *Scomber japonicus*, Spotted mackerel *Scomber australasicus*, Japanese sardine *Sardinops melanostictus*, Neon flying squid *Ommastrephes bartramii*, Japanese flying squid *Todarodes pacificus*.

Areas of work

- Completion of stock assessment for Pacific saury and development of the framework and timeline for its regular improvement and update
- Conducting stock assessment for Chub mackerel and other priority species considering their top-down prioritization (Spotted mackerel - Japanese sardine - Neon flying squid - Japanese flying squid) and available funds and capacity
- Identification of data gaps, determination of activities to address those gaps and development of standards and mechanisms for data collection and verification

3.1.2. Bottom fish stock assessment

Rationale

Data used for traditional stock assessment are sparse for bottom fish, and it is unlikely that traditional methods will be applicable for most deepwater species in the Convention Area. In

addition, some bottom species have unique life cycles, sporadic recruitment patterns and irregular spawning-recruitment relationships that also makes difficult accurate stock assessment. All these require specific approaches for management and sustainable use of bottom fisheries resources. More than ten bottom species have been exploited by fisheries in the Convention Area last decade. Two fish are recognized as priority species: North Pacific armorhead (NPA) *Pentaceros wheeleri*, Splendid alfonsino *Beryx splendens*.

Areas of work

- Review of approaches applicable for stock assessment of target bottom species and investigate various management strategies
- Further development of the Adaptive Management approach for NPA and mechanism for its implementation
- Identification of data needs and establishment of activities to fill data gaps

3.2 Ecosystem Approach to Fisheries

Rationale

Article 3 (c) in the Convention states that: “In giving effect to the objective of this Convention, the following actions shall be taken individually or collectively as appropriate:

(c) adopting and implementing measures in accordance with the precautionary approach and an ecosystem approach to fisheries, and in accordance with the relevant rules of international law, in particular as reflected in the 1982 Convention, the 1995 Agreement and other relevant international instruments”.

Article 7-1 (c,d) in the Convention states that the Commission shall: “adopt, where necessary, conservation and management measures for species belonging to the same ecosystem or dependent upon or associated with the target stocks”; and, “adopt, where necessary, management strategies for any fisheries resources and for species belonging to the same ecosystem or dependent upon or associated with the target stocks, as may be necessary to achieve the objective of this Convention.”

Article 10-4 (d) states that the Scientific Committee shall “assess the impacts of fishing activities on fisheries resources and species belonging to the same ecosystem or dependent upon or associated with the target stocks.”

Areas of work

- Formulation of a research plan on how to implement the ecosystem approach to fisheries in the Convention Area
- Vulnerable Marine Ecosystems
- Understand ecological interactions among species
- Ecosystem modelling
- Evaluate impacts of fishing on fisheries resources and their ecosystem components, including bycatch species
- Other issues related to marine ecosystem including marine debris and pollution

3.2.1 Vulnerable Marine Ecosystems

Rationale

The identification of vulnerable marine ecosystems is a necessary precursor to implementing measures to protect these ecosystems, and such measures are explicitly called for in the Convention (e.g. *Article 7-1(e)*).

Article 10-4 (e) states that the Scientific Committee shall “develop a process to identify vulnerable marine ecosystems, including relevant criteria for doing so, and identify, based on the best scientific information available, areas or features where these ecosystems are known to occur, or are likely to occur, and the location of bottom fisheries in relation to these areas or features, taking due account of the need to protect confidential information.”

Article 7-1 (e) states that the Commission shall “adopt conservation and management measures to prevent significant adverse impacts on vulnerable marine ecosystems in the Convention Area, including but not limited to: measures for conducting and reviewing impact assessments to determine if fishing activities would produce such impacts on such ecosystems in a given area; measures to address unexpected encounters with vulnerable marine ecosystems in the course of normal bottom fishing activities; and as appropriate, measures that specify locations in which fishing activities shall not occur.”

To date, Japan, Russia, Korea, the US and Canada have completed a report on identification of VMEs and an assessment of impacts caused by bottom fishing activities on VMEs and marine species. The Scientific Committee may build on these reports, which will be kept up to date by respective Parties.

Areas of work

- **Review existing NPFC standards on VME data collection, including guidelines set forth in the CMMs for bottom fisheries and protection of vulnerable marine ecosystems in the northwestern and northeastern Pacific Ocean (CMM 2016-05 and CMM 2016-06), and determine if any modifications to these standards are needed in the short-term and/or longer term**
- **Review of Encounter Protocol for bottom fisheries on Vulnerable Marine Ecosystems**
- Determination of data requirements and identification of what data may be collected through commercial fishing operations
- Develop consensus on criteria used to identify VMEs and how this might be applied in the NPFC (note that guidelines from the FAO are already referenced in Annex 2 of the CMM 2016-05 and CMM 2016-06)
- Analysis of known or suspected VMEs in the Convention Area
- Surveys of VMEs for data collection
- Development of a framework to conduct assessments of Impacts of Bottom Fishing Activities on Vulnerable Marine Ecosystems

3.2.1.1 Review of Encounter Protocol for bottom fisheries on Vulnerable Marine Ecosystems

Rationale

The purposes of VME encounter protocols in NPFC Convention Area include:

- Ensuring early detection and protection of potential VMEs within an existing fishing area;
- Ensuring early detection and protection of potential VME within an unfished area;
- Documenting information on known occurrences of VME indicators within the Convention Area.

Development of the Encounter Protocol progressed through the Science Working Group and Scientific Committee meetings as well as intersessional activities. VME encounter protocols are incorporated in the CMMs for bottom fisheries and protection of vulnerable marine ecosystems in the northwestern and northeastern Pacific Ocean, CMM 2016-05 and CMM 2016-06, specifically in Para 4(g) and 3(j), respectively.

Areas of Work

Consideration of the following subjects of research and analyses are recommended to further refine encounter protocols in the Convention Area (as notified in Appendix C, NPFC01-2016-SSC-

VME01- Final Report):

- Other taxa, topographical, geographical and geological features that may indicate the presence of VMEs;
- Taxon-specific encounter thresholds and reporting;
- Framework for evaluating the effectiveness of encounter protocols;
- Tiered approach with different encounter protocols associated with different thresholds;
- Gear-specific thresholds to reflect differences in catchability;
- Gear-specific move-on distances to reflect type of gear;
- Different reporting requirements for different catches;
- Tiered approach to reporting bycatch of VME indicator taxa;
- Different encounter protocols for existing and new fishing areas

3.3 Data collection, management and security

Rationale

Many issues related to data collection, management and security are incorporated into the previous categories in Section 3 above. Nevertheless, the Commission has been still setting up and most policies, rules and standards have not been developed yet. Consequently, the Scientific Committee shall pay much attention to these issues at this early stage of its development.

Article 10, paragraph 4 (i) in the Convention states that the functions of the Scientific Committee shall be to: “develop rules and standards, for adoption by the Commission, for the collection, verification, reporting, and the security of, exchange of, access to and dissemination of data on fisheries resources, species belonging to the same ecosystem, or dependent upon or associated with the target stocks and fishing activities in the Convention Area”.

Areas of work

- Review of data standards related to stock assessments and other relevant data, including VME data collection and vessel monitoring systems
- Identify data sources to meet data needs for priority areas of work above and develop programs for data collection
- Develop data security policy including data handling and sharing protocol, information confidentiality classification and access control security guideline

4.0 IMPLEMENTATION AND REVIEW

Monitoring the implementation of this Research Plan will be the responsibility of the Chair of the Scientific Committee in collaboration with the Chairs of the Small Scientific Committees and Executive Secretary. Members of the Commission and the Secretariat will share responsibility for implementation of the Plan.

Full implementation of the Research Plan will likely be beyond the means of the Commission's core budget. Extra-budgetary funds from voluntary contributions of Members and other sources will be required and actively sought by the Commission. Nevertheless, adoption of the Plan by the Scientific Committee and subsequent strong support from the Commission is a prerequisite to securing the necessary extra-budgetary funds.

[An independent external review of the Plan may periodically be requested by the SC. The Scientific Committee will be responsible for preparing the terms of reference for the review. The Scientific Committee will present the report of the review to the next regular session of the Commission.]

5.0 SCIENTIFIC COLLABORATION WITH OTHER ORGANIZATIONS

While not included as a priority, *Article 21* of the Convention addresses cooperation with other organizations or arrangements. It calls on the Commission to cooperate, as appropriate, on matters of mutual interest with FAO, other specialized agencies of the FAO and relevant RFMOs. Further, the Commission is called on to develop cooperative working relationships, including potential agreements, with intergovernmental organizations that can contribute to its work.

Article 10 also speaks to this issue in clauses five and six, stating that the Scientific Committee may exchange information on matters of mutual interest with other relevant scientific organizations or arrangements, and that the Committee shall not duplicate the activities of other scientific organizations and arrangements that cover the Convention Area.

The impetus to collaborate is made stronger by the prospect of limited research funding in the Commission, at least in the short-term, but it is also in the best interests of the Commission to seek synergies with other organizations with mutual interests and similar membership (e.g. North Pacific Marine Science Organization and North Pacific Anadromous Fish Commission).

Activities could include:

- Evaluate reports of International Organizations that may be relevant to the functioning of the Scientific Committee
- Identify other organizations with relevant mandates and activities
- Formalize relationships with these organizations (e.g. MOUs, standing invitations to meetings)
- Identify potential funding opportunities

Five-Year Work Plan for each Priority Area

1. Stock assessments for target fisheries and bycatch species

| | 2017 | 2018 | 2019 | 2020 | 2021 |
|------------------|---|--|--|--|--|
| Pacific saury | Completed stock assessment (provisional) through TWG PSSA meeting | Evaluate the quality of the data for stock assessment; Update stock assessment and recommendations to Commission to improve conservation and management of Pacific saury | Update/ benchmark stock assessment and recommendations to Commission to improve conservation and management of Pacific saury | Update/ benchmark stock assessment and recommendations to Commission to improve conservation and management of Pacific saury | Update/ benchmark stock assessment and recommendations to Commission to improve conservation and management of Pacific saury |
| Chub mackerel | Review of Members' national research on stock status and fisheries through CM workshop; Establish TWG for Chub mackerel | | | | |
| Spotted mackerel | | Collect data and monitor situation for further analyses | | | |
| Japanese sardine | | Collect data and monitor situation | | | |

| | | | | | |
|-------------------------|--|---|---|--|---|
| | | for further analyses | | | |
| Neon flying squid | | Collect data and monitor situation for further analyses | | | |
| Japanese flying squid | | Collect data and monitor situation for further analyses | | | |
| North Pacific armorhead | <ol style="list-style-type: none"> 1. Adopt Adaptive Management process 2. Develop work plan to implement the Adaptive Management process 3. Assess and monitor the status of the stock 4. Conduct affiliated research | <ol style="list-style-type: none"> 1. Develop harvest control rules to conserve stock 2. Assess and monitor the status of the stock 3. Conduct affiliated research | <ol style="list-style-type: none"> 1. Implement harvest control rules 2. Assess and monitor the status of the stock 3. Conduct affiliated research | <ol style="list-style-type: none"> 1. Review monitoring and survey designs 2. Assess and monitor the status of the stock 3. Conduct affiliated research | <ol style="list-style-type: none"> 1. Evaluate Adaptive Management process and refine harvest control rules 2. Assess and monitor the status of the stock 3. Conduct affiliated research |
| Splendid alfonsino | | <ol style="list-style-type: none"> 1. Review monitoring and assessment of the stock 2. Conduct affiliated research | <ol style="list-style-type: none"> 1. Conduct comprehensive stock assessment | <ol style="list-style-type: none"> 1. Develop harvest control rules and management advice | <ol style="list-style-type: none"> 1. Assess and monitor the status of the stock 2. Conduct affiliated research |

2. Ecosystem approach to fisheries

| | 2017 | 2018 | 2019 | 2020 | 2021 |
|--|---|--|--|--|--|
| 1. Review existing NPFC standards on VME data collection | | VME workshop | | | |
| 2. VME encounter protocols | Identification of fished and unfished areas; Analysis of fishery bycatch in the fished areas | VME workshop | Refinement of encounter protocols for fished areas | Development of encounter protocols for exploratory fishing in unfished areas | |
| 3. Determination of data requirements | Development and validation of the data templates | VME workshop | Review and revise data templates | | |
| 4. Develop consensus on criteria used to identify VMEs | | VME workshop | Revision of the VME indicator taxa and identification criteria | | |
| 5. Analysis of known or suspected VMEs in the CA | Screening out potential VME sites on fished seamounts | VME workshop | Establishment of the conservation framework for known VMEs | | |
| 6. Surveys of VMEs for data collection | Data collection through scientific surveys and | Data collection through scientific surveys and | Data collection through scientific surveys and | Data collection through scientific surveys and | Data collection through scientific surveys and |

| | observers | observers | observers | observers | observers |
|---|--|--|--|--|-----------|
| 7. Development of a framework to conduct assessments of Impacts of Bottom Fishing Activities on VMEs | Exploration of the SAI assessment methods for VMEs in the western CA | VME workshop Assessment of the bottom fishery impacts on VMEs | Refinement of the VME conservation measures for the existing fishing grounds | Reinforcement of the experimental fishing protocols for unfished areas | |

3. Data collection, management and security

| | 2017 | 2018 | 2019 | 2020 | 2021 |
|-----------------|---|--|--|--|--|
| Data standards | Finalize data collection templates Pacific saury and continue development for bottom fisheries (trawl, gillnet, longline) | Develop data collection templates for chub mackerel, squid and crab fisheries | Revision of data collection templates if necessary | Revision of data collection templates if necessary | Revision of data collection templates if necessary |
| Data collection | Identifying data needs and data gaps | Identifying data needs and data gaps; enhancement of data collection: fisheries, surveys, Observer program | Identifying data needs and data gaps; enhancement of data collection: fisheries, surveys, Observer program | Identifying data needs and data gaps; enhancement of data collection: fisheries, surveys, Observer program | Identifying data needs and data gaps; enhancement of data collection: fisheries, surveys, Observer program |

| | | | | | |
|---------------|---------------------------------|--|--|--|--|
| Data security | Information Security Guidelines | Prioritization of areas of the Information Security and Management System and development of Information Security and Management regulations | Development of Information Security and Management regulations | Development of Information Security and Management regulations | Development of Information Security and Management regulations |
|---------------|---------------------------------|--|--|--|--|

4. Other*

| | 2017 | 2018 | 2019 | 2020 | 2021 |
|--------------------------------|------|------|------|------|------|
| Management Strategy Evaluation | | | | | |
| Data review | | | | | |

* under development

**Terms of Reference for the Technical Working Group on Pacific Saury Stock Assessment
(TWG PSSA) for 2017-2021**

1. To review fishery data
 - Catch series
 - Age/size composition data
 - Others
2. To review fishery-dependent and fishery-independent indices
 - Review/update the existing protocol
 - Review/update the indices
 - Evaluate the quality of the indices
 - Recommendation of future works
3. To review and update biological information/data
 - Stock structure
 - Growth
 - Reproduction and maturity schedule
 - Natural mortality
 - Migration pattern
 - Others
4. To update the stock assessment using “provisional base models” (i.e. Bayesian state-space production models)
 - Review existing protocol
 - Simple update (including projection and evaluation of reference points as well as diagnosis)
 - Consideration of scenarios (for base and sensitivity)
 - Assessment of uncertainty and its implication of management
 - Evaluation/improvement (if necessary) the models
 - Recommendation of the research for future works
5. To explore stock assessment models other than existing “provisional base models”
 - Data invention/availability (including the identification of potential covariates)
 - Initial (and continued) discussion on age-/size/stage-structure models
 - Identification of lack of information/data and limits
 - Recommendation of the research for future works
6. To facilitate data- and code- sharing processes
7. To review/improve presentation of stock assessment results (including stock status summary report in a format to be determined by the Working Group)
8. To explore the design of Management Strategy Evaluation framework

Draft TORs of SSC-VME and SSC-Bottom Fish for the development of technical guidelines that supplement exploratory fishery protocols

a. Develop technical guidelines for preparation and submission of notifications of exploratory fisheries that qualify the information required by Appendix 1.1/Annex 1/ CMM2016-05 and 06

To specify the contents of notification for each gear type.

b. Develop templates for submitting preliminary assessments of the potential for proposed bottom fishing activities to have significant adverse impacts on VMEs

To specify the pre-fishing assessment procedure and requisite information

c. Specify data collection plan and reporting requirement during the course of and after the completion of the proposed exploratory fisheries

- Data requirement for gear type unspecified by current CMMs (e.g. crab pot)

- Necessity of in/out reports, start/end fishing reports

- Necessity of daily/5-day/monthly reports

- Requirement for information relevant to bottom fish stocks and bycatch species

d. Consider procedures to evaluate the impacts of exploratory fishing operations on VMEs (and fish stocks) based on the post-fishing reports.

- To improve reporting requirements (Appendix 1.2) if it is necessary

NPFC Meetings 2017 – 2018

| Meeting | Date | Place | Chair |
|--------------|-------------------|------------------------|-----------------------------------|
| TCC | 10-12 July 2017 | Sapporo, Japan | R. Day |
| FAC | 12 July 2017 | Sapporo, Japan | K. Kagawa |
| Commission | 13-15 July 2017 | Sapporo, Japan | K. Kagawa |
| TWG CMSA | 4-5 December 2017 | Vladivostok, Russia | O. Katugin |
| TWG PSSA | 6-8 December 2017 | Vladivostok, Russia | T. Kitakado |
| VME Workshop | 12-15 March 2018 | Yokohama, Japan | Co-Chairs L. Low and M. Kiyota |
| SSCs | 9-16 April 2018 | Tokyo, Japan | B. Li/T. Ichii/T. Iwasaki |
| SC | 17-20 April 2018 | Tokyo, Japan | J. Morishita |



2nd Meeting of the Technical and Compliance Committee

10-12 July 2017

Sapporo, Japan

Meeting Report



2nd Meeting of the Technical and Compliance Committee

AGENDA

Agenda Item 1. Opening of the Meeting

Agenda Item 2. Appointment of Rapporteur

Agenda Item 3. Admission of Observers

Agenda Item 4. Adoption of Agenda

Agenda Item 5. Progress Report from the Secretariat

Chair's Presentation on key issues for consideration in the formulation of the TCC Work Plan

5.1 Overview of North Pacific Fisheries

5.2 Secretariat and Chair Review of TCC Activities 2016-2017

5.2.1 VMS Study Tender and Status

5.2.2 TCC WEBEX Preparatory Meeting

a. CMM 2016-06 revision

b. High Seas Boarding and Inspection

c. Compliance Work Plan and Priorities

Agenda Item 6. Review of MCS related issues from SC

6.1 Data Management and Information Security

6.2 Other Issues from SC

Agenda Item 7. Review of Current MCS-related CMMs

Japan's presentation on monitoring the compliance of all CMMs

7.1 CMM 2016-01 - Vessel Registry

7.2 CMM 2016-02 – IUU

a) Draft IUU Vessel List

7.3 CMM 2016-03 – Interim Transshipment Procedures

7.4 CMM 2016-04 – Vessels with No Nationality

7.5 CMM 2016-05 – Bottom Fisheries and VME Protection NW Pacific Ocean

a) Review of the proposal of crab fishery (NPFC-2017-SC02-WP02) in light of the paragraph 4A of CMM 2016-05

7.6 CMM 2016-06 – Bottom Fisheries and VME Protection NE Pacific Ocean

a) CMM 2016-06 SC Revision

7.7 CMM 2016-07 – Chub Mackerel

Japan's request for state of Member's compliance with this CMM

7.8 CMM 15-02 - Pacific Saury

Japan's request for state of Member's compliance with this CMM

Agenda Item 8. Compliance Work Plan and Priorities

8.1 Review of TCC Framework, key management issues and discussion on key management pressures from Agenda Items 6 and 7

8.2 Recommendation on TCC Work Plan Priorities

8.3 Procedures to advance TCC Work Plan

Agenda Item 9. Ongoing and new MCS-related CMMs and Issues

9.1 High Seas Boarding and Inspection Procedures

9.2 Other MCS Issues

9.3 Annual Reporting Format (Science vs. Compliance data)

Agenda Item 10. Other Matters

10.1 Selection of next Chair and Vice-Chair

10.2 Cooperating Non-Contracting Parties (CNCs)

10.3 Observer Program

Agenda Item 11. Recommendations to the Commission

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 Meeting

1. The 2nd Meeting of the Technical and Compliance Committee (TCC) took place in Sapporo, Japan on 10-12 July 2017, 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 North Pacific Anadromous Fish Commission attended the meeting from July 10. The Organization for Regional and Inter-regional Studies of Waseda University attended the meeting from July 11. The observers were admitted without objection.
4. The Chair explained that contractors Collecte Localisation Satellites (CLS) and Eighty Options were attending as consultant guests of the Secretariat.

Agenda Item 4. Adoption of Agenda

5. The Chair explained that he would give an introductory presentation on the key issues for consideration in the formulation of the TCC work plan at the beginning of Agenda Item 5.
6. The revised agenda was adopted.

Agenda Item 5. Progress Report from the Secretariat

7. The Chair gave an introductory presentation on the key issues for consideration in the formulation of the TCC work plan (NPFC-2017-TCC02-WP08 (Rev. 1)) with discussion to occur under Agenda Item 8.

5.1 Overview of North Pacific Fisheries

8. The Secretariat presented an overview of the North Pacific fisheries addressing each fishery (NPFC-2017-TCC02-IP01). The concern of the Scientific Committee (SC) was noted over the current state of the North Pacific Armorhead stocks, which is placing additional pressure on the splendid alfonsino stocks which might also be stressed. The SC noted that new adaptive measures and possible stronger management measures must be developed very quickly for these bottom fisheries. The Pacific saury stock appears not to be overfished nor is overfishing occurring at this time. There is concern over the rapid increase in effort on the mackerel stocks, which has resulted in a CMM to limit effort until a stock assessment can be carried out. The squid stocks appear relatively stable at current levels of fishing effort.

5.2 Secretariat and Chair Review of TCC Activities 2016-2017

5.2.1 VMS Study Tender and Status

9. The Secretariat explained that it had commissioned a study of current vessel monitoring systems (VMS) already in use by NPFC Members and whether it would be possible to merge them into a regional VMS in a cost-effective manner, and that CLS had won the tender to conduct the study.
10. CLS provided an update on the progress of the ongoing VMS study (NPFC-2017-TCC02-WP01). Most Members already collected required data and can transmit them to the North Pacific Fisheries Commission (NPFC). All Members' VMS tools can thus be linked to a future NPFC Regional VMS. Most of the costs associated with such a Regional VMS would be related to the installation and operation of the NPFC Regional Fisheries Monitoring Center (FMC).
11. Some Members emphasized that in principle flag States are responsible for managing their vessels and their VMS data. Some Members also noted that the establishment of Regional VMS is not necessarily a prerequisite to implement Article 7 of the Convention, and there could be flexibility in the way VMS data is used depending on issues identified. The TCC held preliminary discussions on the cost of establishing the NPFC Regional FMC, the merits of doing so, and the personnel required to operate it. The TCC agreed to hold further discussions under Agenda Item 8 on the level of priority to give the NPFC Regional FMC in the TCC work plan.

5.2.2 TCC WEBEX Preparatory Meeting

12. The Chair provided a report of the TCC WEBEX Preparatory Meeting and the work conducted in relation to revising CMM 2016-06, high seas boarding and inspection, and the TCC work plan and priorities (NPFC-2017-TCC02-WP02).

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

6.1 Data Management and Information Security

13. The Secretariat provided an update on the work of the SC and the intersessional corresponding group to formulate draft Information Security Guidelines, underscoring that the SC recognizes there is an urgent need to formulate such Information Security Guidelines in order to facilitate the sharing of data for stock assessment and other scientific information among Members (NPFC-2017-TCC01-WP05).

14. The TCC also acknowledged the necessity of further developing the Information Security Guidelines for compliance purposes. The United States informed the TCC that it had prepared draft Interim Guidance for Management of Scientific Data Used in Stock Assessments, based on CMM 15-01 and guidelines used by other regional fisheries management organizations (NPFC-2017-COM03-WP10) that will be presented at the Commission meeting.

Recommendation: The TCC acknowledged the immediate necessity of the Information Security Guidelines for scientific data and recommended that the Commission consider these as a priority.

Recommendation: The TCC acknowledged that more work is needed to establish information security guidelines for compliance data and recommended that this work continue.

6.2 Other Issues from SC

15. The Secretariat informed the TCC about other issues from the SC related to CMMs 15-02, 2016-03, 2016-05 and 2016-06, as well as an Observer Program.

16. The Secretariat provided an update on the revision of CMM 2016-05 for Bottom Fisheries and Protection of Vulnerable Marine Ecosystems (VMEs) in the Northwestern (NW) Pacific Ocean (NPFC-2017-TCC02-WP06).

Recommendation: The TCC reviewed the editorial changes made to CMM 2016-05 and endorsed it as edited.

17. The Secretariat provided an update on the revision of CMM 2016-06 for Bottom Fisheries and Protection of VMEs in the Northeastern (NE) Pacific Ocean (NPFC-2017-TCC02-WP04).

Recommendation: The TCC reviewed the editorial changes made to CMM 2016-06 and endorsed it as edited.

18. The Secretariat informed the TCC that the SC recognized the necessity of developing a North Pacific Ocean Fisheries Observer Program and had established a corresponding group for advancing work towards the development of such an Observer Program.

Agenda Item 7. Review of Current MCS-related CMMs

7.1 CMM 2016-01 – Vessel Registry

19. The Secretariat provided an update on plans to improve the NPFC's vessel registry system. Under the new system, the register would be updated, including bulk updates, by Members as needed rather than annually. The data would be validated on entry. The existing values would be pre-populated. Members would not be able to update another Member's authorized vessel until it is deleted from the register. A unique NPFC Vessel ID would be introduced and maintained throughout the history of each vessel (NPFC-2017-TCC02-IP03).

Recommendation: The TCC recommended that Members test a pilot version of the new system, clarify issues such as the minimum information requirements for registering a vessel, and revise CMM 2016-01 as necessary for TCC03.

7.2 CMM 2016-02 –IUU

20. The Secretariat reported on the work to compile the draft Illegal, Unreported and Unregulated (IUU) Vessel List (NPFC-2017-TCC02-WP07).

21. Japan reported on vessels sighted in the Convention Area by Japan's fisheries inspection vessels (NPFC-2017-TCC02-IP05). Japan reported 288 vessels sighted in 2016 in the Convention Area. This compared to 194 in 2015. Of the 288 vessels, 68 were suspected to be IUU vessels. Of these, Japan noted presumed instances of IUU where vessels had changed their names and cases of multiple vessels having the same name and number.

22. China expressed its concern that such information should be carefully clarified before being submitted to the Secretariat.

23. The TCC acknowledged the responses of the Members concerned to the information provided by Japan. The TCC undertook a review of the proposals and developed a refined list. All Members agreed to do their utmost to prevent and combat IUU activity.

24. The United States highlighted the interpretation of paragraph 7 of CMM 2016-02 regarding to whom the draft IUU Vessel List should be transmitted.

Recommendation: The TCC shared the common understanding that "all Members/CNCPs, as well as to non-Contracting Parties with vessels on the list" means all Members/CNCPs regardless of whether or not they have vessels on the list, in addition to all non-Contracting Parties that have vessels on the list.

25. The TCC revised CMM 2016-02 to include a paragraph encouraging Members/CNCPs that have information that a vessel is presumed to be carrying out IUU activities, to inform the Member/CNCP or non-Contracting Party whose vessel is presumed to be carrying out IUU activities, for clarification.

Recommendation: The TCC recommended that the Commission endorse the revised CMM 2016-02 (COM03 Annex D).

26. The TCC reviewed and revised the draft IUU Vessel List. The TCC noted that there are seven cases of two vessels with the same name and number. China will re-register the seven authorized vessels under new names and numbers, upon which the seven illegal vessels will automatically be included on the draft IUU Vessel List. The TCC adopted the Provisional IUU Vessel List (16 of 68 vessels) and recommended the automatic inclusion of the seven illegal vessels once the seven authorized vessels have been re-registered under new names and numbers.

Recommendation: The TCC recommended that the Commission adopt the Provisional IUU Vessel List.

Recommendation: The TCC noted that there are seven cases of two vessels with the same name and number, and recommended the automatic inclusion of the seven illegal vessels once the authorized vessels have been re-registered under new names and numbers.

7.3 CMM 2016-03 – Interim Transshipment Procedures

27. The Secretariat presented a proposal on the NPFC transshipment data format for discussion (NPFC-2017-TCC02-WP03).

28. Japan informed that the International Maritime Organization (IMO) is considering expanding the scope of vessels eligible to obtain an IMO number and noted that, in accordance with CMM 2016-01, all eligible Member vessels are required to obtain an IMO number. Japan explained that there could be difficulties in obtaining IMO numbers for newly eligible vessels, especially small vessels, due to problems including language. The TCC acknowledged the need for flexibility in the evolution of NPFC measures.

29. The TCC reviewed and revised the proposal (NPFC-2017-TCC02-WP03).

Recommendation: The TCC endorsed the revised proposal on the NPFC transshipment data format (Annex A).

30. Japan noted that currently CMM 2016-03 on transshipment only addresses bottom fisheries as an initial step (paragraph 1 of CMM 2016-03) and requested that Members initiate

discussions towards the revision of the CMM so that it applies to other fisheries, especially chub mackerel and Pacific saury.

Recommendation: The TCC agreed to hold further discussions, as part of the development of the TCC work plan.

7.4 CMM 2016-04 – Vessels with No Nationality

Recommendation: The TCC reviewed CMM 2016-04 and agreed to maintain it without revision.

7.5 CMM 2016-05 – Bottom Fisheries and VME Protection NW Pacific Ocean

31. Russia informed the TCC that the crab fishery activity would be a resumption of previous activity, in compliance with CMM 2016-05. The information on Russia's crab fishery is found in NPFC-2017-SC02-Final Report.

32. Japan expressed concern over the potential gear conflicts from the renewal of the Russian crab fishery. It was recognized that discussion is necessary among Members concerned to find a way of avoiding such conflicts. Russia noted that it expected all gear that was formerly authorized would remain so, and that any future gear issues would be addressed by Members accordingly. There was no disagreement with respect to renewal of the Russian crab fishery.

33. Japan expressed concern over the activity of Korean sea trawlers in the C-H Seamount as reported in NPFC-2017-SSC VME02-WP06. Japan recognized that this activity was prior to the Commission coming into force, but further noted that it did contravene the interim measures agreed by participants. Korea explained that it was an isolated and unintended incident in 2013, that Korea took appropriate action in relation to the incident pursuant to Korea's domestic law, and that it will ensure that similar incidents do not occur in future.

7.6 CMM 2016-06 – Bottom Fisheries and VME Protection NE Pacific Ocean

34. No issues were discussed.

7.7 CMM 2016-07 – Chub Mackerel

35. The TCC recognized the need to improve the precision of the assessment of compliance with CMM 2016-07.

Recommendation: The TCC agreed to conduct intersessional work to improve the precision of the assessment of compliance with CMM 2016-07 to allow for discussion at TCC03.

36. Japan asked the Secretariat for more information on numbers of vessels registered to fish chub mackerel and Pacific saury. The Secretariat explained that it would be difficult to

provide the requested information at this time. Japan withdrew its request and suggested that the TCC hold further discussions on compliance monitoring under Agenda Item 8.

7.8 CMM 15-02 – Pacific Saury

37. The TCC recognized the need to improve the precision of the assessment of compliance with CMM 15-02.

Recommendation: The TCC agreed to conduct intersessional work to improve the precision of the assessment of compliance with CMM 15-02 to allow for discussion at TCC03.

Agenda Item 8. Compliance Work Plan and Priorities

8.1 Review of TCC Framework, Key Management Issues and Discussion on Key Management Issues from Agenda Items 6 and 7; 8.2 Recommendation on TCC Work Plan Priorities; 8.3 Procedures to Advance TCC work plan

38. It was agreed that Agenda Items 8.1-8.3 would be discussed together.

39. The TCC discussed and revised the TCC Draft Compliance Work Plan proposed by Canada (NPFC-2017-TCC02-WP11). It was recognized that the work plan will be modified and updated as work progresses and new priorities appear. Japan emphasized the importance of determining procedures for assessing compliance (as noted in agenda items 7.7 and 7.8) with tools such as a “compliance table,” which is included in the TCC work plan as Item 2.2.

Recommendation: The TCC endorsed the revised proposal (Annex B) recognizing that the TCC Draft Compliance Work Plan will be modified and updated as work progresses and new priorities appear.

Recommendation: As noted in the TCC Terms of Reference, TCC recommended that each Member nominate a focal point contact.

40. The TCC also discussed priority species. There was a suggestion that this issue is best addressed by the Commission, after which time the TCC can address compliance considerations related to priority species at the request of the Commission.

Recommendation: The TCC requested that the Commission identify priority species for the work plan.

Agenda Item 9. Ongoing and New MCS-related CMMs and Issues

9.1 High Seas Boarding and Inspection Procedures

41. The TCC held discussions on finalizing a new CMM on High Seas Boarding and Inspection Procedures. The TCC endorsed, in principle, a new CMM on High Seas Boarding and Inspection Procedures (COM03 Annex G), noting the reservations expressed by Russia, who is awaiting final approval from their capital. The United States and Canada expressed some

concern about the limited use of force, but supported the CMM. The TCC also agreed to monitor compliance with inspection requests (i.e., should inspectors be obstructed in their work).

Recommendation: The TCC recommended that the Commission, recognizing the reservations of Russia, consider endorsing the CMM on High Seas Boarding and Inspection Procedures (COM03 Annex G).

Recommendation: The TCC agreed to hold further discussions on the establishment of a mechanism for addressing cases in which inspections are obstructed, as part of future discussions on the TCC work plan.

9.2 Other MCS Issues

42. No other MCS issues were discussed.

9.3 Annual Reporting Format (Science vs. Compliance Data)

43. The Secretariat proposed the separation of science and compliance data in Members' annual reporting format to allow for easier publication of non-confidential data.

Recommendation: The TCC recommended that the Commission consider endorsing the proposal to separate the science and compliance data into two parts.

Agenda Item 10. Other Matters

10.1 Selection of Next Chair and Vice-Chair

Recommendation: The TCC recommended that Dr. Robert Day continue to serve as the TCC Chair and Mr. Chan Soo Park (Korea) to serve as the TCC Vice-Chair.

10.2 Cooperating Non-Contracting Parties (CNCPS)

44. The TCC discussed matters related to the paper on CNCP from the Final Report of the Commission Meeting in 2016 (NPFC-2016-SWG-Fin & Admin01-WP08).

Recommendation: The TCC recommended deferring consideration to the Finance and Administration Committee.

10.3 Observer Program

45. The Secretariat provided an update on the SC development of an Observer Program. The TCC Members agreed that it would be useful for the TCC to jointly participate with SC in considering the Observer Program.

Recommendation: The TCC recommended that the Commission consider TCC participating in the Observer Program jointly with SC.

Agenda Item 11. Recommendations to the Commission.

46. The TCC recommended the following to the Commission:

(Agenda Item 6)

- a. The TCC acknowledged the immediate necessity of the Information Security Guidelines for scientific data and recommended that the Commission consider these as a priority.
- b. The TCC acknowledged that more work is needed to establish information security guidelines for compliance data and recommended that this work continue.
- c. The TCC reviewed the editorial changes made to CMM 2016-05 and endorsed it as edited.
- d. The TCC reviewed the editorial changes made to CMM 2016-06 and endorsed it as edited.

(Agenda Item 7)

- e. The TCC recommended that Members test a pilot version of the new vessel registry system, clarify issues such as the minimum information requirements for registering a vessel, and revise CMM 2016-01 as necessary for TCC03.
- f. The TCC shared the common understanding that in paragraph 7 of CMM 2016-02, “all Members/CNCPs, as well as to non-Contracting Parties with vessels on the list” means all Members/CNCPs regardless of whether or not they have vessels on the list, in addition to all non-Contracting Parties that have vessels on the list.
- g. The TCC recommended that the Commission endorse the revised CMM 2016-02 (COM03 Annex D).
- h. The TCC recommended that the Commission adopt the Provisional IUU Vessel List.
- i. The TCC noted that there are seven cases of two vessels with the same name and number, and recommended the automatic inclusion of the seven illegal vessels once the authorized vessels have been re-registered under new names and numbers.
- j. The TCC endorsed the revised proposal on the NPFC transshipment data format (Annex B).
- k. The TCC agreed to hold further discussions on CMM 2016-03 on transshipment and its application to other fisheries, as part of the development of the TCC work plan.
- l. The TCC agreed to maintain CMM 2016-04 without revision.
- m. The TCC agreed to conduct intersessional work to improve the precision of the assessment of compliance with CMM 2016-07 to allow for discussion at TCC03.
- n. The TCC agreed to conduct intersessional work to improve the precision of the assessment of compliance with CMM 15-02 to allow for discussion at TCC03.

(Agenda Item 8)

- o. The TCC endorsed the revised TCC Work Plan (Annex C), recognizing that the TCC Work Plan will be modified and updated as work progresses and new priorities appear.
- p. The TCC recommended that each Member nominate a focal point contact.
- q. The TCC requested that the Commission identify priority species for the work plan.

(Agenda Item 9)

- r. The TCC recommended that the Commission, recognizing the reservations of Russia, consider endorsing the CMM on High Seas Boarding and Inspection Procedures (COM03 Annex G).

- s. The TCC agreed to hold further discussions on the establishment of a mechanism for addressing cases in which inspections are obstructed, as part of future discussions on the TCC work plan.
- t. The TCC recommended that the Commission consider endorsing the proposal to separate the science and compliance data into two parts.

(Agenda Item 10)

- u. The TCC recommended that Dr. Robert Day continue to serve as the TCC Chair and that Mr. Chan Soo Park serve as the TCC Vice-Chair.
- v. The TCC recommended deferring consideration to the Finance and Administration Committee regarding matters related to the paper on CNCP from the Final Report of the Commission Meeting in 2016.
- w. The TCC recommended that the Commission consider TCC participating in the Observer Program jointly with SC.

(Agenda Item 12)

- x. The TCC requested the guidance of the Commission in determining the date and location of the next TCC meeting.

Agenda Item 12. Next Meeting

- 47. The TCC noted the importance of ensuring adequate time for the TCC to discuss compliance matters, recognizing that there will likely be a growing need to conduct more complete and in-depth assessment of compliance going forward.

Recommendation: The TCC requested the guidance of the Commission in determining the date and location of the next TCC meeting.

Agenda Item 13. Adoption of the Report

- 48. The report was adopted by consensus.

Agenda Item 14. Close of the Meeting

- 49. The TCC meeting closed at 11:44 on 12 July 2017.

Annexes

Annex A – Transshipment Data Format

Annex B – TCC Work Plan

NPFC TRANSSHIPMENT DATA FORMAT

ABSTRACT:

Paragraph 4 of CMM 2016-03 on the Interim Transshipment Measures stated that the SC and TCC “will recommend the specific data fields required to be in the summary [of transshipments]. The summary will be provided as an attachment to the Annual Report.” Currently only China and the Russian Federation provide such summaries.

In an effort to standardize the format for such reports, the attached draft document has been developed by the Secretariat for discussion at TCC.

NPFC Transshipment Information

Participant's name:

| Calendar Year | Information on Catching/Unloading Vessel | | | | Information on Carrier/Receiving Vessel | | | | | Information on transshipment | | | | Information on Species | | |
|---------------|--|-------------------------------|------|-------------------|---|-------------------------------|------|----------|-------------------|------------------------------|----|-----|-------|------------------------|-------------------------|-------------|
| | Name | IMO number (where applicable) | Flag | Authorization NO. | Name | IMO number (where applicable) | Flag | Register | Observer (Yes/No) | Date | CA | NCA | Ports | Name (FAO code) | Product Form (FAO code) | Weight (MT) |
| | | | | | | | | | | | | | | | | |

**North Pacific Fisheries Commission
Technical and Compliance Committee Work Plan**

Background

Recognizing the overall objective of the NPFC 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;

Recognizing the Convention sets forth the requirement for the Commission to implement various compliance and enforcement measures, and the work of the Technical and Compliance Committee (TCC) to date in establishing an overview and framework to guide these efforts as referenced by Annexes D and E from Circular 030-2017 TCC Preparatory WebEx meeting;

Acknowledging concerns shared by members to date with respect to managing and conserving priority species, identifying and reducing potential IUU activities, and the need to implement monitoring, control and surveillance measures to support the overall objectives of the Commission;

Assessing that these concerns pose risks within the TCC framework's three pillars¹; and,

Determining the need to prioritize the implementation of compliance and enforcement measures, as informed by evidence brought forth by members and associated risks that can undermine Commission objectives, TCC proposes the following as TCC priorities over the period 2017-2020:

1. Targeting the conservation and management of Pacific Saury and Chub Mackerel

Rationale: Under Pillar 1, there is a need to reinforce the conservation and management measures related to Pacific Saury (CMM 15-02) and Chub Mackerel (CMM 2016-07), identified as key species of interest over the time period.

Proposed Actions: Confirm priority of species with Members. Determine rules² and consequences of non-compliance.

Tools: Determine the tools that are needed to enforce these CMMs (e.g. VMS, catch reporting, effort)

2. Developing a CMS

To reinforce all pillars of the framework, and overall member accountability, there is a need to develop an overall Compliance Monitoring System (CMS). At the outset, this includes clarifying the rules and respective sanctions of breaking them, and the ability to validate non-compliance. These components of the CMS are outlined below.

¹ TCC Framework Pillars:

- i) CMMs for Priority Species;
- ii) CMMs for Vulnerable Marine Ecosystems (VMEs) or other ecosystem elements; and,
- iii) CMMs for Science and Monitoring, Control and Surveillance (MCS) measures.

² Note: Japan has put forth two proposals for Commission consideration at its Annual meeting regarding Pacific Saury and Chub Mackerel.

i) Assessing Compliance

Rationale: Without clear rules and consequences of breaking them, incentives to comply are minimized.

Proposed Actions: Determine the consequences of breaking the rules and the related procedures for determining non-compliance, updating CMMs as required with priority focus on Pacific Saury and Chub Mackerel, vessel identification and over the planning horizon. Compiling all rules and sanctions into a compendium structured under the pillars of the TCC framework is also recommended.

Tools: Compendium of rules, procedures and respective consequences of non-compliance, structured in a single, accessible document.

ii) Developing vessel marking and identification standards

Rationale: Under pillar 3 of the framework, there is a need for vessel marking and identification standards. Ensuring that all member vessels adhere to these standards, this will address risks associated with ambiguously marked vessel sightings in the Convention Area. This, in turn, will support answering questions related to what activities they may be engaged in vis-à-vis pillars 1 and 2.

Proposed Action: Changes to the rules could be reflected in updates to CMM 2016-01 (Vessel Registration Requirements) or in a new CMM.

Tools: Update online vessel registry to accommodate new marking and standards. Update online registry to minimize work load, data entry requirements and have authorized users who can update the data.

iii) Developing a VMS

Rationale: Further to being able to accurately identify vessels through a standardized marking and identification scheme, there is a need for a Vessel Monitoring System (VMS). This will enable the NPFC to track and report movements of registered vessels. This is vital to supporting all pillars of the TCC framework.

Proposed Actions: Continue to advance work initiated on the VMS. Determine what data needs to be collected and at what intervals (i.e. to support target species such as Chub Mackerel and Pacific Saury), ensuring system can grow over time. Update Information Security Guidelines in conjunction with the types of data required. Members to confirm their vessels are equipped with compatible VMS transmitters that will communicate with an eventual NPFC VMS.

Tools: To be developed in conjunction with VMS work initiated.

iv) Finalizing a High Seas Boarding and Inspection (HSBI) Scheme

Rationale: A HSBI scheme is critical to being able to validate and enforce compliance.

Proposed Actions: Finalize NPFC HSBI scheme before July 19, 2018.

Draft Timeline

| # | Action | Description | Start Date | End Date | Resources | Budget | Lead | Notes | Time (Quarter/Calendar Year) | | | | | | | | | | | | | |
|--|---|--|------------|----------|---------------------|--------|---------------------------|--|-------------------------------------|----|----|------|----|----|----|------|----|----|----|------|----|----|
| | | | | | | | | | 2017 | | | 2018 | | | | 2019 | | | | 2020 | | |
| Developing a Compliance Monitoring System (CMS) | | | | | | | | | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 1 | Target Species for Conservation and Management | | | | | | | | August 2017 - September 2017 | | | | | | | | | | | | | |
| 1.1 | Confirm priority species | Confirm Pacific Saury (CMM 15-02 ³) and Chub Mackerel (CMM 2016-07) as priority species and define related conservation and management risks Questions: Is this a TCC or Commission decision? Are bottom fisheries a priority? Are Pacific arrowhead and Splendid alfonsino priorities? | 08.2017 | 09.2017 | Secretariat support | | TBD, Members | Collaboration with SC required to confirm priority species | ➔ | | | | | | | | | | | | | |
| 2 | Assessing Compliance | | | | | | | | September 2017 – March 2018 | | | | | | | | | | | | | |
| 2.1 | Determine rules and consequences of non-compliance | Determine specific rules and related consequences of non-compliance related to priority species and their CMMs (including a review of member compliance with priority CMMs) | 09.2017 | 11.2017 | Secretariat support | | TBD, Members | | ➔ | | | | | | | | | | | | | |
| 2.2 | | Determine procedures for assessing compliance | 09.2017 | 12.2017 | Secretariat support | | TBD, Members | | ➔ | | | | | | | | | | | | | |
| 2.3 | | Compile all rules and sanctions into a compendium ⁴ (structured according to TCC Framework, focusing initially on target species) | 08.2017 | 12.2017 | Member review | | Secretariat | | ➔ | | | | | | | | | | | | | |
| 2.4 | Determine tools | Determine tools required to enforce rules determined in 2 | 12.2017 | 03.2018 | | | TBD, Secretariat, Members | | ➔ | | | | | | | | | | | | | |

³ Reflecting updated CMM after July 2017

⁴ Compendium to be updated on an ongoing basis, when and as required

| # | Action | Description | Start Date | End Date | Resources | Budget | Lead | Notes | Time (Quarter/Calendar Year) | | | | | | | | | | | | | | | |
|--|--|---|------------|----------|---------------------------------------|--------|-------------------------|--|-----------------------------------|----|----|----|------|----|----|----|------|----|----|----|------|----|--|--|
| | | | | | | | | | 2017 | | | | 2018 | | | | 2019 | | | | 2020 | | | |
| | | | | | | | | | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | | |
| Developing a Compliance Monitoring System (CMS) | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Develop Vessel Marking and Identification Standards | | | | | | | | August 2017 – March 2018 | | | | | | | | | | | | | | | |
| 3.1 | Confirm risks | Define and confirm risks of not having a standardized identification and vessel marking scheme (including a discussion on the limitations of such a scheme) | 08.2017 | 08.2017 | | | | | → | | | | | | | | | | | | | | | |
| 3.2 | Review existing vessel marking schemes | Review existing schemes in other RFMOs, including international guidelines and standards | 08.2017 | 09.2017 | Potential Third-party support | TBD | TBD, Members | | → | | | | | | | | | | | | | | | |
| 3.3 | | Determine vessel marking and identification standards for NPFC Convention Area | 09.2017 | 11.2017 | | TBD | TBD, Members | | → | | | | | | | | | | | | | | | |
| 3.4 | | Determine consequences of non-compliance with established vessel marking scheme | 11.2017 | 12.2017 | | TBD | TBD, Members | | → | | | | | | | | | | | | | | | |
| 3.5 | | Update rules in CMM 2016-01 (Vessel Registration Requirements) as required | 12.2017 | 01.2018 | | TBD | TBD, Members | | → | | | | | | | | | | | | | | | |
| 3.6 | Update tools | Update online vessel registry to accommodate new marking and standards | 12.2017 | 03.2018 | Third-party support | TBD | Secretariat | | → | | | | | | | | | | | | | | | |
| 4 | Develop a VMS | | | | | | | | August 2017 – January 2019 | | | | | | | | | | | | | | | |
| 4.1 | Phase II of VMS Study | Determine what data needs to be collected from members to support priority species (e.g. Pacific Saury and Chub Mackerel, bottom fisheries) | 08.2017 | 11.2017 | Third-party support | TBD | Secretariat, Members | Collaboration with SC required to determine science data needs | → | | | | | | | | | | | | | | | |
| 4.2 | | Determine scale, scope, timeline and budget for Phase II building upon overview of VMS systems established in Phase I | 02.2018 | 05.2018 | Third-party support | TBD | Secretariat, Members | Scale and scope to be determined for priority species as well as a system to enable modular compatible add-ons to the VMS over time. | → | | | | | | | | | | | | | | | |
| 4.3 | Determine VMS needs and design | Phase II of VMS study (to determine recommended VMS system) | 05.2018 | 08.2018 | Third-party support | TBD | Secretariat, Members | | → | | | | | | | | | | | | | | | |
| 4.4 | Develop and test VMS | Phase III of VMS work – Design, develop and test VMS | 08.2018 | 12.2018 | Third-party support | TBD | Secretariat, Members | | → | | | | | | | | | | | | | | | |
| | Implement VMS | Implement VMS system, monitor, assess vis-à-vis priority species | 01.2019 | - | All Members | TBD | Secretariat and Members | | → | | | | | | | | | | | | | | | |
| 4.5 | | Update Information Security Guidelines (note: to be updated on an ongoing basis) | 11.2017 | 12.2017 | TBD (e.g. SC/TCC Corresponding Group) | | Members | | → | | | | | | | | | | | | | | | |
| 5 | Finalize a High Seas Boarding and Inspection Scheme | | | | | | | | | | | | | | | | | | | | | | | |
| 5.1 | Finalize HSBI scheme | Determine HSBI scheme for the NPFC | - | 07.2018 | | | | | → | | | | | | | | | | | | | | | |
| 5.2 | Develop implementation plan | Develop an implementation plan for the HSBI scheme to come into force | 11.2017 | 06.2018 | | | | | → | | | | | | | | | | | | | | | |
| 5.3 | Implementation | Implement HSBI as per procedures in force | 07.2018 | - | | | | | → | | | | | | | | | | | | | | | |



1st Meeting of the Finance and Administration Committee

12 July 2017
Sapporo, Japan
Meeting Report



1st Meeting of the Finance and Administration Committee

AGENDA

Agenda Item 1. Opening of the Meeting

Agenda Item 2. Selection of Chair, Vice-Chair and Rapporteur.

Agenda Item 3. Adoption of Agenda

Agenda Item 4. Financial Statement

4.1 Financial Statement from 2016 and 2017 to date

4.2 Contributions outstanding and new Member contribution

4.3 Working Capital Fund

4.4 Establishment of a Special Project Fund

Agenda Item 5. Secretariat's Work Plan 2017; Budget Estimates for 2018-2020

Agenda Item 6. Issues arising from 2016

6.1 Fixed yen-based staff salary

6.2 Revision to Staff Regulations

Agenda Item 7. Other matters

7.1 Procedures for submission, review and approval of projects proposed by
Members/NPFC subsidiary bodies

7.2 Others

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 Meeting

1. The 1st Meeting of the Finance and Administration Committee (FAC) took place in Sapporo, Japan on 12 July 2017, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, Chinese Taipei, the United States of America, and the Republic of Vanuatu. The meeting was opened by Executive Secretary Dae-Yeon Moon.

Agenda Item 2. Selection of Chair, Vice-Chair and Nomination of Rapporteur

2. The FAC elected Mr. Kenji Kagawa (Japan) to serve as Chair of the FAC, and Dr. Siquan Tian (China) to serve as Vice-Chair. Mr. Alexander Meyer was appointed as Rapporteur.

Agenda Item 3. Adoption of Agenda

3. The agenda was adopted without revision (Annex A).

Agenda Item 4. Financial Statement

4.1 Financial Statement from 2016 and 2017 to Date

4.2 Contributions Outstanding and New Member Contribution

4.3 Working Capital Fund

4. The Secretariat reported on the financial statement from 2016 and 2017 to date, contributions outstanding and new Member contribution, and the Working Capital Fund (NPFC-2017-FAC01-WP01 (Rev. 1); NPFC-2017-FAC01-IP02).
5. The FAC requested that the Secretariat make a number of improvements to the invoice format.
6. The United States explained that it was in the process of securing the necessary budget to pay its contribution to the NPFC, and that it will complete its payment within 2017.

4.4 Establishment of a Special Project Fund

7. The Secretariat presented a proposal to establish a Special Project Fund (NPFC-2017-FAC01-WP02). The FAC reviewed the proposal and revised it to clarify the funding mechanisms and purpose of the Special Project Fund, and the membership of the SWG Special Projects.

Recommendation: The FAC endorsed the revised proposal (Annex A).

Agenda Item 5. Secretariat's Work Plan 2017; Budget Estimates for 2018-2020

8. The Secretariat presented its work plan for 2017 (NPFC-2017-FAC01-WP03 (Rev 1)). The FAC reviewed and revised the Secretariat work plan for 2017. In particular, the FAC noted that requests for the Commission to cover travel costs associated with meeting attendance were inappropriate as they did not comply with the stipulations of the Convention (Article 12, Paragraph 1).

Recommendation: The FAC endorsed the revised work plan (Annex B).

9. The FAC noted that because the TCC and FAC meetings are held in conjunction, it is currently not possible to incorporate the TCC work plan in the Secretariat's work plan. To address this, the FAC requested that the TCC develop a rolling two-year work plan.

Recommendation: The FAC requested that the TCC develop a rolling two-year work plan.

10. The Secretariat presented the budget estimates for 2018-2020 (NPFC-2017-FAC01-WP01 (Rev. 1)) for the review of the FAC. The FAC revised and endorsed the budgets for 2017 and 2018, and considered the budget for 2019 and 2020.

Recommendation: The FAC endorsed the revised contributions and budgets for 2017 and 2018 (Annex C).

Agenda Item 6. Issues Arising from 2016

6.1 Fixed Yen-Based Staff Salary

11. The Secretariat presented options for fixed yen-based salaries for Commission staff (NPFC-2017-FAC01-WP04). The FAC discussed the options for fixed-yen based salaries for Commission staff and agreed on a fixed rate of 124.36 JPY=1 US\$, which is the exchange rate used in the initial budget and contributions plan.

Recommendation: The FAC recommended that the Commission set fixed yen-based salaries for Commission staff at a rate of 124.36 JPY=1 US\$.

6.2 Revision to Staff Regulations

12. The Secretariat proposed the addition of two new paragraphs (5.9 and 5.10) to the Staff Regulations, as outlined in NPFC-2017-FAC01-IP01, to incorporate the accommodation allowance and education allowance for professional staff of the Commission that were approved at the 2nd Commission Meeting. The FAC reviewed and endorsed the proposal.

Recommendation: The FAC endorsed the revised NPFC Staff Regulations (Annex D).

Agenda Item 7. Other Matters

7.1 Procedures for submission, review and approval of projects proposed by Members/NPFC subsidiary bodies

13. The Secretariat presented the proposed Guidelines Outlining the Process for Submission, Review, Approval and Implementation of Projects to Finalize the Commission Work Program and Budget (NPFC-2017-FAC01-WP05).

Recommendation: The FAC endorsed the Guidelines (Annex E).

7.2 Others

14. The Secretariat presented the proposed NPFC Media Access Policy (NPFC-2017-FAC01-WP06). The FAC reviewed and revised the proposal. In particular, the FAC discussed the importance of Members maintaining the confidentiality of conference proceedings when interacting with members of the media.

Recommendation: The FAC endorsed the revised NPFC Media Access Policy (Annex F).

15. The Secretariat presented the proposed NPFC Policy on Support to Specialist Experts to the Secretariat or Commission (NPFC-2017-FAC01-WP07).

Recommendation: The FAC endorsed the Policy (Annex G).

16. The Secretariat presented the NPFC Document Rules (NPFC-2017-FAC01-WP08). The FAC reviewed and revised the proposal, clarifying the rules for the submission of Information Papers and Observer Papers. It was also noted that the Secretariat should continue to explore ways to promote the use of electronic documents.

Recommendation: The FAC endorsed the revised NPFC Document Rules (Annex H).

17. The FAC discussed matters related to the paper on cooperating non-contracting parties (CNCs) from the Final Report of the Commission Meeting in 2016 (NPFC-2017-COM03-WP03). The FAC determined that CNCs should be encouraged to make contributions to the Commission, rather than being mandated to do so, referring to the practices of other

regional fisheries management organizations.

Recommendation: The FAC recommended that contributions to the Commission by CNCPs should be voluntary and endorsed the revised document (Annex I).

18. The Secretariat proposed the re-appointment of Tokoro Accounting Ltd. as the auditor of the Commission (NPFC-2017-FAC01-WP09).

Recommendation: The FAC endorsed the proposal.

19. **Recommendation:** The FAC recommended that each Member nominate a focal point contact for FAC-related matters.

Agenda Item 8. Recommendations to the Commission

20. The FAC recommended the following to the Commission:

(Agenda Item 4)

a. The FAC endorsed the revised proposal to establish a Special Project Fund (Annex A).

(Agenda Item 5)

b. The FAC endorsed the revised Secretariat work plan for 2017 (Annex B).

c. The FAC requested that the TCC develop a rolling two-year work plan.

d. The FAC endorsed the revised budgets for 2017 and 2018 (Annex C).

(Agenda Item 6)

e. The FAC recommended that the Commission set fixed yen-based salaries for Commission staff at a rate of 124.36 JPY=1 US\$.

f. The FAC endorsed the revised NPFC Staff Regulations (Annex D).

(Agenda Item 7)

g. The FAC endorsed the Guidelines Outlining the Process for Submission, Review, Approval and Implementation of Projects to Finalize the Commission Work Program and Budget (Annex E).

h. The FAC endorsed the revised NPFC Media Access Policy (Annex F).

i. The FAC endorsed the NPFC Policy on Support to Specialist Experts to the Secretariat or Commission (Annex G).

j. The FAC endorsed the revised NPFC Document Rules (Annex H).

k. The FAC endorsed the revised document on CNCPs (Annex I).

l. The FAC endorsed the re-appointment of Tokoro Accounting Ltd. as the auditor of the Commission.

m. The FAC recommended that each Member nominate a focal point contact for FAC-related matters.

(Agenda Item 9)

- n. The FAC requested the guidance of the Commission in determining the date and location of the next FAC meeting.

Agenda Item 9. Next Meeting

21. **Recommendation:** The FAC requested the guidance of the Commission in determining the date and location of the next FAC meeting.

Agenda Item 10. Adoption of the Report

22. The report was adopted by consensus.

Agenda Item 11. Close of the Meeting

23. The FAC meeting closed at 19:04 on 12 July 2017.

Annexes

Annex A – Establishment of a Special Projects Fund or Use of Article 24 of the NPFC Financial Regulations

Annex B – Secretariat Work Plan 2017

Annex C – NPFC expenses in the fiscal years 2017 and 2018

Annex D – Revised NPFC Staff Regulations

Annex E – Guidelines Outlining the Process for Submission, Review, Approval and Implementation of Projects to Finalize the Commission Work Program and Budget

Annex F – NPFC Media Access Policy

Annex G – NPFC Policy on Support to Specialist Experts to the Secretariat or Commission

Annex H – NPFC Document Rules

Annex I – Cooperating Non-Contracting Parties

Establishment of a Special Projects Fund or Use of Article 24 of the NPFC Financial Regulations

INTRODUCTION:

The Scientific Committee has identified several special projects proposed to move the scientific component forward in its duties for stock assessments, joint scientific ventures with other RFMOs, development of VME identification guides for Members in 2017 and also for stock assessment review and training of at-sea observers in the following years. It is also expected that a similar situation will soon exist in the Technical and Compliance Committee with the development of the NPFC compliance program including for example: at-sea and port observer program, transshipment monitoring, implementation of a regional VMS, special training seminars for implementation of new international legal instruments and others. SC and TCC are looking at appropriate mechanisms to facilitate the implementation of these special projects.

Paragraphs 18,21 and 24 of the NPFC Financial Regulations note the financial set up and flow of funds for the Commission. Contributions and other income received by the Commission shall be placed in the General Fund. Any surplus funds at the end of each fiscal year of the Commission (1 April-31 March of the following year), shall be transferred to the Working Capital Fund, “*or designated for a specific purpose as determined by the Commission*”, (paragraph 18), or alternately *divided into special reserve funds as determined by the Commission (paragraph 21)*. Further, under paragraph 24, ‘The Commission may transfer amounts of the Working Capital Fund to the General Fund from time to time as it deems necessary in order to offset expenditures in any financial year or to finance unforeseen and extraordinary expenses.’

OBJECTIVE: To establish a mechanism to accommodate the *specific purpose* of addressing such special science and compliance initiatives as identified above or will be proposed in future, especially such costly non-recurring projects as the establishment of key tools for science, compliance and management, such as Database Management System or Observer Program.

SOURCE OF THE FUND AND MANAGEMENT

Monies for these special non-recurring initiatives can be addressed by the establishment of a Special Projects Fund under paragraph 18; the establishment of a focused special reserve fund under paragraph 21; or through a transfer of funds from the Working Capital Fund from time to time for identified special projects. The proposal was for the establishment of a Special Projects fund which would be funded from General Funds surplus to expenditures and the cap set for the Working Capital Fund.

Alternatively, the Commission could utilize Paragraph 21 of the financial regulations to establish a special reserve fund for Special Projects under the Working Capital Fund, with access to funds from the mother fund, Working Capital, or as noted above under paragraph 24 through a transfer from the Working Capital Fund on an event-based/individual special project approved by the Commission.

It is proposed that this ‘Special Project Fund’, funding mechanism to be identified by the Commission, would be considered and maintained as distinct financial and accounting entity. Therefore, a separate bank account in the name of the Commission shall be held and different sets of financial statements shall be prepared which are not included in the general account fund statements.

CRITERIA FOR ACCESS TO THE SPECIAL PROJECTS FUND:

1. In general, projects for management, science and compliance are expected to be addressed through the Commission under their sectoral budgets, however there may be required activities/projects that exceed these regular budget levels, in such case, they may be considered for funding from the Special Projects Fund based on the additional criteria noted below.
2. Similar to the *Special Purpose Fund* (paragraph 26), the ‘Special Projects Fund’ would be for non-recurring initiatives or the initial development and set up of key tools for management, science or compliance, such as: database development and set-up; observer program set up and initial training; regional VMS set up.
Note: Normal operational costs of such programs or other recurring programs are expected to be addressed through the regular budget of the Commission.
3. Projects noted in Item 1 for the Special Projects Fund are time limited to a two/three-year period.

SPECIAL PROJECT’S FORMAT:

Project proposal should address, as a minimum the following issues:

| Part A. Administrative Summary | Part B. Project Proposal Description |
|--|--|
| 1) Project Title 2) Organization 3) Administrative Contact 4) Project Lead and CV 5) Commencement and Completion Date 6) Project Budget Summary – Salaries, Travel, Operating and Other 7) Expected Outputs/Benefits to the Commission | 1) Background and Need (also identify which point on the sectoral work plan [Management, Science, Compliance] the proposal will address) 2) Objectives 3) Expected Project Outputs 5) Risks of project not achieving its objectives 6) Methodology/Steps with milestones 7) Schedule of Milestones 8) Detailed costs against milestones 9) Other Related Projects 10) Project Staff and CV’s |

PROJECT SUBMISSION:

Projects for the special projects fund must be submitted by SC, TCC and Management/FAC at least one month prior to the FAC meeting for preliminary assessment and endorsement to the Commission. In the case of TCC and Management/FAC initiatives, these must be addressed intersessionally prior to the annual TCC and FAC meetings to meet the timeline for consideration.

Processes for Sectoral Actions prior to submission to the FAC SWG-Special Projects, and actions post-approval by the Commission are addressed in a separate paper.

METHODOLOGY FOR EVALUATION OF PROPOSALS:

Principles:

1. A Special Working Group (SWG) – Special Projects be formed under the FAC with its purpose being to review, assess and endorse projects for funding from the Special Projects Fund to the Commission on an annual basis.
2. The SWG-Special Projects would be comprised of: Chair of FAC who would be *de facto* Chair of the SWG-Special projects; Executive Secretary; Chair of SC, Chair of TCC, one representative from each Member, and other staff of the Secretariat and Members as requested by the SWG Chair.
3. The SWG-Special Projects would only be permitted to allocate 80% of the total uncommitted funds in the Special Projects Fund each year, thus leaving 20% for future building of the Fund.

Actions of the SWG-Special Projects:

1. Annually, the SWG-Special Projects would set overall Commission priorities from the Secretariat and Sectoral Work Plans and identify the funding available for special projects funding.
2. The SWG-Special Projects would review submitted proposals and identify those that meet the criteria for evaluation.
3. The SWG-Special Projects would establish the projects to be endorsed according to the priorities established under Item 1.
4. The SWG-Special Projects Chair would note the available Special Projects funds and provide the list of endorsed projects by priority to the Commission for approval.

Secretariat Work Plan 2017

ABSTRACT

This paper addresses a work plan for 2017 fiscal year for six key areas based on the Secretariat's Work Plan 2016-2019 presented at the last Commission meeting*;

- a. Coordination of scientific activities of the Commission;
- b. Coordination of compliance activities and operational reporting to the Commission;
- c. Data management;
- d. Development and implementation of guidelines for financial matters to support the Secretariat and Commission in the execution of its duties;
- e. Provision of administrative services to, and representation of the Commission and its subsidiary bodies;
- f. Management of human resources.

* It should be noted that the Secretariat work planning exercise is hampered by the timing of the subsidiary meetings. Only the Scientific Committee has met and endorsed its work plan for 2017. The Finance and Administration Committee has not met so only reports and proposed budgets can be presented at this time. The Technical and Compliance Committee has just met so its work plan for 2017 cannot be detailed and proposals for Compliance are therefore tentative at best, and require further refinement by TCC.

DETAILS:

The function of the NPFC Secretariat is the provision of services to, and representation of the Commission as determined by its Members in accordance with the Convention and relevant rules and regulations. As identified by the Secretariat and shared with Members, six key areas highlighted below provide the Secretariat and the Commission guidance with regard to the second year of the Commission's activities.

I. Coordination of scientific activities of the Commission

The Secretariat coordinates the scientific activities of the Commission including:

- a. Scientific Committee, in cooperation with Small Scientific Committees, drafted Five-Year Work Plan for each Priority Area:
 - Stock assessments for target fisheries and bycatch species
 - An ecosystem and adaptive management approach to fisheries
 - Data collection, management and security (refer to the 2nd SC Report for details)
- b. Organizing VME Workshop co-sponsored by FAO-ABNJ project to be held in early 2018 in Japan.
- c. Assisting Members to compile a field VME identification guide including coordination of the meeting to be held in Korea/Japan.
- d. Conducting intersessional work to develop templates for data collection and reporting by observers and fishers through a Corresponding Group nominated at the SC meeting.
- e. Assisting Members to develop a GIS database for the spatial management of bottom fisheries and VMEs.
- f. Forming a corresponding group to develop data reporting templates for bottom fisheries.
- g. Assisting a Technical Working Group on Chub Mackerel (TWG CM) for the purpose of

- stock assessment with a draft work plan and terms of reference to be determined.
- h. Contributing to work of a corresponding group to develop the North Pacific Ocean Fisheries Observer Program, noting that according to the Convention the program shall address both compliance and science data gathering, analyses and results. The first step is to gather current scientific data formats in use by Members to enable the group to then establish a standardized protocol and data collection templates. Subsequent steps for compliance, for training, etc. will also be considered by this group.
 - i. Coordinating scientific projects to be conducted during 2017.

| # | Project | Time | Rough estimation of required funds |
|---|---------------------------------------|----------------------------------|--|
| 1 | VME identification guide (printing) | 2017 | 1.2 mil JPY (9,500 USD) |
| 2 | TWG PSSA meeting (meeting costs) | Every year from 2017-2021 | 2.5 mil JPY (20,000 USD) |
| 3 | Chub mackerel meeting (meeting costs) | Every year TBD by the Commission | 2.5 mil JPY (20,000 USD) |
| 4 | VME workshop (SAI + data) | 2018 | 1.2 mil JPY (about 10,000 USD) and also supported by ABNJ project, FAO |

II. Coordination of compliance activities of the Commission

* Note that compliance priorities have not yet been fully established by TCC consequently the list of Secretariat-intended activities in this sector is only tentative.

The Secretariat coordinates compliance activities of the Commission including:

- a. Development of a new compliance compendium including TORs for the TCC, the Compliance Framework and the CMMs in accordance with the framework as key steps in the development of a compliance monitoring scheme (CMS). Funds for this exercise are to be for a Small Working Group (SWG) of fisheries compliance specialists to develop this compendium;
- b. Update the vessel registration, develop vessel marking and the online registry system. Again, this SWG will assist in developing the standards and funds are required for training on the on-line registry implementation.
- c. When the agreement is reached for development of a regional VMS, TORs for a tender shall be developed, tender let and the results of the initial study will assist the successful service provider. Funds will be required for the development of the TORs for the tender (SWG again), establishment of the NPFC FMC and final training of the new VMS operator at NPFC;
- d. On approval of the high seas boarding and inspection measure, the SWG shall be required to develop standard procedures and reports and funds shall be required for this development as well as support for training of Member's officers designated for NPFC compliance operations.
- e. Review of existing CMMs for revision and consideration of new CMMs, if any, from Members;
- f. Maintain the vessel register and interim non-member carrier vessel register for Members, with the intent to move to *a system for direct entry of vessel data* by Members in 2017.
- g. Coordinate the IUU vessel listing process from data submitted by Members.

III. Data management

The data management system is the core for the storage of data and the analyses of scientific and compliance operations of the Commission, consequently, significant effort is being placed on the initial development and setup of this system.

The intent of the NPFC Database is to: provide a secure, user-friendly, accessible, and reliable database for all scientific and compliance needs of the Commission, one that is fully integrated with other data modules of the Commission so as to continually support Members' efforts to provide appropriate and timely management advice to the Commission.

- a. The Secretariat is conducting a consultancy (March – October 2017) initiated through the official NPFC tender process to establish an NPFC Data Management System;
 - The consultancy intends to develop the business plan for the North Pacific Fisheries Commission; and to develop the supporting database including such modules as: i. the Vessel Registry module; ii. data warehousing business intelligence to aggregate data and create summary reports/analyses for both scientific and compliance purposes; iii. link to VMS; iv. Chart of Accounts for assessment of Member's compliance with conservation and management measures for the Members' reporting requirements; v. scientific information analyses, e.g., dimension analyses, e.g., scope analysis of one Member, fleet, species by set period and area.
- b. Drafted the NPFC Information Security Guidelines to discuss the security guidelines for NPFC data sharing and publication.

IV. Financial matters to support the Secretariat and Commission in the execution of its duties

Securing funds for the Commission's activities and implementation of approved activities through formal and internationally recognized financial mechanisms is one of the areas for the Secretariat to assist Members and the Commission to achieve objectives of the Convention.

Given that the Commission is entering its second year of operation, there is still an urgent need for initial investment by Members for its establishment and to address the challenges commonly faced by RFMOs during development. Following the Secretariat's work plan 2016-2019, the Secretariat highlights the following as major financial activities for 2017:

- a. Development of two options for a four-year budget plan 2017-2020 as requested by the Commission to accommodate the contributions of two new Members, USA and Vanuatu, for approval at the 3rd Commission meeting;
 - Adjustment of the 2017 budget expenditures based on actual expenditures during 2016, and development of a proposed 2018 budget and budget forecast for 2019 and 2020;
- b. Drafting of a Fixed Yen-based Staff salary for Member's consideration at the Commission meeting;
- c. Submission of the external Auditor's report for 2016 Commission's financial affairs;
- d. Proposal to establish a Special Projects Fund for the specific purpose of addressing such special science and compliance initiatives;
- e. Revised Staff Regulations to accommodate the Commission's decision to support professional staff members for their accommodation and education of their dependents.

V. Provision of administrative services to the Commission and its subsidiary bodies

1. Host Commission meetings

The Secretariat assists Members to host Commission meetings, subsidiary body meetings and workshops and working group meetings.

- a. Scientific Meetings (17-27 April 2017, Shanghai, China)
- b. Annual Meetings (10-15 July 2017, Sapporo, Japan)

- 2nd Technical and Compliance Committee (TCC), 10-12 (noon) July 2017
- 1st Finance and Administration Committee (FAC), 12 July 2017 (1300-1800 hrs)
- 3rd Annual Session of the Commission, 13-15 July 2017
- c. Workshops and Technical Working Group meetings
 - Chub mackerel and PSSA Workshops (December 2017, Russia)
 - VME Workshop (March 2018, Japan)
- d. Compliance SWGs/Workshops as noted above.

2. Build and maintain the NPFC Website

The Secretariat opened a new website recently under the npfc.int domain name and it is now up and running – www.npfc.int.

- a. Data from the former website has been downloaded and stored for future reference. The new webpage is interactive with a new vessel registry, interim non-Member carrier vessel registry, IUU vessel listing capacity; key documents listing; online meeting registration, and all meeting documents from past meetings.
- b. There is a public page with only selected information available and a Member's page with complete information.
- c. Official observers are also limited in their access to non-sensitive meeting documents.

3. Cooperation with other organizations

The Secretariat currently liaises with other organizations including RFMOs by attending meetings for information sharing and for developing other joint or reciprocal activities of mutual interest. In 2017, the meetings attended and scheduled to be represented by Secretariat staff are as follows:

- a. 25th Annual meeting of the North Pacific Anadromous Fish Commission (16-20 May, Canada)
- b. The Ocean Conference: SDG14 (5-9 June, USA)
- c. Annual Meeting of PICES (22 September – 1 October, Russia)
- d. FAO workshop on potential impacts of climate change on deep-sea ecosystems and the implications for the management of deep sea fisheries (26-27 August 2017, Woods Hole, USA) – travel cost will be covered by FAO.
- e. Further representation will be determined at TCC, FAC and the Commission Meetings

Besides attendance at the meetings, there are areas for cooperation with other organizations, which require further consideration and input from the Commission:

- a. Joint multinational research survey in the North Pacific scheduled during early 2019 under the International Year of Salmon (IYS) project of NPAFC to collect new data on North Pacific Armorhead and other species of NPFC's interests; NPFC's representative will attend the IYS workshop (26-27 May 2018, Khabarovsk, Russia) to discuss possible participation of NPFC in the multinational survey in the North Pacific
- b. Co-sponsorship or supporting organization was requested by PICES for International Symposium on Understanding Changes in Transitional Areas of the Pacific (La Paz, Mexico, 24-26 April 2018) and the 4th International Symposium on the Effect of Climate Change on the World's Oceans (Washington DC, USA June 4-8, 2018)
- c. Establishing a joint NPFC-PICES working group based on the recommendation of the 2nd Scientific Committee to identify potential areas of cooperation between the two organizations and inviting PICES to support NPFC's VME workshop

- d. Cooperation for compliance purposes to be determined by TCC and the Commission, e.g., NPAFC for air surveillance, etc.

4. Enhance public awareness

The Secretariat enhances public awareness through various means;

- a. Update NPFC brochures for display at the Secretariat office for visitors
- b. Maintain and update official website to provide the public information on Commission's activities
- c. Give lectures and seminars relevant to NPFC works upon request from local government or universities
- d. 1st NPFC Yearbook published.

V. Management of human resources

Management of human resources intends to maximize employee performance while considering the best economic use of the resources of the Commission. According to the Secretariat's Work Plan and Commission's decision, the Secretariat coordinated the following:

- a. Recruitment of a Data Coordinator to manage data systems, and ancillary services, e.g., webpage, etc., for a four-year term commencing on 1 April 2017;
- b. Conducted annual performance reviews of the Secretariat staff for 2016 fiscal year: staff performance review by Executive Secretary, a performance review of the Executive Secretary by the Commission. A summary of the performance reviews will be provided to the Commission;
- c. Used contractual services for interim period before hiring regular staff members in urgent areas of tasking such as managing NPFC webpage and data system development and oversight, and finance administration: one IT Specialist and one Finance specialist; and
- d. Is accepting experts and interns from Members for up to a one-year, or six-month period respectively, through advertisement and selection guidelines set by the Commission, after consideration and approval by Commission.

Attachment:

Timeline for Commission's activities and budget estimate in 2017

| Activity | 2017 fiscal year | | | | | | | | | | | | Budget (JPY) |
|-------------|------------------|-------|--------|-----|-----|-------|-----|-----|-----|-----------------|-----|-----|--------------|
| | 2017 Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | 2018 Jan | Feb | Mar | |
| Science | | | | | | | | | | | | | 12.8 mil |
| Compliance | | | | | | | | | | | | | 9 mil |
| Data | | | | | | | | | | | | | |
| Finance | | | | | | | | | | | | | |
| meetings | SC | | | COM | | | | | | Chub, VME, PSSA | | | 7.5 mil |
| Website | | | | | | | | | | | | | 1.3 mil |
| Cooperation | | NPAFC | UN/SDS | | | PICES | | | | | | | 2 mil+* |
| Public | | | | | | | | | | | | | 1 mil |
| Human | | | | | | | | | | | | | 15.8 mil |

* meetings decided by the Commission

NPFC expenses in the fiscal years 2017 and 2018

| Items | Year 2017 | Year 2018 |
|---|-------------|-------------|
| | Cost (JPY) | Cost (JPY) |
| 1. PERSONNEL COSTS | | |
| 1.1-1.6 Staff Remuneration | 52,970,117 | 60,777,221 |
| 1.7 Temporary Services | 621,800 | 621,800 |
| 1.8 (a) Social Security & Insurance | 11,565,480 | 11,565,480 |
| 1.8 (b) Pension Costs | | |
| 1.8 (C) Tax Reimbursement | 5,500,000 | - |
| 1.9 Overtime | 621,800 | 746,160 |
| 1.10 (a) Staff Allowances - Home Leave | 746,160 | 300,000 |
| 1.10 (b) Staff Allowances – Relocation | - | - |
| 1.10 (C) Staff Allowances – Repatriation | - | - |
| 1.10 (d) Staff Allowances - Accommodation Subsidy | 7,461,600 | 7,461,600 |
| 1.11 Professional Development / Training | 1,492,320 | 1,641,552 |
| 1.12 Education Fee | 4,974,400 | 5,223,120 |
| 1.13 Separation Allowances | - | - |
| 2. OTHER SERVICE COSTS | | |
| 2.1 Office Equipment & Furniture | 2,487,200 | 2,487,200 |
| 2.2 Office Supplies | 2,487,200 | 2,735,920 |
| 2.3 Rentals | - | - |
| 2.4 Communications | 2,487,200 | 2,487,200 |
| 2.5 Printing | 1,243,600 | 1,243,600 |
| 2.6 Duty Travel | 6,218,000 | 6,839,800 |
| 2.7 Auditing | 746,160 | 746,160 |
| 2.8 Contractual Services | 15,800,000 | 13,369,000 |
| 2.9 Database Management | 9,026,000 | 9,026,000 |
| 2.10 MCS Costs | | |
| 2.11 Meeting Costs & Workshops | 7,461,600 | 7,461,600 |
| 2.12 Science Support | 12,787,000 | 12,787,000 |
| 2.13 Staff Recruitment & Hiring | 248,720 | - |
| 2.14 To / From Special Project Fund | -6,927,678 | 8,206,782 |
| 2.15 Representation Expenses | 248,720 | 248,720 |
| 2.16 Miscellaneous | 1,294,880 | 1,295,488 |
| TOTAL - (A) | 141,562,279 | 157,271,403 |
| Working Capital Fund (cumulative) | 44,716,124 | 44,716,124 |
| - Special Project Fund (cumulative) | 11,565,050 | 19,771,832 |

Table of Member Contributions, revised 2017 (JPY)

| Member/Rule | a) | b) | c) | Fixed Contribution | Total | % |
|--|------------|------------|-----------|---------------------------|-------------|-----|
| Canada | 4,948,700 | 3,122 | 2,532,413 | | 7,484,236 | 5 |
| China | 4,948,700 | 23,016,263 | 477,088 | | 28,442,051 | 20 |
| Korea | 4,948,700 | 2,221,813 | 1,583,434 | | 8,753,947 | 6 |
| Russia | 4,948,700 | 690,323 | 556,206 | | 6,195,229 | 4 |
| Chinese Taipei | 4,948,700 | 27,966,480 | 1,306,118 | | 34,221,299 | 24 |
| USA | 4,948,700 | 0 | 3,281,648 | | 8,230,348 | 6 |
| Vanuatu | 4,948,700 | 537,700 | 160,493 | | 5,646,892 | 4 |
| Japan | | | | 44,000,000 | 44,000,000 | 31 |
| Sub-Total | 34,640,901 | 54,435,701 | 9,897,400 | 44,000,000 | 142,974,002 | 100 |
| Vanuatu - 9 months: | | | | $5,646,892 \times 9/12 =$ | 4,235,169 | |
| Total (including 9-month Vanuatu contribution) | | | | | 141,562,279 | |

Table of Member Contributions, 2018 (JPY)

| Member/Rule | a) | b) | c) | Fixed Contribution | Total | % |
|----------------|------------|------------|------------|--------------------|-------------|-----|
| Canada | 5,663,570 | 3,719 | 2,898,236 | | 8,565,525 | 5 |
| China | 5,663,570 | 32,139,220 | 546,007 | | 38,348,797 | 24 |
| Korea | 5,663,570 | 1,710,896 | 1,812,171 | | 9,186,637 | 6 |
| Russia | 5,663,570 | 799,201 | 636,553 | | 7,099,325 | 5 |
| Chinese Taipei | 5,663,570 | 26,815,375 | 1,494,795 | | 33,973,741 | 22 |
| USA | 5,663,570 | 0 | 3,755,702 | | 9,419,272 | 6 |
| Vanuatu | 5,663,570 | 830,860 | 183,677 | | 6,678,107 | 4 |
| Japan | | | | 44,000,000 | 44,000,000 | 28 |
| Total | 39,644,991 | 62,299,272 | 11,327,140 | 44,000,000 | 157,271,403 | 100 |

NORTH PACIFIC FISHERIES COMMISSION STAFF REGULATIONS

REGULATION 1

- 1.1 These Staff Regulations establish the fundamental principles of employment, regulate the working relationships and establish the rights and responsibilities of formally appointed employees who render their services in and receive remuneration from the Secretariat of the North Pacific Fisheries Commission (hereinafter called the "Commission"). These regulations do not apply to persons in Regulation 11.2.

REGULATION 2 DUTIES, OBLIGATIONS AND PRIVILEGES

- 2.1 The Executive Secretary and staff members of the Secretariat (hereinafter "staff members") are international civil servants. Upon accepting their appointments, they pledge themselves to discharge their duties faithfully and to conduct themselves in the best interests of the Commission.
- 2.2 For the purposes of these regulations the term "dependent" shall include only:
- (a) the employee's spouse or domestic partner (hereinafter referred to as "spouse");
 - (b) any unsalaried child, who is born of, or adopted by, a staff member, his or her spouse, or their children, who is below the age of eighteen years and who is dependent on a staff member or his or her spouse for main and continuing support;
 - (c) any child fulfilling the conditions laid down in paragraph (a) above, but who is between eighteen and twenty-five years of age and is receiving school or university education or vocational training;
 - (d) any child with a disability who is dependent on a staff member or his or her spouse for main and continuing support;
 - (e) any other child who is given a home by and is dependent on a staff member or his or her spouse for main and continuing support;
 - (f) any person related by blood or marriage for whose main and continuing support a staff member or his or her spouse is legally responsible.
- 2.3 Staff members shall at all times conduct themselves in a manner in keeping with the international nature of the Commission. They shall always exercise the loyalty, discretion and tact imposed on them by their international responsibilities in the performance of their duties. They shall avoid all actions, statements or public activities which might potentially be detrimental to the Commission and its aims.
- 2.4 Staff members shall not be the subject of discrimination on the basis of age, race, color, creed, gender, sexual orientation, disability or national origin.
- 2.5 In the performance of their duties, staff members shall neither seek nor accept instructions from any government or authority other than the Executive Secretary. In the case of the Executive Secretary, he or she shall neither seek nor accept instructions from any government or authority other than the Commission.
- 2.6 Staff members shall observe maximum discretion regarding official matters and shall abstain from making private use of information they possess by reason of their position.

Authorization for the release of information for official purposes shall lie with the Commission or the Executive Secretary, as the case may require.

- 2.7 Staff members shall, in general, have no employment other than with the Commission. In special cases, staff members may accept other employment, provided that it does not interfere or represent a conflict of interest with their duties in the Commission, and that prior authorization by the Executive Secretary has been obtained. The Commission's prior authorization shall be obtained in respect of the Executive Secretary.
- 2.8 No staff member may be associated in the management of a business, industry or other enterprise, or have a financial interest therein if, as a result of the official position held in the Secretariat, he or she may benefit from such association or interest.
- 2.9 Staff members shall enjoy the privileges and immunities to which they are entitled under the AGREEMENT BETWEEN THE GOVERNMENT OF JAPAN AND THE NORTH PACIFIC FISHERIES COMMISSION REGARDING PRIVILEGES AND IMMUNITIES OF THE NORTH PACIFIC FISHERIES COMMISSION, and such other privileges and immunities as may be decided.
- 2.10 The Commission shall sit as a body to hear grievances from staff members regarding human resource related matters, where other less formal attempts at resolution have not met with success. For staff members' grievances, the Commission may instruct the Executive Secretary to undertake other actions where the Commission deems that a grievance hearing is not appropriate. The Commission's decision is final and not subject to appeal.

REGULATION 3 HOURS OF WORK

- 3.1 The normal working day shall be eight hours, Monday through Friday, for a total of forty hours per week.
- 3.2 The Executive Secretary shall establish the working hours and may, in consultation with staff members, alter them for the benefit of the Commission as circumstances may require.

REGULATION 4 CLASSIFICATION OF STAFF

- 4.1 Staff members shall be classified in either of the two following categories:
 - (a) Professional Category (Positions of high responsibility of a managerial, professional, or scientific nature)
These posts will be filled by appropriately qualified professionals, preferably with University qualifications or the equivalent. Staff members in this category will be recruited internationally.
 - (b) General Services Category (Auxiliary administrative and technical positions. Clerical, secretarial and other office personnel)
Such staff shall be recruited from among citizens of members of the Commission, taking into account potential benefits that may occur from hiring staff locally.
- 4.2 Persons employed under Regulation 11 shall not be classified as staff members.

REGULATION 5
SALARIES AND OTHER REMUNERATION

- 5.1 The scale of salaries for staff members in the professional category shall be established by the Commission, taking into account the scales of salaries which would apply to officials of the United Nations Secretariat employed in Japan as well as the salaries of government officials working in Japan. Such salaries shall be paid in Japanese Yen.
- 5.2 Staff members in the general services category shall, in principle, be paid at rates equivalent to those paid in Japan for staff of equivalent qualifications and experience.
- 5.3 Performance reviews shall be completed for all staff members by the Executive Secretary on an annual basis. A summary of the performance reviews will be provided to the Commission annually. The annual performance review of the Executive Secretary shall be completed by the Commission.
- 5.4 The salaries of staff members shall be reviewed annually by the Commission taking into account the cost of living in the host country and the performance of each staff member concerned, based on an annual performance review.
- 5.5 Staff members of the Commission subject to national income tax shall be eligible for reimbursement of the tax paid on his or her salary. Such arrangements shall be made only on the basis that the direct costs of reimbursement are paid by the staff member's home country.
- 5.6 Staff members in the professional category are not entitled to overtime pay or compensatory leave.
- 5.7 Staff members in the general services category required by the Executive Secretary to work more than 40 hours during one week will be compensated. The method of compensation will be determined by the Executive Secretary in consultation with the staff member and shall include one of the following options:
 - (a) with compensatory leave equivalent to hours of overtime performed; or
 - (b) by remuneration per overtime hour, to be estimated at the rate of time and a half, or if the additional time is worked on a Sunday, or on holidays listed in Regulation 7.14, at the rate of double time.
- 5.8 The Commission shall pay duly justified and authorized representation expenses incurred by the Executive Secretary in the performance of his or her duties within the limits prescribed annually in the Budget.
- 5.9 Professional staff renting an apartment or house are eligible to receive an accommodation allowance. The allowance is based on the actual contracts and set at a maximum of 240,000 JPY per month. The Commission shall reimburse 75% of actual expenses within the cap set above. The accommodation allowance shall be reviewed every three (3) years and adjusted on relative movement in the local rental market.
- 5.10 A professional staff member is eligible to receive an education allowance, based on actual contracts, for each dependent child, determined by Regulation 2.2, b-e, in full-time attendance at school, university or similar higher educational institution in or outside a country of the staff member's duty station. The education allowance shall include costs of registration, tuition, education, boarding and ancillary fees related to student enrollment. The education allowance entitlement for a staff member is a maximum of 2,000,000 JPY

per annum per dependent child. The Commission shall reimburse 75% of actual expenses within the cap set above. The education allowance shall be reviewed every three (3) years. Each employee's entitlement under the education allowance is defined as the sum of the entitlements up to three of the employee's dependent children. Education allowances are not payable:

- a) in respect of children of staff members serving in their home country;
- b) for correspondence courses;
- c) when schooling does not require regular attendance at an education institution;
- d) for secondary dependents defined as parents, cousins, brothers or sisters of the staff member or his spouse;
- e) for attendance at kindergarten or nursery school at the preparatory level;
- f) for private tuition, except tuition in a language of the home country at duty stations where satisfactory school facilities for learning that language are not available;
- g) if education allowance is already covered by benefits of staff member's spouse.

REGULATION 6 RECRUITMENT AND APPOINTMENT

- 6.1 In accordance with Article 5.9 of the Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean (hereinafter called the "Convention"), the Commission shall appoint the Executive Secretary and shall establish his or her remuneration and such other entitlements as it deems appropriate.
- 6.2 In accordance with Rule 6.2 and 6.4 of the Rules of Procedure of the Commission, the Executive Secretary shall appoint, direct, and supervise staff. The paramount consideration in the appointment, transfer or promotion of the staff shall be the necessity for securing the highest standards of efficiency, competence and integrity.
- 6.3 Offers of appointment to the Secretariat may require the persons selected to undergo a medical examination and present a certificate stating that they have no medical condition that might prevent them from performing their duties.
- 6.4 Upon selection, each prospective staff member shall receive an offer of appointment stating:
 - (a) that the appointment is subject to the staff regulations applicable to the category of appointment in question, and to changes which may be duly made in such regulations from time to time;
 - (b) the nature of the appointment;
 - (c) the date on which the staff member is required to commence duty;
 - (d) the period of appointment, the notice required to terminate it and the period of probation;
 - (e) the category, level, commencing rate of salary and the scale of increments and the maximum salary attainable;
 - (f) any special terms and conditions which may be applicable.
- 6.5 Together with the offer of appointment, staff members shall be provided with a copy of these Regulations. Upon acceptance of the offer staff members shall state in writing that they are familiar with and accept the conditions set out in these Regulations.

REGULATION 7 LEAVE

- 7.1 Staff members shall be entitled to annual leave at the rate of two and half workdays for each full month of service. Annual leave is cumulative, but at the end of each calendar year, not more than 30 workdays may be carried over to the following year.
- 7.2 The taking of leave shall not cause undue disruption to normal Secretariat operations. In accordance with this principle, leave dates shall be subject to the needs of the Commission. Leave dates shall be approved by the Executive Secretary who shall, as far as possible, bear in mind the personal circumstances, needs and preferences of staff members.
- 7.3 Annual leave may be taken in one or more periods. The total amount of annual leave taken in any calendar year shall not be longer than 45 days under any circumstances.
- 7.4 Any absence not approved within the terms of these Regulations shall be deducted from annual leave.
- 7.5 Staff members who, upon termination of their appointment, have accumulated annual leave that has not been taken shall receive the cash equivalent estimated on the basis of the last salary received.
- 7.6 Staff members shall be entitled to sick leave at the rate of one and one quarter days for each full month for service. Sick leave is cumulative and may be accrued without limit. Accrued sick leave is not subject to payment upon termination or separation from employment.
- 7.7 Staff members shall not be granted sick leave for a period of more than 3 consecutive days without producing a medical certificate.
- 7.8 Staff members shall be granted certified sick leave not exceeding 12 months in any 4 consecutive years. The first 6 months shall be on full salary and the second 6 months on half salary, except that no more than 4 months on full salary shall normally be granted in any period of 12 consecutive months.
- 7.9 Sick leave may also be used to care for a staff member's spouse, child or parent with a serious health condition.
- 7.10 Staff members shall be entitled up to twelve weeks of family leave per calendar year for (a) the birth of a child and to care for the newborn child within one year of birth; or (b) the placement with the employee of a child for adoption or foster care and to care for the newly placed child within one year of placement. During this period staff members shall receive full pay.
- 7.11 Staff members shall be entitled to bereavement leave of up to five days upon the death of an immediate family member and up to three days for a relative other than an immediate family member. Reasonable travel time to and from destination will not be counted under these limits.
- 7.12 After 18 months of service the Commission shall, in accordance with Regulations 9.3 and 9.4, pay travel expenses to the staff member's home country on annual leave for internationally recruited staff members and their dependents. Following this, home leave shall be granted at two-year intervals provided that:

- (a) dependents who benefit from this Commission grant have resided in Japan for at least 6 months prior to travel;
- (b) it is expected that staff members will return to the Secretariat to continue rendering their services for a minimum additional period of 6 months.

7.13 The possibility of combining travel to home country on leave with official travel in Commission service may also be considered, provided the interests of the Commission are duly borne in mind.

7.14 Staff members shall be entitled to the statutory holidays in Japan, i.e.: (Annex: List of Holidays), and other holidays that may be designated by the Government of Japan from time to time, such as for national elections and other special circumstances.

7.15 If under special circumstances staff members are required to work on one of the aforementioned days the holiday shall be observed on another day to be set by the Executive Secretary, who shall take into account the needs of the Commission.

REGULATION 8 SOCIAL SECURITY

8.1 It is a condition of employment that each staff member will contribute to a recognized retirement fund and have adequate medical, hospital, life and disability insurance cover to the satisfaction of the Executive Secretary. Such insurance cover shall include adequate provision for dependents. The Commission shall pay two-thirds of the total contribution to the retirement fund and of the insurance premiums, up to the maximum percentage applying in the United Nations Secretariat from time to time of the total of the staff member's salary. Such payment shall be by way of reimbursement upon the production of receipts, or shall be paid direct together with the employee's contribution.

8.2 In the event of death of a staff member following illness or surgery not resulting from an accident covered by the appropriate insurance, the right to salary and other corresponding benefits shall cease on the day on which death occurs, unless the deceased leaves dependents, in which case these shall be entitled to mortality allowances and return travel and removal expenses to country of origin or former residence at the expense of the Commission.

8.3 Eligibility of the dependents of a deceased staff member for the payment of return travel and removal expenses shall lapse if the travel is not undertaken within six months of the date of the staff member's death. The Executive Secretary may extend this period in the case of special circumstances: e.g., to allow a dependent child to finish a school term.

8.4 The above mortality allowance for death shall be calculated in accordance with the following scale:

| Years of Service | Months of Net Base Pay Salary Following Death |
|---|---|
| Less than 3 years | 3 months |
| 3 years and more, but less than 7 years | 4 months |
| 7 years and more, but less than 9 years | 5 months |
| 9 years and more | 6 months |

8.5 The Commission shall pay for shipment of the staff member's remains and personal effects from the place of death to the place designated by the spouse, next of kin, or other individual(s) designated by the staff member.

REGULATION 9 TRAVEL

- 9.1 All official travel shall be authorized by the Executive Secretary in advance within the limits of the budget, and the itinerary and travelling conditions shall be those best suited for maximum effectiveness in the fulfillment of duties assigned.
- 9.2 With regard to official travel, a travel allowance, generally consistent with United Nations practice, may be paid in advance for fares and daily living expenses. However, charges for hotel accommodations shall be paid based on charges actually incurred.
- 9.3 Official travel should be planned well in advance to avoid incurring higher costs for airfares and other travel related cost.
- 9.4 Whenever feasible, economy class travel shall be used for all travel.
- 9.5 Following completion of a duty journey, staff members shall repay any travel allowances to which, in the event, they were not entitled. Where staff members have incurred expenses above and beyond those for which travel allowances have been paid, they shall be reimbursed, against receipts and vouchers, as long as such expenses were necessarily incurred in pursuit of their official duties.
- 9.6 On taking up an appointment in the Professional Category staff members shall be eligible for:
 - (a) payment of economy class air fares (or equivalent) and travel allowance for themselves, their spouses and dependents from their place of residence to Japan;
 - (b) an Installation Grant calculated on the basis of the prevailing United Nations rate;
 - (c) payment of removal costs, including the shipment of personal effects and household goods from place of residence to Japan, subject to a maximum volume of 30 cubic meters or one international standard shipping container,
 - (d) payment or reimbursement of sundry other expenses related to relocation, including insurance of goods in transit and excess baggage charges subject to the prevailing relevant United Nations rules. Such payments shall be subject to prior approval by the Executive Secretary.
- 9.7 Staff members who, in the course of their duty, are required to use private motor vehicles for official travel purposes shall, with the prior authorization of the Executive Secretary, be entitled to receive a reimbursement of the costs involved in line with that available to members of the Government Service in Japan. The costs associated with normal daily travel to and from place of work shall not be reimbursed.

REGULATION 10 SEPARATION FROM SERVICE

- 10.1 Staff members may resign at any time upon giving three months' notice or such lesser period as may be approved by the Executive Secretary or the Commission, as the case may require.
- 10.2 The Executive Secretary may terminate the appointment of a staff member by giving three (3) months written notice, when that termination is due to restructuring of the Commission

or of any of its constituent bodies, or if the Commission would decide to cease its functions. If at any time the Executive Secretary considers that a staff member does not give satisfactory service or fails to comply with the duties and obligations set out in these Rules, the staff member will receive a formal written warning. If the performance does not improve or the employee continues to fail to comply with the duties and obligations set out in the rules, the staff member will receive a second formal written warning and if necessary, other disciplinary action (e.g. suspension, demotion) may follow. If after the second formal written warning the staff member's performance does not improve to a satisfactory standard, the appointment of the staff member may be terminated upon written notice of one (1) month in advance subject to the prior notification of the Chair of the Commission.

- 10.3 In the event of involuntary separation from service with the Secretariat, staff members shall be compensated at a rate of two weeks base pay for each year of service, beginning the second year, unless the cause of termination has been gross dereliction of duties imposed in Regulation 2.
- 10.4 On separation from service, a staff member shall, subject to Regulation 10.5 below, be entitled to the following:
- (a) payment of economy class air fares (or equivalent) to the staff member's country of origin or former residence, for the staff member and dependent members of his or her family;
 - (b) payment of removal costs, including the shipment of personal effects and household goods from place of residence in Japan to the country of origin or former residence, subject to a maximum volume of 30 cubic meters or one international shipping container;
 - (c) a repatriation allowance generally consistent with United Nations' practice.
- 10.5 At the discretion of the Executive Secretary, the right to the repatriation expenses provided for in Regulation 10.4 may be cancelled or reduced appropriately if:
- (a) the staff member fails to provide the three months advance notice as specified in paragraph 10.1;
 - (b) less than one year has elapsed between the date of taking up the appointment and the date of separation from service;
 - (c) the reason for separation from service was termination of employment due to gross dereliction of duty;
 - (d) more than six months has elapsed between the staff member's separation from service and his or her return to his or her country of origin or former residence;
 - (e) less than six months has elapsed since the staff member last visited his or her country of origin or former residence on home leave at the expense of the Commission; or
 - (f) the staff member has applied for or received status as a permanent resident of Japan.
- 10.6 In the case of serious misconduct by a staff member that threatens the Commission's operations or the reputation of the Commission or its members (for example, a criminal offense such as theft, intentional breach of confidentiality etc.), appointment of the staff member may be terminated without prior warning.

REGULATION 11
TEMPORARY PERSONNEL UNDER CONTRACT

- 11.1 The Executive Secretary may contract temporary personnel necessary to discharge special duties in the service of the Commission. Such personnel shall be classified as additional help and may be paid on an hourly basis.
- 11.2 Persons in this category may include translators, interpreters, typists, and other persons contracted for meetings, as well as those whom the Executive Secretary contracts for a specific task. Whenever possible, persons resident in Japan shall be utilized in such cases.

REGULATION 12
APPLICATION AND AMENDMENT OF REGULATIONS

- 12.1 Any doubts or disputes arising from application or interpretation of these Regulations shall be resolved by the Executive Secretary in consultation with the members of the Commission.
- 12.2 Situations involving the Executive Secretary shall resolved by the Chair in consultation with members of the Commission.
- 12.3 Matters not foreseen in these Staff Regulations that materially affect the operation of the Secretariat or the working conditions of the staff shall be brought to the attention of the Commission by the Executive Secretary.
- 12.4 Subject to the provisions of the Convention, these Regulations may be amended by the Commission in accordance with its Rules of Procedure.

Guidelines Outlining the Process for Submission, Review, Approval and Implementation of Projects to Finalize the Commission Work Program and Budget

The following Guidelines outline the process for submission, review, approval and implementation of projects based on similar guidelines of the WCPFC. It includes five steps: (1) review and prioritization of the submitted projects by an appropriate Committee, (2) endorsement to and approval by the Commission, (3) call for expressions of interest for approved projects and receiving proposals where appropriate, (4) evaluation of proposals and signing of contracts with successful bidders, and (5) monitoring review and reporting on project implementation.

Table 1. Schedule outlining the process for submission, review, approval and implementation of projects to be supported by the NPFC budget

| Time | Task/Activity | Responsibility |
|--|--|---|
| Committee's meeting (SC in spring, TCC in summer) | <ol style="list-style-type: none"> 1. Update Committee's work program including projects* submitted by Members or subsidiary bodies 2. Review and re-prioritize projects (i.e. High, Medium, Low) 3. Source of funds (Committee's fund or Special Project Fund (SPF)) | Informal Small Group compiles the projects, prioritize them and makes recommendations to Committee for consideration and adoption |
| FAC and Commission meetings (summer) | FAC reviews SC and TCC recommendations and prioritize projects suggested to be funded by SPF. Commission reviews and approves FAC recommendations. | FAC Commission |
| After Commission meeting (summer) | Call for expressions of interest for priority projects posted on NPFC website** Requirements for proposals are listed in Table 3. | Secretariat |
| October | Deadline for receipt of proposals by Secretariat | Proposer |
| November | Review and appraisal (and modification, if required) of proposals and identification of projects for funding support using agreed proposal assessment criteria in Table 2 | Secretariat and Chair, if appropriate |
| | Signing project contracts | Secretariat |
| Committee's meeting (SC in spring, TCC in summer) | <p>Reports on the status of projects approved the previous year(s), and for new projects:</p> <ol style="list-style-type: none"> 1. Update Committee's work program including projects* submitted by Members or subsidiary bodies 2. Review and re-prioritize projects (i.e. High, Medium, Low) 3. Source of funds (Committee's fund or Special Project Fund (SPF)) | Informal Small Group compiles the projects, prioritize them and makes recommendations to Committee for consideration and adoption |
| FAC and Commission meetings (summer) | FAC reviews SC and TCC recommendations and prioritize projects suggested to be funded by SPF. Commission reviews and approves FAC recommendations. | FAC Commission |

* Project submission shall include Project title, Description, Objective, Tasks/TOR, Expected outputs, Timelines, Rough estimation of costs, History/Background.

** There is the option of posting the recommended projects on the website after completion of the Committee's meeting in order to provide more time for consideration by organizations which may submit a proposal. The approved budget for supporting proposals would not be known until after the Commission meets in summer.

Table 2. Proposal assessment criteria

| Assessment Criteria | Score (1-5) | Justification for score |
|---|-------------|-------------------------|
| Attractiveness | | |
| Is the proposal aligned with a priority project listed in the Commission’s or Committee’s Work Programs and the budget allocated to it? | | |
| Is the need and are the planned outputs/benefits well-defined and relevant? | | |
| Adoption and uptake. What is the level of impact and likelihood that the project outputs will be adopted? Is the pathway for uptake described? | | |
| Cost effectiveness: Is the project cost effective? Is it using other sources to lever additional funds? | | |
| Is there an appropriate level of collaboration between the applicant and other relevant researchers, fisheries managers and the fishing industry? | | |
| Feasibility | | |
| Are the objectives clearly specified and are they consistent with the planned project outputs/benefits? | | |
| Sound methodology: Is the project design/method well described and is it consistent with the projects objectives? | | |
| Likelihood of success: Are the project objectives likely to be achieved? | | |
| Is there a strategy for managing data arising from the project so that it will be easily accessible by others in the future? | | |
| Applicant’s expertise/experience. Does the research team have the ability, capacity and track record to deliver the outputs? | | |
| Total score | | |

Scores for assessing proposals: 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high

Table 3. Proposals should address, as a minimum, the following issues:

| Part A: Administrative Summary | Part B: Project Proposal Description |
|--|--|
| <ol style="list-style-type: none"> 1) Project Title 2) Organization 3) Administrative Contact 4) Principal Investigator and CV 5) Commencement and Completion Date 6) Project Budget Summary – Salaries, Travel, Operating and Other | <ol style="list-style-type: none"> 1) Background and Need 2) Objectives 3) Project Outcomes 4) Form of Results 5) Methods 6) Risks of project not achieving Project Objectives 7) Schedule of Milestones 8) Other Related Projects 9) Project Staff and CV's 10) Detailed costs against milestones |

NPFC Media Access Policy

Ref: Rules 5 and 9 of the NPFC Rules of Procedure

ABSTRACT:

The intent of the media access policy is to provide the guidelines to the Commission, Secretariat and the Information Services themselves for access and participation of the media at all Commission meetings, including the rules for release of information prior to it being approved for such release. This is to prevent any misunderstanding by all Members, and also clarify the rules for the implementation and compliance with the policy. This policy is brought forward from last meeting of the Commission and includes suggestions and corrections made by the NPFC Members during and after the 2nd Commission meeting.

PURPOSE:

Rule 5 notes that the meetings of the Commission and its subsidiary bodies shall be open to delegates and observers unless the Commission or subsidiary bodies decide that exceptional circumstances require a closed session.

Rule 9 of the Rules of Procedure on observers is silent on the issue of media access to annual sessions or sessions of subsidiary bodies. The intent of this short paper is to establish a NPFC media access policy including rules of procedure for media while permitted to attend sessions of the Commission or subsidiary bodies.

The Commission wishes to provide clear guidelines for media access and participation to the annual Commission and Subsidiary meetings. The North Pacific Fisheries Commission encourages access by approved observers in accordance with its Rules of Procedure, Rule 9. The Commission also further wishes to enhance and extend this same access and transparency as far as possible for accredited media to record highlights of the meeting and report on such to the general public. The following have therefore been developed as guidelines to enable NPFC to provide information on its activities to the public. Media policies of other RFMOs have been consulted in developing this document.

SCOPE: This policy shall apply equally to accredited media for the annual Commission and subsidiary meetings.

Note: Government media who are part of delegations are expected to be under the rules of the head of delegation and expected to conduct themselves in a similar manner as noted below.

DETAILED ACCESS RULES:

1. The guidelines for media participation have been structured to cover two different media scenarios.
 - a) Mainstream media that are interested in covering the event as a current news item for local or international interest; and
 - b) media participation for a documentary, story or some other requirement whereby they wish to access the meeting during the sessions.

A) General Conditions applicable to all media participation

2. Approval of all media access or participation will rest with the Chair of the meeting in consultation with the Executive Secretary (ES), and where appropriate, the Commission Members.
3. All requests for media participation to NPFC meetings or for interviews with the NPFC or Secretariat shall be directed to the Executive Secretary of the NPFC Secretariat and include media accreditation documents (press card and letter of authorization from the media company) and purpose of the participation.
4. Subject to the approval of the ES accredited and approved media will be provided media identification that shall be worn at all times while on the meeting facilities, inside and outside the meeting room.
5. Interviews of members of the Commission, cooperating non-Contracting Members or other participants at the meeting shall not interrupt proceedings, consequently if during the meeting shall they shall be either:
 - a) after sessions or during breaks; or
 - b) outside the conference meeting facilities.
6. Members are reminded of the rules of confidentiality with respect to the release of details of the meeting prior to the end of the Commission meeting.
7. The Commission Chair, and Executive Secretary shall be the only spokespersons for the NPFC and the Secretariat. No other Secretariat Staff shall be permitted to participate in any media events or interviews unless authorized by the Executive Secretary.

B) Guidelines for general mainstream media access for news recording or interviews:

8. Subject to the approval of the ES, all approved media are permitted inside the meeting room for the **opening session** subject to the following rules:
 - a) media must wear their Secretariat-issued media identification card at all times;
 - b) any disruptive behavior during the opening session shall result in the ES requesting the company to immediately leave the meeting venue and the withdrawal of credentials;
 - c) cameras may only be used on the periphery of the meeting and cannot be disruptive to the opening ceremonies;
 - d) interviewing of delegates in the meeting room is not permitted;
 - e) timely departure from the meeting room after the opening session.
9. Media participation during the **closing ceremonies**, if any, is subject to the approval of the Chair, and will be conducted in accordance with the above rules.
10. The Chair may decide to conduct a press conference after the meeting which would be open to all media in attendance.

C) Guidelines for media submitting special requests to film documentaries or special

interest programs:

11. Requests for media participation for access for the filming of special interest programs or documentaries during the meeting proceedings shall be provided to the Executive Secretary of the NPFC Secretariat at least 60 calendar days in advance of the meeting to permit circulation and feedback from the NPFC Members. This is consistent with access requests for NGO observers under the Rules of Procedure Rule 9.

12. The request for such access shall include media credentials, official Press card and letter of authorization from the media company with the intent of the access or description of the project. The Executive Secretary shall circulate the request to the NPFC Members. The Chair or Executive Secretary shall notify the media entity at least ten days prior to the commencement of the meeting of the decision.

13. Approved media participation and access for these special cases shall be subject to the following conditions to prevent any disruption to the meeting:

- a) the approval provides clearance as agreed by all Members and is considered as **‘one time’¹ access for that visit;**
- b) media must wear their Secretariat issued media identification card at all times while on the meeting premises inside and outside the meeting rooms;
- c) any disruptive behavior during meeting discussions or external to the meeting shall result in the ES requesting the company to immediately leave the meeting venue and the withdrawal of credentials.
- d) the use of cameras is permitted inside the conference room for the official opening and only at set times during the meeting as discussed and agreed by the Chair in advance of the meeting. This agreement can be withdrawn anytime during the meeting when a Member conveys its objection to the Chair;
- e) camera close up shots are not permitted during meeting discussions;
- f) interviewing delegates during the formal Commission discussions or in the meeting room is not permitted;
- g) the use of any disruptive personal communications devices by media during discussions by the Commission is not allowed; and
- h) if the ES requests media to leave the meeting room this is to be done immediately.

¹ “One time” means the clearance given is only effective for that particular meeting. Should there be another meeting for the same agenda item, the same should also be cleared and agreed by all Members prior to the meeting.

NPFC Policy on Support to Specialist Experts to the Secretariat or Commission

ABSTRACT:

The intent of this policy is to provide and publish general terms that can be expected from the Secretariat in support of the various categories of specialist technical assistance to the Secretariat or Commission. This policy is brought forward from last meeting of the Commission and includes suggestions and corrections made by the NPFC Members at the 2nd Commission meeting and by Secretariat after the meeting.

POLICY:

It is envisioned that the Secretariat or Commission shall seek assistance of technical specialists to support the activities of the Secretariat to set up the appropriate mechanisms to provide appropriate Secretariat services to the Commission. It is expected that these specialists shall be sought under four different scenarios:

1. Consultancies, on a task-based assignment for which remuneration is expected;
2. No fee Consultancies from like-minded organizations for system advice and set up with cost of only travel, accommodation and per diems;
3. Long term secondment assignments from Members to provide advice, system or mechanism set up;
4. Interns to provide an opportunity for working with an RFMO, join specific projects ongoing in the Commission and build capacity in understanding the operations and functions of the Commission and the role of the Secretariat.

The Secretariat proposes the following levels of support in each circumstance:

| Technical Support | Level of Secretariat support | | | |
|-------------------|--|--------------------|---|--|
| | Consultancy | No Fee Consultancy | Long term Secondment (> 1 month) | Intern |
| Air fare | ✓ | ✓ | (Special cases ES can approve air fare) | |
| DSA as UN rate | ✓ | ✓ | | |
| Allowance | | | | 200,000 JPY/month to assist in accommodation |
| Consultancy fee | ✓ (see Consultant Remuneration Guideline) | | | |

CONSULTANT REMUNERATION GUIDELINE (draft)

1. In accordance with established practice, the following rates are the basis on which to set the remuneration of consultants employed by the NPFC.

(in United States dollars)
(expressed in gross terms)

| <u>Level</u> | <u>Monthly rate</u> | <u>Daily rate</u> |
|--------------|---------------------|-------------------|
| A | 4,000 - 6,800 | 200 - 340 |
| B | 6,400 - 11,600 | 320 - 580 |

2. Executive Secretary will be responsible for determining the level as well as the precise honorarium in accordance with the criteria set out in paragraphs 3 and 4 below.

3. Assigning the level

The primary consideration in establishing the level to be assigned to the consultant shall be the nature of the services to be provided by the consultant, i.e. the complexity, difficulty and extent of the work to be performed and the degree of expertise required to accomplish it.

Level A: This level is typically used for (i) the university graduate with some pertinent experience or (ii) for an administrative or technical specialist with many years' experience of a quasi-professional nature.

Level B: This level is considered to be the normal level at which the vast majority of the Organization's consultants are employed. It is used for the consultant who is highly trained and has long experience in one of the technical/administrative fields of the Organization. His/her recommendations, for example, may form one of several contributions to the accomplishment of a specific project of a comparatively narrow scope.

4. Determining the honorarium

Once the level has been established, the rate within the range for the level will be determined taking into account such factors as:

- (a) the estimated time required for the consultant to undertake the work involved shall be taken into account as well as the current market rate for comparable work for the specialty concerned, if available, as well as the maximum amount budgeted for the purpose;
- (b) the remuneration to be paid shall be the minimum amount necessary to obtain the services required by the Commission. The level of expertise of the consultant must be appropriate to the importance of the services performed;
- (c) the earnings over the past year on similar arrangements;
- (d) the relationship (favourable or unfavourable) of the consultant's home currency to the US dollar;
- (e) hardship conditions at the duty station.

5. Rates above the maxima

Proposals for rates above the maxima for Level B must be referred with appropriate justification to the Chairman of the Commission for approval.

6. The total remuneration payable to a consultant shall be specified in the special service agreement (SSA) in gross terms, i.e. before tax. The remuneration of a consultant shall normally be paid in a lump-sum on satisfactory completion of the services described in the SSA.

NO FEE CONSULTANCY

In case of mutual cooperation with other RFMOs and Agencies and their consent to dispatch their professional staff to assist and advise on specific technical matters, consultancy remuneration shall be zero however the Executive Secretary has the authority to provide travel expenses.

LONG TERM SECONDMENT POLICY

Introduction

NPFC invites citizens from its member Parties to apply for the NPFC secondment. The period of the secondment is from 1 to 12 months. The secondee will work at the NPFC Secretariat in Tokyo, Japan.

Objective

To assist NPFC Secretariat in setting up new systems and mechanisms, and provide advice on operational matters.

Qualifications of Candidates

This individual is a senior technical specialist from a Member Party who can assist the Secretariat in the set-up of key Commission systems, e.g., data, website, intranet, VMS, science projects, and others.

Period of internship: Start on or about (TBA) for a period from 1 (one) to 12 (twelve) months. Deadline for application: (TBA)

Guidelines for application and selection procedure

1. Applicants will apply to the NPFC Secretariat following the procedure described on the NPFC website. Applicants must describe their interests and qualifications in a cover letter, provide a resume delineating their work experience, and submit a reference letter written by Member's Representative.
2. Applications (including cover letter, resume, and reference letter) must be received by the NPFC Secretariat 60 days prior to the NPFC Annual Meeting. The NPFC Executive Secretary will review applications and transmit his/her recommendation(s) to the NPFC Points of Contact 30 days prior to the NPFC Annual Meeting.
3. The Commission will announce the successful secondee at the Annual Meeting. The NPFC Secretariat staff will contact the secondee immediately after the Annual Meeting by email, or by phone, or by regular mail to make arrangements with the secondee to assume the secondment.

Travel expenses

The secondee may or may not be provided air travel at economy rate subject to discussions and approval of the Executive Secretary.

NPFC INTERNSHIP PROGRAM

Introduction

NPFC invites citizens from its member Parties to apply for the NPFC Internship Program. The period of the internship is up to six months. One intern per year will be accepted upon approval of the Commission. The intern will work at the NPFC Secretariat in Tokyo, Japan.

Objectives

The NPFC Internship Program has two goals:

1. to help early-career professionals gain experience and knowledge in operations of the Commission, and
2. to increase the capacity of the NPFC secretariat through the presence of an additional professional bringing his/her experience and knowledge.

Nature of the Internship

The intern works under the supervision of the Executive Secretary and/or his/her designates and may be given a wide variety of tasks:

- fisheries management;
- fisheries science;
- databases;
- administrative, meeting coordination, publications; and
- other NPFC activities delegated by the Executive Secretary.

Period of internship: Start on or about (TBA) for a period up to a maximum of 6 (six) months.
Deadline for application: (TBA)

Qualifications of Candidates

Applicants must be from NPFC Member, have a minimum of a university degree, the ability to read, write, and speak English, the ability to use computers and the internet, and demonstrated personal initiative.

Applicants must currently be a part of the government or academic sector, a recent graduate, or currently enrolled in school for an advanced degree.

Guidelines for application and selection procedure

Applicants will apply to the NPFC Secretariat following the procedure described on the NPFC website. Applicants must describe their interests and qualifications in a cover letter, provide a resume delineating their academic and work experience, and submit two professional reference letters.

Applications (including cover letter, resume, and two reference letters) must be received by the NPFC Secretariat 60 days prior to the NPFC Annual Meeting.

The NPFC Executive Secretary will review applications and transmit his/her recommendation(s) to the NPFC Points of Contact 30 days prior to the NPFC Annual Meeting.

The Commission will announce the successful intern at the Annual Meeting.

The NPFC Secretariat staff will contact the successful intern immediately after the Annual Meeting by email, or by phone, or by regular mail to make arrangements with the intern to assume the internship

Financial Support

NPFC will provide a stipend of 200,000 JPY per month to assist in accommodation and living costs. Travel costs for the intern to and from their place of residence and the location of the Secretariat will be at his/her own expense or by home country support. Travel expenses associated with the Intern's work in the Secretariat will be covered by NPFC. The Intern's medical insurance and benefits are not covered by the NPFC Internship Program.

How to Apply

Procedure for applying for the NPFC Internship Program:

Submit the following to the Secretariat by email (secretariat@npfc.int):

- 1) A cover letter describing applicant's interests and qualifications,
- 2) Resume showing academic and/or work experience
- 3) Two professional letters of reference

Deadline of submission: (TBA)

Starting date of the next Internship: on or about (TBA)

Duration of internship: maximum of six months

NPFC Document Rules

Abstract. This paper is intended to classify documents submitted to or developed by the NPFC and its subsidiaries and establishes rules for each type of document. It describes document requirements, includes examples which *can be used as templates* and provides guidelines for submission of NPFC documents.

The paper was adopted by the Commission at its 2nd Annual Session. The current version is the revision of that paper including new NPFC header and footer (appendices 2-6) and also Secretariat's suggestions in track changes based on its experience in handling NPFC papers past year.

TYPES OF NPFC DOCUMENTS

Working Papers (WP) are documents generated by the Members or the Secretariat for consideration and discussion by the Members.

Information Papers (IP) are submitted by the Members and present information which may be useful for the Commission, does not require discussion, but may provide background for WPs.

Observer Papers (OP) are Information Papers submitted by Observers.

Meeting Info Papers (MIP) provide organizational support to participants, i.e. agenda, schedule, meeting venue etc.

Reference Documents (RD) include key NPFC documents relevant to the meeting (Convention, Rules of Procedure, CMMs etc.)

Meeting Reports (spelled out with the acronym of the meeting before wording, e.g., SSC VME01 Report) summarize results of the meetings of the Commission and its subsidiaries.

Annual Reports (AR) are generated by the Members and describe how the Member of the Commission has implemented the conservation and management measures and monitoring, control and surveillance and enforcement procedures adopted by the Commission. It has a separate part (Part II) that provides confidential information on compliance activities of the Members.

Compliance Reports (CR) are reports from the Secretariat on the assessment of Member's compliance with CMMs (confidential until approved).

Vessel Registration Reports (VR) are the complete lists with all the details required in accordance with CMM 01-2015 for all vessels of a Member authorized by that Member to operate in the NPFC Convention Area.

Workshop Reports (WR) are extended abstracts of presentations given at NPFC workshops.

Other documents are papers issued on an irregular basis and do not meet above descriptions.

REQUIREMENTS FOR NPFC DOCUMENTS

All documents submitted to or developed by the NPFC and its subsidiaries shall include header (NPFC+logo), document number (appendix 1), page numbers, title, and, if appropriate, author(s) and affiliation. Specific requirements to different types of documents are as follows:

Working Paper shall have an abstract. It also *may* have cover page and citation that is strongly recommended for scientific papers which have not yet been published. Citation format: Author(s). Year. Title. Document number. # pp. (number of pages) Available at <http://www.npfc.int>. (appendix 2)

Meeting Report shall have cover page and citation. Citation format: NPFC or its subsidiary. Year. Title. Document number. # pp. (number of pages). Available at <http://www.npfc.int>. (appendix 3)

Annual Report shall have cover page and citation. Citation format: Member. Year. Title. Document number. # pp. (number of pages). Available at <http://www.npfc.int>. (appendix 4 and 5 for Part I and II respectively).

Compliance Report *may* have cover page and citation, if necessary. Citation format: Member. Year. Title. Document number. # pp. (number of pages). Available at <http://www.npfc.int>.

Vessel Registration Report *may* have cover page and citation, if necessary. Citation format: NPFC or its subsidiary. Year. Title. Document number. # pp. (number of pages). Available at <http://www.npfc.int>. (same as appendix 5)

Workshop Report shall have cover page, summary, list of sponsors and organizing committee, table of contents, list of participants, and extended abstracts. Citation format for workshop abstracts: Author(s). Year. Title. NPFC Workshop Report #. P. #. Available at <http://www.npfc.int>. (appendix 6).

Reference Documents/Papers, Meeting Info Papers, Information Papers, Observer Papers and other NPFC documents do not have specific requirements but shall follow common rules for numbering and content for all documents noted above.

GUIDELINES FOR SUBMISSION OF NPFC DOCUMENTS

Submission

NPFC Documents must be prepared in English and submitted to the Secretariat through the Commission's point of contact in each Member.

Submission of all documents must be in electronic form unless there are special circumstances and be sent by electronic mail.

All text, tables, and figures must be embedded in the file.

Document number

The Secretariat will assign a document number to completed documents in the order they are received. If a document is revised, the Secretariat will add "Rev #" in the end of document number.

Citation

In case the document is not citable, insert one or any following sentences under the document number:

NOT TO BE CITED, or NOT TO BE CITED WITHOUT PERMISSION OF THE

ISSUING AGENCY, and/or NOT TO BE DISTRIBUTED WITHOUT AUTHORIZATION OF THE ISSUING AGENCY.

Uploading on the Website

The Secretariat will upload submitted documents to the Meetings page of the NPFC website which will be accessible for Members only. After the adoption of documents at the Annual Meeting, documents will be posted in the public area of the NPFC website. Documents determined to contain sensitive information shall remain on the Members' Area of the webpage.

Deadlines

The Secretariat encourages the Members to follow deadlines for submission of documents as per Rules of Procedure to give others enough time for consideration and, therefore, make the Commission meetings more effective and productive.

| Document type | Deadline | Clause of the NPFC Rules of Procedure |
|--|--|---|
| <i>Documents from the Members</i> | | |
| Annual report | End of February | 8.5 |
| Compliance Report | End of February | Under same guidelines as Annual Report, e.g., AR Part 2 |
| Working Paper | 30 days before the opening of the meeting | 5.7.2 |
| Working Paper (subsidiary bodies, 45 days ¹) | 14 days before the opening of the meeting (except where meetings are coincidental) | 5.7.3 |
| <i>Documents from the Secretariat</i> | | |
| Provisional Agenda | 90 days before the Meeting | 5.1.1 |
| Revised Provisional Agenda | 60 days before the Meeting | 5.1.2 |

¹ For documents or proposals that require the input of subsidiary bodies, and the meeting of such subsidiary body concluded within 45 days of the opening of a regular Commission meeting

| | | |
|----------------|---|-------|
| Meeting Papers | 30 days prior to, or at least 14 days prior to the applicable Meeting | 5.7.1 |
|----------------|---|-------|

- Members and Observers are encouraged to submit Information and Observer Papers in as much advance notice as possible.

Documents submitted during the meeting will not be discussed at the meeting. They will be labeled as Information Papers for consideration by the Members. Members may, however, decide to reconsider them as Working Papers for full discussion.

DOCUMENTS AVAILABILITY AT THE MEETING

The Secretariat provides participants with the Meeting Info Papers at meeting registration. This document package includes Provisional Agenda, Provisional Annotated Agenda, Indicative Schedule, Provisional List of Documents, and Meeting Information.

Hard copy of other documents will not be available at the meeting site except two copies for each member's Heads of Delegation. Participants must either download the documents from the website to their own devices, or bring their own hard copy to the meeting.

Secretariat considers development of electronic means (e.g. SharePoint) to make documents available during the meetings.

Numbering for NPFC Meeting Documents

The following is proposed for an official numbering scheme for each of the official NPFC meetings. These are based on the numbering scheme of the PrepCon and other RFMOs.

1. Annual Session of the Commission

Reference Documents

Be referred by name only.

Meeting Info Papers

NPFC – year – COM+# mtg – MIP# (rev # if needed) – title e.g., NPFC-2016-MIP01

Working Papers

NPFC – year – COM+# mtg – WP# (rev # if needed)

Information Papers

NPFC – year – COM+# mtg – IP# (rev # if needed) Observer Papers

NPFC – year – COM+# mtg – OP#

Meeting Report

NPFC – year – COM+# mtg – Report (draft/provisional/final)

2. Scientific Committee Meeting

Reference Documents

Be referred by name only.

Meeting Info Papers

NPFC – year-SC+# mtg– MIP# (rev # if needed) Working Papers

NPFC – year-SC+# mtg– WP# (rev # if needed)

Information Papers

NPFC – year – SC+# mtg - IP# (rev # if needed)

Observer Papers

NPFC-year-SC+# mtg– OP#

Meeting Report

NPFC – year – SC+# mtg–Report (draft/provisional/final)

3. Small Scientific Committee Meetings

Reference Documents

Be referred by name only.

Meeting Info Papers

NPFC-year-SSC– Title of SSC+# mtg– MIP# (rev # if needed)

Working Papers

NPFC-year-SSC– Title of SSC+# mtg-WP# (rev # if needed)

Information Papers

NPFC – year – SSC– Title of SSC +# mtg - IP# (rev # if needed)

Observer Papers

NPFC-year-SSC–Title of SSC+# mtg– OP#

Meeting Report

NPFC-year-SSC–Title of SSC+#mtg–Report (draft/provisional/final)

4. Technical and Compliance Committee Meeting

Reference Documents

Be referred by name only.

Meeting Info Papers

NPFC-year-TCC+# mtg– IP# (rev # if needed) Working Papers

NPFC-year-TCC+# mtg– WP# (rev # if needed)

Information Papers

NPFC – year – TCC +# mtg - IP# (rev # if needed)

Observer Papers

NPFC-year-TCC+# mtg–OP#

Reports from TCC Working Groups

NPFC-year-TCC-WG Title (e.g, HSBI)+#mtg– Doc # e.g.,

NPFC-2016-TCC-WG-HSBI01-01

Meeting Report

NPFC-year-TCC+#mtg–Report (draft/provisional/final)

5. Working Groups of the Technical and Compliance Committee (if warranted)

Reference Documents

Be referred by name only.

Meeting Info Papers

NPFC-year-TCC-WG-Title of WG Mtg+# mtg– MIP# (rev # if needed)

Working Papers

NPFC-year-TCC-WG-Title of WG Mtg+# mtg– WP# (rev # if needed)

Information Papers

NPFC-year-TCC-WG-Title of WG Mtg+# mtg– IP# (rev # if needed)

Observer Papers

NPFC-year-TCC-WG-Title of WG Mtg+# mtg– OP#

Meeting Report

NPFC-year-TCC-WG-Title of WG Mtg+#mtg–Report (draft/
provisional/final)

6. Special Sessions of the Commission

Reference Documents

Be referred by name only.

Meeting Info Papers

NPFC-SS – year – IP# (rev # if needed)

Working Papers

NPFC-SS – year – WP# (rev # if needed) Information Papers

NPFC-SS – year – IP# (rev # if needed)

Observer Papers

NPFC-SS – year – OP#

Meeting Report

NPFC-SS – year –Report (draft/provisional/final)

7. Finance and Administration Committee

Reference Documents

Be referred by name only.

Meeting Info Papers

NPFC– year – FAC +# mtg - MIP# (rev # if needed)

Working Papers

NPFC– year – FAC +# mtg - WP# (rev # if needed)

Informational Papers

NPFC– year – FAC +# mtg - IP# (rev # if needed)

Meeting Report

NPFC– year – FAC +# mtg - Report (draft/provisional/final)

*It is proposed that **special subject reports** (Annual Reports; Compliance Reports; Vessel Registration Reports – Authorised and Active) required from all parties would be numbered in the following manner:*

Annual Reports

NPFC-year-AR Canada-(Part I or Part II)

NPFC-year-AR China-(Part I or Part II)

NPFC-year-AR Japan-(Part I or Part II)

NPFC-year- AR Korea-(Part I or Part II)

NPFC-year-AR Russia-(Part I or Part II)

NPFC-year-Chinese Taipei-(Part I or Part II)

Compliance Reports

NPFC-year-CR

Vessel Registration Reports

NPFC-year-VR Canada – Authorised/Active (as appropriate)

NPFC-year-VR China – Authorised/Active (as appropriate)

NPFC-year-VR Japan – Authorised/Active (as appropriate)

NPFC-year-VR Korea – Authorised/Active (as appropriate)

NPFC-year-VR Russia – Authorised/Active (as appropriate)

NPFC-year-VR Chinese Taipei – Authorised/Active (as appropriate)

Summary for the stock assessment of chub mackerel (Pacific stock) in 2015

by Ryuji Yukami

Stock Assessment Group, National Research Institute of Fisheries Science,
Fisheries Research Agency, Japan

March 2016

This paper may be cited in the following manner:

Yukami R. 2016. Summary for the stock assessment of chub mackerel (Pacific stock) in 2015. NPFC-2016-SC01-WP01 (Rev 1). 6 pp. (Available at www.npfc.int)

1st meeting of the Small Scientific Committee on Pacific Saury Report

April 2016

This paper may be cited in the following manner:

Small Scientific Committee on Pacific Saury. 2016. Meeting Report. NPFC-2016-SSC PS01-Final Report. 21 pp. (Available at www.npfc.int)

Annual Report

Part I

by Canada

April 2016

This paper may be cited in the following manner:

Canada. 2016. Annual Report. NPFC-2016-AR Canada-Part I (Rev 4). 10 pp.

Annual Report

Part II

by

Canada

April 2016

WORKSHOP REPORT

Pacific saury stock assessment

Technical Editors: Aleksandr Zavolokin and Peter Flewwelling

Tokyo, Japan, 2016

COOPERATING NON-CONTRACTING PARTIES

REAFFIRMING the objective of the NPFC 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.

RECALLING Article 20(3) of the NPFC Convention that provides for members of the Commission to request the non-Contracting Party identified in paragraph 2 to cooperate fully with the Commission either by becoming a Contracting Party or by agreeing to apply the conservation and management measures adopted by the Commission.

NOTING further in Article 20(3) that subject to such terms and conditions as the Commission may establish, such a cooperating non-Contracting Party to this Convention may enjoy benefits from participation in the fisheries commensurate with, *inter alia*, its commitment to comply with and its record of compliance with conservation and management measures in respect of the relevant fisheries resources and any financial contribution it makes to the Commission.

RECALLING that there are Non-Contracting Parties either already fishing in the NPFC Convention Area (CA) or who have expressed an interest to fish in this area and have expressed a willingness to cooperate fully with the Commission and apply the conservation and management measures adopted by the Commission.

RECOGNIZING that there are two key categories of Cooperating Non-Contracting Parties, those that fish and those that do not fish, but that wish to cooperate with the Commission for other purposes either for information sharing or trade-related reasons.

REAFFIRMING from Article 20(4) of the NPFC Convention that each member of the Commission shall take measures consistent with the Convention, the 1982 Convention, the 1995 Agreement and other relevant international law to deter the activities of fishing vessels entitled to fly the flags of non-Contracting Parties to the NPFC Convention that undermine the effectiveness of conservation and management measures adopted by the Commission.

And for GIVING EFFECT to Article 20 of the NPFC Convention:

1. Each year, the Executive Secretary shall contact all non-Contracting Parties whose vessels fish in the Convention Area and, if possible, non-Contracting Parties known to have an

interest in fishing in the Convention Area, to request them to become a Contracting Party to the Convention or to attain the status of Cooperating non-Contracting Party (CNCP).

2. A non-Contracting Party of the Commission, with an interest in the fishery, or whose vessels fish or intend to fish in the Convention Area, may request the Commission for the status of Cooperating non-Contracting Party (CNCP). Any such request and supporting information shall be in English and shall be received by the Executive Secretary at least 60 days in advance of the annual meeting of the Technical and Compliance Committee meeting at which the request will be considered. The Executive Secretary shall notify all members of the Commission of any such request and circulate the full application to all members.
3. A non-Contracting Party seeking the status of CNCP shall include with its request:
 - a. its reason for seeking CNCP status,
 - b. a commitment to cooperate fully in the implementation of conservation and management measures adopted by the Commission and to ensure that fishing vessels flying its flag and fishing in the Convention Area and, to the greatest extent possible, its nationals, comply with the provisions of the Convention and conservation and management measures adopted by the Commission;
 - c. an explicit commitment to accept high seas boarding and inspections in accordance with the Commission's procedures on high seas boarding and inspection;
 - d. full data on its historical fisheries in the Convention Area, including nominal catches, number/type of vessels, name of fishing vessels, fishing effort and fishing areas;
 - e. any further relevant information as determined by the Commission.
4. A non-Contracting Party seeking the status of CNCP is encouraged to make a contribution commensurate with what it would be assessed should it become a Contracting Party, pursuant to the scheme of contributions established by the Commission in accordance with Article 12(3) of the Convention, or an amount as determined by the Commission.
5. The Technical and Compliance Committee (TCC) shall assess applications for CNCP status and provide recommendations and technical advice to the Commission, which shall consider, *inter alia*:
 - a. whether the CNCP application includes all information required under paragraphs 2 and 3;
 - b. in the case of renewal, the record of compliance of the applicant with the provisions of the Convention and the conservation and management measures adopted by the

- Commission, and where appropriate, the fisheries laws and regulations of Members of the Commission;
- c. its record of responding to any IUU activities by vessels flying its flag that have been brought to its attention, in accordance with Article 17 of the NPFC Convention;
 - d. as appropriate, the record of compliance of the applicant with conservation and management measures of other Regional Fisheries Management Organizations (RFMOs); and
 - e. in the case of applications for renewal of CNCP status, whether the applicant is meeting all paragraph 11 requirements for CNCP.
6. The Executive Secretary shall forward a copy of the relevant TCC recommendations and advice to the non-Contracting Party applicant as soon as practicable, including all relevant CMMs to facilitate their compliance.
 7. The non-Contracting Party applicant shall have the opportunity to consider the recommendations and advice of the TCC, and to submit additional information if necessary in advance of the Commission's decision on its application.
 8. The Commission shall, in determining whether a non-Contracting Party is accorded CNCP status, have regard to the criteria outlined in paragraph 3.
 9. The Commission shall also consider information available from other RFMOs relating to non-Contracting Parties seeking CNCP status, as well as data submitted by such non-Contracting Parties to the Commission. Caution shall be used so as not to introduce into the Convention Area excess fishing capacity from other regions or IUU fishing activities in granting CNCP status to such non-Contracting Parties.
 10. *The Commission shall accord CNCP status on a bi-annual basis.* It may renew the CNCP status subject to a review of the CNCP's compliance with the Convention's objectives and requirements.
 11. CNCPs seeking to renew their status as a CNCP shall comply with other requirements the Commission may prescribe to ensure compliance with conservation and management measures adopted by the Commission.

12. CNCPs are entitled to participate at meetings of the Commission and its subsidiary bodies as Observers.
13. CNCPs shall:
 - a. comply with all conservation and management measures adopted by the Commission;
 - b. provide all data that members of the Commission are required to submit, in a timely manner, in accordance with the format and standards adopted by the Commission;
 - c. inform the Commission annually of the measures it takes to ensure compliance by its vessels with the Commission's conservation and management measures;
 - d. respond in a timely manner to alleged violations of conservation and management measures adopted by the Commission and any IUU activities of vessels flying its flag, as requested by a member of the Commission or determined by the appropriate subsidiary bodies of the Commission and communicate to the member making the request and to the Commission, the actions it has taken against the vessels in accordance with the provisions of Article 17 of the Convention;
 - e. accept boarding and inspections in accordance with Commission high seas boarding and inspection procedures.
14. Without prejudice to the sovereign rights of coastal States for the purpose of exploring and exploiting, conserving and managing the fish stocks within areas under national jurisdiction, and following the granting of CNCP status, the Commission shall, where necessary, determine how the participatory rights of CNCPs will be limited by the conservation and management measures adopted by the Commission. In giving effect to this paragraph, the Commission shall take into account *inter alia*:
 - a. the status of the fish stocks under the management mandate of the Commission and the existing level of fishing effort in the fishery;
 - b. the respective interests, fishing patterns and fishing practices of new and existing members or participants;
 - c. the respective contributions of new and existing members or participants to conservation and management of the stocks, to the collection and provision of accurate data and to the conduct of scientific research on the stocks;
15. The limits determined for CNCPs under paragraph 12 may be reviewed by the Commission from time to time in accordance with this measure and other conservation and management measures adopted by the Commission.

16. The Commission shall monitor the activities of nationals and fishing vessels of CNCPs, including their record of compliance with the provisions of the Convention and conservation and management measures adopted by the Commission.
17. CNCPs that fail to comply with any of the conservation and management measures adopted by the Commission shall be deemed to have undermined the effectiveness of the conservation and management measures adopted by the Commission. The Commission shall take appropriate action, which may include revocation of CNCP status and/or sanctions and penalties against such CNCPs, in accordance with the Convention and adopted conservation and management measures.
18. The members of the Commission shall, individually or jointly, request non-Contracting Parties to this Convention whose vessels fish in the Convention Area to cooperate fully in the implementation of the conservation and management measures adopted by the Commission and urge them to apply for the status of a Contracting Party or Cooperating non-Contracting Party.



3rd Commission Meeting

13-15 July 2017

Sapporo, Japan

Meeting Report



3rd Commission Meeting

AGENDA

Agenda Item 1. Opening of Meeting

1.1 Welcome Address

1.2 Adoption of Agenda

1.3 Meeting Arrangement

1.4 Appointment of Rapporteur

Agenda Item 2. Membership of the Commission

Agenda Item 3. Report from the Secretariat

Agenda Item 4. Report of the 2nd Scientific Committee Meeting

Agenda Item 5. Report of the 2nd Technical and Compliance Committee Meeting

Agenda Item 6. Report of the 1st 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 2018

8.2 Indicative Budget for 2019 and 2020

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

Agenda Item 11. Other Matters

11.1 Observer Status (Rules of Procedure 9)

11.2 Cooperating Non-Contracting Parties (CNCPS)

11.3 Others

Agenda Item 12. Next Meeting

12.1 Selection of Next Chair and Vice-Chair

12.2 Date and Place of the Next Meeting

Agenda Item 13. Adoption of the Report

Agenda Item 14. Close of the Meeting

MEETING REPORT

Agenda Item 1. Opening of Meeting

1. The 3rd Meeting of the North Pacific Fisheries Commission took place in Sapporo, Japan on 13-15 July 2017, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, Chinese Taipei, the United States of America, and the Republic of Vanuatu. Ukraine, the North Pacific Anadromous Fish Commission (NPAFC), the North Pacific Marine Science Organization (PICES), 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. Takashi Koya, Director-General, Resources Management Department, Fisheries Agency of Japan, welcomed the participants on behalf of the Government of Japan. Mr. Koya expressed his respect for the achievements of the North Pacific Fisheries Commission (NPFC) to date, including the adoption of several Conservation and Management Measures (CMMs) and the completion of the stock assessment for Pacific saury. Mr. Koya believed that the Members share a common recognition of the importance of fisheries management in the North Pacific Ocean and hoped that the Members will engage in constructive discussions. Finally, he expressed Japan's continued support and cooperation for the activities of the NPFC. (Annex A)
3. The United States expressed its pleasure at becoming a Member of the NPFC and its continued commitment to the goals and activities of the NPFC. The United States also voiced appreciation for Japan's efforts to support the NPFC and for hosting the 3rd meeting of the NPFC.
4. Vanuatu stated that it is an honor and privilege to become a Member of the NPFC and offered its continued support for upholding the objectives and principles of the NPFC. Vanuatu also expressed its respect to Japan for hosting various meetings of the NPFC and its subsidiary bodies, including the 3rd meeting of the NPFC, as well as for hosting the NPFC Secretariat.

1.2 Adoption of Agenda

5. The agenda was adopted without revision (Annex B).

1.3 Meeting Arrangement

6. The Secretariat outlined the procedural matters for the holding of the meeting.

1.4 Appointment of Rapporteur

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

Agenda Item 2. Membership of the Commission

8. 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 United States of America and the Republic of Vanuatu have ratified the Convention, bringing the total number of Members to eight.

Agenda Item 3. Report from the Secretariat

9. The Secretariat presented an annual report on the Commission's activities for the intersessional period between the second Commission Meeting of August 2016 and this current Commission meeting, which was highlighted by activities to facilitate the implementation of the CMMs adopted by the Commission at its 2nd meeting (NPFC-2017-AR).
10. Japan reported that the Japanese Diet has approved the Headquarter Agreement recognizing the special status of the NPFC, and it became effective on 2 June 2017.

Agenda Item 4. Report of the 2nd Scientific Committee Meeting

11. The Chair of the Scientific Committee (SC), Dr. Joji Morishita (Japan), summarized the outcomes of the 2nd SC meeting (Annex E) for discussion by the Commission.
12. The Commission agreed to hold further discussions on the future steps for management measures for North Pacific armorhead under Agenda Item 7.
13. Russia requested that the Commission task the SC and the Small Scientific Committee on Pacific Saury (SSC PS) to develop a template for collecting data on Pacific saury bycatch and discard for the possible inclusion of these data in the stock assessment.

14. The Commission agreed to hold further discussions on the future steps for management measures for Pacific saury under Agenda Item 7.
15. The Commission determined that the recommendation that the Commission bear the travel costs for 1 or 2 participants from each Member to attend the TWG PSSA (paragraph 28, subparagraph k) does not comply with the Convention (Article 12, paragraph 1), as discussed at the Finance and Administration Committee's 1st meeting and thus these financial commitments must be withdrawn from budget plans for any meetings of Members from the Commission.
16. China noted that, according to the Secretariat's report, currently, only China and Russia have submitted transshipment data to the Commission. China encouraged any other Members conducting transshipment activities to also submit the related data to the Commission.
17. Russia informed the Commission that its crab fishery activity would be a resumption of previous activity, in compliance with CMM 2016-05, and that it will provide the necessary data related to this fishery to the Commission.
18. The Commission adopted the report and the recommendations of the SC, excluding the recommendation in paragraph 28, subparagraph k regarding travel costs for the TWG PSSA.
19. Japan presented the draft TOR for the TWG CM (NPFC-2017-COM03-WP04). Russia suggested to use the draft TOR as the basic working document for the upcoming TWG CM in December 2017. The Commission requested that the TWG CM further refine the draft TOR intersessionally (Annex B) and finalize it at the beginning of the next TWG CM meeting.
20. The Secretariat presented the draft TOR for the Joint NPFC-PICES Group on Scientific Cooperation in the North Pacific Ocean (NPFC-2017-COM03-WP07). The Commission reviewed and adopted the draft TOR (Annex C).
21. Japan presented an information paper for the adaptive management of the stock of North Pacific armorhead in the southern Emperor Seamounts (NPFC-2017-COM03-IP01).

Agenda Item 5. Report of the 2nd Technical and Compliance Committee Meeting

22. The Chair of the Technical and Compliance Committee (TCC), Dr. Robert Day (Canada), summarized the outcomes of the 2nd TCC meeting (NPFC-2017-TCC02 Final Report) for discussion by the Commission.
23. Regarding the priority species for the TCC work plan, the Commission discussed priority species. The Commission noted that a list of priority species was prepared by the SC, and that this list of priority species is included in the TCC Framework, both of which were adopted at the 2nd meeting of the Commission. Japan noted that there is a need for a clear understanding of how to reflect the priority species in the TCC work plan.
24. The Commission adopted the report and the recommendations of the TCC (Annex H).
25. Japan reported on vessels sighted in the Convention Area by Japan's fisheries inspection vessels. The total number of the vessels observed increased from 192 in 2015 to 288 in 2016, which includes 67 suspected IUU vessels.

Agenda Item 6. Report of the 1st Finance and Administration Committee Meeting

26. The Chair of the Finance and Administration Committee (FAC), Mr. Kenji Kagawa (Japan), summarized the outcomes of the 1st FAC meeting (NPFC-2017-FAC01 Final Report) for discussion by the Commission.
27. The Members discussed the funding mechanism for the Special Projects Fund. The Members agreed to establish the Special Projects Fund through a transfer of funds from the Working Capital Fund as necessary for identified special projects, utilizing paragraph 24 of the NPFC financial regulations.
28. 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

29. Based on a review of the CMMs and the recommendations by the SC and TCC, the Commission adopted the revised CMM 2016-02 to Establish a List of Vessels Presumed to Have Carried out IUU Activities in the NPFC Convention Area (Annex D), the revised CMM 2016-05 for Bottom Fisheries and Protection of VMEs in the Northwestern Pacific Ocean (Annex E), the revised CMM 2016-06 for Bottom Fisheries and Protection of VMEs in the Northeastern Pacific Ocean (Annex F), and the NPFC IUU Vessel List (Annex K). The Commission also provisionally adopted the new CMM 2017-09 on High Seas Boarding and Inspection Procedures (Annex G), noting the reservation of Russia.

The measure will be adopted if no objection is made during the approval of the record per Rule 8.2 of the NPFC Rules of Procedure.

30. Reiterating the commitment expressed at TCC02, the Members agreed to strengthen cooperation, jointly and/or bilaterally, to terminate IUU issues in the Convention Area.

7.2 Amendments/addition of CMMs

31. Japan proposed a new CMM for Pacific Saury (NPFC-2017-COM03-WP05). Following a Russian proposal, the Members made revisions to the existing CMM. The Members reviewed and revised CMM 15-02 (Annex H).
32. Japan presented its proposed revisions to CMM 2016-07 for Chub Mackerel (NPFC-2017-COM03-WP06). Following a Russian proposal, the Members made revisions to the existing MCM. The Members reviewed and revised the CMM (Annex I). Russia suggested to expedite the process of stock assessment for chub mackerel.
33. Japan noted that the revised CMM on Pacific saury shall be effective for one year, and suggested that the Commission review and discuss the CMM, including the catch limits, at its next meeting. Russia supported the necessity to review and discuss the CMMs at the next Commission meeting.
34. China expressed its views on this matter that catch limits should be based on the advice and recommendations from the SC based on the best available science. China also pointed out that such catch limit measures are not appropriate for pelagic species with short-term life spans and high stock fluctuation, whose stock-recruitment relationship is very difficult to estimate, such as Pacific saury.
35. The United States presented its views on the management of North Pacific armorhead and splendid alfonsino, and a proposal to revise CMM 2016-05 to include a moratorium on fishing for these species within the Convention Area until an adaptive management plan can be implemented (NPFC-2017-COM03-IP04). Some Members supported the proposal while others expressed concern. Russia suggested thorough consideration of the essence of this document intersessionally to be further considered by the Commission's subsidiary bodies.

Agenda Item 8. Adoption of Budget

8.1 Proposed Budget for 2018

36. The Commission adopted the adjusted budget for 2017 and the proposed budget for 2018

as submitted by the Finance and Administration Committee (NPFC-2017-FAC01 Final Report).

8.2 Indicative Budget for 2019 and 2020

37. The Commission considered the indicative budget for the years 2019 and 2020 as submitted by the Finance and Administration Committee (NPFC-2017-FAC01 Final Report).

Agenda Item 9. Data Management and Security

9.1 Progress in development of NPFC data management system

38. Eighty Options reported on the progress in developing the NPFC data management system (NPFC-2017-COM03-WP09). The following activities have been completed: NPFC initial website with basic meeting management and vessel registers, data requirements analysis, database development plan report, vessel register enhancement prototyping, and meeting management enhancement prototyping.
39. The Members requested that, when developing the IUU Vessel List management system, the Secretariat address the concerns discussed at the 2nd TCC meeting relating to the process for including vessels presumed to be conducting IUU fisheries on the draft IUU Vessel List.
40. The Members noted that under the new vessel register system, Members will be able to update the register directly, at any time. The Members requested that the Secretariat establish a process for ensuring that the registration of any vessels on the new system are in compliance with existing CMMs.

9.2 NPFC Information Security Guidelines

41. The United States presented the proposed Interim Guidance for Management of Scientific Data Used in Stock Assessments (NPFC-2017-COM03-WP10). The Members revised and adopted the proposal (Annex J).
42. Canada suggested that it will work with the United States on the Information Security Guidelines with a view of circulating them for further development by Members during the intersessional period.

Agenda Item 10. Cooperation with Other Organizations

43. The Secretariat presented suggestions regarding cooperation with other organizations (NPFC-2017-COM3-WP01) for discussion by the Commission. The Members agreed to enhance cooperation with other organizations and noted that such cooperation should

complement the objectives and activities of the NPFC.

44. Russia suggested that the Members consider the participation of the NPFC in the NPAFC multinational survey plans with the purpose of facilitating the North Pacific armorhead recruitment assessment.
45. The Secretariat presented a request from PICES for the NPFC to co-sponsor an international symposium on Pacific transitional areas (NPFC-2017-COM03-OP01). The Members supported the request, and agreed to have the Secretariat attend and NPFC be a co-sponsor to the amount of 500,000 JPY.
46. The Members agreed that the Secretariat invite PICES to co-sponsor the NPFC/FAO VME workshop.

Agenda Item 11. Other Matters

11.1 Observer status (Rules of Procedure 9)

47. The Secretariat presented a proposal on the status of observers for discussion by the Commission (NPFC-2017-COM03-WP02). The Members adopted the proposal and agreed not to apply a fee to observers.

11.2 Cooperating Non-Contracting Parties (CNCPs)

48. The Secretariat presented a proposal on the status of Cooperating Non-Contracting Parties (CNCPs) as revised by the Finance and Administration Committee (NPFC-2017-COM03-WP03 (Rev. 2)). The Members adopted the proposal.

11.3 Others

49. Ukraine informed the Commission of its intention to conduct fishing activities, in particular crab, squid and finfish fisheries, in the Convention Area and proposed its commitment to cooperate with the NPFC as a CNCP. The Commission requested that the Secretariat coordinate with Ukraine to assist their engagement with the NPFC.
50. The Secretariat presented the proposed policy for NPFC meetings (NPFC-2017-COM03-WP08). The Members considered the proposal and requested the Secretariat to further refine it intersessionally, in consultation with Members.
51. In accordance with the final reports of SC02 and TCC02, the Commission recognized the Russian crab fishery in the Convention Area as a resumption of previous activity.

Agenda Item 12. Next Meeting

12.1 Selection of next Chair and Vice-Chair

52. The Commission elected Mr. Kenji Kagawa (Japan) to continue to serve as the Chair of the Commission and Mr. Aleksei Baitaliuk (Russia) to continue to serve as the Vice-Chair of the Commission.

12.2 Date and place of the next meeting

53. The following schedule and venues were recommended:
 - a. TCC: In Japan, from 28 to 30 June 2018;
 - b. FAC and Commission: In Japan, from 2-5 July 2018; and
 - c. SC and SSCs: In Japan, from 9 to 20 April 2018.

Agenda Item 13. Adoption of the Report

54. The report was adopted by consensus.

Agenda Item 14. Close of the Meeting

55. The Commission meeting closed at 18:13 on 15 July 2017.

Annexes

Annex A – Opening Remarks

Annex B – Draft of Terms of Reference for the Technical Working Group on the Chub Mackerel Stock Assessment (TWG CM), draft 2017-2021 Work Plan and draft Data List for stock assessments

Annex C – Terms of Reference for the Joint NPFC-PICES Group on Scientific Cooperation in the North Pacific Ocean

Annex D – CMM 2017-02 to Establish a List of Vessels Presumed to Have Carried out IUU Fishing Activities in the Convention Area

Annex E – CMM 2017-05 for Bottom Fisheries and Protection of VMEs in the Northwestern Pacific Ocean

Annex F – CMM 2017-06 for Bottom Fisheries and Protection of VMEs in the Northeastern Pacific Ocean

Annex G – CMM 2017-09 for High Seas Boarding and Inspection Procedures

Annex H – CMM 2017-08 for Pacific Saury

Annex I – CMM 2017-07 for Chub Mackerel

Annex J – Interim Guidance for Management of Scientific Data Used in Stock Assessments

Annex K – NPFC IUU Vessel List



FISHERIES AGENCY

MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES, GOVERNMENT OF JAPAN

2-1, 1-Chome, Kasumigaseki, Chiyoda-ku, Tokyo 100-8907 Japan TEL:+81-3-3502-8111 EXT:6747

NPFC 3rd Commission Meeting
Sapporo, Japan
13-15 July 2017

OPENING REMARKS

BY

TAKASHI KOYA

DIRECTOR-GENERAL, RESOURCES MANAGEMENT DEPARTMENT

Good Morning. I am Takashi Koya, Director-General, Resources Management Department of the Fisheries Agency of Japan. I am pleased to welcome you all in Japan, following the 2nd Commission Meeting last year. Representing the host country, I would like to send you my warmest welcome to the 3rd Commission Meeting of the NPFC.

It is of great importance that the NPFC meeting is held here in Hokkaido, the most major area of fishing, which targets fish species including Pacific saury, and Japanese flying squid. I hope you will enjoy the delicious seafood of Hokkaido during your stay here.

While the NPFC was established in 2015 and is one of the newest RFMOs, it has made significant progress, as a responsible RFMO, as it adopted at the last year's meeting the Conservation and Management Measure on chub mackerel and the IUU vessel list.

I would like to express my sincere appreciation to Members' efforts and achievements.

As for Pacific saury, which is one of the major target species here in Hokkaido, the stock assessment has been completed due to tremendous efforts by the Scientific Committee and the Small Scientific Committee on Pacific saury. I would like to reiterate that all Members confirmed last year that they will not substantially increase the number of vessels which target Pacific saury.

Pacific saury is one of the most important fish species in Japan that has been incorporated into the food culture, and has been properly managed under the Japanese TAC scheme for more than twenty years.

However, catch amounts by the Japanese vessels have been declining in recent years, and the NPFC

increasingly draws attention not only from Japanese fishermen but also from consumers and media.

In this Commission Meeting, NPFC is asked to take appropriate measures following the stock assessment by the SC. Japan has submitted a proposed Conservation and Management Measure for Pacific saury, which proposes to introduce catch limits and to refrain from expansion of the number of fishing vessels.

In addition to Pacific saury, most Members expressed their strong concern at the last year's meeting that a rapid increase in chub mackerel catch would have adverse impact on the recovery of its stock.

Life cycle of chub mackerel including migration and spawning is almost completed within Japanese coastal waters, and part of the migration could extend to the high seas area and Russian coastal waters. Chub mackerel, as well as Pacific saury, has been strictly managed under the Japanese TAC scheme for more than twenty years.

At the last year's meeting, the NPFC adopted the Conservation and Management Measure to complete the stock assessment as soon as practicable and to encourage to refrain from expansion of the number of fishing vessels. Nevertheless, the catch of chub mackerel in the Convention Area has been expanding.

Japan has submitted a proposal to amend the current Conservation and Management Measure for chub mackerel that the Members refrain from expansion of the number of fishing vessels because Japan is of the view that the Members should not expand fishing effort on chub mackerel without prior assessment.

As Japan reported at the last year's meeting, there exists a number of suspected IUU vessels in the Convention Area, and these vessels significantly undermine the Members' effort towards sustainable use of fisheries resources.

Following the adoption of the Conservation and Management Measure to establish IUU vessel list last year, Japan has submitted a list of presumed IUU vessels based on sighting information by our fishery inspection vessels during last year with an aim to adopt the NPFC's IUU vessel list. Since combating IUU fishing is recognized as a priority issue by the international community, whether the NPFC can take an effective action against IUU vessels will attract global attention.

Eliminating IUU fishing has become recognized as a necessary step to achieve sustainable use of fish stocks by the international community. Japan continues to strengthen its commitment to counter IUU fishing measures, including the ratification of FAO Port State Measures Agreement this year.

This meeting is the best opportunity for the NPFC to show its strong will to take strict actions against IUU fishing which is our common enemy.

Japan's proposals reflect our strong concerns over the fisheries resources management in the North Pacific Ocean. I believe all of the Members share this concern. Japan strongly hopes that the Members commit to constructive discussion throughout the meeting so that the NPFC is able to make meaningful progress in Hokkaido where a number of fishermen watch over the discussion.

Japan hosted a number of NPFC meetings, including the 1st and 2nd meeting of the Commission. Japan also has substantially contributed to the NPFC work, including conducting scientific research using research vessels.

Japan will provide further supports as a Member of the Commission and the host country of the Secretariat, for timely and effective fisheries resources management by the NPFC.

I would like to conclude my remarks by wishing Members work together to solve difficulties we may face, and to achieve a significant progress at this meeting.

Thank you.

Draft of Terms of Reference for the Technical Working Group on the Chub Mackerel Stock Assessment (TWG CM), draft 2017-2021 Work Plan and draft Data List for stock assessments

(Submitted by Japan)

Explanatory note:

Japan proposes the draft of Terms of Reference for the TWG CM, the draft 2017-2021 Work Plan and the draft Data List for Stock Assessments for Chub Mackerel for consideration by the Commission, following the recommendation from the SC in 2017 (Para 36a, Report of SC in 2017).

Draft of Terms of Reference for the Technical Working Group on the Chub Mackerel Stock Assessment (TWG CM)

1. To review fishery data
 - Catch series
 - Age/size composition data
 - Evaluation of data quantity, data quality, sources of uncertainty (including IUU fishery)
 - Others
 - Recommendation of future works
2. To review fishery-dependent and fishery-independent indices
 - Evaluation of the quality of the indices
 - Review/update the existing protocol
 - Review/update the indices
 - Recommendation of future works
3. To review and update biological information/data
 - Stock structure
 - Growth
 - Reproduction and maturity schedule
 - Natural mortality
 - Migration pattern
 - Others
 - Recommendation of future works

4. To conduct the stock assessment
 - Review existing stock assessment methods
 - Application of candidates of stock assessment models and comparison of the results (if needed)
 - Determine the single stock assessment model for the chub mackerel stock assessment
 - Conduct stock assessment (including diagnostics, sensitivity analysis, future projection and evaluation of reference points)
 - Create the scientific advice on management based on the results of the stock assessment
 - Recommendation of future works
5. To facilitate data- and code- sharing processes
6. To review/improve presentation of stock assessment results (including stock status summary report in a format to be determined by the Working Group)
7. To discuss the design of Management Strategy Evaluation framework

Draft 2017-2021 Work Plan

Stock Assessments

Areas of work

- Conducting stock assessment for Chub mackerel
- Identification of data gaps, determination of activities to address those gaps and development of standards and mechanisms for data collection and verification

Five-Year Work Plan for stock assessments for Chub Mackerel

| | 2017 | 2018 | 2019 | 2020 | 2021 |
|---------------|---|--|--|---|--|
| Chub mackerel | Review of Members' national research on stock status and fisheries through CM workshop Establishment of TWG CM. Proposal of work plan and data list for scientific stock assessment | Data preparation for scientific stock assessment | Preliminary stock assessment and provision of advice and recommendations to the Commission | Update/Improvement of the preliminary stock assessment and provision of advice and recommendation to the Commission | Update/Improvement of the assessment and provision of advice and recommendations to the Commission |

Draft Data list for stock assessments for Chub Mackerel

- Catch data for mackerel.

| Calendar Year Month Ten-days | Fishing Gear | Statistical Area | Effort | | | Catch Amount (Metric Tons) |
|---------------------------------------|-----------------|---------------------|----------------------------------|-----------------|--------|-------------------------------------|
| | | | Numbers of fishing vessels | Fishing days | Others | |
| | | | | | | |

- Age/size composition data

| Calendar Year Month Ten-days | Fishing Gear | Statistical Area | Sample size | Size composition |
|---------------------------------------|-----------------|---------------------|----------------|--|
| 201x/xx/xx | xx | CA | xx | % or ind Length category yy xx yy xx yy xx yy xx |

- Length-Weight Relationship

| Calendar Year Month Ten-days | Statistical Area | Unit | | Sample size | Length-Weight Relationship |
|---------------------------------------|---------------------|--------|--------|-------------|-------------------------------|
| | | Length | Weight | | |
| 201x/xx/xx | CA | mm | g | xx | $WW=a L^b$ |

- Age-length key

| Calendar Year Month Ten-days | Statistical Area | Scale or Otolith | Sample size | Age-length key (%) |
|---------------------------------------|---------------------|---------------------|----------------|-----------------------|
| | | | | |

| | | | | |
|------------|----|---------------------|----|--------------------------|
| 201x/xx/xx | CA | Scale or Otolith | xx | Age |
| | | | | 0 1 2 3 4 5.... |
| | | | | Length yy xx xx xx xx xx |
| | | | | xx yy xx xx xx xx xx |
| | | | | yy xx xx xx xx xx yy |
| | | | | xx xx xx xx xx yy xx |
| | | | | xx xx xx xx yy xx xx |

• Catch at age data

| .Calendar Year Month | Fishing Gear | Statistical Area | Sample size | Age composition |
|----------------------------|-----------------|---------------------|----------------|---|
| 201x/xx/xx | xx | CA | Xx | % or ind Age 0 xx 1 xx 2 xx 3 xx |

• Identification materials for age determination (ie. making age-length key)

| .Sampling Year Month Days | Statistical Area | Length (mm) | Scale or Otolith | Age | | | | |
|------------------------------------|---------------------|----------------|---------------------|------------------------|-------------------|-------|-------|--------|
| | | | | Members identification | | | | |
| | | | | China | Chinese Taipei | Japan | Korea | Russia |
| 201x/xx/xx | CA | xx | Scale or Otolith | xx | xx | xx | xx | xx |

Terms of Reference
for the Joint NPFC-PICES Group on Scientific Cooperation in the North Pacific Ocean

At its meeting in Shanghai in April 2017, the Scientific Committee (SC) agreed to enhance cooperation with PICES as an intergovernmental scientific organization with similar membership, convention area and scientific interests to NPFC. The SC recommended to establish a joint NPFC-PICES group to identify potential areas of cooperation and work intersessionally to develop the terms of reference for the working group for consideration by the Commission in July 2017.

The following draft terms of reference were developed by the NPFC members of the Joint NPFC-PICES group in consultation with PICES Secretariat for consideration by the Commission.

Terms of Reference:

1. Review areas of scientific interests and objectives for each organization
2. Identify potential areas and specific topics for scientific cooperation
3. Identify potential collaborative methods such as representation at each other's meetings, holding the joint workshops or symposia, possibility to construct the Memorandum of Understanding (MOU) between organizations or other formal agreements, establishment of the joint working groups etc.
4. Clarify practical steps to advance the cooperative activities identified above
5. Make a specific proposal to each organization for further consideration.

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

The North Pacific Fisheries Commission (NPFC):

Recalling that the FAO Council adopted on 23 June 2001 an International Plan of Action to prevent, deter and eliminate illegal, unreported and unregulated fishing (IPOA-IUU). This plan stipulates that the identification of the vessels carrying out illegal, unreported and unregulated (IUU) fishing activities should follow agreed procedures and be applied in an equitable, transparent and non-discriminatory way;

Concerned that IUU fishing activities in the Convention Area undermine the effectiveness of the conservation measures adopted by the NPFC;

Further concerned that there is a possibility that vessel owners engaged in such fishing activities may have re-flagged their vessels to avoid compliance with NPFC measures;

Determined to address the challenge of an increase in IUU fishing activities by way of measures to be applied in respect to vessels, without prejudice to further measures adopted in respect of Members, Cooperating Non-Contracting Parties (CNCs) and non-Contracting Parties under the relevant NPFC instruments;

Considering the action undertaken in other regional fisheries organizations to address this issue;

Conscious of the need to address, as a matter of priority, the issue of vessels conducting IUU fishing activities;

Noting that efforts to prevent, deter and eliminate IUU fishing must be addressed in the light of all relevant international fisheries instruments and in accordance with other international obligations, including the rights and obligations established under the World Trade Organization (WTO) Agreement; and

Recalling Articles 13, 14, 15 and 17 of the Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean (hereinafter called the “Convention”) regarding the flag State duties, port State duties, duties of fishing entities and provisions for compliance and enforcement;

Adopts the following conservation and management measure in accordance with Article 7 of the Convention:

Identification of IUU activities

1. At each meeting, the Commission will identify those vessels which have engaged in fishing activities for species covered by the Convention within the Convention Area in a manner which has undermined the effectiveness of the Convention and the NPFC measures in force, and shall establish, and, as necessary, amend in subsequently, a list of such vessels (the IUU Vessel List), in accordance with the procedures and criteria set out in this conservation measure.
2. This identification shall be suitably documented, *inter alia*, on reports from Members/CNCPs relating to NPFC Conservation measures in force, trade information obtained on the basis of relevant trade statistics such as Food and Agriculture Organization of the United Nations (FAO) data, statistical documents and other national or international verifiable statistics, as well as any other information obtained from port States and/or gathered from the fishing grounds that is suitably documented. Information from Members/CNCPs should be provided in the format approved by the Commission.
3. For the purposes of this conservation measure, vessels fishing for species covered by the Convention are presumed to have carried out IUU fishing activities, as described in the IPOA on IUU fishing, in the Convention Area when a Member/CNCP presents suitably documented information that such vessels, *inter alia*:
 - a. Harvest species covered by the Convention in the Convention Area and are not on the NPFC record of authorized vessels or
 - b. Engage in fishing for fishery resources when the Member or CNCP, under whose flag the vessel is sailing, has exhausted or has no quotas, catch limit or effort allocation, including, if applicable, those received from another Member/CNCP under relevant NPFC conservation measures, or
 - c. Do not record or report their catches made in the Convention Area consistent with NPFC measures, or make false reports, or
 - d. Take and land undersized fish in contravention of relevant NPFC conservation measures, or
 - e. Fish in a closed area or during a closed season in contravention of relevant NPFC conservation measures, or
 - f. Use prohibited fishing gear in contravention of relevant NPFC conservation measures, or
 - g. Transship with, participate in joint fishing operations with, support or re-supply vessels included in the IUU Vessel List, or
 - h. Are without nationality and harvest species covered by the Convention in the Convention Area, or
 - i. Engage in any other fishing activities that undermine the provisions of the Convention or any other NPFC conservation measures.
4. If a Member/CNCP has not taken such measures as may be necessary so that fishing vessels entitled to fly its flag avoid conducting unauthorized fishing activities within areas under national jurisdiction of another State adjacent to the Convention Area in accordance with Article 13, the Member/CNCP, within whose areas under national jurisdiction the unauthorized fishing activities were conducted, may submit a proposal for listing the vessels on the draft IUU List if consultation with the Member/CNCP has not resolved the matter. Relevant procedures set out in paragraph 6 below shall apply for proposals under this paragraph.

5. If a Member/CNCP has information that a vessel is presumed to be carrying out IUU activities in the Convention Area during the years from the previous meeting to the current year, the Member/CNCP with such information is encouraged to provide that information as soon as possible to, and consult with, any Member/CNCP or non-Contracting Party that may have a vessel presumed to be carrying out IUU activities for clarification before providing that information to the Executive Secretary under the provisions of paragraph 6.

Information on alleged IUU fishing activities

6. At least 70 days before the meeting of the Technical and Compliance Committee (TCC), Members/CNCPs shall transmit to the Executive Secretary their list of vessels presumed to be carrying out IUU activities in the Convention Area during the years from the previous meeting to the current year, accompanied by suitably documented information, as provided in para 2, concerning the presumption of this IUU activity.
7. Before or at the same time as transmitting a list of presumed IUU vessels to the Executive Secretary, the Member/CNCP shall notify, either directly or through the Executive Secretary, the relevant Member/CNCP/Non-Contracting Party of a vessel's inclusion on this list and provide a copy of the pertinent suitably documented information. The Member/CNCP/Non-Contracting Party shall promptly acknowledge receipt of the notification. If no acknowledgement is received within 10 days of the date of transmittal, the Executive Secretary, Member/CNCP shall retransmit the notification through an alternative means of communication.

Draft IUU Vessel List

8. The Executive Secretary shall draw up a draft IUU Vessel List incorporating the lists of vessels and suitably documented information received pursuant to para 6, and any other suitably documented information at his disposal, and shall transmit it, together with all the supporting information provided, to all Members/CNCPs, as well as to non-Contracting Parties with vessels on the list, at least 55 days before the TCC's meeting except otherwise decided by the TCC.
9. The Executive Secretary shall request each Member/CNCP/non-Contracting Party with vessels on the draft IUU Vessel List to notify the owner of the vessels of their inclusion in that list, and of the consequences of their inclusion being confirmed in the IUU Vessel List.
10. Upon receipt of the draft IUU Vessel List, Members/CNCPs shall closely monitor the vessels included in that list in order to follow their activities and possible changes of name, flag or registered owner.
11. As appropriate, Members/CNCPs/non-Contracting Parties with vessels on the list should transmit, at least 10 days before the TCC's meeting, their comments to the Executive Secretary, including suitably documented information, showing that the vessels have fished in a manner consistent with NPFC conservation measures or have fished exclusively for species not covered by the Convention.

12. The Executive Secretary shall re-circulate the draft IUU Vessel List, 7 days in advance of the TCC's meeting, to the Members/CNCPs/non-Contracting Parties concerned, together with all the suitably documented information provided pursuant to paras 6 and 11 above.
13. Members/CNCPs/non-Contracting Parties may at any time submit to the Executive Secretary any additional suitably documented information regarding any vessels on the draft IUU Vessel List. The Executive Secretary shall circulate this additional information to all Members/CNCPs and to the non-Contracting Parties concerned immediately upon receipt of such information.

Provisional and current IUU Vessel List

14. The NPFC's IUU Vessel List adopted at the previous meeting of the Commission, as well as any new suitably documented information regarding this list, including intersessional amendments, shall be transmitted to Members/CNCPs and the non-Contracting Parties concerned in conjunction with the draft IUU Vessel List and materials outlined in para 8.
15. Members/CNCPs/non-Contracting Parties with vessels on the current NPFC IUU Vessel List should transmit at least 30 days before the meeting of the TCC, but may submit at any time, to the Executive Secretary suitably documented information regarding any of the vessels on the current NPFC IUU Vessel List, including, where appropriate, suitably documented information as provided for in paragraph 29. The Executive Secretary shall re-circulate the current NPFC IUU Vessel List two weeks in advance of the meeting of the TCC to the Members/CNCPs and non-Contracting Parties concerned, together with all the information provided pursuant to paragraph 14 and this paragraph.
16. At its meeting, the TCC shall:
 - a. following consideration of the draft IUU Vessel List and the suitably documented information circulated under paras 8, 12 and 13, adopt a Provisional IUU Vessel List; and
 - b. following consideration of the current NPFC IUU Vessel List and the suitably documented information circulated under paras 14 and 15, recommend to the Commission which, if any, vessels should be removed from the current NPFC IUU Vessel List.
17. The TCC shall not include a vessel on the Provisional IUU Vessel List if the Member/CNCP/non-Contracting Party, under whose flag the vessel is sailing, demonstrates that:
 - a. The vessel fished in a manner consistent with the Convention and NPFC Conservation Measures or have fished exclusively for species not covered by the NPFC Convention, or
 - b. Effective action has been taken in response to the IUU fishing activities in question, such as, *inter alia*, prosecution or the imposition of sanctions of adequate severity.
18. The TCC shall not include a vessel on the Provisional IUU Vessel List if the notifying Member/CNCP did not follow the provisions of para 7.
19. The TCC shall recommend removal of a vessel from the current NPFC IUU Vessel List only if the Member/CNCP/Non-Contracting Party, under whose flag the vessel is sailing, submits to the Executive Secretary the information provided in para 29 of this measure.

20. Following the examination referred to in para 16, the TCC shall submit the Provisional IUU Vessel List to the Commission for its consideration, and as appropriate, recommend any proposed changes to the current NPFC IUU Vessel List.
21. The draft IUU Vessel List, Provisional IUU Vessel List, and the NPFC IUU Vessel List shall contain the following details for each vessel:
 - a. name and previous names, if any;
 - b. flag and previous flags, if any;
 - c. owner and previous owners, including beneficial owners, if any;
 - d. operator and previous operators, if any;
 - e. call sign and previous call signs, if any;
 - f. Lloyds/IMO number, if any;
 - g. photographs, where available;
 - h. date first included on the IUU Vessel List;
 - i. summary of activities which justify inclusion of the vessel on the list, together with references to all relevant documents informing of and evidencing those activities; and
 - j. the date(s) and subsequent sightings of the vessels, if any, and any other related activities.

NPFC IUU Vessel List

22. At its meeting, the Commission shall review the Provisional IUU Vessel List, taking into account any new suitably documented information related to vessels on the Provisional IUU Vessel List, and any recommendations to amend the current NPFC IUU Vessel List made pursuant to paragraph 20 above, and adopt a new NPFC IUU Vessel List. To the maximum extent possible Members/CNCPs/non-Contracting Parties concerned shall provide any new suitably documented information at least two weeks before the meeting of the Commission.
23. Upon adopting the new NPFC IUU Vessel List, the Commission shall request Members/CNCPs/non-Contracting Parties with vessels on the NPFC IUU Vessel List to:
 - a. notify the owner of the vessels of its inclusion on the NPFC IUU Vessel List and the consequences that result from being included in the list, and
 - b. take all the necessary measures to eliminate these IUU fishing activities, including, if necessary, the withdrawal of the registration or the fishing licenses of these vessels, and to inform the Commission of the measures taken in this respect.
24. Members/CNCPs shall take all necessary non-discriminatory measures under their applicable legislation, international law and each Members/CNCPs' international obligations, and pursuant to paras 56 and 66 of the IPOA-IUU to:
 - a. remove or withdraw vessels on the NPFC IUU Vessel List from the NPFC Vessel Registry;
 - b. ensure that fishing vessels, support vessels, mother ships or cargo vessels flying their flag do not participate in any transshipment or joint fishing operations with, support or re-supply vessels on the NPFC IUU Vessel List;
 - c. prohibit the entry into their ports of vessels included on the NPFC IUU Vessel List, except in the case of investigation or *force majeure*;
 - d. prohibit the chartering of a vessel on the NPFC IUU Vessel List;
 - e. refuse to grant their flag to vessels on the NPFC IUU Vessel List, unless the ownership of the vessel has subsequently changed and the new owner has provided sufficient evidence

demonstrating that the previous owner or operator has no legal, beneficial or financial interest in, or control of the vessels, or the Member concerned is satisfied that, having taken into account all relevant facts, the vessel is no longer engaged in or associated with IUU fishing activities;

- f. prohibit commercial transactions, imports, landings and/or transshipment of species covered by the Convention from vessels on the IUU Vessel List;
 - g. encourage traders, importers, transporters and others involved, to refrain from transactions in, and transshipment of, species covered by the Convention caught by vessels on the NPFC IUU Vessel List;
 - h. collect, and exchange with other Members/CNCs, any appropriate information with the aim of searching for, controlling and preventing false import/export certificates for species covered by the Convention from vessels on the NPFC IUU Vessel List.
25. Members/CNCs should cooperate with each other and other flag States to strengthen their legal, operational and institutional capacity to take action against their flagged vessels that have engaged in IUU fishing in the Area, including the imposition of adequate sanctions, as an alternative to de-flagging such vessels, thereby rendering such vessels without nationality.
26. The Executive Secretary shall take any measure necessary to ensure publicity of the NPFC IUU Vessel List, in a manner consistent with any applicable confidentiality requirements, including placing it on the NPFC website. Furthermore, the Executive Secretary shall transmit the NPFC IUU Vessel List to the FAO and to other regional fisheries organizations for the purposes of enhancing cooperation between the NPFC and these organizations aimed at preventing, deterring and eliminating IUU fishing.
27. Upon receipt of the final IUU vessel list established by another Regional Fisheries Management Organization (RFMO) and any other information regarding the list including its modification, the Executive Secretary shall circulate it to Members/CNCs and shall place it on the NPFC website.
28. Without prejudice to the rights of Members/CNCs and coastal states to take proper action, consistent with international law, including applicable WTO obligations, the Members/CNCs shall not take any unilateral trade measures or other sanctions against vessels on the draft or Provisional IUU Vessel Lists, pursuant to paras 8 or 16, or that have been removed from the NPFC IUU Vessel List, pursuant to paras 19 and 22, on the grounds that such vessels are involved in IUU fishing activities.

Modification of the NPFC IUU Vessel List

29. Member/CNCs/non-Contracting Parties with a vessel on the NPFC IUU Vessel List may request the removal of the vessel from the list at any time during the intersessional period by submitting to the Executive Secretary suitably documented information demonstrating that:
- a. it has adopted measures that will seek to ensure that the vessel complies with all NPFC measures; and
 - b. it will be able to assume effectively its duties with regards to the monitoring and control of the vessel's fishing activities in the Convention Area; and

- c. it has taken effective action in response to the IUU fishing activities that resulted in the vessel's inclusion in the NPFC IUU Vessel List, including prosecution or the imposition of sanctions of adequate severity; or
 - d. the vessel has changed ownership and that the new owner can establish that the previous owner no longer has any legal, financial or real interests in the vessel or exercises control over it, and that the new owner has not participated in IUU fishing activities.
30. The Executive Secretary will transmit the removal request, with all the supporting information, to the Members/CNCPs within 15 days following the receipt of the removal request. Members/CNCPs shall promptly acknowledge receipt of the removal request. If no acknowledgement is received within 10 days of the date of transmittal, the Executive Secretary shall retransmit the removal request and shall use additional means available to ensure the request has been received.
31. Each Commission Member shall examine the removal request and notify the Executive Secretary in writing of its decision, and the rationale therefore, regarding the removal of the vessel within 30 days following the notification by the Executive Secretary. Decisions on the request to remove the vessel shall be made in accordance with Rule 2 of the Rules of Procedure.
32. If Commission Members agree to the removal of the vessel from the NPFC IUU Vessel List within the period stipulated in para 30, the Executive Secretary will inform Members/CNCPs, and non-Contracting Parties concerned, FAO and other regional fisheries management organizations, and will remove the vessel from the NPFC IUU Vessel List, as published on the NPFC website.
33. If Commission Members disagree with the request for the removal of the vessel from the IUU Vessel List, the vessel will be maintained on the NPFC IUU Vessel List and the Executive Secretary will inform the Members/CNCPs/non-Contracting Parties that made the removal request.
34. A Member/CNCP with information indicating a change of name and/or an International Radio Call Sign (IRCS) of a vessel appearing on the NPFC IUU Vessel List shall, as soon as practicable, transmit such information to the Executive Secretary. The Executive Secretary shall communicate such information to all Members/CNCPs and, after verification*, update the current NPFC IUU Vessel List on the NPFC website to reflect such information.

* If the Secretariat, after reasonable efforts, is unable to verify the information submitted by the Member/CNCP the vessel name or identifying number will not be updated.

Review

35. This Conservation and Management Measure shall be subject to review and, as appropriate, revision by the TCC and acceptance by the Commission.

NPFC Reporting Form for Illegal Activity

Recalling NPFC CMM 2016 - 02 on *Establishing a list of vessels presumed to have carried out illegal, unreported and unregulated fishing activities in the Convention Area of North Pacific Fisheries Commission*, attached are details of illegal activity recorded in

Details of Vessel

- a. Name of vessel and previous names, if any;
- b. Flag of vessel and previous flags, if any;
- c. Owner and previous owner, including beneficial owners, if any;
- d. Operator of vessel and previous operators, if any;
- e. Call sign of vessel and previous call sign, if any;
- f. Lloyds/IMO number, if any;
- g. Photographs of the vessel, where available;
- h. Date vessel was first included on the IUU List;
- i. Summary of activities which justify inclusion of the vessel on the list, together with references to all relevant documents informing of and evidencing those activities (more detail in section 2)

Details of elements contravened

(Indicate with an "X" the individual elements of CMM contravened, and provide relevant details including date, location, source of information. Additional information can be provided in an attachment, if necessary, and listed under section 3).

| Item | Definition | Indicate |
|------|---|----------|
| a | Harvest species covered by the Convention in the Convention Area and are not on the NPFC record of authorized vessels | |
| b | Engage in fishing for fishery resources, when the Member or CNCP, under whose flag the vessel is sailing, has exhausted or has no quotas, catch limit or effort allocation, including, if applicable, those received from another Member/CNCP, under relevant NPFC conservation | |
| c | Do not record or report their catches made in the Convention Area consistent with NPFC Measures, or make false reports | |
| d | Take and land undersized fish in contravention of relevant NPFC conservation measures | |

| | | |
|---|---|--|
| e | Fish in a closed area or during a closed season in contravention of relevant NPFC conservation measures | |
| f | Use prohibited fishing gear in contravention of relevant NPFC conservation measures | |
| g | Transship with, participate in joint fishing operations with, support or re-supply vessels included in the IUU vessels list | |
| h | Are without nationality and harvest species covered by the Convention in the Convention Area | |
| i | Engage in any other fishing activities that is in contravention of relevant NPFC conservation measures | |
| j | Are related to paragraph 4 of this conservation and management measures | |

Associated documents

(List here the associated documents that are appended e.g. boarding reports, court proceedings, photographs).

Recommended actions

| Item | Recommended actions | Indicate |
|------|--|----------|
| A | Notification to NPFC Executive Secretary only. No further action is recommended | |
| B | Notification of illegal activity to NPFC Executive Secretary. Recommend notification of activity to flag Member/CNCP/non-Contracting Party | |
| C | Recommended for inclusion on NPFC IUU Vessel List | |

**Information to be included in all NPFC IUU Vessel
Lists (Draft, Provisional and Final)**

The Draft IUU Vessel List, as well as the Provisional and Final IUU Vessel Lists shall contain the following details, where available:

- a. Name of vessel and previous names, if any;
- b. Flag of vessel and previous flags, if any;
- c. Owner and previous owners, including beneficial owners, if any;
- d. Operator of vessel and previous operators, if any;
- e. Call sign of vessel and previous call signs, if any;
- f. Lloyds/IMO number, if any;
- g. Photographs of the vessel, where available;
- h. Date vessel was first included on the IUU Vessel List;
- i. Summary of activities which justify inclusion of the vessel on the List, together with references to all relevant documents informing of and evidencing those activities.

**CONSERVATION AND MANAGEMENT MEASURE
FOR BOTTOM FISHERIES AND PROTECTION OF VULNERABLE
MARINE ECOSYSTEMS IN THE NORTHWESTERN PACIFIC OCEAN**

The North Pacific Fisheries Commission (NPFC),

Strongly supporting protection of vulnerable marine ecosystems (VMEs) and sustainable management of fish stocks based on the best scientific information available;

Recalling the United Nations General Assembly Resolutions (UNGA) on Sustainable Fisheries, particularly paragraphs 66 to 71 of the UNGA59/25 in 2004, paragraphs 69 to 74 of UNGA60/31 in 2005, and paragraphs 69 and 80 to 91 of UNGA61/105 in 2006;

Noting, in particular, paragraphs 66 and 69 of UNGA59/25 that call upon States to take action urgently to address the issue of bottom trawl fisheries on VMEs and to cooperate in the establishment of new regional fisheries management organizations or arrangements;

Recognizing further that fishing activities, including bottom fisheries, are an important contributor to the global food supply and that this must be taken into account when seeking to achieve sustainable fisheries and to protect VMEs;

Recognizing the importance of collecting scientific data to assess the impacts of these fisheries on marine species and VMEs;

Concerned about possible adverse impacts of unregulated expansion of bottom fisheries on marine species and VMEs in the western part of the Convention Area.

Adopts the following Conservation and Management Measure:

1. Scope

A. Coverage

These Measures are to be applied to all bottom fishing activities throughout the high seas areas of the Northwestern Pacific Ocean, defined, for the purposes of this document, as those occurring in the Convention Area as set out in Article 4 of the Convention text to the west of the line of 175 degrees W longitude (here in after called “the western part

of the Convention Area”) including all such areas and marine species other than those species already covered by existing international fisheries management instruments, including bilateral agreements and Regional Fisheries Management Organizations or Arrangements.

B. Management target

Bottom fisheries conducted by vessels operating in the western part of the Convention Area.

2. General purpose

Sustainable management of fish stocks and protection of VMEs in the western part of the Convention Area.

The objective of these Measures 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. These measures shall set out to prevent significant adverse impacts on VMEs in the Convention Area of the North Pacific Ocean, acknowledging the complex dependency of fishing resources and species belonging to the same ecosystem within VMEs.

The Commission shall re-evaluate, and as appropriate, revise, the definition based on further consideration of the work done through FAO and by NPFC.

3. Principles

The implementation of this CMM shall:

- a. be based on the best scientific information available,
- b. be in accordance with existing international laws and agreements including UNCLOS and other relevant international instruments,
- c. establish appropriate and effective conservation and management measures,
- d. be in accordance with the precautionary approach, and
- e. incorporate an ecosystem approach to fisheries management.

4. Measures

Members of the Commission shall take the following measures in order to achieve sustainable management of fish stocks and protection of VMEs in the western part of the Convention Area:

A. Limit fishing effort in bottom fisheries on the western part of the Convention Area to the

level agreed in February 2007 in terms of the number of fishing vessels and other parameters which reflect the level of fishing effort, fishing capacity or potential impacts on marine ecosystems.

B. Not allow bottom fisheries to expand into the western part of the Convention Area where no such fishing is currently occurring, in particular, by limiting such bottom fisheries to seamounts located south of 45 degrees North Latitude and refrain from bottom fisheries in other areas of the western part of the Convention Area covered by these measures and also not allow bottom fisheries to conduct fishing operation in areas deeper than 1,500m.

C. Notwithstanding subparagraphs A and B above, exceptions to these restrictions may be provided in cases where it can be shown that any fishing activity beyond such limits or in any new areas would not have significant adverse impacts (SAIs) on marine species or any VME. Such fishing activity is subject to an exploratory fishery protocol (Annex 1).

D. Any determinations pursuant to subparagraph C that any proposed fishing activity will not have SAIs on marine species or any VME are to be in accordance with the Science-based Standards and Criteria (Annex 2), which are consistent with the FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas.

E. Any determinations, by any flag state or pursuant to any subsequent arrangement for the management of the bottom fisheries in the areas covered by these measures, that fishing activity would not have SAIs on marine species or any VMEs, shall be made publicly available through agreed means.

F. Prohibit its vessels from engaging in directed fishing on the following orders: Alcyonacea, Antipatharia, Gorgonacea, and Scleractinia as well as any other indicator species for VMEs as may be identified from time to time by the SC and approved by the Commission.

G. Further, considering accumulated information regarding fishing activities in the western part of the Convention Area, in areas where, in the course of fishing operations, cold water corals more than 50Kg are encountered in one gear retrieval, Members of the Commission shall require vessels flying their flag to cease bottom fishing activities in that location. In such cases, the vessel shall not resume fishing activities until it has relocated a sufficient distance, which shall be no less than 2 nautical miles, so that additional encounters with VMEs are unlikely. All such encounters, including the location and the species in question, shall be reported to the Secretariat, who shall notify the other Members of the Commission so that

appropriate measures can be adopted in respect of the relevant site. It is agreed that the cold water corals include: Alcyonacea, Antipatharia, Gorgonacea, and Scleractinia.

H. C-H seamount and Southeastern part of Koko seamount, specifically for the latter seamount, the area South of 34 degrees 57 minutes North, East of the 400m isobaths, East of 171 degrees 54 minutes East, North of 34 degrees 50 minutes North, are closed precautionary for potential VME conservation. Fishing in these areas requires exploratory fishery protocol (Annex 1).

I. Ensure that the distance between the footrope of the gill net and sea floor is greater than 70 cm.

J. Apply a bottom fisheries closure from November to December

K. Limit annual catch of North Pacific armorhead to 15,000 tons for Japan

5. Contingent Action

Members of the Commission shall submit to the SC their assessments of the impacts of fishing activity on marine species or any VMEs, including the proposed management measures to prevent such impact. Such submissions shall include all relevant data and information in support of any such assessment. Procedures for such reviews including procedures for the provision of advice and recommendations from the SC to the submitting Member are attached (Annex 3). Members will only authorize bottom fishing activity pursuant to para 4 (C).

6. Scientific Information

To facilitate the scientific work associated with the implementation of these measures, each Member of the Commission shall undertake:

A. Collection of Information for purposes of defining the footprint

In implementing paragraphs 4A and 4B, the Members of the Commission shall provide for each year, the number of vessels by gear type, size of vessels (tons), number of fishing days or days on the fishing grounds, total catch by species, and areas fished (names of seamounts) to the Secretariat. The Secretariat shall circulate the information received to the other Members consistent with the approved Interim Data Handling and Data Sharing Protocol. To support assessments of the fisheries and refinement of conservation and management measures, Members of the Commission are to provide update information on an annual basis.

B. Collection of Information

(i) Collection of scientific information from each bottom fishing vessel operating in the western part of the Convention Area.

- a. Catch and effort data
- b. Related information such as time, location, depth, temperature, etc.

(ii) As appropriate the collection of information from research vessels operating in the western part of the Convention Area.

- a. Physical, chemical, biological, oceanographic, meteorological, etc.
- b. Ecosystem surveys.

(iii) Collection of Observer Data

Duly designated observers from the flag member shall collect information from bottom fishing vessels operating in the western part of the Convention Area. Observers shall collect data in accordance with Annex 5. Each Member of the Commission shall submit the reports to the Secretariat in accordance with Annex 4. The Secretariat shall compile this information on an annual basis and make it available to the Members of the Commission.

7. Control of bottom fishing vessels

To strengthen its control over bottom fishing vessels flying its flag, each Member of the Commission shall ensure that all such vessels operating in the western part of the Convention Area be equipped with an operational vessel monitoring system.

8. Observers

All vessels authorized to bottom fishing in the western part of the Convention Area shall carry an observer on board.

EXPLORATORY FISHERY PROTOCOL IN THE NORTH PACIFIC OCEAN

1. From 1 January 2009, all bottom fishing activities in new fishing areas and areas where fishing is prohibited in a precautionary manner or with bottom gear not previously used in the existing fishing areas, are to be considered as “exploratory fisheries” and to be conducted in accordance with this protocol.

2. Precautionary conservation and management measures, including catch and effort controls, are essential during the exploratory phase of deep sea fisheries. Implementation of a precautionary approach to sustainable exploitation of deep sea fisheries shall include the following measures:

- i. precautionary effort limits, particularly where reliable assessments of sustainable exploitation rates of target and main by-catch species are not available;
- ii. precautionary measures, including precautionary spatial catch limits where appropriate, to prevent serial depletion of low-productivity stocks;
- iii. regular review of appropriate indices of stock status and revision downwards of the limits listed above when significant declines are detected;
- iv. measures to prevent significant adverse impacts on vulnerable marine ecosystems; and
- v. comprehensive monitoring of all fishing effort, capture of all species and interactions with VMEs.

3. When a member of the Commission would like to conduct exploratory fisheries, it is to follow the following procedure:

(1) Prior to the commencement of fishing, the member of the Commission is to circulate the information and assessment in Appendix 1.1 to the members of the Scientific Committee (SC) for review and to all members of the Commission for information, together with the impact assessment. Such information is to be provided to the other members at least 30 days in advance of the meeting at which the information shall be reviewed.

(2) The assessment in (1) above is to be conducted in accordance with the procedure set forth in “Science-based Standards and Criteria for Identification of VMEs and Assessment of Significant Adverse Impacts on VMEs and Marine Species (Annex 2)”, with the understanding that particular care shall be taken in the evaluation of risks of the significant adverse impact on vulnerable marine ecosystems (VMEs), in line with the precautionary

approach.

(3) The SC is to review the information and the assessment submitted in (1) above in accordance with “SC Assessment Review Procedures for Bottom Fishing Activities (Annex 3).”

(4) The exploratory fisheries are to be permitted only where the assessment concludes that they would not have significant adverse impacts (SAIs) on marine species or any VMEs and on the basis of comments and recommendations of SC. Any determinations, by any Member of the Commission or the SC, that the exploratory fishing activities would not have SAIs on marine species or any VMEs, shall be made publicly available through the NPFC website.

4. The member of the Commission is to ensure that all vessels flying its flag conducting exploratory fisheries are equipped with a satellite monitoring device and have an observer on board at all times.

5. Within 3 months of the end of the exploratory fishing activities or within 12 months of the commencement of fishing, whichever occurs first, the member of the Commission is to provide a report of the results of such activities to the members of the SC and all members of the Commission. If the SC meets prior to the end of this 12 month period, the member of the Commission is to provide an interim report 30 days in advance of the SC meeting. The information to be included in the report is specified in Appendix 1.2.

6. The SC is to review the report in 5 above, and decide whether the exploratory fishing activities had SAIs on marine species or any VME. The SC then is to send its recommendations to the Commission on whether the exploratory fisheries can continue and whether additional management measures shall be required if they are to continue. The Commission is to strive to adopt conservation and management measures to prevent SAIs on marine species or any VMEs. If the Commission is not able to reach consensus on any such measures, each fishing member of the Commission is to adopt measures to avoid any SAIs on VMEs.

7. Members of the Commission shall only authorize continuation of exploratory fishing activity, or commencement of commercial fishing activity, under this protocol on the basis of comments and recommendations of the SC.

Information to be provided before exploratory fisheries start

1. A harvesting plan

- Name of vessel
- Flag member of vessel
- Description of area to be fished (location and depth)
- Fishing dates
- Anticipated effort
- Target species
- Bottom fishing gear-type used
- Area and effort restrictions to ensure that fisheries occur on a gradual basis in a limited geographical area.

2. A mitigation plan

- Measures to prevent SAIs to VMEs that may be encountered during the fishery

3. A catch monitoring plan

- Recording/reporting of all species brought onboard to the lowest possible taxonomic level
- 100% satellite monitoring
- 100% observer coverage

4. A data collection plan

- Data is to be collected in accordance with “Type and Format of Scientific Observer Data to be Collected” (Annex 5)

Information to be included in the report

- Name of vessel
- Flag member of vessel
- Description of area fished (location and depth)
- Fishing dates
- Total effort
- Bottom fishing gear-type used
- List of VME encountered (the amount of VME indicator species for each encounter specifying the location: longitude and latitude)
- Mitigation measures taken in response to the encounter of VME
- List of all organisms brought onboard
- List of VMEs indicator species brought onboard by location: longitude and latitude

**SCIENCE-BASED STANDARDS AND CRITERIA FOR IDENTIFICATION OF VMES
AND ASSESSMENT OF SIGNIFICANT ADVERSE IMPACTS ON VMES AND
MARINE SPECIES**

1. Introduction

Members of the Commission have hereby established science-based standards and criteria to guide their implementation of United Nations General Assembly (UNGA) Resolution 61/105 and the measures adopted by the Members in respect of bottom fishing activities in the North Pacific Ocean (NPO). In this regard, these science-based standards and criteria are to be applied to identify vulnerable marine ecosystems (VMEs) and assess significant adverse impacts (SAIs) of bottom fishing activities on such VMEs or marine species and to promote the long-term sustainability of deep sea fisheries in the Convention Area. The science-based standards and criteria are consistent with the FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas, taking into account the work of other RFMOs implementing management of deep-sea bottom fisheries in accordance with UNGA Resolution 61/105. The standards and criteria are to be modified from time to time as more data are collected through research activities and monitoring of fishing operations.

2. Purpose

(1) The purpose of the standards and criteria is to provide guidelines for each member of the Commission in identifying VMEs and assessing SAIs of individual bottom fishing activities⁷ on VMEs or marine species in the Convention Area. Each member of the Commission, using the best information available, is to decide which species or areas are to be categorized as VMEs, identify areas where VMEs are known or likely to occur, and assess whether individual bottom fishing activities would have SAIs on such VMEs or marine species. The results of these tasks are to be submitted to and reviewed by the Scientific Committee with a view to reaching a common understanding among the members of the Commission.

(2) For the purpose of applying the standards and criteria, the bottom fisheries are defined as follows:

- (a) The fisheries are conducted in the Convention Area;
- (b) The total catch (everything brought up by the fishing gear) includes species that can only sustain low exploitation rates; and
- (c) The fishing gear is likely to contact the seafloor during the normal course of fishing operations

⁷ “individual bottom fishing activities” means fishing activities by each fishing gear. For example, if ten fishing vessels operate bottom trawl fishing in a certain area, the impacts of the fishing activities of these vessels on the ecosystem are to be assessed as a whole rather than on a vessel-by-vessel basis. It should be noted that if the total number or capacity of the vessels using the same fishing gear has increased, the impacts of the fishing activities are to be assessed again.

3. Definition of VMEs

(1) Although Paragraph 83 of UNGA Resolution 61/105 refers to seamounts, hydrothermal vents and cold water corals as examples of VMEs, there is no definitive list of specific species or areas that are to be regarded as VMEs.

(2) Vulnerability is related to the likelihood that a population, community or habitat will experience substantial alteration by fishing activities and how much time will be required for its recovery from such alteration. The most vulnerable ecosystems are those that are both easily disturbed and are very slow to recover, or may never recover. The vulnerabilities of populations, communities and habitats are to be assessed relative to specific threats. Some features, particularly ones that are physically fragile or inherently rare may be vulnerable to most forms of disturbance, but the vulnerability of some populations, communities and habitats may vary greatly depending on the type of fishing gear used or the kind of disturbance experienced. The risks to a marine ecosystem are determined by its vulnerability, the probability of a threat occurring and the mitigation means applied to the threat. Accordingly, the FAO Guidelines only provide examples of potential vulnerable species groups, communities and habitats as well as features that potentially support them (Annex 2.1).

(3) A marine ecosystem is to be classified as vulnerable based on its characteristics. The following list of characteristics is used as criteria in the identification of VMEs.

(a) Uniqueness or rarity - an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by other similar areas. These include:

- (i) Habitats that contain endemic species;
- (ii) Habitats of rare, threatened or endangered species that occur in discrete areas;
- (iii) Nurseries or discrete feeding, breeding, or spawning areas

(b) Functional significance of the habitat – discrete areas or habitats that are necessary for the survival, function, spawning/reproduction or recovery of fish stocks, particular life-history stages (e.g. nursery grounds or rearing areas), or of rare, threatened or endangered marine species.

(c) Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities

(d) Life-history traits of component species that make recovery difficult – ecosystems that are characterized by populations or assemblages of species with one or more of the following characteristics:

- (i) Slow growth rates
- (ii) Late age of maturity
- (iii) Low or unpredictable recruitment
- (iv) Long-lived

(e) Structural complexity – an ecosystem that is characterized by complex physical structures created by significant concentrations of biotic and abiotic features. In these ecosystems, ecological processes are

usually highly dependent on these structured systems. Further, such ecosystems often have high diversity, which is dependent on the structuring organisms.

(4) Management response may vary, depending on the size of the ecological unit in the Convention Area. Therefore, the spatial extent of the ecological unit is to be decided first. That is, whether the ecological unit is the entire Area, or the current fishing ground, namely, the Emperor Seamount and Northern Hawaiian Ridge area (hereinafter called “the ES-NHR area”), or a group of the seamounts within the ES-NHR area, or each seamount in the ES-NHR area, is to be decided using the above criteria.

4. Identification of potential VMEs

(1) Fished seamounts

(a) Identification of fished seamounts

It is reported that four types of fishing gear are currently used by the members of the Commission in the ES-NHR area, namely, bottom trawl, bottom gillnet, bottom longline and pot. A fifth type of fishing gear (coral drag) was used in the ES-NHR area from the mid-1960s to the late 1980s and is possibly still used by non-members of the Commission. These types of fishing gear are usually used on the top or slope of seamounts, which could be considered VMEs. It is therefore necessary to identify the footprint of the bottom fisheries (fished seamounts) based on the available fishing record. The following seamounts have been identified as fished seamounts: Suiko, Showa, Youmei, Nintoku, Jingu, Ojin, Northern Koko, Koko, Kinmei, Yuryaku, Kammu, Colahan, and C-H. Since the use of most of these gears in the ES-NHR area dates back to the late 1960s and 1970s, it is important to establish, to the extent practicable, a time series of where and when these gears have been used in order to assess potential long-term effects on any existing VMEs.

Fishing effort may not be evenly distributed on each seamount since fish aggregation may occur only at certain points of the seamount and some parts of the seamount may be physically unsuitable for certain fishing gears. Thus, it is important to know actual fished areas within the same seamount so as to know the gravity of the impact of fishing activities on the entire seamount.

Due consideration is to be given to the protection of commercial confidentiality when identifying actual fishing grounds.

(b) Assessment on whether a specific seamount that has been fished is a VME

After identifying the fished seamounts or fished areas of seamounts, it is necessary to assess whether each fished seamount is a VME or contains VMEs in accordance with the criteria in 3 above, individually or in combination using the best available scientific and technical information as well as Annex 2.1. A variety of data would be required to conduct such assessment, including pictures of seamounts taken by an ROV camera or drop camera, biological samples collected through research activities and observer

programs, and detailed bathymetry map. Where site-specific information is lacking, other information that is relevant to inferring the likely presence of VMEs is to be used.

(2) New fishing areas

Any place other than the fished seamounts above is to be regarded as a new fishing area. If a member of the Commission is considering fishing in a new fishing area, such a fishing area is to be subject to, in addition to these standards and criteria, an exploratory fishery protocol (Annex 1).

5. Assessment of SAIs on VMEs or marine species

(1) Significant adverse impacts are those that compromise ecosystem integrity (i.e., ecosystem structure or function) in a manner that: (i) impairs the ability of affected populations to replace themselves; (ii) degrades the long-term natural productivity of habitats; or (iii) causes, on more than a temporary basis, significant loss of species richness, habitat or community types. Impacts are to be evaluated individually, in combination and cumulatively.

(2) When determining the scale and significance of an impact, the following six factors are to be considered:

- (a) The intensity or severity of the impact at the specific site being affected;
- (b) The spatial extent of the impact relative to the availability of the habitat type affected;
- (c) The sensitivity/vulnerability of the ecosystem to the impact;
- (d) The ability of an ecosystem to recover from harm, and the rate of such recovery;
- (e) The extent to which ecosystem functions may be altered by the impact; and
- (f) The timing and duration of the impact relative to the period in which a species needs the habitat during one or more life-history stages.

(3) Temporary impacts are those that are limited in duration and that allow the particular ecosystem to recover over an acceptable timeframe. Such timeframes are to be decided on a case-by-case basis and be on the order of 5-20 years, taking into account the specific features of the populations and ecosystems.

(4) In determining whether an impact is temporary, both the duration and the frequency with which an impact is repeated is to be considered. If the interval between the expected disturbances of a habitat is shorter than the recovery time, the impact is to be considered more than temporary.

(5) Each member of the Commission is to conduct assessments to establish if bottom fishing activities are likely to produce SAIs in a given seamount or other VMEs. Such an impact assessment is to address, *inter alia*:

- (a) Type of fishing conducted or contemplated, including vessel and gear types, fishing areas, target and potential bycatch species, fishing effort levels and duration of fishing;
- (b) Best available scientific and technical information on the current state of fishery resources, and baseline

information on the ecosystems, habitats and communities in the fishing area, against which future changes are to be compared;

- (c) Identification, description and mapping of VMEs known or likely to occur in the fishing area;
- (d) The data and methods used to identify, describe and assess the impacts of the activity, identification of gaps in knowledge, and an evaluation of uncertainties in the information presented in the assessment;
- (e) Identification, description and evaluation of the occurrence, scale and duration of likely impacts, including cumulative impacts of activities covered by the assessment on VMEs and low-productivity fishery resources in the fishing area;
- (f) Risk assessment of likely impacts by the fishing operations to determine which impacts are likely to be SAIs, particularly impacts on VMEs and low-productivity fishery resources (Risk assessments are to take into account, as appropriate, differing conditions prevailing in areas where fisheries are well established and in areas where fisheries have not taken place or only occur occasionally);
- (g) The proposed mitigation and management measures to be used to prevent SAIs on VMEs and ensure long-term conservation and sustainable utilization of low-productivity fishery resources, and the measures to be used to monitor effects of the fishing operations.

(6) Impact assessments are to consider, as appropriate, the information referred to in these Standards and Criteria, as well as relevant information from similar or related fisheries, species and ecosystems.

(7) Where an assessment concludes that the area does not contain VMEs or that significant adverse impacts on VMEs or marine species are not likely, such assessments are to be repeated when there have been significant changes to the fishery or other activities in the area, or when natural processes are thought to have undergone significant changes.

6. Proposed conservation and management measures to prevent SAIs

As a result of the assessment in 5 above, if it is considered that individual fishing activities are causing or likely to cause SAIs on VMEs or marine species, the member of the Commission is to adopt appropriate conservation and management measures to prevent such SAIs. The member of the Commission is to clearly indicate how such impacts are expected to be prevented or mitigated by the measures.

7. Precautionary approach

If after assessing all available scientific and technical information, the presence of VMEs or the likelihood that individual bottom fishing activities would cause SAIs on VMEs or marine species cannot be adequately determined, members of the Commission are only to authorize individual bottom fishing activities to proceed in accordance with:

- (a) Precautionary, conservation and management measures to prevent SAIs;
- (b) Measures to address unexpected encounters with VMEs in the course of fishing operations;
- (c) Measures, including ongoing scientific research, monitoring and data collection, to reduce the uncertainty; and

(d) Measures to ensure long-term sustainability of deep sea fisheries.

8. Template for assessment report

Annex 2.2 is a template for individual member of the Commission to formulate reports on identification of VMEs and impact assessment.

ANNEX 2.1

EXAMPLES OF POTENTIAL VULNERABLE SPECIES GROUPS, COMMUNITIES AND HABITATS AS WELL AS FEATURES THAT POTENTIALLY SUPPORT THEM

The following examples of species groups, communities, habitats and features often display characteristics consistent with possible VMEs. Merely detecting the presence of an element itself is not sufficient to identify a VME. That identification is to be made on a case-by-case basis through application of relevant provisions of the Standards and Criteria, particularly Sections 3, 4 and 5.

Examples of species groups, communities and habitat forming species that are documented or considered sensitive and potentially vulnerable to deep-sea fisheries in the high-seas, and which may contribute to forming VMEs:

| | |
|-----------|--|
| a. | certain coldwater corals, e.g., reef builders and coral forest including: stony corals (scleractinia), alcyonaceans and gorgonians (octocorallia), black corals (antipatharia), and hydrocorals (stylasteridae), |
| b. | Some types of sponge dominated communities, |
| c. | communities composed of dense emergent fauna where large sessile protozoans (xenophyphores) and invertebrates (e.g., hydroids and bryozoans) form an important structural component of habitat, and |
| d. | seep and vent communities comprised of invertebrate and microbial species found nowhere else (i.e., endemic). |

Examples of topographical, hydrophysical or geological features, including fragile geological structures, that potentially support the species groups or communities, referred to above:

| | |
|-----------|---|
| a. | submerged edges and slopes (e.g., corals and sponges), |
| b. | summits and flanks of seamounts, guyots, banks, knolls, and hills (e.g., corals, sponges, xenophyphores), |
| c. | canyons and trenches (e.g., burrowed clay outcrops, corals), |
| d. | hydrothermal vents (e.g., microbial communities and endemic invertebrates), and |
| e. | cold seeps (e.g., mud volcanoes, microbes, hard substrates for sessile invertebrates). |

TEMPLATE FOR REPORTS ON IDENTIFICATION OF VMES AND ASSESSMENT OF IMPACTS CAUSED BY INDIVIDUAL FISHING ACTIVITIES ON VMES OR MARINE SPECIES

1. Name of the member of the Commission
2. Name of the fishery (e.g., bottom trawl, bottom gillnet, bottom longline, pot)
3. Status of the fishery (existing fishery or exploratory fishery)
4. Target species
5. Bycatch species
6. Recent level of fishing effort (every year at least since 2002)
 - (1) Number of fishing vessels
 - (2) Tonnage of each fishing vessel
 - (3) Number of fishing days or days on the fishing ground
 - (4) Fishing effort (total operating hours for trawl, # of hooks per day for long-line, # of pots per day for pot, total length of net per day for gillnet)
 - (5) Total catch by species
 - (6) Names of seamounts fished or to be fished
7. Fishing period
8. Analysis of status of fishery resources
 - (1) Data and methods used for analysis
 - (2) Results of analysis
 - (3) Identification of uncertainties in data and methods, and measures to overcome such uncertainties
9. Analysis of status of bycatch species resources
 - (1) Data and methods used for analysis
 - (2) Results of analysis
 - (3) Identification of uncertainties in data and methods, and measures to overcome such uncertainties
10. Analysis of existence of VMES in the fishing ground
 - (1) Data and methods used for analysis
 - (2) Results of analysis
 - (3) Identification of uncertainties in data and methods, and measures to overcome such uncertainties
11. Impact assessment of fishing activities on VMES or marine species including cumulative impacts, and identification of SAIs on VMES or marine species, as detailed in Section 5 above, Assessment of SAIs on VMES or marine species
12. Other points to be addressed
13. Conclusion (whether to continue or start fishing with what measures, or stop fishing)

SCIENTIFIC COMMITTEE ASSESSMENT REVIEW PROCEDURES FOR BOTTOM FISHING ACTIVITIES

1. The Scientific Committee (SC) is to review identifications of vulnerable marine ecosystems (VMEs) and assessments of significant adverse impact on VMEs, including proposed management measures intended to prevent such impacts submitted by individual Members.
2. Members of the Commission shall submit their identifications and assessments to members of the SC at least 21 days prior to the SC meeting at which the review is to take place. Such submissions shall include all relevant data and information in support of such determinations.
3. The SC will review the data and information in each assessment in accordance with the Science-based Standards and Criteria for Identification of VMEs and Assessment of Significant Adverse Impacts on VMEs and Marine Species (Annex 2), previous decisions of the Commission, and the FAO Technical Guidelines for the Management of Deep Sea Fisheries in the High Seas, paying special attention to the assessment process and criteria specified in paragraphs 47-49 of the Guidelines.
4. In conducting the review above, the SC will give particular attention to whether the deep-sea bottom fishing activity would have a significant adverse impact on VMEs and marine species and, if so, whether the proposed management measures would prevent such impacts.
5. Based on the above review, the SC will provide advice and recommendations to the submitting Members on the extent to which the assessments and related determinations are consistent with the procedures and criteria established in the documents identified above; and whether additional management measures will be required to prevent SAIs on VMEs.
6. Such recommendations will be reflected in the report of the SC meeting at which the assessments are considered.

FORMAT OF NATIONAL REPORT SECTIONS ON DEVELOPMENT AND IMPLEMENTATION OF SCIENTIFIC OBSERVER PROGRAMMES

Report Components

Annual Observer Programme implementation reports should form a component of annual National Reports submitted by members to the Scientific Committee. These reports should provide a brief overview of observer programmes conducted in the NPFC Convention Area. Observer programme reports should include the following sections:

A. Observer Training

An overview of observer training conducted, including:

- Overview of training programme provided to scientific observers.
- Number of observers trained.

B. Scientific Observer Programme Design and Coverage

Details of the design of the observer programme, including:

- Which fleets, fleet components or fishery components were covered by the programme.
- How vessels were selected to carry observers within the above fleets or components.
- How was observer coverage stratified: by fleets, fisheries components, vessel types, vessel sizes, vessel ages, fishing areas and seasons.

Details of observer coverage of the above fleets, including:

- Components, areas, seasons and proportion of total catches of target species, specifying units used to determine coverage.
- Total number of observer employment days, and number of actual days deployed on observation work.

C. Observer Data Collected

List of observer data collected against the agreed range of data set out in Annex 5, including:

- Effort Data: Amount of effort observed (vessel days, net panels, hooks, etc), by area and season and % observed out of total by area and seasons
- Catch Data: Amount of catch observed of target and by-catch species, by area and season, and % observed out of total estimated catch by species, area and seasons
- Length Frequency Data: Number of fish measured per species, by area and season.
- Biological Data: Type and quantity of other biological data or samples (otoliths, sex, maturity, etc) collected per species.
- The size of length-frequency and biological sub-samples relative to unobserved quantities.

D. Tag Return Monitoring

- Number of tags returns observed, by fish size class and area.

E. Problems Experienced

- Summary of problems encountered by observers and observer managers that could affect the NPFC Observer Programme Standards and/or each member's national observer programme developed under the NPFC standards.

**NPFC BOTTOM FISHERIES
OBSERVER PROGRAMME STANDARDS: SCIENTIFIC COMPONENT**

TYPE AND FORMAT OF SCIENTIFIC OBSERVER DATA TO BE COLLECTED

A. Vessel & Observer Data to be collected for Each Trip

1. Vessel and observer details are to be recorded only once for each observed trip.
2. The following vessel data are to be collected for each observed trip:
 - a) Current vessel flag.
 - b) Name of vessel.
 - c) Name of the Captain.
 - d) Name of the Fishing Master.
 - e) Registration number.
 - f) International radio call sign (if any).
 - g) Lloyd's / IMO number (if allocated).
 - h) Previous Names (if known).
 - i) Port of registry.
 - j) Previous flag (if any).
 - k) Type of vessel.
 - l) Type of fishing method(s).
 - m) Length (m).
 - n) Beam (m).
 - o) Gross register tonnage (international tonnage).
 - p) Power of main engine(s) (kilowatts).
 - q) Hold capacity (cubic metres).
 - r) Record of the equipment on board which may affect fishing power factors (navigational equipment, radar, sonar systems, weather fax or satellite weather receiver, sea-surface temperature image receiver, Doppler current monitor, radio direction finder).
 - s) Total number of crew (all staff, excluding observers).
3. The following observer data are to be collected for each observed trip:
 - a) Observer's name.
 - b) Observer's organisation.

- c) Date observer embarked (UTC date).
- d) Port of embarkation.
- e) Date observer disembarked (UTC date).
- f) Port of disembarkation.

B. Catch & Effort Data to be collected for Trawl Fishing Activity

1. Data are to be collected on an un-aggregated (tow by tow) basis for all observed trawls.
2. The following data are to be collected for each observed trawl tow:
 - a) Tow start date (UTC).
 - b) Tow start time (UTC).
 - c) Tow end date (UTC).
 - d) Tow end time (UTC).
 - e) Tow start position (Lat/Lon, 1 minute resolution).
 - f) Tow end position (Lat/Lon, 1 minute resolution).
 - g) Type of trawl, bottom or mid-water.
 - h) Type of trawl, single, double or triple.
 - i) Height of net opening (m).
 - j) Width of net opening (m).
 - k) Mesh size of the cod-end net (stretched mesh, mm) and mesh type (diamond, square, etc).
 - l) Gear depth (of footrope) at start of fishing (m).
 - m) Bottom (seabed) depth at start of fishing (m).
 - n) Gear depth (of footrope) at end of fishing (m).
 - o) Bottom (seabed) depth at end of fishing (m).
 - p) Status of the trawl operation (no damage, lightly damaged*, heavily damaged*, other (specify)). *Degree may be evaluated by time for repairing (<=1hr or >1hr)
 - q) Duration of estimated period of seabed contact (minute)
 - r) Intended target species.
 - s) Catch of all species retained on board, split by species, in weight (to the nearest kg).
 - t) Estimate of the amount (weight or volume) of all living marine resources discarded, split by species.
 - u) Record of the numbers by species of all marine mammals, seabirds or reptiles caught.
 - v) Record of sensitive benthic species in the trawl catch, particularly vulnerable or habitat-forming species such as sponges, sea-fans or corals.

C. Catch & Effort Data to be collected for Bottom Gillnet Fishing Activity

1. Data are to be collected on an un-aggregated (set by set) basis for all observed bottom gillnet sets.
2. The following data are to be collected for each observed bottom gillnet set:
 - a) Set start date (UTC).
 - b) Set start time (UTC).
 - c) Set end date (UTC).
 - d) Set end time (UTC).
 - e) Set start position (Lat/Lon, 1 minute resolution).
 - f) Set end position (Lat/Lon, 1 minute resolution).
 - g) Net panel (“tan”) length (m).
 - h) Net panel (“tan”) height (m).
 - i) Net mesh size (stretched mesh, mm) and mesh type (diamond, square, etc)
 - j) Bottom depth at start of setting (m).
 - k) Bottom depth at end of setting (m).
 - l) Number of net panels for the set.
 - m) Number of net panels retrieved.
 - n) Number of net panels actually observed during the haul.
 - o) Actually observed catch of all species retained on board, split by species, in weight (to the nearest kg).
 - p) An estimation of the amount (numbers or weight) of marine resources discarded, split by species, during the actual observation.
 - q) Record of the actually observed numbers by species of all marine mammals, seabirds or reptiles caught.
 - r) Intended target species.
 - s) Catch of all species retained on board, split by species, in weight (to the nearest kg).
 - t) Estimate of the amount (weight or volume) of all marine resources discarded* and dropped-off, split by species. * Including those retained for scientific samples.
 - u) Record of the numbers by species of all marine mammals, seabirds or reptiles caught (including those discarded and dropped-off).

D. Catch & Effort Data to be collected for Bottom Long Line Fishing Activity

1. Data are to be collected on an un-aggregated (set by set) basis for all observed longline sets.
2. The following fields of data are to be collected for each set:
 - a) Set start date (UTC).
 - b) Set start time (UTC).
 - c) Set end date (UTC).
 - d) Set end time (UTC).
 - e) Set start position (Lat/Lon, 1 minute resolution).
 - f) Set end position (Lat/Lon, 1 minute resolution).
 - g) Total length of longline set (m).
 - h) Number of hooks for the set.
 - i) Bottom (seabed) depth at start of set.
 - j) Bottom (seabed) depth at end of set.
 - k) Number of hooks actually observed during the haul.
 - l) Intended target species.
 - m) Actually observed catch of all species retained on board, split by species, in weight (to the nearest kg).
 - n) An estimation of the amount (numbers or weight) of marine resources discarded* or dropped-off, split by species, during the actual observation. * Including those retained for scientific samples.
 - o) Record of the actually observed numbers by species of all marine mammals, seabirds or reptiles caught (including those discarded and dropped-off).

E. Length-Frequency Data to Be Collected

1. Representative and randomly distributed length-frequency data (to the nearest mm, with record of the type of length measurement taken) are to be collected for representative samples of the target species and other main by-catch species. Total weight of length-frequency samples should be recorded, and observers may be required to also determine sex of measured fish to generate length-frequency data stratified by sex. The length-frequency data may be used as potential indicators of ecosystem changes (for seample, see: Gislason, H. et al. (2000. ICES J Mar Sci 57: 468-475) Yamane et al. (2005. ICES J Mar Sci, 62: 374-379), and Shin, Y-J. et al. (2005. ICES J Mar Sci, 62: 384-396)).

2. The numbers of fish to be measured for each species and distribution of samples across area and month strata should be determined, to ensure that samples are properly representative of species distributions and size ranges.

F. Biological sampling to be conducted (optional for gillnet and long line fisheries)

1. The following biological data are to be collected for representative samples of the main target species and, time permitting, for other main by-catch species contributing to the catch:
 - a) Species
 - b) Length (to the nearest mm), with record of the type of length measurement used.
 - c) Length and depth in case of North Pacific armorhead.
 - d) Sex (male, female, immature, unsexed)
 - e) Maturity stage (immature, mature, ripe, ripe-running, spent)
2. Representative stratified samples of otoliths are to be collected from the main target species and, time permitting, from other main by-catch species regularly occurring in catches. All otoliths to be collected are to be labelled with the information listed in 1 above, as well as the date, vessel name, observer name and catch position.
3. Where specific trophic relationship projects are being conducted, observers may be requested to also collect stomach samples from certain species. Any such samples collected are also to be labelled with the information listed in 1 above, as well as the date, vessel name, observer name and catch position.
4. Observers may also be required to collect tissue samples as part of specific genetic research programmes implemented by the SC.
5. Observers are to be briefed and provided with written length-frequency and biological sampling protocols and priorities for the above sampling specific to each observer trip.

G. Data to be collected on Incidental Captures of Protected Species

1. Flag members operating observer programs are to develop, in cooperation with the SC, lists and identification guides of protected species or species of concern (seabirds, marine mammals or marine reptiles) to be monitored by observers.
2. The following data are to be collected for all protected species caught in fishing operations:

- a) Species (identified as far as possible, or accompanied by photographs if identification is difficult).
- b) Count of the number caught per tow or set.
- c) Life status (vigorous, alive, lethargic, dead) upon release.
- d) Whole specimens (where possible) for onshore identification. Where this is not possible, observers may be required to collect sub-samples of identifying parts, as specified in biological sampling protocols.

H. Detection of Fishing in Association with Vulnerable Marine Ecosystems

1. The SC is to develop a guideline, species list and identification guide for benthic species (e.g. sponges, sea fans, corals) whose presence in a catch will indicate that fishing occurred in association with a vulnerable marine ecosystem (VME). All observers on vessels are to be provided with copies of this guideline, species list and ID guide.
2. For each observed fishing operation, the following data are to be collected for all species caught, which appear on the list of vulnerable benthic species:
 - a) Species (identified as far as possible, or accompanied by a photograph where identification is difficult).
 - b) An estimate of the quantity (weight (kg) or volume (m³)) of each listed benthic species caught in the fishing operation.
 - c) An overall estimate of the total quantity (weight (kg) or volume (m³)) of all invertebrate benthic species caught in the fishing operation.
 - d) Where possible, and particularly for new or scarce benthic species which do not appear in ID guides, whole samples should be collected and suitable preserved for identification on shore.

I. Data to be collected for all Tag Recoveries

1. The following data are to be collected for all recovered fish, seabird, mammal or reptile tags:
 - a) Observer name.
 - b) Vessel name.
 - c) Vessel call sign.
 - d) Vessel flag.
 - e) Collect, label (with all details below) and store the actual tags for later return to the tagging agency.
 - f) Species from which tag recovered.

- g) Tag colour and type (spaghetti, archival).
- h) Tag numbers (The tag number is to be provided for all tags when multiple tags were attached to one fish. If only one tag was recorded, a statement is required that specifies whether or not the other tag was missing)
- i) Date and time of capture (UTC).
- j) Location of capture (Lat/Lon, to the nearest 1 minute)
- k) Animal length / size (to the nearest cm) with description of what measurement was taken (such as total length, fork length, etc).
- l) Sex (F=female, M=male, I=indeterminate, D=not examined)
- m) Whether the tags were found during a period of fishing that was being observed (Y/N)
- n) Reward information (e.g. name and address where to send reward)

(It is recognised that some of the data recorded here duplicates data that already exists in the previous categories of information. This is necessary because tag recovery information may be sent separately to other observer data.)

J. Hierarchies for Observer Data Collection

1. Trip-specific or programme-specific observer task priorities may be developed in response to specific research programme requirements, in which case such priorities should be followed by observers.
2. In the absence of trip- or programme-specific priorities, the following generalised priorities should be followed by observers:
 - a) Fishing Operation Information
 - All vessel and tow / set / effort information.
 - b) Monitoring of Catches
 - Record time, proportion of catch (e.g. proportion of trawl landing) or effort (e.g. number of hooks), and total numbers of each species caught.
 - Record numbers or proportions of each species retained or discarded.
 - c) Biological Sampling
 - Length-frequency data for target species.
 - Length-frequency data for main by-catch species.
 - Identification and counts of protected species.

- Basic biological data (sex, maturity) for target species.
- Check for presence of tags.
- Otoliths (and stomach samples, if being collected) for target species.
- Basic biological data for by-catch species.
- Biological samples of by-catch species (if being collected)
- Photos

3. The monitoring of catches and biological sampling procedures should be prioritised among species groups as follows:

| Species | Priority (1 highest) |
|---|---------------------------------|
| Primary target species (such as North Pacific armorhead and splendid alfonsin) | 1 |
| Other species typically within top 10 in the fishery (such as mirror dory, and oreos) | 2 |
| Protected species | 3 |
| All other species | 4 |

The allocation of observer effort among these activities will depend on the type of operation and setting. The size of sub-samples relative to unobserved quantities (e.g. number of hooks/panels examined for species composition relative to the number of hooks/panels retrieved) should be explicitly recorded under the guidance of member country observer programmes.

K. Coding Specifications to be used for Recording Observer Data

1. Unless otherwise specified for specific data types, observer data are to be collected in accordance with the same coding specifications as specified in this Annex.
2. Coordinated Universal Time (UTC) is to be used to describe times.
3. Degrees and minutes are to be used to describe locations.
4. The following coding schemes are to be used:
 - a) Species are to be described using the FAO 3 letter species codes.
 - b) Fishing methods are to be described using the International Standard Classification of Fishing Gear (ISSCFG - 29 July 1980) codes.
 - c) Types of fishing vessel are to be described using the International Standard Classification of Fishery Vessels (ISSCFV) codes.

5. Metric units of measure are to be used, specifically:
 - a) Kilograms are to be used to describe catch weight.
 - b) Metres are to be used to describe height, width, depth, beam or length.
 - c) Cubic metres are to be used to describe volume.
 - d) Kilowatts are to be used to describe engine power.

**CONSERVATION AND MANAGEMENT MEASURE
FOR BOTTOM FISHERIES AND PROTECTION OF VULNERABLE
MARINE ECOSYSTEMS IN THE NORTHEASTERN PACIFIC OCEAN**

The North Pacific Fisheries Commission (NPFC):

Seeking to ensure the long term conservation and sustainable use of the fishery resources of the Northeastern Pacific Ocean and, in so doing, protect the vulnerable marine ecosystems that occur there, in accordance with the Sustainable Fisheries Resolutions adopted by the United Nations General Assembly (UNGA) including, in particular, paragraphs 66 to 71 of the UNGA59/25 in 2004, paragraphs 69 to 74 of UNGA60/31 in 2005, paragraphs 69 and 80 to 91 of UNGA61/105 in 2006, and paragraphs 113 to 124 of UNGA64/72 in 2009;

Recalling that paragraph 85 of UNGA 61/105 calls upon participants in negotiations to establish regional fisheries management organizations or arrangements with the competence to regulate bottom fisheries to adopt permanent measures in respect of the area of application of the instruments under negotiation;

Noting that North Pacific Fisheries Commission has previously adopted interim measures for the Northeastern Pacific Ocean;

Conscious of the need to adopt permanent measures for the Northeastern Pacific Ocean to ensure that this area is not left as the only major area of the Pacific Ocean where no such measures are in place;

Hereby adopt the following Conservation and Management Measure (CMM) for bottom fisheries of the Northeastern Pacific Ocean while working to develop and implement other permanent management arrangements to govern these and other fisheries in the North Pacific Ocean.

Scope

1. These Measures are to be applied to all bottom fishing activities throughout the high seas areas of the Northeastern Pacific Ocean, defined, for the purposes of this document, as those occurring in the Convention Area as set out in Article 4 of the Convention text to the east of the line of 175 degrees W longitude (here in after called “the eastern part of the Convention Area”) including all such areas and marine species other than those species already covered by existing international fisheries management instruments, including bilateral agreements and Regional

Fisheries Management Organizations or Arrangements.

For the purpose of these Measures, the term vulnerable marine ecosystems is to be interpreted and applied in a manner consistent with the International Guidelines on the Management of Deep Sea Fisheries on the High Seas adopted by the FAO on 29 August 2008 (see Annex 2 for further details).

2. The implementation of these Measures shall:
 - a. be based on the best scientific information available in accordance with existing international laws and agreements including UNCLOS and other relevant international instruments,
 - b. establish appropriate and effective conservation and management measures,
 - c. be in accordance with the precautionary approach, and
 - d. incorporate an ecosystem approach to fisheries management.

3. Actions by Members of the Commission

Members of the Commission will take the following actions in respect of vessels operating under its Flag or authority in the area covered by these Measures:

- a. Conduct the assessments called for in paragraph 83(a) of UNGA Resolution 61/105, in a manner consistent with the FAO Guidelines and the Standards and Criteria included in Annex 2;
- b. Submit to the SC their assessments conducted pursuant to subparagraph (a) of this paragraph, including all relevant data and information in support of any such assessment, and receive advice and recommendations from the SC, in accordance with the procedures in Annex 3;
- c. Taking into account all advice and recommendations received from the SC, determine whether the fishing activity or operations of the vessel in question are likely to have a significant adverse impact on any vulnerable marine ecosystem;
- d. If it is determined that the fishing activity or operations of the vessel or vessels in question would have a significant adverse impact on vulnerable marine ecosystems, adopt conservation and management measures to prevent such impacts on the basis of advice and recommendations of the SC, which are subject to adoption by the Commission;
- e. Ensure that if any vessels are already engaged in bottom fishing, that such assessments have been carried out in accordance with paragraph 119(a)/UNGA RES 2009, the determination called for in subparagraph (c) of this paragraph has been rendered and, where appropriate, managements measures have been implemented in accordance with the advice and recommendations of the SC, which are subject to adoption by the Commission;

- f. Further ensure that they will only authorize fishing activities on the basis of such assessments and any comments and recommendations from the SC;
 - g. Prohibit its vessels from engaging in directed fishing on the following orders: Alcyonacea, Antipatharia, Gorgonacea, and Scleractinia as well as any other indicator species for vulnerable marine ecosystems as may be identified from time to time by the SC and approved by the Commission;
 - h. In respect of areas where vulnerable marine ecosystems are known to occur or are likely to occur, based on the best available scientific information, ensure that bottom fishing activities do not proceed unless conservation and management measures have been established to prevent significant adverse impacts on vulnerable marine ecosystems;
 - i. Limit fishing effort in bottom fisheries on the Eastern part of the Convention Area to the level of a historical average (baseline to be determined through consensus in the SC based on information to be provided by Members) in terms of the number of fishing vessels and other parameters which reflect the level of fishing effort, fishing capacity or potential impacts on marine ecosystems dependent on new SC advice;
 - j. Further, considering accumulated information regarding fishing activities in the Eastern part of the Convention Area, in areas where, in the course of fishing operations, cold water corals or other indicator species as identified by the SC that exceed 50Kg are encountered in one gear retrieval, Members of the Commission shall require vessels flying their flag to cease bottom fishing activities in that location. In such cases, the vessel shall not resume fishing activities until it has relocated a sufficient distance, which shall be no less than 2 nautical miles, so that additional encounters with VMEs are unlikely. All such encounters, including the location and the species in question, shall be reported to the Secretariat, who shall notify the other Members of the Commission so that appropriate measures can be adopted in respect of the relevant site. It is agreed that the cold water corals include: Alcyonacea, Antipatharia, Gorgonacea, and Scleractinia, as well as any other indicator species for vulnerable marine ecosystems as may be identified from time to time by the SC and approved by the Commission.
4. All assessments and determinations by any Member as to whether fishing activity would have significant adverse impacts on vulnerable marine ecosystems, as well as measures adopted in order to prevent such impacts, will be made publicly available through agreed means.

Control of Bottom Fishing Vessels

5. Members will exercise full and effective control over each of their bottom fishing vessels operating in the high seas of the Northeastern Pacific Ocean, including by means of fishing licenses, authorizations or permits, and maintenance of a record of these vessels as outlined in

the Convention and applicable CMM.

6. New and exploratory fishing will be subject to the exploratory fishery protocol included as Annex 1.

Scientific Committee (SC)

7. Scientific Committee will provide scientific support for the implementation of these CMMs.

Scientific Information

8. The Members shall provide all available information as required by the Commission for any current or historical fishing activity by their flag vessels, including the number of vessels by gear type, size of vessels (tons), number of fishing days or days on the fishing grounds, total catch by species, areas fished (names or coordinates of seamounts), and information from scientific observer programmes (see Annexes 4 and 5) to the NPFC Secretariat as soon as possible and no later than one month prior to SC meeting. The Secretariat will make such information available to SC.
9. Scientific research activities for stock assessment purposes are to be conducted in accordance with a research plan that has been provided to SC prior to the commencement of such activities.

EXPLORATORY FISHERY PROTOCOL IN THE NORTH PACIFIC OCEAN

1. From 1 January 2009, all bottom fishing activities in new fishing areas and areas where fishing is prohibited in a precautionary manner or with bottom gear not previously used in the existing fishing areas, are to be considered as “exploratory fisheries” and to be conducted in accordance with this protocol.

2. Precautionary conservation and management measures, including catch and effort controls, are essential during the exploratory phase of deep sea fisheries. Implementation of a precautionary approach to sustainable exploitation of deep sea fisheries shall include the following measures:

- i. precautionary effort limits, particularly where reliable assessments of sustainable exploitation rates of target and main by-catch species are not available;
- ii. precautionary measures, including precautionary spatial catch limits where appropriate, to prevent serial depletion of low-productivity stocks;
- iii. regular review of appropriate indices of stock status and revision downwards of the limits listed above when significant declines are detected;
- iv. measures to prevent significant adverse impacts on vulnerable marine ecosystems; and
- v. comprehensive monitoring of all fishing effort, capture of all species and interactions with VMEs.

3. When a member of the Commission would like to conduct exploratory fisheries, it is to follow the following procedure:

(1) Prior to the commencement of fishing, the member of the Commission is to circulate the information and assessment in Appendix 1.1 to the members of the Scientific Committee (SC) for review and to all members of the Commission for information, together with the impact assessment. Such information is to be provided to the other members at least 30 days in advance of the meeting at which the information shall be reviewed.

(2) The assessment in (1) above is to be conducted in accordance with the procedure set forth in “Science-based Standards and Criteria for Identification of VMEs and Assessment of Significant Adverse Impacts on VMEs and Marine Species (Annex 2)”, with the understanding that particular care shall be taken in the evaluation of risks of the significant adverse impact on vulnerable marine ecosystems (VMEs), in line with the precautionary approach.

(3) The SC is to review the information and the assessment submitted in (1) above in accordance with “SC Assessment Review Procedures for Bottom Fishing Activities (Annex 3).”

(4) The exploratory fisheries are to be permitted only where the assessment concludes that they would not have significant adverse impacts (SAIs) on marine species or any VMEs and on the basis of comments and recommendations of SC. Any determinations, by any Member of the Commission or the SC, that the exploratory fishing activities would not have SAIs on marine species or any VMEs, shall be made publicly available through the NPFC website.

4. The member of the Commission is to ensure that all vessels flying its flag conducting exploratory fisheries are equipped with a satellite monitoring device and have an observer on board at all times.

5. Within 3 months of the end of the exploratory fishing activities or within 12 months of the commencement of fishing, whichever occurs first, the member of the Commission is to provide a report of the results of such activities to the members of the SC and all members of the Commission. If the SC meets prior to the end of this 12 month period, the member of the Commission is to provide an interim report 30 days in advance of the SC meeting. The information to be included in the report is specified in Appendix 1.2.

6. The SC is to review the report in 5 above, and decide whether the exploratory fishing activities had SAIs on marine species or any VME. The SC then is to send its recommendations to the Commission on whether the exploratory fisheries can continue and whether additional management measures shall be required if they are to continue. The Commission is to strive to adopt conservation and management measures to prevent SAIs on marine species or any VMEs. If the Commission is not able to reach consensus on any such measures, each fishing member of the Commission is to adopt measures to avoid any SAIs on VMEs.

7. Members of the Commission shall only authorize continuation of exploratory fishing activity, or commencement of commercial fishing activity, under this protocol on the basis of comments and recommendations of the SC.

Appendix 1.1

Information to be provided before exploratory fisheries start

1. A harvesting plan
 - Name of vessel
 - Flag member of vessel
 - Description of area to be fished (location and depth)
 - Fishing dates
 - Anticipated effort
 - Target species
 - Bottom fishing gear-type used
 - Area and effort restrictions to ensure that fisheries occur on a gradual basis in a limited geographical area.
2. A mitigation plan
 - Measures to prevent SAIs to VMEs that may be encountered during the fishery
3. A catch monitoring plan
 - Recording/reporting of all species brought onboard to the lowest possible taxonomic level
 - 100% satellite monitoring
 - 100% observer coverage
4. A data collection plan
 - Data is to be collected in accordance with “Type and Format of Scientific Observer Data to be Collected” (Annex 5)

Appendix 1.2

Information to be included in the report

- Name of vessel
- Flag member of vessel
- Description of area fished (location and depth)
- Fishing dates
- Total effort
- Bottom fishing gear-type used
- List of VME encountered (the amount of VME indicator species for each encounter specifying the location: longitude and latitude)
- Mitigation measures taken in response to the encounter of VME
- List of all organisms brought onboard
- List of VMEs indicator species brought onboard by location: longitude and latitude

SCIENCE-BASED STANDARDS AND CRITERIA FOR IDENTIFICATION OF VMES AND ASSESSMENT OF SIGNIFICANT ADVERSE IMPACTS ON VMES AND MARINE SPECIES

1. Introduction

Members of the Commission have hereby established science-based standards and criteria to guide their implementation of United Nations General Assembly (UNGA) Resolution 61/105 and the measures adopted by the Members in respect of bottom fishing activities in the North Pacific Ocean (NPO). In this regard, these science-based standards and criteria are to be applied to identify vulnerable marine ecosystems (VMEs) and assess significant adverse impacts (SAIs) of bottom fishing activities on such VMEs or marine species and to promote the long-term sustainability of deep sea fisheries in the Convention Area. The science-based standards and criteria are consistent with the FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas, taking into account the work of other RFMOs implementing management of deep-sea bottom fisheries in accordance with UNGA Resolution 61/105. The standards and criteria are to be modified from time to time as more data are collected through research activities and monitoring of fishing operations.

2. Purpose

(1) The purpose of the standards and criteria is to provide guidelines for each member of the Commission in identifying VMEs and assessing SAIs of individual bottom fishing activities⁸ on VMEs or marine species in the Convention Area. Each member of the Commission, using the best information available, is to decide which species or areas are to be categorized as VMEs, identify areas where VMEs are known or likely to occur, and assess whether individual bottom fishing activities would have SAIs on such VMEs or marine species. The results of these tasks are to be submitted to and reviewed by the Scientific Committee with a view to reaching a common understanding among the members of the Commission.

- (2) For the purpose of applying the standards and criteria, the bottom fisheries are defined as follows:
- (a) The fisheries are conducted in the Convention Area;
 - (b) The total catch (everything brought up by the fishing gear) includes species that can only sustain low exploitation rates; and
 - (c) The fishing gear is likely to contact the seafloor during the normal course of fishing operations

3. Definition of VMEs

(1) Although Paragraph 83 of UNGA Resolution 61/105 refers to seamounts, hydrothermal vents and cold water corals as examples of VMEs, there is no definitive list of specific species or areas that are to be regarded as VMEs.

(2) Vulnerability is related to the likelihood that a population, community or habitat will experience substantial alteration by fishing activities and how much time will be required for its recovery from such alteration. The most vulnerable ecosystems are those that are both easily disturbed and are very slow to recover, or may never recover. The vulnerabilities of populations, communities and habitats are to be assessed relative to specific threats. Some features, particularly ones that are physically fragile or inherently rare may be vulnerable to most forms of disturbance, but the vulnerability of some populations, communities and habitats may vary greatly depending on the type of fishing gear used or the kind of disturbance experienced. The risks to a marine ecosystem are determined by its vulnerability, the probability of a threat occurring and the mitigation means applied to the threat. Accordingly, the FAO Guidelines only provide examples of potential vulnerable species groups, communities and habitats as well as features that potentially support them (Annex 2.1).

⁸ “individual bottom fishing activities” means fishing activities by each fishing gear. For example, if ten fishing vessels operate bottom trawl fishing in a certain area, the impacts of the fishing activities of these vessels on the ecosystem are to be assessed as a whole rather than on a vessel-by-vessel basis. It should be noted that if the total number or capacity of the vessels using the same fishing gear has increased, the impacts of the fishing activities are to be assessed again.

(3) A marine ecosystem is to be classified as vulnerable based on its characteristics. The following list of characteristics is used as criteria in the identification of VMEs.

- (a) Uniqueness or rarity - an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by other similar areas. These include:
 - (i) Habitats that contain endemic species;
 - (ii) Habitats of rare, threatened or endangered species that occur in discrete areas;
 - (iii) Nurseries or discrete feeding, breeding, or spawning areas
- (b) Functional significance of the habitat – discrete areas or habitats that are necessary for the survival, function, spawning/reproduction or recovery of fish stocks, particular life-history stages (e.g. nursery grounds or rearing areas), or of rare, threatened or endangered marine species.
- (c) Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities
- (d) Life-history traits of component species that make recovery difficult – ecosystems that are characterized by populations or assemblages of species with one or more of the following characteristics:
 - (i) Slow growth rates
 - (ii) Late age of maturity
 - (iii) Low or unpredictable recruitment
 - (iv) Long-lived
- (e) Structural complexity – an ecosystem that is characterized by complex physical structures created by significant concentrations of biotic and abiotic features. In these ecosystems, ecological processes are usually highly dependent on these structured systems. Further, such ecosystems often have high diversity, which is dependent on the structuring organisms.

(4) Management response may vary, depending on the size of the ecological unit in the Convention Area. Therefore, the spatial extent of the ecological unit is to be decided first. For example, whether the ecological unit is a group of seamounts, or an individual seamount in the Convention Area, is to be decided using the above criteria.

4. Identification of potential VMEs

(1) Fished seamounts

(a) Identification of fished seamounts

It is reported that two types of fishing gear are currently used by members of the Commission in the NE area, namely long-line hook and long-line trap. The footprint of the bottom fisheries (fished seamounts) is identified based on the available fishing record. The following seamounts have been identified as fished seamounts at some point in the past: Brown Bear, Cobb, Warwick, Eickelberg, Pathfinder, Miller, Murray, Cowie, Surveyor, Pratt, and Durgin. It is important to establish, to the extent practicable, a time series of where and when these gears have been used in order to assess potential long-term effects on any existing VMEs.

Fishing effort may not be evenly distributed on each seamount since fish aggregation may occur only at certain points of the seamount and some parts of the seamount may be physically unsuitable for certain fishing gears. Thus, it is important to know actual fished areas within the same seamount so as to know the gravity of the impact of fishing activities on the entire seamount.

Due consideration is to be given to the protection of commercial confidentiality when identifying actual fishing grounds.

(b) Assessment on whether a specific seamount that has been fished is a VME

After identifying the fished seamounts or fished areas of seamounts, it is necessary to assess whether each fished seamount is a VME or contains VMEs in accordance with the criteria in 3 above, individually or in combination using the best available scientific and technical information as well as Annex 2.1. A variety of data would be required to conduct such assessment, including pictures of seamounts taken by an ROV camera or drop camera, biological samples collected through research activities and observer programs, and detailed bathymetry map. Where site-specific information is lacking, other information that is relevant to inferring the likely presence of VMEs is to be used.

(2) New fishing areas

Any place other than the fished seamounts above is to be regarded as a new fishing area. If a member of the Commission is considering fishing in a new fishing area, such a fishing area is to be subject to, in addition to these standards and criteria, an exploratory fishery protocol (Annex 1).

5. Assessment of SAIs on VMEs or marine species

(1) Significant adverse impacts are those that compromise ecosystem integrity (i.e., ecosystem structure or function) in a manner that: (i) impairs the ability of affected populations to replace themselves; (ii) degrades the long-term natural productivity of habitats; or (iii) causes, on more than a temporary basis, significant loss of species richness, habitat or community types. Impacts are to be evaluated individually, in combination and cumulatively.

(2) When determining the scale and significance of an impact, the following six factors are to be considered:

- (a) The intensity or severity of the impact at the specific site being affected;
- (b) The spatial extent of the impact relative to the availability of the habitat type affected;
- (c) The sensitivity/vulnerability of the ecosystem to the impact;
- (d) The ability of an ecosystem to recover from harm, and the rate of such recovery;
- (e) The extent to which ecosystem functions may be altered by the impact; and
- (f) The timing and duration of the impact relative to the period in which a species needs the habitat during one or more life-history stages.

(3) Temporary impacts are those that are limited in duration and that allow the particular ecosystem to recover over an acceptable timeframe. Such timeframes are to be decided on a case-by-case basis and be on the order of 5-20 years, taking into account the specific features of the populations and ecosystems.

(4) In determining whether an impact is temporary, both the duration and the frequency with which an impact is repeated is to be considered. If the interval between the expected disturbances of a habitat is shorter than the recovery time, the impact is to be considered more than temporary.

(5) Each member of the Commission is to conduct assessments to establish if bottom fishing activities are likely to produce SAIs in a given seamount or other VMEs. Such an impact assessment is to address, *inter alia*:

- (a) Type of fishing conducted or contemplated, including vessel and gear types, fishing areas, target and potential bycatch species, fishing effort levels and duration of fishing;
- (b) Best available scientific and technical information on the current state of fishery resources, and baseline information on the ecosystems, habitats and communities in the fishing area, against which future changes are to be compared;
- (c) Identification, description and mapping of VMEs known or likely to occur in the fishing area;
- (d) The data and methods used to identify, describe and assess the impacts of the activity, identification of gaps in knowledge, and an evaluation of uncertainties in the information presented in the assessment
- (e) Identification, description and evaluation of the occurrence, scale and duration of likely impacts, including cumulative impacts of activities covered by the assessment on VMEs and low-productivity fishery resources in the fishing area;
- (f) Risk assessment of likely impacts by the fishing operations to determine which impacts are likely to be SAIs, particularly impacts on VMEs and low-productivity fishery resources (Risk assessments are to take into account, as appropriate, differing conditions prevailing in areas where fisheries are well established and in areas where fisheries have not taken place or only occur occasionally);
- (g) The proposed mitigation and management measures to be used to prevent SAIs on VMEs and ensure long-term conservation and sustainable utilization of low-productivity fishery resources, and the measures to be used to monitor effects of the fishing operations.

(6) Impact assessments are to consider, as appropriate, the information referred to in these Standards and Criteria, as well as relevant information from similar or related fisheries, species and ecosystems.

(7) Where an assessment concludes that the area does not contain VMEs or that significant adverse impacts on VMEs or marine species are not likely, such assessments are to be repeated when there have been significant changes to the fishery or other activities in the area, or when natural processes are thought to have undergone significant changes.

6. Proposed conservation and management measures to prevent SAIs

As a result of the assessment in 5 above, if it is considered that individual fishing activities are causing or likely to cause SAIs on VMEs or marine species, the member of the Commission is to adopt appropriate conservation and management measures to prevent such SAIs. The member of the Commission is to clearly indicate how such impacts are expected to be prevented or mitigated by the measures.

7. Precautionary approach

If after assessing all available scientific and technical information, the presence of VMEs or the likelihood that individual bottom fishing activities would cause SAIs on VMEs or marine species cannot be adequately determined, members of the Commission are only to authorize individual bottom fishing activities to proceed in accordance with:

- (a) Precautionary, conservation and management measures to prevent SAIs;
- (b) Measures to address unexpected encounters with VMEs in the course of fishing operations;
- (c) Measures, including ongoing scientific research, monitoring and data collection, to reduce the uncertainty; and
- (d) Measures to ensure long-term sustainability of deep sea fisheries.

8. Template for assessment report

Annex 2.2 is a template for individual member of the Commission to formulate reports on identification of VMEs and impact assessment.

ANNEX 2.1

EXAMPLES OF POTENTIAL VULNERABLE SPECIES GROUPS, COMMUNITIES AND HABITATS AS WELL AS FEATURES THAT POTENTIALLY SUPPORT THEM

The following examples of species groups, communities, habitats and features often display characteristics consistent with possible VMEs. Merely detecting the presence of an element itself is not sufficient to identify a VME. That identification is to be made on a case-by-case basis through application of relevant provisions of the Standards and Criteria, particularly Sections 3, 4 and 5.

Examples of species groups, communities and habitat forming species that are documented or considered sensitive and potentially vulnerable to deep-sea fisheries in the high-seas, and which may contribute to forming VMEs:

| | |
|-----------|--|
| a. | certain coldwater corals, e.g., reef builders and coral forest including: stony corals (scleractinia), alcyonaceans and gorgonians (octocorallia), black corals (antipatharia), and hydrocorals (stylasteridae), |
| b. | Some types of sponge dominated communities, |
| c. | communities composed of dense emergent fauna where large sessile protozoans (xenophyophores) and invertebrates (e.g., hydroids and bryozoans) form an important structural component of habitat, and |
| d. | seep and vent communities comprised of invertebrate and microbial species found nowhere else (i.e., endemic). |

Examples of topographical, hydrophysical or geological features, including fragile geological structures, that potentially support the species groups or communities, referred to above:

| | |
|-----------|--|
| a. | submerged edges and slopes (e.g., corals and sponges), |
| b. | summits and flanks of seamounts, guyots, banks, knolls, and hills (e.g., corals, sponges, xenophyophores), |
| c. | canyons and trenches (e.g., burrowed clay outcrops, corals), |
| d. | hydrothermal vents (e.g., microbial communities and endemic invertebrates), and |
| e. | cold seeps (e.g., mud volcanoes, microbes, hard substrates for sessile invertebrates). |

TEMPLATE FOR REPORTS ON IDENTIFICATION OF VMES AND ASSESSMENT OF IMPACTS CAUSED BY INDIVIDUAL FISHING ACTIVITIES ON VMES OR MARINE SPECIES

1. Name of the member of the Commission
2. Name of the fishery (e.g., bottom trawl, bottom gillnet, bottom longline, pot)
3. Status of the fishery (existing fishery or exploratory fishery)
4. Target species
5. Bycatch species
6. Recent level of fishing effort (every year at least since 2002)
 - (1) Number of fishing vessels
 - (2) Tonnage of each fishing vessel
 - (3) Number of fishing days or days on the fishing ground
 - (4) Fishing effort (total operating hours for trawl, # of hooks per day for long-line, # of pots per day for pot, total length of net per day for gillnet)
 - (5) Total catch by species
 - (6) Names of seamounts fished or to be fished
7. Fishing period
8. Analysis of status of fishery resources
 - (1) Data and methods used for analysis
 - (2) Results of analysis
 - (3) Identification of uncertainties in data and methods, and measures to overcome such uncertainties
9. Analysis of status of bycatch species resources
 - (1) Data and methods used for analysis
 - (2) Results of analysis
 - (3) Identification of uncertainties in data and methods, and measures to overcome such uncertainties
10. Analysis of existence of VMES in the fishing ground
 - (1) Data and methods used for analysis
 - (2) Results of analysis
 - (3) Identification of uncertainties in data and methods, and measures to overcome such uncertainties
11. Impact assessment of fishing activities on VMES or marine species including cumulative impacts, and identification of SAIs on VMES or marine species, as detailed in Section 5 above, Assessment of SAIs on VMES or marine species
12. Other points to be addressed
13. Conclusion (whether to continue or start fishing with what measures, or stop fishing)

SCIENTIFIC COMMITTEE ASSESSMENT REVIEW PROCEDURES FOR BOTTOM FISHING ACTIVITIES

1. The Scientific Committee (SC) is to review identifications of vulnerable marine ecosystems (VMEs) and assessments of significant adverse impact on VMEs, including proposed management measures intended to prevent such impacts submitted by individual Members.
2. Members of the Commission shall submit their identifications and assessments to members of the SC at least 21 days prior to the SC meeting at which the review is to take place. Such submissions shall include all relevant data and information in support of such determinations.
3. The SC will review the data and information in each assessment in accordance with the Science-based Standards and Criteria for Identification of VMEs and Assessment of Significant Adverse Impacts on VMEs and Marine Species (Annex 2), previous decisions of the Commission, and the FAO Technical Guidelines for the Management of Deep Sea Fisheries in the High Seas, paying special attention to the assessment process and criteria specified in paragraphs 47-49 of the Guidelines.
4. In conducting the review above, the SC will give particular attention to whether the deep-sea bottom fishing activity would have a significant adverse impact on VMEs and marine species and, if so, whether the proposed management measures would prevent such impacts.
5. Based on the above review, the SC will provide advice and recommendations to the submitting Members on the extent to which the assessments and related determinations are consistent with the procedures and criteria established in the documents identified above; and whether additional management measures will be required to prevent SAIs on VMEs.
6. Such recommendations will be reflected in the report of the SC meeting at which the assessments are considered.

FORMAT OF NATIONAL REPORT SECTIONS ON DEVELOPMENT AND IMPLEMENTATION OF SCIENTIFIC OBSERVER PROGRAMMES

Report Components

Annual Observer Programme implementation reports should form a component of annual National Reports submitted by members to the Scientific Committee. These reports should provide a brief overview of observer programmes conducted in the NPFC Convention Area. Observer programme reports should include the following sections:

A. Observer Training

An overview of observer training conducted, including:

- Overview of training programme provided to scientific observers.
- Number of observers trained.

B. Scientific Observer Programme Design and Coverage

Details of the design of the observer programme, including:

- Which fleets, fleet components or fishery components were covered by the programme.
- How vessels were selected to carry observers within the above fleets or components.
- How was observer coverage stratified: by fleets, fisheries components, vessel types, vessel sizes, vessel ages, fishing areas and seasons.

Details of observer coverage of the above fleets, including:

- Components, areas, seasons and proportion of total catches of target species, specifying units used to determine coverage.
- Total number of observer employment days, and number of actual days deployed on observation work.

C. Observer Data Collected

List of observer data collected against the agreed range of data set out in Annex 5, including:

- Effort Data: Amount of effort observed (vessel days, net panels, hooks, etc), by area and season and % observed out of total by area and seasons
- Catch Data: Amount of catch observed of target and by-catch species, by area and season, and % observed out of total estimated catch by species, area and seasons
- Length Frequency Data: Number of fish measured per species, by area and season.
- Biological Data: Type and quantity of other biological data or samples (otoliths, sex, maturity, etc) collected per species.
- The size of length-frequency and biological sub-samples relative to unobserved quantities.

D. Tag Return Monitoring

- Number of tags returns observed, by fish size class and area.

E. Problems Experienced

- Summary of problems encountered by observers and observer managers that could affect the NPFC Observer Programme Standards and/or each member's national observer programme developed under the NPFC standards.

**NPFC BOTTOM FISHERIES
OBSERVER PROGRAMME STANDARDS: SCIENTIFIC COMPONENT**

TYPE AND FORMAT OF SCIENTIFIC OBSERVER DATA TO BE COLLECTED

A. Vessel & Observer Data to be collected for Each Trip

1. Vessel and observer details are to be recorded only once for each observed trip.
2. The following vessel data are to be collected for each observed trip:
 - a) Current vessel flag.
 - b) Name of vessel.
 - c) Name of the Captain.
 - d) Name of the Fishing Master.
 - e) Registration number.
 - f) International radio call sign (if any).
 - g) Lloyd's / IMO number (if allocated).
 - h) Previous Names (if known).
 - i) Port of registry.
 - j) Previous flag (if any).
 - k) Type of vessel.
 - l) Type of fishing method(s).
 - m) Length (m).
 - n) Beam (m).
 - o) Gross register tonnage (international tonnage).
 - p) Power of main engine(s) (kilowatts).
 - q) Hold capacity (cubic metres).
 - r) Record of the equipment on board which may affect fishing power factors (navigational equipment, radar, sonar systems, weather fax or satellite weather receiver, sea-surface temperature image receiver, Doppler current monitor, radio direction finder).
 - s) Total number of crew (all staff, excluding observers).
3. The following observer data are to be collected for each observed trip:
 - a) Observer's name.
 - b) Observer's organisation.
 - c) Date observer embarked (UTC date).
 - d) Port of embarkation.
 - e) Date observer disembarked (UTC date).
 - f) Port of disembarkation.

B. Catch & Effort Data to be collected for Trawl Fishing Activity

1. Data are to be collected on an un-aggregated (tow by tow) basis for all observed trawls.
2. The following data are to be collected for each observed trawl tow:
 - a) Tow start date (UTC).
 - b) Tow start time (UTC).
 - c) Tow end date (UTC).
 - d) Tow end time (UTC).
 - e) Tow start position (Lat/Lon, 1 minute resolution).
 - f) Tow end position (Lat/Lon, 1 minute resolution).
 - g) Type of trawl, bottom or mid-water.
 - h) Type of trawl, single, double or triple.
 - i) Height of net opening (m).

- j) Width of net opening (m).
- k) Mesh size of the cod-end net (stretched mesh, mm) and mesh type (diamond, square, etc).
- l) Gear depth (of footrope) at start of fishing (m).
- m) Bottom (seabed) depth at start of fishing (m).
- n) Gear depth (of footrope) at end of fishing (m).
- o) Bottom (seabed) depth at end of fishing (m).
- p) Status of the trawl operation (no damage, lightly damaged*, heavily damaged*, other (specify)). *Degree may be evaluated by time for repairing (<=1hr or >1hr)
- q) Duration of estimated period of seabed contact (minute)
- r) Intended target species.
- s) Catch of all species retained on board, split by species, in weight (to the nearest kg).
- t) Estimate of the amount (weight or volume) of all living marine resources discarded, split by species.
- u) Record of the numbers by species of all marine mammals, seabirds or reptiles caught.
- v) Record of sensitive benthic species in the trawl catch, particularly vulnerable or habitat-forming species such as sponges, sea-fans or corals.

C. Catch & Effort Data to be collected for Bottom Gillnet Fishing Activity

1. Data are to be collected on an un-aggregated (set by set) basis for all observed bottom gillnet sets.
2. The following data are to be collected for each observed bottom gillnet set:
 - a) Set start date (UTC).
 - b) Set start time (UTC).
 - c) Set end date (UTC).
 - d) Set end time (UTC).
 - e) Set start position (Lat/Lon, 1 minute resolution).
 - f) Set end position (Lat/Lon, 1 minute resolution).
 - g) Net panel ("tan") length (m).
 - h) Net panel ("tan") height (m).
 - i) Net mesh size (stretched mesh, mm) and mesh type (diamond, square, etc)
 - j) Bottom depth at start of setting (m).
 - k) Bottom depth at end of setting (m).
 - l) Number of net panels for the set.
 - m) Number of net panels retrieved.
 - n) Number of net panels actually observed during the haul.
 - o) Actually observed catch of all species retained on board, split by species, in weight (to the nearest kg).
 - p) An estimation of the amount (numbers or weight) of marine resources discarded, split by species, during the actual observation.
 - q) Record of the actually observed numbers by species of all marine mammals, seabirds or reptiles caught.
 - r) Intended target species.
 - s) Catch of all species retained on board, split by species, in weight (to the nearest kg).
 - t) Estimate of the amount (weight or volume) of all marine resources discarded* and dropped-off, split by species. * Including those retained for scientific samples.
 - u) Record of the numbers by species of all marine mammals, seabirds or reptiles caught (including those discarded and dropped-off).

D. Catch & Effort Data to be collected for Bottom Long Line Fishing Activity

1. Data are to be collected on an un-aggregated (set by set) basis for all observed longline sets.
2. The following fields of data are to be collected for each set:
 - a) Set start date (UTC).

- b) Set start time (UTC).
- c) Set end date (UTC).
- d) Set end time (UTC).
- e) Set start position (Lat/Lon, 1 minute resolution).
- f) Set end position (Lat/Lon, 1 minute resolution).
- g) Total length of longline set (m).
- h) Number of hooks for the set.
- i) Bottom (seabed) depth at start of set.
- j) Bottom (seabed) depth at end of set.
- k) Number of hooks actually observed during the haul.
- l) Intended target species.
- m) Actually observed catch of all species retained on board, split by species, in weight (to the nearest kg).
- n) An estimation of the amount (numbers or weight) of marine resources discarded* or dropped-off, split by species, during the actual observation. * Including those retained for scientific samples.
- o) Record of the actually observed numbers by species of all marine mammals, seabirds or reptiles caught (including those discarded and dropped-off).

E. Length-Frequency Data to Be Collected

1. Representative and randomly distributed length-frequency data (to the nearest mm, with record of the type of length measurement taken) are to be collected for representative samples of the target species and other main by-catch species. Total weight of length-frequency samples should be recorded, and observers may be required to also determine sex of measured fish to generate length-frequency data stratified by sex. The length-frequency data may be used as potential indicators of ecosystem changes (for seample, see: Gislason, H. et al. (2000. ICES J Mar Sci 57: 468-475) Yamane et al. (2005. ICES J Mar Sci, 62: 374-379), and Shin, Y-J. et al. (2005. ICES J Mar Sci, 62: 384-396)).
2. The numbers of fish to be measured for each species and distribution of samples across area and month strata should be determined, to ensure that samples are properly representative of species distributions and size ranges.

F. Biological sampling to be conducted (optional for gillnet and long line fisheries)

1. The following biological data are to be collected for representative samples of the main target species and, time permitting, for other main by-catch species contributing to the catch:
 - a) Species
 - b) Length (to the nearest mm), with record of the type of length measurement used.
 - c) Length and depth in case of North Pacific armorhead.
 - d) Sex (male, female, immature, unsexed)
 - e) Maturity stage (immature, mature, ripe, ripe-running, spent)
2. Representative stratified samples of otoliths are to be collected from the main target species and, time permitting, from other main by-catch species regularly occurring in catches. All otoliths to be collected are to be labelled with the information listed in 1 above, as well as the date, vessel name, observer name and catch position.
3. Where specific trophic relationship projects are being conducted, observers may be requested to also collect stomach samples from certain species. Any such samples collected are also to be labelled with the information listed in 1 above, as well as the date, vessel name, observer name and catch position.
4. Observers may also be required to collect tissue samples as part of specific genetic research programmes implemented by the SC.

5. Observers are to be briefed and provided with written length-frequency and biological sampling protocols and priorities for the above sampling specific to each observer trip.

G. Data to be collected on Incidental Captures of Protected Species

1. Flag members operating observer programs are to develop, in cooperation with the SC, lists and identification guides of protected species or species of concern (seabirds, marine mammals or marine reptiles) to be monitored by observers.
2. The following data are to be collected for all protected species caught in fishing operations:
 - a) Species (identified as far as possible, or accompanied by photographs if identification is difficult).
 - b) Count of the number caught per tow or set.
 - c) Life status (vigorous, alive, lethargic, dead) upon release.
 - d) Whole specimens (where possible) for onshore identification. Where this is not possible, observers may be required to collect sub-samples of identifying parts, as specified in biological sampling protocols.

H. Detection of Fishing in Association with Vulnerable Marine Ecosystems

1. The SC is to develop a guideline, species list and identification guide for benthic species (e.g. sponges, sea fans, corals) whose presence in a catch will indicate that fishing occurred in association with a vulnerable marine ecosystem (VME). All observers on vessels are to be provided with copies of this guideline, species list and ID guide.
2. For each observed fishing operation, the following data are to be collected for all species caught, which appear on the list of vulnerable benthic species:
 - a) Species (identified as far as possible, or accompanied by a photograph where identification is difficult).
 - b) An estimate of the quantity (weight (kg) or volume (m³)) of each listed benthic species caught in the fishing operation.
 - c) An overall estimate of the total quantity (weight (kg) or volume (m³)) of all invertebrate benthic species caught in the fishing operation.
 - d) Where possible, and particularly for new or scarce benthic species which do not appear in ID guides, whole samples should be collected and suitable preserved for identification on shore.

I. Data to be collected for all Tag Recoveries

1. The following data are to be collected for all recovered fish, seabird, mammal or reptile tags:
 - a) Observer name.
 - b) Vessel name.
 - c) Vessel call sign.
 - d) Vessel flag.
 - e) Collect, label (with all details below) and store the actual tags for later return to the tagging agency.
 - f) Species from which tag recovered.
 - g) Tag colour and type (spaghetti, archival).
 - h) Tag numbers (The tag number is to be provided for all tags when multiple tags were attached to one fish. If only one tag was recorded, a statement is required that specifies whether or not the other tag was missing)
 - i) Date and time of capture (UTC).
 - j) Location of capture (Lat/Lon, to the nearest 1 minute)
 - k) Animal length / size (to the nearest cm) with description of what measurement was taken (such as total length, fork length, etc).

- l) Sex (F=female, M=male, I=indeterminate, D=not examined)
- m) Whether the tags were found during a period of fishing that was being observed (Y/N)
- n) Reward information (e.g. name and address where to send reward)

(It is recognised that some of the data recorded here duplicates data that already exists in the previous categories of information. This is necessary because tag recovery information may be sent separately to other observer data.)

J. Hierarchies for Observer Data Collection

1. Trip-specific or programme-specific observer task priorities may be developed in response to specific research programme requirements, in which case such priorities should be followed by observers.
2. In the absence of trip- or programme-specific priorities, the following generalised priorities should be followed by observers:
 - a) Fishing Operation Information
 - All vessel and tow / set / effort information.
 - b) Monitoring of Catches
 - Record time, proportion of catch (e.g. proportion of trawl landing) or effort (e.g. number of hooks), and total numbers of each species caught.
 - Record numbers or proportions of each species retained or discarded.
 - c) Biological Sampling
 - Length-frequency data for target species.
 - Length-frequency data for main by-catch species.
 - Identification and counts of protected species.
 - Basic biological data (sex, maturity) for target species.
 - Check for presence of tags.
 - Otoliths (and stomach samples, if being collected) for target species.
 - Basic biological data for by-catch species.
 - Biological samples of by-catch species (if being collected)
 - Photos
3. The monitoring of catches and biological sampling procedures should be prioritised among species groups as follows:

| Species | Priority (1 highest) |
|---|-------------------------|
| Primary target species (such as North Pacific armorhead and splendid alfonsin) | 1 |
| Other species typically within top 10 in the fishery (such as mirror dory, and oreos) | 2 |
| Protected species | 3 |
| All other species | 4 |

The allocation of observer effort among these activities will depend on the type of operation and setting. The size of sub-samples relative to unobserved quantities (e.g. number of hooks/panels examined for species composition relative to the number of hooks/panels retrieved) should be explicitly recorded under the guidance of member country observer programmes.

K. Coding Specifications to be used for Recording Observer Data

1. Unless otherwise specified for specific data types, observer data are to be collected in accordance with the same coding specifications as specified in this Annex.
2. Coordinated Universal Time (UTC) is to be used to describe times.
3. Degrees and minutes are to be used to describe locations.
4. The following coding schemes are to be used:
 - a. Species are to be described using the FAO 3 letter species codes.
 - b. Fishing methods are to be described using the International Standard Classification of Fishing Gear (ISSCFG - 29 July 1980) codes.
 - c. Types of fishing vessel are to be described using the International Standard Classification of Fishery Vessels (ISSCFV) codes.
5. Metric units of measure are to be used, specifically:
 - a. Kilograms are to be used to describe catch weight.
 - b. Metres are to be used to describe height, width, depth, beam or length.
 - c. Cubic metres are to be used to describe volume.
 - d. Kilowatts are to be used to describe engine power.

**CONSERVATION AND MANAGEMENT MEASURE FOR
HIGH SEAS BOARDING AND INSPECTION PROCEDURES FOR THE
NORTH PACIFIC FISHERIES COMMISSION (NPFC)**

1. The following procedures are established by the North Pacific Fisheries Commission, in accordance with Article 7, paragraph 2-c of its Convention, to govern high seas boarding and inspection of fishing vessels in the Convention Area.

Definitions

2. For the purposes of interpreting and implementing these procedures, the following definitions shall apply:

- a. “Convention” means the Convention on the Conservation and Management of High Seas Fisheries resources in the North Pacific Ocean;
- b. “Commission” means the North Pacific Fisheries Commission (NPFC) established under Article 5 of the Convention;
- c. “Authorities of the Inspection Vessel” means the authorities of the Contracting Party under whose jurisdiction the inspection vessel is operating;
- d. “Authorities of the Fishing Vessel” means the authorities of the Member of the Commission under whose jurisdiction the fishing vessel is operating;
- e. “Authorized inspection vessel” means any vessel included in the Commission’s register of vessels as authorized to engage in boarding and inspection activities pursuant to these procedures;
- f. “Authorized inspector” means inspectors employed by the authorities responsible for boarding and inspection included in the Commission register and authorized to conduct boarding and inspection activities pursuant to these procedures;
- g. “Fishing activity” means the activities established under Article 1 (i) of the Convention;
- h. “Fishing vessels” means any vessel described under Article 1 (j) of the Convention.

PURPOSE

3. Boarding and inspection and related activities conducted pursuant to these procedures shall be for the purpose of ensuring compliance with the provisions of the Convention and conservation and management measures adopted by the Commission and in force.

AREA OF APPLICATION

4. These procedures shall apply throughout the Convention Area, which consists of the high seas areas of the North Pacific Ocean as specified in Article 4 of the Convention.

GENERAL RIGHTS AND OBLIGATIONS

5. Each Contracting Party may, subject to the provisions of these procedures, carry out boarding and inspection on the high seas of fishing vessels engaged in or reported to have engaged in a fishery regulated pursuant to the Convention.
6. These procedures shall also apply in their entirety as between a Contracting Party and a Fishing Entity, subject to a notification to that effect to the Commission from the parties concerned.
7. Each Member of the Commission shall ensure that vessels flying its flag accept boarding and inspection by authorized inspectors in accordance with these procedures. Such authorized inspectors shall comply with these procedures in the conduct of any such activities.

GENERAL PRINCIPLES

8. These procedures are intended to implement and give effect to, and are to be read consistently with, Article 7.2.c and Article 17.6 of the Convention.
9. These procedures shall be implemented in a transparent and non-discriminatory manner, taking into account, inter alia:
 - a. such factors as the presence of observers on board a vessel and the frequency and results of past inspections; and
 - b. the full range of measures to monitor compliance with the provisions of the Convention and agreed conservation and management measures, including inspection activities carried out by the authorities of Members of the Commission in respect of their own flag vessels.
10. While not limiting efforts to ensure compliance by all vessels, priority for boarding and inspection efforts pursuant to these procedures may be given to:
 - a. fishing vessels that are not on the NPFC Record of Fishing Vessels and are flagged to Members of the Commission;
 - b. fishing vessels reasonably believed to engage or to have been engaged in any activity in contravention of the Convention or any conservation and management measure adopted thereunder;
 - c. fishing vessels that are entitled to fly the flag of a Member of the Commission that does not dispatch patrol vessels to the area of application to monitor its own fishing vessels;
 - d. fishing vessels without observers on board if so required by the Convention, Article 7.2b;
 - e. fishing vessels with a known history of violating conservation and management measures adopted by international agreement or any domestic laws and regulations.
11. The Commission shall keep the implementation of these procedures under review.
12. The interpretation of these procedures shall rest with the Commission.

PARTICIPATION

13. The Commission shall maintain a register of all authorized inspection vessels and authorities or inspectors. Only vessels and authorities or inspectors listed on the Commission's register are authorized under these procedures to board and inspect fishing vessels of Commission Members and Cooperating Non-Contracting Parties on the high seas within the Convention Area.

14. Each Contracting Party that intends to carry out boarding and inspection activities pursuant to these procedures shall so notify the Commission, through the Executive Secretary, and shall provide the following:

a. with respect to each inspection vessel it assigns to boarding and inspection activities under these procedures:

- i) details of the vessel (name, description, photograph, registration number, port of registry (and, if different from the port of registry, port marked on the vessel hull), international radio call sign and communication capability);
- ii) An example of the credentials issued to the inspectors by its authorities;
- iii) notification that the inspection vessel is clearly marked and identifiable as being on government service;
- iv) notification that the crew has received and completed training in carrying out boarding and inspection activities at sea in accordance with any standards and procedures as may be adopted by the Commission.

b. with respect to inspectors it assigns pursuant to these procedures:

- i) the names of the authorities responsible for boarding and inspection;
- ii) notification that such authorities' inspectors are fully familiar with the fishing activities to be inspected and the provisions of the Convention and conservation and management measures in force; and
- iii) notification that such authorities' inspectors have received and completed training in carrying out boarding and inspection activities at sea in accordance with any standards and procedures as may be adopted by the Commission.

15. Where military vessels are used as a platform for the conduct of boarding and inspection, the authorities of the inspection vessel shall ensure that the boarding and inspection is carried out by inspectors fully trained in fisheries enforcement procedures and duly authorized for this purpose under national laws, and that boardings from such military vessels and inspectors conform to the procedures contained within these Boarding and Inspection Procedures.

16. Authorized inspection vessels and inspectors notified by Contracting Parties pursuant to paragraph 14 shall be included on the Commission register once the Executive Secretary confirms that they meet the requirements of that paragraph.

17. To enhance the effectiveness of the Commission's boarding and inspection procedures, and to maximize the use of trained inspectors, Contracting Parties may identify opportunities to place authorized inspectors on inspection vessels of another Contracting Party. Where appropriate, Contracting Parties should seek to conclude bilateral arrangements to this end or otherwise facilitate communication and coordination between them for the purpose of implementing these procedures.

18. The Executive Secretary shall ensure that the register of authorized inspection vessels and authorities or inspectors is at all times available to all Members of the Commission and shall immediately circulate any changes therein. Updated lists shall be posted on the Commission website. Each Member of the Commission shall take necessary measures to ensure that these lists are circulated in a timely manner to each of its fishing vessels operating in the Convention Area.

PROCEDURES

19. The Commission shall develop an NPFC inspection flag, which shall be flown by authorized inspection vessels, in clearly visible fashion.

20. Authorized inspectors shall carry an approved identity card identifying the inspector as authorized to carry out boarding and inspection procedures under the auspices of the Commission and in accordance with these procedures.

21. An authorized inspection vessel that intends to board and inspect a fishing vessel on the high seas that is engaged in or reported to have engaged in a fishery regulated pursuant to the Convention shall, prior to initiating the boarding and inspection:

- a. make best efforts to establish contact with the fishing vessel by radio, by the appropriate International Code of Signals or by other accepted means of alerting the vessel;
- b. provide the information to identify itself as an authorized inspection vessel - name, registration number, international radio call sign and contact frequency;
- c. communicate to the master of the vessel its intention to board and inspect the vessel under the authority of the Commission and pursuant to these procedures; and
- d. initiate notice through the authorities of the inspection vessel of the boarding and inspection to the authorities of the fishing vessel.

22. In carrying out boarding and inspection pursuant to these procedures, the authorized inspection vessel and authorized inspectors shall make their best efforts to communicate with the master of the fishing vessels in a language that the master can understand. In order to facilitate communications between the inspectors and the master of the vessel, the Commission shall develop a standardized multi-language questionnaire, which shall be circulated to all Contracting Parties with authorized inspection vessels.

23. Authorized inspectors shall have the authority to inspect the vessel, its license, gear, equipment, records, facilities, fish and fish products and any relevant documents necessary to

verify compliance with the conservation and management measures in force pursuant to the Convention.

24. Boarding and inspection pursuant to these procedures shall:

- a. be carried out in accordance with internationally accepted principles of good seamanship so as to avoid risks to the safety of fishing vessels and crews;
- b. be conducted as much as possible in a manner so as not to interfere unduly with the lawful operation of the fishing vessel;
- c. take reasonable care to avoid action that would adversely affect the quality of the catch; and
- d. not be conducted in such manner as to constitute harassment of a fishing vessel, its officers or crew.

25. In the conduct of a boarding and inspection, the authorized inspectors shall:

- a. present their identity card to the master of the vessel and a copy of the text of the relevant measures in force pursuant to the Convention in the relevant area of the high seas;
- b. not interfere with the master's ability to communicate with the authorities of the fishing vessel;
- c. complete the inspection of the vessel within 4 (four) hours unless evidence of a serious violation is found;
- d. collect and clearly document any evidence they believe indicates a violation of measures in force pursuant to the Convention;
- e. provide to the master prior to leaving the vessel a copy of an interim report on the boarding and inspection including any objection or statement which the master wishes to include in the report;
- f. promptly leave the vessel following completion of the inspection if they find no evidence of a serious violation; and
- g. provide a full report on the boarding and inspection to the authorities of the fishing vessel, pursuant to paragraph 31, which shall also include any master's statement.

26. During the conduct of a boarding and inspection, the master of the fishing vessel shall:

- a. follow internationally accepted principles of good seamanship so as to avoid risks to the safety of authorized inspection vessels and inspectors;
- b. accept and facilitate prompt and safe boarding by the authorized inspectors;
- c. cooperate with and assist in the inspection of the vessel pursuant to these procedures;
- d. not assault, resist, intimidate, interfere with, or unduly obstruct or delay the inspectors in the performance of their duties;
- e. allow the inspectors to communicate with the crew of the inspection vessel, the authorities of the inspection vessel, any embarked observers, as well as with the authorities of the fishing vessel being inspected;

- f. provide the inspectors onboard with reasonable facilities, including, where appropriate, food and accommodation; and
- g. facilitate safe disembarkation by the inspectors.

27. If the master of a fishing vessel refuses to allow an authorized inspector to carry out a boarding and inspection in accordance with these procedures, such master shall offer an explanation of the reason for such refusal. The authorities of the inspection vessel shall immediately notify the authorities of the fishing vessel, as well as the Commission, of the master's refusal and any explanation.

28. The authorities of the fishing vessel, unless generally accepted international regulations, procedures and practices relating to safety at sea make it necessary to delay the boarding and inspection, shall direct the master to accept the boarding and inspection. If the master does not comply with such direction, the Member shall suspend the vessel's authorization to fish and order the vessel to return immediately to port. The Member shall immediately notify the authorities of the inspection vessel and the Commission of the action it has taken in these circumstances.

USE OF FORCE

29. The use of force shall be prohibited except when and to the degree necessary to ensure the safety of the inspectors during the conduct of their boarding and inspection activities. The degree of force used shall not exceed that reasonably required in the circumstances.

30. Any incident involving the use of force shall be immediately reported to the authorities of the fishing vessel, as well as to the Executive Secretary for distribution to the Commission.

INSPECTION REPORTS

31. Authorized inspectors shall prepare a full report on each boarding and inspection they carry out pursuant to these procedures in accordance with a format specified by the Commission. The authorities of the inspection vessel from which the boarding and inspection was carried out shall transmit a copy of the boarding and inspection report to the authorities of the fishing vessel being inspected, as well as the Commission, within 3 (three) full working days of the completion of the boarding and inspection. Where it is not possible for the authorities of the inspection vessel to provide such report to the authorities of the fishing vessel within this timeframe, the authorities of the inspection vessel shall inform the authorities of the fishing vessel and shall specify the time period within which the report will be provided.

32. Such report shall include the names and authority of the inspectors and clearly identify any observed activity or condition that the authorized inspectors believe to be a violation of the Convention or conservation and management measures in force and indicate the nature of specific factual evidence of such violation.

SERIOUS VIOLATIONS

33. In the case of any boarding and inspection of a fishing vessel during which the authorized inspectors observe an activity or condition that would constitute a serious violation, as defined in paragraph 38, the authorities of the inspection vessels shall immediately notify the authorities of the fishing vessel, directly as well as through the Commission.

34. Upon receipt of a notification under paragraph 33, the authorities of the fishing vessels shall without delay:

- a. assume their obligation to investigate and, if the evidence warrants, take enforcement action against the fishing vessel in question and so notify the authorities of the inspection vessel, as well as the Commission; or
- b. authorize the authorities of the inspection vessel to complete investigation of the possible violation and so notify the Commission.

35. In the case of 34(a) above, the authorities of the inspection vessel shall provide, as soon as practicable, the specific evidence collected by the authorized inspectors to the authorities of the fishing vessel.

36. In the case of 34(b) above, the authorities of the inspection vessel shall provide the specific evidence collected by the authorized inspectors, along with the results of their investigation, to the authorities of the fishing vessel immediately upon completion of the investigation.

37. Upon receipt of a notification pursuant to paragraph 33, the authorities of the fishing vessel shall make best effort to respond without delay and in any case no later than within 3 (three) full working days.

38. For the purposes of these procedures, a serious violation means the following violations of the provisions of the Convention or conservation and management measures adopted by the Commission:

- a. fishing without a valid license, permit or authorization issued by the Member whose flag the fishing vessel is entitled to fly, in accordance with Article 13 of the Convention;
- b. significant failure to maintain records of catch and catch-related data in accordance with the Commission's reporting requirements or significant misreporting of such catch and/or catch-related data;
- c. fishing in a closed area;
- d. fishing during a closed season;
- e. intentional taking or retention of species in contravention of any applicable conservation and management measure adopted by the Commission;
- f. significant violation of catch limits or quotas in force pursuant to the Convention;
- g. using prohibited fishing gear;

- h. falsifying or intentionally concealing the markings, identity or registration of a fishing vessel;
- i. concealing, tampering with or disposing of evidence relating to investigation of a violation;
- j. multiple violations which taken together constitute a serious disregard of measures in force pursuant to the Commission;
- k. refusal to accept a boarding and inspection, other than as provided in paragraphs 27 and 28;
- l. assault, resist, intimidate, sexually harass, interfere with, or unduly obstruct or delay an authorized inspector; and
- m. intentionally tampering with or disabling the vessel monitoring system;
- n. such other violations as may be determined by the Commission, once these are included and circulated in a revised version of these procedures.

ENFORCEMENT

39. Any evidence obtained as a result of a boarding and inspection pursuant to these procedures with respect to violation by a fishing vessel of the Convention or conservation and management measures adopted by the Commission and in force shall be referred to the authorities of the fishing vessel for action in accordance with Article 17 of the Convention.

40. For the purposes of these procedures, the authorities of the fishing vessels shall regard interference by their fishing vessels, captains or crew with an authorized inspector or an authorized inspection vessel in the same manner as any such interference occurring within its exclusive jurisdiction.

ANNUAL REPORTS

41. Contracting Parties that authorize inspection vessels to operate under these procedures shall report annually to the Commission on the boarding and inspections carried out by its authorized inspection vessels, as well as upon possible violations observed.

42. Contracting Parties shall include in their annual statement of compliance within their Annual Report to the Commission under Article 16 of the Convention action that they have taken in response to boarding and inspections of their fishing vessels that resulted in observation of alleged violations, including any proceedings instituted and sanctions applied.

OTHER PROVISIONS

43. Authorized inspection vessels, while carrying out activities to implement these procedures, shall engage in surveillance aimed at identifying fishing vessels of non-Members undertaking fishing activities on the high seas in the Convention area. Any such vessels identified shall be immediately reported to the Executive Secretary for distribution to the Commission.

44. The authorized inspection vessel shall attempt to inform any fishing vessel identified pursuant to paragraph 43 that has been sighted or identified as engaging in fishing activities that are undermining the effectiveness of Convention and that this information will be sent to the Executive Secretary for distribution to the Members of the Commission and the non-Member whose flag the fishing vessel is entitled to fly of the vessel in question.

45. If warranted, the authorized inspectors may request permission from the fishing vessel and/or the non-Member whose flag the vessel is entitled to fly to board a vessel identified pursuant to paragraph 43. If the vessel master or the vessel's non-Member whose flag the vessel is entitled to fly consents to a boarding, the findings of any subsequent inspection shall be transmitted to the Executive Secretary. The Executive Secretary shall distribute this information to all Commission Members as well as to the non-Member whose flag the vessel is entitled to fly.

46. Contracting Parties shall be liable for damage or loss attributable to their action in implementing these procedures when such action is unlawful or exceeds that reasonably required in the light of available information.

COMMISSION COORDINATION AND OVERSIGHT

47. Authorized inspection vessels in the same operational area should seek to establish regular contact for the purpose of sharing information on areas in which they are patrolling, on sightings and on boarding and inspections they have carried out, as well as other operational information relevant to carrying out their responsibilities under these procedures.

48. The Commission shall keep under continuous review the implementation and operation of these procedures, including review of annual reports relating to these procedures provided by Members. In applying these procedures, Contracting Parties may seek to promote optimum use of the authorized inspection vessels and authorized inspectors by:

- a. identifying priorities by area and/or by fishery for boarding and inspections pursuant to these procedures;
- b. ensuring that boarding and inspection on the high seas is fully integrated with the other monitoring, compliance and surveillance tools available pursuant to the Convention;
- c. ensuring non-discriminatory distribution of boarding and inspections on the high seas among fishing vessels of Members of the Commission without compromising the opportunity of Contracting Parties to investigate possible serious violations; and
- d. taking into account high seas enforcement resources assigned by Members of the Commission to monitor and ensure compliance by their own fishing vessels, particularly for small boat fisheries whose operations extend onto the high seas in areas adjacent to waters under their jurisdiction.

SETTLEMENT OF DISAGREEMENTS

49. In the event of a disagreement concerning the application or implementation of these procedures, the parties concerned shall consult in an attempt to resolve the disagreement.
50. If the disagreement remains unresolved following the consultations, the Executive Secretary of the Commission shall, at the request of the parties concerned, and with the consent of the Commission, refer the disagreement to the Technical and Compliance Committee (TCC). The TCC shall establish a panel of five representatives, acceptable to the parties to the disagreement, to consider the matter.
51. A report on the disagreement shall be drawn up by the panel and forwarded through the TCC Chair to the Executive Secretary for distribution to the Commission within two months of the TCC meeting at which the case is reviewed.
52. Upon receipt of such report, the Commission may provide appropriate advice with respect to any such disagreement for the consideration of the Members concerned.
53. Application of these provisions for the settlement of disagreements shall be non-binding. These provisions shall not prejudice the rights of any Member to use the dispute settlement procedures provided in the Convention.

CONSERVATION AND MANAGEMENT MEASURE FOR PACIFIC SAURY

The North Pacific Fisheries Commission (NPFC),

Recognizing that Small Scientific Committee (SSC) for Pacific saury and the Scientific Committee (SC) completed the provisional stock assessment including Maximum Sustainable Yield (MSY) in accordance with the timeframe specified in CMM 15-02;

Following the recommendation by the SC in 2017 that CMM 15-02 is maintained in its current form and fishing efforts in 2018 will not be expanded, or that the Commission develop a new management measure based on the stock status and MSY mentioned in the SC and SSC reports, with a consideration of the uncertainties, and the recommendation by the TCC in 2017 that there is a need to improve the precision of the assessment of compliance with CMM 15-02, and such work should be done intersessionally to allow discussion at the 3rd TCC meeting;

Reaffirming the General Principles, Article 3 of the Convention, in particular, paragraph (b) stipulating that measures are adopted, based on the best scientific information available, to ensure that fisheries resources are maintained at or restored to levels capable of producing maximum sustainable yield, and paragraph (f) stipulating that preventing or eliminating overfishing and excess fishing capacity and ensuring that levels of fishing effort or harvest levels are based on the best scientific information available and do not exceed those commensurate with the sustainable use of the fisheries resources;

Adopts the following conservation and management measure in accordance with Article 7 of the Convention:

1. Members of the Commission, not described under Paragraph 2, and that are currently fishing for Pacific saury shall refrain from expansion, in the Convention Area, of the number of fishing vessels entitled to fly their flags and authorized to fish for Pacific saury from the historical existing level.
2. Members fishing for Pacific saury in areas of their jurisdiction that are adjacent to the Convention area shall refrain from rapid expansion, in the Convention Area, of the number of fishing vessels entitled to fly their flags and authorized to fish for Pacific saury from the historical existing level.

3. Members of the Commission participating in Pacific saury fisheries in areas under national jurisdiction adjacent to the Convention Area are, in accordance with relevant provisions of Article 3 of the Convention, requested to take compatible measures in paragraph 2.
4. Members of the Commission shall ensure that fishing vessels flying its flag operating in the Convention area to fish Pacific saury be equipped with an operational vessel monitoring system that is activated at all times.
5. The SC and its subsidiary SSC for Pacific saury will continue their work to improve the current stock assessment and other analysis, and provide advice and recommendations to the Commission at the next Commission meeting in 2018 in accordance with Article 10, subparagraph 4(b) of the Convention.
6. This CMM shall not be a precedent to hinder those Members which presently do not engage in Pacific saury fisheries in the Convention Area to develop their own Pacific saury fisheries in the Convention Area.
7. This CMM is an amendment of the NPFC CMM 15-02 and shall be effective for one year, subject to review at the next Commission meeting in 2018.

CONSERVATION AND MANAGEMENT MEASURE FOR CHUB MACKEREL

The North Pacific Fisheries Commission (NPFC),

Recognizing that outcomes of the small *ad hoc* workshop for the scientific analysis of chub mackerel stock were presented to the Scientific Committee (SC) in April 2017 and the SC recommended to establish the Technical Working Group (TWG) on chub mackerel stock assessment;

Noting that CMM 2016-07 states the SC will complete the stock assessment of chub mackerel as soon as practicable, even if such assessment is provisional, and provide advice and recommendations to the Commission in accordance with Article 10, paragraph 4(b) of the Convention;

Reaffirming the General Principles provided in Article 3 of the Convention, in particular, paragraph (h) stipulating that any expansion of fishing effort does not proceed without prior assessment of the impacts of those fishing activities on the long-term sustainability of fisheries resources;

Recalling that concern was expressed on an adverse impact on the stock of chub mackerel given the rapid increase in vessels that appear to be fishing for chub mackerel in the Convention Area, as articulated in paragraphs 9 and 10 of Report of the 1st Meeting of the Technical and Compliance Committee;

Adopts the following conservation and management measure in accordance with Article 7 of the Convention:

1. Members of the Commission and Cooperating non-Contracting Parties (CNCP) with substantial harvest of chub mackerel in the Convention Area shall refrain from expansion, in the Convention area, of the number of fishing vessels entitled to fly their flags and authorized to fish for chub mackerel based on the number of vessels from the historical existing level until the stock assessment by the SC has been completed.
2. Members and Cooperating non-Contracting Parties without substantial harvest of chub mackerel in the Convention Area are encouraged to refrain from expansion, in the Convention area, of the number of fishing vessels entitled to fly their flags and authorized to fish for chub mackerel from the historical existing level until the stock assessment by the SC has been completed.

3. Members of the Commission participating in chub mackerel fisheries in areas under national jurisdiction adjacent to the Convention area are requested to take compatible measures in paragraph 1.
4. Members of the Commission and CNCP shall ensure that fishing vessels flying their flag operating in the Convention Area to fish chub mackerel are to be equipped with an operational vessel monitoring system that is activated at all times.
5. Members of the Commission and CNCPs shall provide their data on chub mackerel separated by the Convention Area and the areas under national jurisdiction adjacent to the Convention Area in accordance with the data requirements adopted by the Commission in the Annual Report by the end of February, every year. The Commission shall review such information at the annual meeting of every year.
6. Members of the Commission and CNCPs shall cooperate to take necessary measures including sharing information, in order to accurately understand the situation and eliminate IUU fishing for chub mackerel.
7. The SC and its subsidiary TWG on chub mackerel stock assessment will complete the stock assessment of chub mackerel as soon as possible in accordance with the terms of reference agreed at the TWG CM meeting in December 2017, even if such assessment is provisional, and provide advice and recommendations to the Commission in accordance with Article 10, paragraph 4(b) of the Convention. For the purpose of this, the TWG will meet in December 2017 and in 2018.
8. After chub mackerel stock assessment has been completed, the provisions in Paragraph 1 shall be reviewed by the Commission and those provisions shall not be a precedent to hinder those Members who are not harvesting substantial amounts of chub mackerel in the Convention Area to develop their own chub mackerel fisheries in the Convention Area noting the Commission shall regularly review chub mackerel harvests in the Convention Area by all Members.
9. This management measure shall expire and be replaced by the measure to be adopted by the Commission based on the advice and recommendations from the Scientific Committee.
10. This CMM is an amendment of the NPFC CMM 2016-07.

Interim Guidance for Management of Scientific Data Used in Stock Assessments

This Interim Guidance is intended to apply while the NPFC develops comprehensive rules and procedures governing the security of, exchange of, access to and dissemination of data held by, or accessed by Members of the Commission, its subsidiary bodies, the Secretariat, and by service providers, contractors, or consultants acting on their behalf or others so authorized for access by the Secretariat.

1. Objectives

The objectives of this Interim Guidance are (1) to support stock assessments and accumulation of scientific knowledge of fisheries resources under the Commission's jurisdiction, (2) to encourage cooperation on scientific analyses among Members, and (3) to establish an interim guidance on handling scientific data.

2. Scientific Data included in Members' Annual Reports

Scientific data (e.g., catch amount, number of vessels, number of fishing days and so on) included in Members' Annual Reports should be uploaded to the public section of the NPFC website for public access and use.

3. Other scientific data, not included in Members' Annual Reports, submitted for use in stock assessment

The Secretariat should not disclose Members' scientific data submitted by means other than Members' Annual Reports.

Members may cite and/or use such data when working on matters under consideration by the Scientific Committee/SSCs. If a Member or cooperating non-Member wishes to cite and/or use these data for work that is intended to be conducted or shared outside of the NPFC, such Member or non-Member should consult with the data provider(s) through the Secretariat, stating 1) the data subject to the request, and 2) the purpose for which the data is intended to be used. The Secretariat should immediately notify the data provider(s) of the request. The data provider(s) should inform the Secretariat within 30 calendar days whether to accept or reject the request. If the data provider(s) reject the request, the data provider(s) should state the reason(s) for the rejection. If the data provider(s) accept the request, the data provider(s) may request an agreed-upon credit line in any subsequently-created product. Those who cited/used data shall not distribute the data further nor use it for the purpose not declared.

If the Secretariat proposes to outsource analyses of such scientific data to a contractor, the Secretariat should seek agreement from all the data providers concerned. If all data providers do not agree, the relevant data should not be disclosed to the contractor.

NPFC IUU VESSEL LIST

Revised 22 January 2018

Commission Members adopted the attached NPFC IUU List at the Third Commission Meeting in July 2017, *with agreement for the addendum attached hereto dated 13 November 2017.*

| No. | a. Name of vessel (previous names) | b. Flag of vessel (previous flags) | c. Owner (previous owners) | d. Operator of vessel (previous operators) | e. Call sign of vessel (previous call signs) | f. Lloyds/IMO number | h. Date first included on NPFC IUU List | i. Summary of activities |
|-----|------------------------------------|------------------------------------|----------------------------|--|--|----------------------|---|--|
| 1 | LIAO YUAN YU 071 | unknown | Not known | Not known | Not known | Not known | | It was seen at 42° 15.4'N, 153° 22.8'E on 23 Aug 2016. When the Japanese patrol vessel approached, a vessel crew tried to hide the vessel name. Communication between the Japanese patrol vessel and LIAO YUAN YU 071 indicated that they hid the vessel name because they didn't want to be caught. (Port displayed on the vessel: Shidao; Vessel type; Lighted lift net vessel; Tonnage: 800t) |

g. Photographs



| | | | | | | | | |
|-----------------------|---------------------|---------|-----------|-----------|-----------|-----------|-----------|---|
| 2 | LIAO YUAN YU 072 | unknown | Not known | It was seen at 42°18.7'N, 153°27.9'E on 23 Aug and at 42°9.2'N, 151°16.4'E on 11 Oct 2016. Vessel name was hidden by paint. (Port displayed on the vessel: Shidao; Vessel type; Lighted lift net vessel; Tonnage: 800t) |
| g. Photographs | | | | | | | | |
| 3 | LIAO YUAN YU 9 | unknown | Not known | It was seen at 42°3.0'N, 153°0.8'E on 23 Aug and at 42°10.0'N, 151°16.8'E on 11 Oct 2016. Vessel name was hidden by paint. (Port displayed on the vessel: Shidao; Vessel type; Lighted lift net vessel; Tonnage: 800t) |
| g. Photographs | | | | | | | | |



| | | | | | | | | | |
|---|-------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|---|
| 4 | ZHOU YU 651 | unknown | Not known | It was seen at 42°30'2N, 152°05'4E on 29 Sep 2016. (Port displayed on the vessel: Fungcheng; Vessel type: Lighted lift net vessel; Tonnage: 850t) |
|---|-------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|---|

g. Photographs



| | | | | | | | | | |
|---|-------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|---|
| 5 | ZHOU YU 652 | unknown | Not known | It was seen at 42°48.9N, 152°48.2E on 7 Sep 2016. Port of registry was hidden by paint. (Vessel type: Lighted lift net vessel; Tonnage: 820t) |
|---|-------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|---|

g. Photographs



| | | | | | | | |
|---|-------------|---------|-----------|-----------|-----------|-----------|---|
| 6 | ZHOU YU 653 | unknown | Not known | Not known | Not known | Not known | <p>It was seen with LU RONG YU YUN 56219 and ZHOU YU 656 at 42°11.9'N, 151°14.6'E on 30 Sep 2016. (Port displayed on the vessel: Fungcheng; Vessel type; Lighted lift net vessel; Tonnage: 850t)</p> <p>Communication between Japanese patrol vessel and LU RONG YU YUN 56219 indicated ZHOU YU 653 were transshipping 1500t of mackerel together with ZHOU YU 656.</p> |
|---|-------------|---------|-----------|-----------|-----------|-----------|---|

g. Photographs

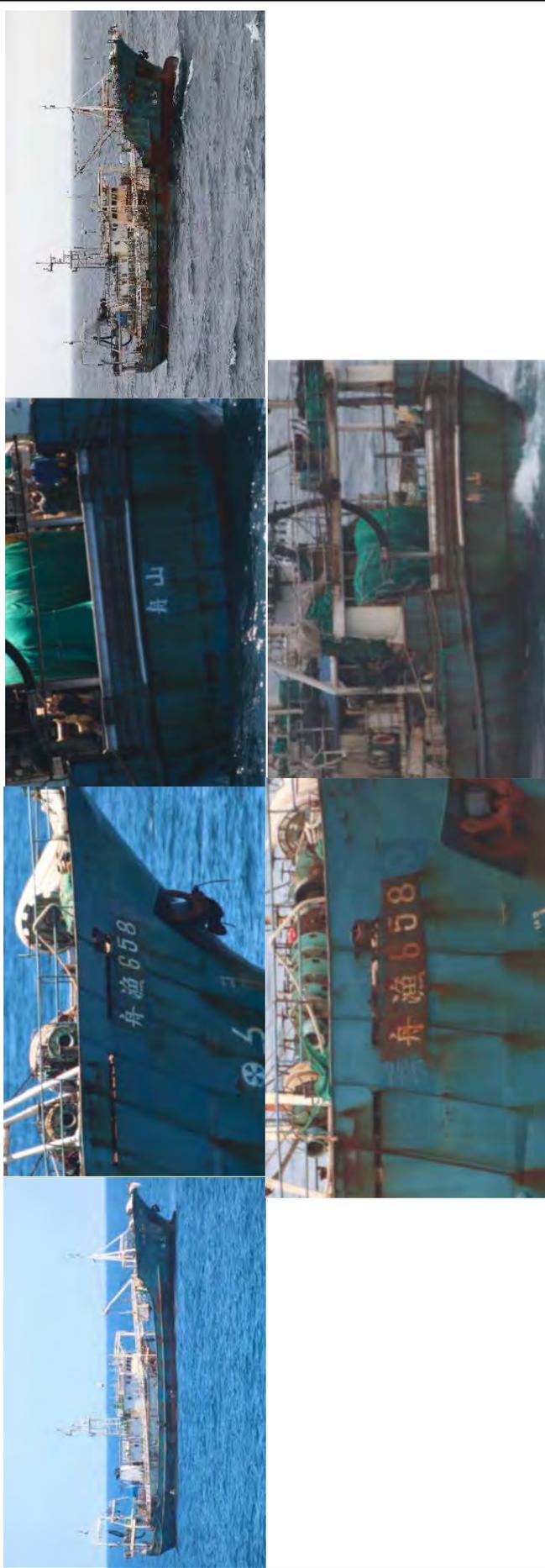


| | | | | | | | | | |
|--|-------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| 7 | ZHOU YU 656 | unknown | Not known | <p>It was seen with LU RONG YU YUN 56219 and ZHOU YU 656 at 42°11.9'N, 151°14.6'E on 30 Sep 2016. (Port displayed on the vessel: Fungcheng; Vessel type: Lighted lift net vessel; Tonnage: 850t)</p> <p>Note that the same vessel name with the different port of registry (Zhoushan) (600t) has been seen in the similar area.</p> <p>Communication between Japanese patrol vessel and LU RONG YU YUN 56219 indicated ZHOU YU 656 were transshipping 1500t of mackerel together with ZHOU YU 653.</p> |
| g. Photographs (No Photographs Available) | | | | | | | | | |

| | | | | | | | | | |
|-----------------------|-------------|---------|-----------|-----------|--|-----------|-----------|-----------|--|
| 8 | ZHOU YU 657 | unknown | Not known | Not known | Not known | Not known | Not known | Not known | <p>It was seen at 42°35.5'N, 152°6.7'E on 12 Sep 2016. (Port displayed on the vessel: Zhoushan; Vessel type: Lighted lift net vessel; Tonnage: 600t)</p> |
| g. Photographs | | | | | | | | | |
| | | | | |  | | | | |

| | | | | | | | | |
|---|-------------|---------|-----------|-----------|-----------|-----------|--|---|
| 9 | ZHOU YU 658 | unknown | Not known | Not known | Not known | Not known | | <p>It was seen at 40° 12.3'N, 148° 40.5'E on 29 May 2016 and at 42° 46.7'N, 152° 41.2'E on 7 Sep 2016. (Port displayed on the vessel: Zhoushan; Vesseltype; Lighted lift net vessel; Tonnage: 600t)</p> |
|---|-------------|---------|-----------|-----------|-----------|-----------|--|---|

g. Photographs



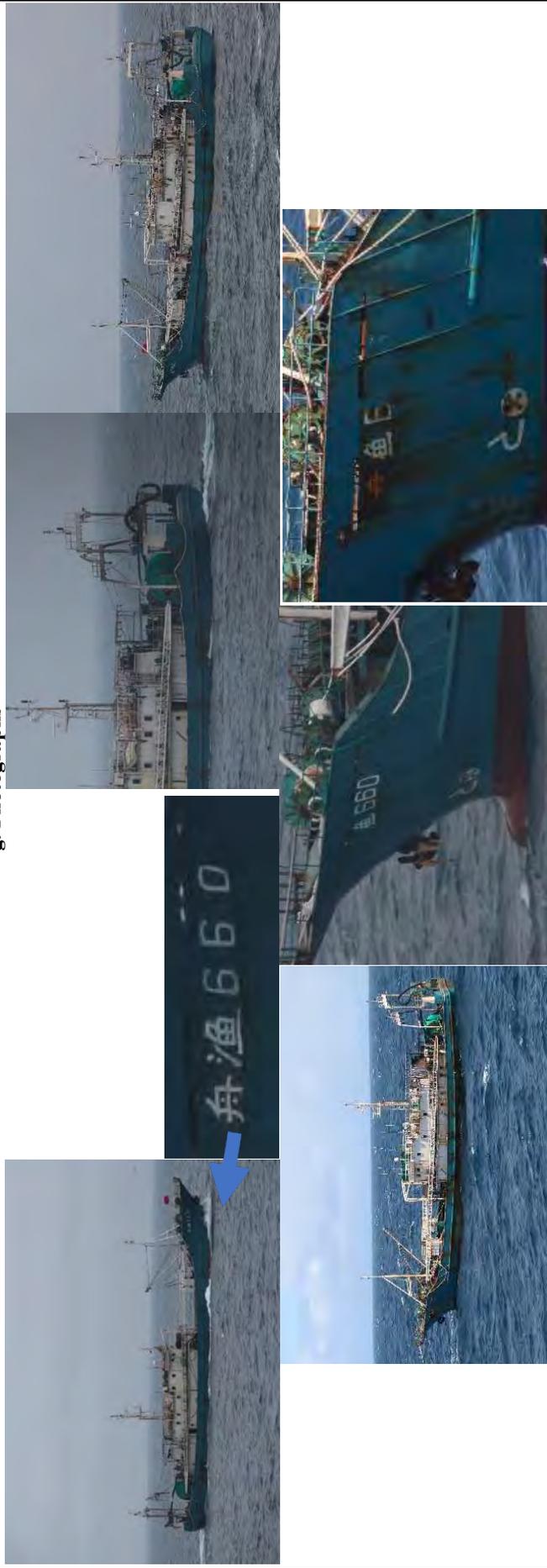
| | | | | | | | | |
|----|-------------|---------|-----------|-----------|-----------|-----------|--|--|
| 10 | ZHOU YU 659 | unknown | Not known | Not known | Not known | Not known | | It was seen in the NPFC area on 2, 4, 13, 17 Jun and 7 Sep 2016. On 4 Jun the vessel name on the right side was hidden by paint. (Port displayed on the vessel: Zhoushan; Vessel type: Lighted lift net vessel; Tonnage: 600t) |
|----|-------------|---------|-----------|-----------|-----------|-----------|--|--|

g. Photographs



| | | | | | | | | |
|----|-------------|---------|-----------|-----------|-----------|-----------|-----------|---|
| 11 | ZHOU YU 660 | unknown | Not known | <p>It was seen in the Japanese EEZ on 10 May 2016 and in NPFC area multiple times from May to Sep 2016. On 10 May the vessel showed Korean flag but changed the Korean to Japanese flag when the Japanese patrol vessel approached.</p> <p>Vessel name changed between 15 May and 12 Sep 2016 (see the photos). The vessel is not permitted in Japan nor registered in NPFC. (Port displayed on the vessel: Basuo-not apparent; Vessel type: Lightedlift net vessel; Tonnage: 600t)</p> |
|----|-------------|---------|-----------|-----------|-----------|-----------|-----------|---|

g. Photographs



| | | | | | | | | |
|----|-------------|---------|-----------|-----------|-----------|-----------|-----------|--|
| 12 | ZHOU YU 661 | unknown | Not known | It was seen in the Japanese EEZ on 10 and 13 May 2016 and in NPFC area on 15, 29 May and 7 Sep 2016. The vessel names on the left and right side changed frequently (see the photos). The vessel showed Japanese flag in May. But the vessel is not permitted in Japan nor registered in NPFC. (Port displayed on the vessel: Shidao; Vessel type: Lighted lift net vessel; Tonnage: 600t) |
|----|-------------|---------|-----------|-----------|-----------|-----------|-----------|--|

g. Photographs



| | | | | | | | | |
|----|------------|---------|-----------|-----------|-----------|-----------|-----------|---|
| 13 | HAI DA 705 | unknown | Not known | Communications between Japanese Patrol vessel and HAI DA705 at 43°10.4'N, 153°38.6'E on 11 Sep 2016 indicated they caught squid with drift net in the high sea. (Port displayed on the vessel: 沈家们; Vessel type: Drift net vessel; Tonnage: 290t) |
|----|------------|---------|-----------|-----------|-----------|-----------|-----------|---|

g. Photographs



| | | | | | | | | |
|---|------------------------|---------|-----------|-----------|-----------|-----------|-----------|---|
| 14 | LU RONG YU 11189 | unknown | Not known | It was seen at 41°24.9'N, 140°32.7'E (Japan EEZ) on 14 Jun 2016. (Port displayed on the vessel: Shidao; Vessel type: Carrier vessel; Tonnage: 100t) |
| g. Photographs  | | | | | | | | |
| 15 | ZHE LING YU LENG 90055 | unknown | Not known | It was seen at 40°25.3'N, 149°13.2'E on 29 May 2016. (Port displayed on the vessel: Wenling; Vessel type: Carrier vessel; Tonnage: 600t) |
| g. Photographs  | | | | | | | | |

| | | | | | | | | | |
|--|-------------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|---|
| 16 | ZHE LING YU LENG 905 | unknown | Not known | It was seen at 42°45.6'N, 152°45.8'E on 24 Aug 2016. (Port displayed on the vessel: Wenling; Vessel type: Carrier vessel; Tonnage: 1000t) |
| g. Photographs (No Photographs Available) | | | | | | | | | |

Addendum to initial NPFC IUU Vessel List adopted by Members

NPFC IUU VESSEL LIST

Addendum 22 January 2018

Commission Members agreed to the attached addendum to the NPFC IUU List effective the above date.

| No. | a. Name of vessel (previous names) | b. Flag of vessel (previous flags) | c. Owner (previous owners) | d. Operator of vessel (previous operators) | e. Call sign of vessel (previous call signs) | f. Lloyds/IMO number | h. Date first included on NPFC IUU List | i. Summary of activities |
|-----|------------------------------------|------------------------------------|----------------------------|--|--|----------------------|---|--|
| 17 | LU RONG YUAN YU 101 | unknown | Not known | Not known | Not known | Not known | | While LU RONG YUAN YU 101 is registered as a light PS vessel in the NPFC list, the identical name with different vessel types were seen. LU RONG YUAN YU 101 with lift net type was seen at 49°9.2'N, 149°19.5'E on 17 May 2016. LU RONG YUAN YU 101 with stern-trawl type was seen at 38°0.2'N, 145°58.5'E on 20 May 2016. (Port displayed on the vessel: Shidao; Vessel type: Stern Trawl/Light lift net vessel; Tonnage: 800t/651t) |

g. Photographs

Any vessel with this name is now assumed to be IUU

| | | | | | | | | | |
|---|------------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|---|
| 18 | LU RONG YUAN YU 102 | unknown | Not known | While LU RONG YUAN YU 102 is registered as one light PS vessel in the NPFC list, the identical name with different vessel types were seen. LU RONG YUAN YU 102 with lift net type was seen at 42°21.3'N, 151°55.5'E on 11 Oct 2016. LU RONG YUAN YU 102 with stern-trawl type was seen at 42°7.3'N, 151°13.8'E on the same day. LU RONG YUAN YU 102 was also seen with a carrier vessel "MIN FU DING YU LENG 08888" at 42°22.2'N, 151°19.6'E on 12 Oct 2016. (Port displayed on the vessel: Shidao; Vessel type: Stern Trawl/Light lift net vessel; Tonnage: 800t/651t) |
| g. Photographs | | | | | | | | | |
| <i>Any vessel with this name is now assumed to be IUU</i> | | | | | | | | | |
| 19 | LU RONG YUAN YU 103 | unknown | Not known | While LU RONG YUAN YU 103 is registered as one light PS vessel in the NPFC list, the identical name with different vessel types were seen. LU RONG YUAN YU 103 with lift net type was seen at 40°25.9'N, 150°9.9'E on 1 June 2016. LU RONG YUAN YU 103 with stern-trawl type was seen at 37°59.9'N, 145°58.5'E on 20 May 2016. (Port displayed on the vessel: Shidao; Vessel type: Stern Trawl/Light lift net vessel; Tonnage: 651t/651t) |
| g. Photographs | | | | | | | | | |
| <i>Any vessel with this name is now assumed to be IUU</i> | | | | | | | | | |

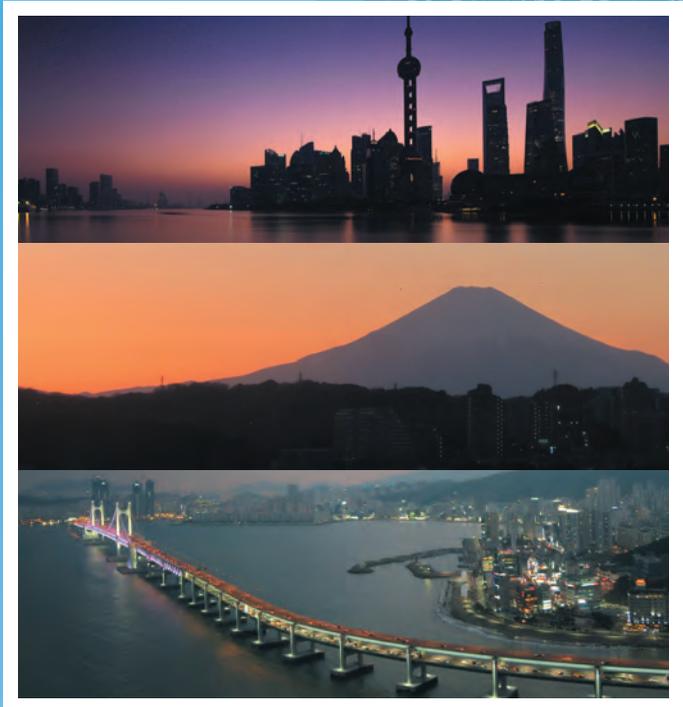
| | | | | | | | | | |
|---|------------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| 20 | LU RONG YUAN YU 105 | unknown | Not known | While LU RONG YUAN YU 105 is registered as one light PS vessel in the NPFC list, the identical name with different vessel types were seen. LU RONG YUAN YU 105 with lift net type was seen at 42°27'N, 152° 5.8'E on 11 Oct 2016. LU RONG YUAN YU 105 with stern-trawl type was seen at 41° 54.8'N, 151° 17.4'E on 5 Sep 2016. (Port displayed on the vessel: Shidao; Vessel type: Stern Trawl/Light lift net vessel; Tonnage: 651t/651t) |
| g. Photographs | | | | | | | | | |
| <i>Any vessel with this name is now assumed to be IUU</i> | | | | | | | | | |
| 21 | LU RONG YUAN YU 106 | Unknown | Not known | While LU RONG YUAN YU 106 is registered as one light PS vessel in the NPFC list, the identical name with different vessel types were seen. LU RONG YUAN YU 106 with lift net type was seen at 40° 30.4'N, 149° 34'E on 29 May 2016. LU RONG YUAN YU 106 with stern-trawl type was seen at 40° 17.6'N, 148° 33'E on the same day. The two fishing vessels with duplicate names "LU RONG YUAN YU 106" were seen transshipping with a carrier vessel "MIN FU DING YU LENG 08888", at 42° 16.4'N, 151° 21.4'E on 8 Oct 2016 (see the last photo). (Port displayed on the vessel: Shidao; Vessel type: Stern Trawl/Light lift net vessel; Tonnage: 651t/651t) |
| g. Photographs | | | | | | | | | |
| <i>Any vessel with this name is now assumed to be IUU</i> | | | | | | | | | |

| | | | | | | | | | |
|---|------------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|---|
| 22 | LU RONG YUAN YU 108 | Unknown | Not known | While LU RONG YUAN YU 108 is registered as one light PS vessel in the NPFC list, the identical name with different vessel types were seen. LU RONG YUAN YU 108 with lift net type was seen at 40°28.4'N, 149°28.1'E on 29 May 2016. LU RONG YUAN YU 108 with stern-trawl type was seen at 40°18.6'N, 148°30.7'E on the same day. (Port displayed on the vessel: Shidao; Vessel type: Stern Trawl/Light lift net vessel; Tonnage: 651t/651t) |
| g. Photographs | | | | | | | | | |
| <i>Any vessel with this name is now assumed to be IUU</i> | | | | | | | | | |
| 23 | LU RONG YUAN YU 109 | Unknown | Not known | While LU RONG YUAN YU 109 is registered as one light PS vessel in the NPFC list, the identical name with different vessel types were seen. LU RONG YUAN YU 109 with lift net type was seen at 40°25.1'N, 149°25'E on 29 May 2016. LU RONG YUAN YU 109 with stern-trawl type was seen at 40°16.4'N, 148°32.1'E on the same day. (Port displayed on the vessel: Shidao; Vessel type: Stern Trawl/Light lift net vessel; Tonnage: 651t/651t) |
| g. Photographs | | | | | | | | | |
| <i>Any vessel with this name is now assumed to be IUU</i> | | | | | | | | | |

Canada China Japan Korea Russia Chinese Taipei United States Vanuatu Canada
China Japan Korea Russia Chinese Taipei United States Vanuatu Canada China
Japan Korea Russia Chinese Taipei United States Vanuatu Canada China Japan
United States Vanuatu Canada China Japan Korea
Vanuatu Canada China Japan Korea Russia
Canada China Japan Korea Russia Chinese
Japan Korea Russia Chinese Taipei
Korea Russia Chinese Taipei United
Chinese Taipei United States
Taipei United States Vanuatu
United States Vanuatu Canada
Vanuatu Canada China
Canada China Japan Korea



Thank you!



United States Vanuatu
States Vanuatu Canada
es Vanuatu Canada China
Vanuatu Canada China Japan
u Canada China Japan Korea
Canada China Japan Korea Russia
China Japan Korea Russia Chinese
Japan Korea Russia Chinese Taipei
Japan Korea Russia Chinese Taipei United
pan Korea Russia Chinese Taipei United States
pan Korea Russia Chinese Taipei United States Vanuatu
Canada China Japan Korea Russia Chinese Taipei United States Vanuatu Canada
China Japan Korea Russia Chinese Taipei United States Vanuatu Canada China
Japan Korea Russia Chinese Taipei United States Vanuatu Canada China Japan
Korea Russia Chinese Taipei United States Vanuatu Canada China Japan Korea

