North Pacific Fisheries Commission

1st Meeting of the Small Scientific Committee on Bottom Fish and Marine Ecosystems
REPORT

16-18 November 2020

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North Pacific Fisheries Commission
1st Meeting of the Small Scientific Committee on Bottom Fish and Marine Ecosystems

16-18 November 2020
Video conference

REPORT

Agenda Item 1. Opening of the Meeting

1. The 1st Meeting of the Small Scientific Committee on Bottom Fish and Marine Ecosystems (SSC BF-ME01) took place in the format of video conferencing via WebEx, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, and the United States of America. The North Pacific Anadromous Fish Commission (NPAFC), the Deep Sea Conservation Coalition (DSCC), and the Pew Charitable Trusts (Pew) attended as observers.

2. The meeting was opened by the SSC BF-ME Chair, Dr. Chris Rooper (Canada), who welcomed the participants. The Science Manager, Dr. Aleksandr Zavolokin, outlined the procedures for the meeting. Mr. Alex Meyer was selected as rapporteur.

Agenda Item 2. Adoption of Agenda

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

Agenda Item 3. Stock assessment and scientific advice on the management of North Pacific armorhead (NPA)

3.1 NPA monitoring survey and Adaptive Management Procedure (AMP)

3.1.1 Review of the results from 2020 monitoring survey

4. The Science Manager presented the results of the monitoring survey for NPA in the Emperor Seamounts in 2020 (NPFC-2020-SSC BFME01-IP03). Four monitoring surveys were conducted. Nominal catch per unit effort (CPUE) ranged from 57.5 to 148 kg/hour. The ratio of fatness index varied significantly from 28 to 80. The criteria for strong recruitment were not met and the CPUE indicated that probably the stock remained at a low level.

3.1.2 Review of proposed changes to monitoring survey design

5. Japan presented the proposed amendment to the monitoring survey design (NPFC-2020-SSC BFME01-WP09). Only one Japanese bottom trawler conducted fishing in the Emperor Seamounts in the 2020 fishing season. This is likely to remain unchanged for the 2021 fishing season. Therefore, Japan proposes to amend Conservation and Management Measure (CMM) 2019-05, to increase the number of monitoring blocks from two to four to enable the trawler to continue to conduct monitoring surveys at regular intervals while reducing the current operational difficulties. The Japanese trawler would conduct a monitoring survey each month from March to June in the monitoring block that is nearest to its position, as long as signs of high recruitment are not detected. If signs of possible high recruitment are detected, Japan will consider increasing the frequency of monitoring surveys while taking into account the trawler's operational availability.

6. The SSC BF-ME reviewed and revised Annex 6 of the CMM 2019-05 (Annex D).

7. The SSC BF-ME noted Article 9, 1 (b) of the Convention that "the decision shall become binding upon all members of the Commission ninety (90) days after the date of transmittal specified in the Chairperson's notification of the adoption of the decision by the Commission, pursuant to subparagraph (a) above, unless otherwise specified in the decision." The SSC BF-ME suggested that the Commission consider a waiver to the above 90-day rule in order to enter the revised CMM 2019-05 into force before March 2021.

8. Korea mentioned the possibility that one Korean trawler may decide to operate in the Emperor Seamount area in 2021, in which case it could participate in the monitoring survey in addition to the Japanese trawler. This would increase the frequency of samples and the spatial coverage.

3.2 Update on analyses or progress on biomass estimates from the NPA 2020 acoustic survey

9. Japan reported that work to produce biomass estimates from the NPA 2020 acoustic survey is ongoing and that it will share the results when they are available.

3.3 Review of Members' research activities on NPA

3.3.1 Analysis of recruitment relationships to oceanography

10. Canada reported that it is planning to conduct an analysis of recruitment relationships to oceanography and invited other Members to collaborate with such work.

3.3.2 Review of the report on literature, data availability and data gaps for NPA stock assessment

11. Canada presented a report on the literature review, data availability and data gaps for NPA

stock assessment (NPFC-2020-SSC BFME01-WP14). The report included a review of research on life history studies and important processes, including factors affecting recruitment, factors affecting mortality, distribution, and information of previous stock assessments; a list of available data including catch and effort history, survey data, biological data associated with catch and surveys, and biological data that can be inferred from previous stock assessments; data gaps; and potential next steps.

12. Japan pointed out that one data gap may be fatness index, which can be an indicator of new recruitment. Japan has been collecting such data from 2009.

13. Korea explained that it collected NPA fatness data in 2019.

14. Korea mentioned that it had participated in a paper describing otolith-based age estimations for armorhead that could be used as reference.

Agenda Item 4. Stock assessment and scientific advice on the management of splendid alfonsino (SA)

4.1 Review of Members' research activities on SA

15. Japan presented the catch size composition of splendid alfonsino in the Emperor Seamounts area before and after the implementation of the NPFC's mesh size regulation (NPFC-2020-SSC BFME01-WP05 (Rev.1)). To evaluate the effectiveness of the new mesh size regulation, Japan compared the catch size composition of splendid alfonsino before (2018) and after (2019) its implementation. The direction and extent of yearly changes differed among vessels and seasons, indicating the need for further examination on the determinants of catch size composition in this fishery. Possible determinants include different gear configurations, different operational patterns, and seasonal fluctuation in population structure and/or local size distribution.

16. Korea explained that it has observer data from Korean trawlers that could be included in Japan's analysis of the effect of the mesh size regulation and offered to collaborate with Japan.

17. The SSC BF-ME noted that the research results presented by Japan remain inconclusive about the effectiveness of the new mesh size regulation and encouraged Japan to continue to conduct such research in collaboration with Korea and any other interested Members.

18. Japan reported that it is engaged in the analysis of SA gonad samples from the Emperor Seamount area to study size-at-maturation and will share the results when they are available.

4.1.1 Yield per recruit analysis of SA

19. No updates were provided.

4.1.2 Review of the report on literature, data availability and data gaps for SA stock assessment

20. Canada presented a report on the literature review, data availability and data gaps for SA stock assessment (NPFC-2020-SSC BFME01-WP11 (Rev. 1)). The report included a review of research on important life-history processes, including factors affecting recruitment, factors affecting mortality, distribution, and information of previous stock assessments; a list of available data including catch and effort history, survey data, biological data associated with catch and surveys, and biological data that can be inferred from previous stock assessments; data gaps; and potential next steps.

4.2 Adaptive management strategy for SA

4.2.1 Review of approaches from other RFMOs

21. The Chair presented a brief review of approaches to SA management by other regional fisheries management organizations (RFMOs) and nations (NPFC-2020-SSC BFME01-WP10). Measures include spatial closures (SPRFMO), effort controls (NPFC, NEAFC, SIOFA), and quota systems based on historical catch (SEAFO). In one case (NAFO) the fishery was closed to protect an overfished stock and has not been re-opened. Only one of the RFMOs conducts a stock assessment. None of the RFMOs use a fishery-independent survey-based approach. None of the RFMOs use an adaptive management approach.

4.2.2 Intersessional work to develop TOR for SA adaptive management plan

22. Discussion of the intersessional work to develop the Terms of Reference (TOR) for the SA adaptive management plan was included as part of the discussions on plans to establish a small working group (SWG) on data-limited management tools and approaches for assessing NPA and SA stocks under Agenda Item 5.

Agenda Item 5. Data-limited management tools and approach to assessment of NPA and SA

23. Japan presented a summary of past NPFC studies of the biology, life history, biomass and stock for NPA and SA in the Emperor Seamounts area (NPFC-2020-SSC BFME01-WP04). Although several stock assessment approaches have been applied, they were not successful in specifying ways to harvest NPA and SA stocks sustainably.

5.1 Discussion of next steps in identification of data limited approaches to stock assessment for NPA and SA

5.1.1 Review of tools available to use with existing data

5.1.2 Discussion of data availability and sharing

5.1.3 Planning for identification and application of data limited approaches to stock assessment for NPA and/or SA

24. The SSC BF-ME agreed to establish an SWG on data-limited management tools and approaches for assessing NPA and SA stocks (SWG NPA&SA) whose tasks would include:
    (a) Reviewing available data for stock assessment, examining data quality and sharing data
    (b) Formulating TORs for stock assessment for NPA and SA, and potentially for adaptive management of SA
    (c) Reviewing and recommending data-limited stock assessment methods
    (d) Deciding who (one Member / all Members / an external consultant) will conduct the stock assessments if possible
    (e) Discussing plans determining stock status and potentially for rebuilding stocks
    (f) Discussing environmental factors affecting abundance and recruitment
    (g) Developing plans for holding a workshop with other RFMOs managing stocks of NPA, SA and other related species, possibly under the framework of the FAO Deep Sea Fisheries Project

25. Ms. Kari Fenske (USA) volunteered to lead the new SWG NPA&SA. The other members of the SWG would be Dr. Chris Rooper (Canada), Dr. Qiuyun Ma (China), Dr. Kota Sawada (Japan), Dr. Kyum Joon Park (Korea), and Dr. Oleg Katugin (Russia).

Agenda Item 6. Assessment and scientific advice on the management of Vulnerable Marine Ecosystems (VME)

26. The SSC BF-ME agreed to establish an SWG for assessment and scientific advice on the management of VMEs (SWG VME) that would conduct various intersessional work as detailed below. Dr. Janelle Curtis (Canada) volunteered to lead the new SWG VME. The other members of the SWG would be Dr. Qiuyun Ma (China), Dr. Mai Miyamoto (Japan), Dr. Taro Ichii (Japan), Dr. Kyum Joon Park (Korea), Dr. Oleg Katugin (Russia), and Ms. Kari Fenske (USA). Dr. Amy Baco-Taylor, an observer, would also participate.

6.1 Review of Members' research activities on VME

27. Korea reported on VME bycatch by Korean trawl fisheries on the Emperor Seamounts in 2019 (NPFC-2020-SSC BFME01-WP07). In 2019, one Korean trawler operated in the Emperor Seamount area. It took a total of 49 hauls, 36 of which were observed, and 14 of which included VME bycatch. The largest constituent of the by-caught VME indicator taxa was Gorgonacea, which accounted for 47% by weight. This was followed by Antipatharia, which accounted for

26% by weight. Korea also presented a map of by-caught VME indicator taxa's spatial distribution and weight composition in 2019.

28. Russia introduced NPFC-2020-SSC BFME01-IP06 of its research in the Emperor Seamount chain, including indicator taxa, landscapes, and biogeography and NPFC-2020-SSC BFME01-IP07 on research on diversity, distribution and biogeographical boundary of Octocorallia as a key taxon in the VMEs of the Emperor Seamount chain. The two papers are based on the surveys conducted by a Russian research vessel in July and August 2019. The research utilized a remotely operated underwater vehicle (ROV) that was able to take videos, photos and sampling. A laser scale of 10 cm was used to measure the size of underwater objects. Around 2,000 photos and 50 hours of video were taken. The depth range was 338 to 2,182 m.

29. Russia informed that the research in the Emperor Seamounts will be continued in the future. The SSC BF-ME encouraged Russia to continue to conduct such surveys in 2021.

6.1.1 Towards a quantitative definition of VMEs

30. Canada proposed the use of a decision tree as the first step in the identification of VMEs using the best information available (NPFC-2020-SSC BFME01-WP12). The proposed decision tree is related to use of bycatch data, visual data, predictive models, and other sources of available information. Canada also proposed that it would develop a method to use predictive models for quantitatively identifying VMEs.

31. The SSC BF-ME considered the proposed decision tree and agreed to work intersessionally, through the SWG VME, to define the types of data that can be used to identify VMEs and review Members' available VME-related data.

32. The SSC BF-ME noted the difference in the approach for VME identification proposed by Canada and the approaches of other Members.

6.1.2 Trade-off analysis between VME protection and sablefish fishing

33. Canada proposed a process for analyzing trade-offs between fishing and VME protection and presented a preliminary study to demonstrate the proposed process (NPFC-2020-SSC BFME01-WP13). The process includes nine general steps modelled after the South Pacific RFMO (SPRFMO) VME trade-off analysis and follows the basic principles of systematic conservation planning: (1) identifying and involving stakeholders, (2) identifying goals and objectives, (3) defining conservation features and gathering data, (4) setting conservation targets and design principles, (5) identifying cost metrics and gathering data, (6) dividing the

planning region into planning units, (7) selecting a decision support tool, (8) completing analysis, and (9) completing sensitivity analysis. The process is not definitive and leaves room for customization based on regional or situational differences among Members. Canada also suggested that it would conduct a trade-off analysis in the northeast Pacific using the proposed method.

34. The SSC BF-ME endorsed the proposed process for analyzing trade-offs between fishing and VME protection as one potential approach, while recognizing the need to continue to explore various options, and to discuss data availability and needs.

35. The SSC BF-ME endorsed Canada's plan to conduct a trade-off analysis in the northeast Pacific using the proposed method and asked Canada to report its progress at the next SSC BF-ME meeting.

6.2 VME identification

6.2.1 Update on planning for VME indicator taxa identification course

36. The Science Manager provided an update on the organizing of a VME indicator taxa identification course (NPFC-2020-SSC BFME01-IP02 (Rev. 1)). The course was originally planned for 2020 but was postponed due to the COVID-19 pandemic and other factors. Dr. Tatiana Dautova (Russia) has agreed to be the principal coordinator and Russia has expressed its interest in hosting the course. The provisional dates are for fall 2021, and the duration is tentatively set at four days. The proposed course was also presented as a project to North Pacific Marine Science Organization (PICES), and PICES has provisionally decided to provide 15,000 US dollars for the course to cover meeting costs, travel costs for invited experts, and travel costs for students.

6.2.2 Adoption of the VME taxa ID guide

37. The SSC BF-ME reviewed and adopted the final draft of the VME taxa identification guide for the Western North Pacific compiled by the Small Working Group on VME Taxa ID Guide and the Secretariat (NPFC-2020-SSC BFME01-WP06; https://www.npfc.int/system/files/2020-09/NPFC%20VME%20taxa%20ID%20guide.pdf).

6.2.3 Update on the two potential VME sites identified by Japan

38. Japan reported on its work to define the distribution ranges of the two potential VME sites identified in NPFC-2019-SSC VME04-WP02 in the Emperor Seamounts area based on aggregations of corals observed (NPFC-2020-SSC BFME01-WP03). For the potential VME sites in the northwestern part of Koko Seamount, the distribution range is approximately 0.95

miles north-south and 0.4 miles east-west, and the coordinates of its four corners are 35-44.75 N 171-07.60 E, 35-44.75 N 171-07.80 E, 35-43.80 N 171-07.80 E, 35-43.80 N 171-08.00 E. For the potential VME site on the northern ridge of Colahan Seamount, the distribution range is approximately 0.8 miles north-south and 0.4 miles east-west, and the coordinates of its four corners are 31-03.85 N 175-53.40 E, 31-03.85 N 175-53.65 E, 31-03.05 N 175-53.50 E, 31-03.05 N 175-53.85 E. Japan recommended that the Commission consider the coordinates of the potential VME sites, along with information in NPFC-2019-SSC VME04-WP02, and develop measures for the protection of these VMEs.

39. The SSC BF-ME recommended to revise CMM 2019-05 to protect the two areas as potential VME sites.

6.3 Encounter protocol

6.3.1 Review of post-encounter measure questionnaire results

6.3.2 Discussion of suggestions from post-encounter questionnaire

6.3.3 Refinement of post-encounter measures

40. The Science Manager presented the results of the questionnaire on options for the development of a post encounter measure for the NPFC's bottom fisheries (NPFC-2020-SSC BFME01-WP16).

41. The SSC BF-ME recommended to the SC to revise the requirements for reporting of an encounter of VME indicator taxa and the collection of supplementary information in the CMMs 2019-05 and 2019-06. All such encounters, including the location, gear type, date, time and name and weight of the VME indicator species, shall be reported to the Secretariat, through the Member state, within one business day, who shall immediately notify the other Members of the Commission. To collect supplementary information for identification of VMEs, Members are encouraged to conduct research surveys for seabed mapping (e.g. multibeam or other echosounder), seafloor images by drop camera, ROV and/or autonomous underwater vehicle (AUV).

42. The SSC BF-ME recognized some ambiguity in the questions in the questionnaire and divergent understandings of their intended meaning among Members. The SSC BF-ME agreed to work intersessionally, through the SWG VME, to clarify the questions and update the Members' views on a temporary measure, SAI assessment, potential conservation measures and other elements of a post-encounter measure presented in the questionnaire (NPFC-2020-SSC BFME01-WP16 (Rev. 1)).

43. The SSC BF-ME discussed the need for gear-specific encounter thresholds, noting that most RFMOs have different encounter protocols for mobile and static gears.

6.4 Significant and adverse impacts (SAI) assessment

44. The Science Manager presented a review conducted by SPRFMO of the approaches used by other RFMOs and CCAMLR to avoid significant adverse impacts on VMEs (NPFC-2020-SSC BFME01-IP04).

45. The SSC BF-ME noted the variety of approaches used by other RFMOs and CCAMLR to avoid SAIs on VMEs and agreed to evaluate their relevance and utility for preventing SAIs on VMEs as a future task.

6.4.1 Update on Canada-Japan small working group to compare approaches to standardizing an approach to defining SAI

46. Canada presented an update on its intersessional work to standardize an approach to defining SAI (NPFC-2020-SSC BFME01-WP15 (Rev. 1)). Canada explained that it has used its fishing footprint and predictive habitat models to identify potential areas of high risk of SAIs. Canada recommended that the SSC BF-ME establish an SWG that will work intersessionally to continue developing standardized approaches to defining risk of SAI for all NPFC Members and provide an update at the next SSC BF-ME meeting.

47. The SSC BF-ME endorsed Canada's recommendation and agreed that the proposed work will be conducted by the SWG VME.

6.4.2 Review of the report on the observations of VMEs and presence of SAIs on the Emperor Seamounts

48. Dr. Amy Baco-Taylor presented a report on surveys of VMEs and SAIs on Koko, Yuryaku, Kammu and Colahan seamounts based on Baco et al. 2019 and Baco et al. 2020. (NPFC-2020-SSC BFME01-WP08). The evidence from the aforementioned research shows that VMEs are likely to be widespread and SAI have occurred. The United States recommended that the Emperor Seamount area be closed to bottom contact fisheries until the gear used can be proven to not cause SAIs. Furthermore, since recovery is possible for these VME taxa, both untrawled areas and actively fished areas should be closed to bottom contact gear to allow them time to recover.

49. The SSC BF-ME considered the proposed recommendations but was not able to reach a consensus. Some Members believed that further discussion and additional scientific research

are required before determining mitigation measures and advocated taking a staged-approach.

50. The SSC BF-ME noted that the surveys presented by the United States showed some areas with significant densities of VMEs that may require closures and agreed to work intersessionally, through the SWG VME, to analyze the potential impact of current fishing activities on known potential VME sites identified by the USA and other Members and provide an update at the next SSC BF-ME meeting.

Agenda Item 7. Data collection and reporting

7.1 Review of the template for collection of scientific observer data

51. The SSC BF-ME reviewed the template for collection of scientific observer data and determined that no revisions are currently required.

52. The SSC BF-ME agreed to discuss the sharing of data collected in accordance with the template at the next SSC BF-ME meeting.

7.2 Update on Japan's fish ID guide, translation into English and translation costs

53. Japan explained that the work to translate its fish ID guide into English is ongoing. It will provide an update at the next SSC BF-ME meeting.

54. Japan reported that it has conducted a literature survey on the taxonomy and biogeography of the species in the tentative list of bycatch species, as outlined in NPFC-2020-SSC BFME01-IP01.

7.3 Update on fishing footprint and effort data sharing

55. The Data Coordinator, Mr. Mervin Ogawa, presented a summary of fishing footprint and effort data shared by Members.

56. The SSC BF-ME requested the Secretariat to work intersessionally to develop provisional maps of combined, gear-specific footprints and present them at the next SSC BF-ME.

57. The SSC BF-ME recognized the need to hold further discussions on the intended objective(s) of developing maps of combined fishing footprint, which could inform the setting of the appropriate data resolution and time period.

7.4 Review of example species profile concept and recommendation of direction on future development

58. The United States explained that it has begun work to develop "Species Summary" documents for the NPFC priority species, as outlined by NPFC-2020-SSC BFME01-WP02.

59. The SSC BF-ME welcomed the work initiated by the United States and agreed to continue this work intersessionally for NPA and SA, through the SWG NPA&SA.

7.5 Review of spatial databases for VME

60. The Chair presented an overview of the National Oceanic and Atmospheric Administration (NOAA) Deep Sea Coral Research and Technology Program's (DSCRTP's) deep sea coral database (NPFC-2020-SSC BFME01-IP05). The Chair reported that Dr. Tom Hourigan, the lead scientist of DSCRTP, would support Members of the NPFC working with the DSCRTP to submit VME data to the database, if this was deemed appropriate by Members.

7.6 Review of the draft data sharing and data security protocols from the TCC

61. The Compliance Manager, Mr. Peter Flewwelling, reported on the ongoing work to draft NPFC Data-Sharing and Data-Security Protocol for Vessel Monitoring System (VMS) Data (NPFC-2020-SC05-WP07), highlighting the sections of the draft protocol that are relevant to SSC BF-ME.

Agenda Item 8. Proposed 5-Year (2020-2024) Rolling Work Plan

8.1 North Pacific armorhead

8.2 Splendid alfonsino

8.3 Sablefish

8.4 Vulnerable marine ecosystems

8.5 Other ecosystem components

62. The SSC BF-ME reviewed the 2020-2024 SSC BF-ME 5-Year Rolling Work Plan and updated it as detailed in NPFC-2020-SSC BFME01-WP01 (Rev. 1).

Agenda Item 9. Review of CMMs 2019-05 and 2019-06 for bottom fisheries and protection of vulnerable marine ecosystems and CMM 2019-10 for sablefish

63. The SSC BF-ME reviewed and revised CMM 2019-05 (Annex D).

64. The SSC BF-ME reviewed CMM 2019-06 and agreed to revise the requirements for reporting of an encounter of VME indicator taxa and the collection of supplementary information in accordance with paragraph 41.

Agenda Item 10. Other matters

10.1 Inter-sessional work and priority issues for next meeting

65. The SSC BF-ME identified the following intersessional work and priority issues for the next meeting:
    (a) Update on Japanese biomass survey
    (b) Update on Japanese maturity data
    (c) Update on mesh size analyses for SA
    (d) Tasks and reporting of the SWG NPA&SA
    (e) Tasks and reporting of the SWG VME

10.2 Other issues

66. Canada reported that PICES has established a new Working Group that will work on ecology of seamounts. Its objectives are mainly focused on understanding the ecology and distribution of species associated with pelagic, demersal and benthic communities of seamounts.

67. The Chair reported that he recently attended an International Seabed Authority workshop on seabed mining in the northwestern Pacific as an informal representative of the NPFC.

Agenda Item 11. Recommendations to the Scientific Committee

68. The SSC BF-ME agreed to:
    (a) Continue research to evaluate the effectiveness of the mesh size regulation for SA
    (b) Establish an SWG on data-limited management tools and approaches for assessing NPA and SA stocks (SWG NPA&SA) whose tasks would include:
        i. Reviewing available data for stock assessment, examining data quality and sharing data
        ii. Formulating TORs for stock assessment for NPA and SA, and potentially for adaptive management of SA
        iii. Reviewing and recommending data-limited stock assessment methods
        iv. Deciding who (one Member / all Members / an external consultant) will conduct the stock assessments if possible
        v. Discussing plans determining stock status and potentially for rebuilding stocks
        vi. Discussing environmental factors affecting abundance and recruitment
        vii. Developing plans for holding a workshop with other RFMOs managing stocks of NPA, SA and other related species, possibly under the framework of the FAO Deep Sea Fisheries Project
        viii. Developing “Species Summary” documents for NPA and SA
    (c) Establish an SWG for assessment and scientific advice on the management of VMEs (SWG VME) whose tasks would include:

i. Updating the Members' views on a temporary measure, SAI assessment, potential conservation measures and other elements of a post-encounter measure
ii. Defining the types of data that can be used to identify VMEs
iii. Reviewing Members' available VME-related data
iv. Analyzing the potential impact of current fishing activities on known potential VME sites in the Emperor Seamount area
v. Continuing to develop standardized approaches to defining risk of SAI for all NPFC Members

(d) Continue to explore various options for analyzing trade-offs between fishing and VME protection, and discuss data availability and needs
(e) Hold a VME indicator taxa identification course in fall 2021 in cooperation with PICES

69. The SSC BF-ME recommends the following to the SC:
(a) Endorse the revised CMM 2019-05 (Annex D)
(b) Revise CMM 2019-05 to protect the two areas identified as potential VME sites in NPFC-2020-SSC BME01-WP03
(c) Endorse the revised requirements for reporting of an encounter of VME indicator taxa and the collection of supplementary information in CMM 2019-06 in accordance with paragraph 41
(d) Adopt the VME taxa identification guide for the Western North Pacific
(e) Endorse the updated 2020-2024 SSC BF-ME 5-Year Rolling Work Plan (NPFC-2020-SSC BFME01-WP01 (Rev. 1))
(f) Hold a 3-day meeting of the SSC BF-ME in 2021
(g) Hold intersessional meetings of the SWG NPA&SA and SWG VME

Agenda Item 12. Next meeting

70. The SSC BF-ME recommends holding a 3-day meeting of the SSC BF-ME in 2021 and requests the guidance of the SC and Commission for determining the date and location of the meeting.

71. The SSC BF-ME recommends holding intersessional meetings of the SWG NPA&SA and SWG VME.

Agenda Item 13. Adoption of the Report

72. The report was adopted by consensus.

Agenda Item 14. Close of the Meeting

73. The meeting closed at 13:08 on 18 November 2020, Tokyo time.

Annexes:

Annex A – Agenda

Annex B – List of documents

Annex C –List of participants

Annex D – Revised CMM 2019-05 - Conservation and Management Measure for Bottom Fisheries and Protection of Vulnerable Marine Ecosystems in the Northwestern Pacific Ocean

Annex A

Agenda

Agenda Item 1. Opening of the Meeting

Agenda Item 2. Adoption of Agenda

Agenda Item 3. Stock assessment and scientific advice on the management of North Pacific armorhead (NPA)

- 3.1 NPA monitoring survey and Adaptive Management Procedure (AMP)
  - 3.1.1 Review of the results from 2020 monitoring survey
  - 3.1.2 Review of proposed changes to monitoring survey design
- 3.2 Update on analyses or progress on biomass estimates from the NPA 2020 acoustic survey
- 3.3 Review of Members' research activities on NPA
  - 3.3.1 Analysis of recruitment relationships to oceanography
  - 3.3.2 Review of the report on literature, data availability and data gaps for NPA stock assessment

Agenda Item 4. Stock assessment and scientific advice on the management of splendid alfonsino (SA)

- 4.1 Review of Members' research activities on SA
  - 4.1.1 Yield per recruit analysis of SA
  - 4.1.2 Review of the report on literature, data availability and data gaps for SA stock assessment
- 4.2 Adaptive management strategy for SA
  - 4.2.1 Review of approaches from other RFMO's
  - 4.2.2 Intersessional work to develop TOR for SA adaptive management plan

Agenda Item 5. Data-limited management tools and approach to assessment of NPA and SA

- 5.1 Discussion of next steps in identification of data limited approaches to stock assessment for NPA and SA
  - 5.1.1 Review of tools available to use with existing data
  - 5.1.2 Discussion of data availability and sharing
  - 5.1.3 Planning for identification and application of data limited approaches to stock assessment for NPA and/or SA

Agenda Item 6. Assessment and scientific advice on the management of Vulnerable Marine

Ecosystems (VME)

6.1 Review of Members' research activities on VME

6.1.1 Towards a quantitative definition of VMEs

6.1.2 Trade-off analysis between VME protection and sablefish fishing

6.2 VME identification

6.2.1 Update on planning for VME indicator taxa identification course

6.2.2 Adoption of the VME taxa ID guide

6.2.3 Update on the two potential VME sites identified by Japan

6.3 Encounter protocol

6.3.1 Review of post-encounter measure questionnaire results

6.3.2 Discussion of suggestions from post-encounter questionnaire

6.3.3 Refinement of post-encounter measures

6.4 Significant and adverse impacts (SAI) assessment

6.4.1 Update on Canada-Japan small working group to compare approaches to standardizing an approach to defining SAI

6.4.2 Review of the report on the observations of VMEs and presence of SAIs on the Emperor Seamounts

Agenda Item 7. Data collection and reporting

7.1 Review of the template for collection of scientific observer data

7.2 Update on Japan's fish ID guide, translation into English and translation costs

7.3 Update on fishing footprint and effort data sharing

7.4 Review of example species profile concept and recommendation of direction on future development

7.5 Review of spatial databases for VME

7.6 Review of the draft data sharing and data security protocols from the TCC

Agenda Item 8. Proposed 5-Year (2020-2024) Rolling Work Plan

8.1 North Pacific armorhead

8.2 Splendid alfonsino

8.3 Sablefish

8.4 Vulnerable marine ecosystems

8.5 Other ecosystem components

Agenda Item 9. Review of CMMs 2019-05 and 2019-06 for bottom fisheries and protection of vulnerable marine ecosystems and CMM 2019-10 for sablefish

Agenda Item 10. Other matters

10.1 Inter-sessional work and priority issues for next meeting

10.2 Other issues

Agenda Item 11. Recommendations to the Scientific Committee

Agenda Item 12. Next meeting

Agenda Item 13. Adoption of the Report

Agenda Item 14. Close of the Meeting

Annex B

List of documents

MEETING INFORMATION PAPERS

Symbol	Title
NPFC-2020-SC05-MIP01 (Rev. 1)	Details for the virtual meetings of the Scientific Committee and its subsidiary bodies
NPFC-2020-SSC BFME01-MIP02	Provisional Agenda
NPFC-2020-SSC BFME01-MIP03 (Rev. 1)	Provisional Annotated Agenda

REFERENCE DOCUMENTS

Symbol	Title
NPFC-2020-SC05-WP07	NPFC Data-Sharing and Data-Security Protocol for Vessel Monitoring System (VMS) Data

WORKING PAPERS

Symbol	Title
NPFC-2020-SSC BFME01-WP01 (Rev. 1)	SSC BFME 5-Year Rolling Work Plan, 2020-2024
NPFC-2020-SSC BFME01-WP02	A proposal to develop 'Species Summary' documents for the NPFC priority species
NPFC-2020-SSC BFME01-WP03	Defining the distribution range of the two potential vulnerable marine ecosystem (VME) sites identified in NPFC-2019-SSC VME04-WP02 in the Emperor Seamounts region
NPFC-2020-SSC BFME01-WP04	Blast from the past: a brief summary on the past studies for bottom fish stocks in the Emperor Seamounts area
NPFC-2020-SSC BFME01-WP05 (Rev. 1)	Catch size composition of splendid alfonsino in the Emperor Seamounts area before and after the implementation of the mesh size regulation
NPFC-2020-SSC BFME01-WP06	NPFC VME taxa identification guide Western North Pacific Ocean
NPFC-2020-SSC BFME01-WP07	VME bycatch by Korean trawl fisheries on the Emperor Seamounts in 2019
NPFC-2020-SSC BFME01-WP08	Report on VMEs and SAIs on Koko, Yuryaku, Kammu and Colahan seamounts

NPFC-2020-SSC BFME01-WP09	Proposed amendment to CMM2019-05, Annex 6
NPFC-2020-SSC BFME01-WP10	Brief review of approaches to Splendid Alfonsino management
NPFC-2020-SSC BFME01-WP11 (Rev. 1)	Literature review and data availability for Splendid Alfonsino stock assessment
NPFC-2020-SSC BFME01-WP12	A Framework for Identifying Vulnerable Marine Ecosystems in the North Pacific Ocean
NPFC-2020-SSC BFME01-WP13 (Rev. 1)	Process for Analyzing Trade-offs between Fishing and Vulnerable Marine Ecosystem Protection
NPFC-2020-SSC BFME01-WP14 (Rev. 1)	Literature review and data availability for North Pacific Armorhead stock assessment
NPFC-2020-SSC BFME01-WP15 (Rev. 1)	Standardized approach to defining potential SAI
NPFC-2020-SSC BFME01-WP16 (Rev. 1)	Elements of NPFC post-encounter measure

INFORMATION PAPERS

Symbol	Title
NPFC-2020-SSC BFME01-IP01	Comments on compiled bycatch species list for the Emperor Seamounts (ESM)
NPFC-2020-SSC BFME01-IP02 (Rev. 1)	NPFC SC Project #10: International Course for NPFC Observers for VME Indicator Taxa Identification
NPFC-2020-SSC BFME01-IP03	Revised schedule and results of monitoring survey for North Pacific armorhead in the Emperor Seamounts in 2020
NPFC-2020-SSC BFME01-IP04	Approaches used by other RFMOs and CCAMLR to avoid significant adverse impacts on Vulnerable Marine Ecosystem
NPFC-2020-SSC BFME01-IP05	Overview of NOAA Deep Sea Coral database
NPFC-2020-SSC BFME01-IP06	First data on the structure of vulnerable marine ecosystems of the Emperor Chain Seamounts: Indicator taxa, landscapes and biogeography
NPFC-2020-SSC BFME01-IP07	Octocorallia as a key taxon in the vulnerable marine ecosystems of the Emperor Chain (Northwest Pacific): diversity, distribution and biogeographical boundary
	Template for collecting scientific observer data from BF

Annex C

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Annex D

CMM 2019-05 (Rev. 1)
(Entered into force 29 November 2019)

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 Deepsea 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 taxa: *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, gear type, date, time and ~~the species~~name and weight of the VME indicator species ~~in question~~, shall be reported to the Secretariat, through the Member, ~~as soon as possible~~[within one business day], who shall immediately 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.

L. Development of new fishing activity for the North Pacific armorhead and splendid alfonsino in the Convention Area by Members without documented historical catch for North Pacific armorhead and splendid alfonsino in the Convention Area shall be determined in accordance with relevant provisions, including but not limited to Article 3, paragraph (h) and Article 7, subparagraphs 1(g) and (h) of the Convention.

M. In years when strong recruitment of North Pacific armorhead is not detected (Annex 6), the Commission encourages Japan to limit the annual catch of North Pacific armorhead by vessels flying its flag to 500 tons, and encourages Korea to limit the annual catch of North Pacific armorhead by vessels flying its flag to 200 tons. The Commission encourages that catch overages for any given year be subtracted from the applicable annual catch limit in the following year, and that catch underages during any given year not be added to the applicable annual catch limit during the following year.

N. Notwithstanding subparagraph K, when a strong recruitment of North Pacific armorhead is detected through the monitoring surveys as specified in Annex 6, the Commission encourages that Japan limit the annual catch of North Pacific armorhead by vessels flying its flag to 10,000 tons, and that Korea limit the annual catch of North Pacific armorhead by vessels flying its flag to 2,000 tons. The Commission encourages that catch overages for any given year be subtracted from the applicable annual catch limit in the following year, and that catch underages during any given year not be added to the applicable annual catch limit during the following year. During a year when high recruitment is detected, bottom fishing with trawl gear shall be prohibited in specific areas in the Emperor seamounts where half of the catch occurred in 2010 and 2012 (Annex 6). Determination of a strong recruitment year and of the specific areas where bottom fishing with trawl gear is prohibited shall be communicated to all Members and Cooperating Non-Contracting parties following the procedure specified in Annex 6.

O. Catch in the monitoring surveys shall not be included in the catch limits specified in paragraphs M and N but shall be reported to the Secretariat.

P. Fishing activity for the North Pacific armorhead and splendid alfonsino in the Convention Area by Members with documented historical catch for North Pacific armorhead and splendid alfonsino in the Convention Area is not precluded.

Q. Members shall require vessels flying their flags to use trawl nets with mesh size greater than or equal to 130mm of stretched mesh with 5kg tension in the codend when conducting fishing activities for North Pacific armorhead or splendid alfonsino.

R. Task the Scientific Committee with reviewing the appropriate methods for establishing catch limits, and the adequacy and practicability of the adaptive management plan described in subparagraphs K, L, M, N, O, P, Q and Annex 6 from time to time and recommending revisions and actions, if necessary.

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~~ Reporting 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 Regulations for Management of Scientific Data and Information~~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.

(c) Seabed mapping (e.g. multibeam or other echosounder); seafloor images by drop camera, remotely operated underwater vehicle (ROV) and/or autonomous underwater vehicle (AUV).

(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.

Annex 1

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:
   (i) 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.
   (ii) The assessment in (i) 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.
   (iii) The SC is to review the information and the assessment submitted in (i) above in accordance with "SC Assessment Review Procedures for Bottom Fishing Activities (Annex 3)."

(iv) 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

Annex 2

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 activities[1] 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:

[1] "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.

(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).

(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 ESNHR 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 CH. 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 cold-water 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 and 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).

Annex 2.2

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).

Annex 3

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.

Annex 4

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. Detection of Fishing in Association with Vulnerable Marine Ecosystems

- Information about VME encounters (species and quantity in accordance with Annex 5, H, 2).

E. Tag Return Monitoring

- Number of tags returns observed, by fish size class and area.

F. 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.

Annex 5

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 observer data are to be collected for each observed trip:
   (a) NPFC vessel ID.
   (b) Observer's name.
   (c) Observer's organisation.
   (d) Date observer embarked (UTC date).
   (e) Port of embarkation.
   (f) Date observer disembarked (UTC date).
   (g) 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.

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 or traps for the set.
   (i) Bottom (seabed) depth at start of set.
   (j) Bottom (seabed) depth at end of set.
   (k) Number of hooks or traps 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 example, 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, indeterminate, not examined)
   (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 (m^3)) of each listed benthic species caught in the fishing operation.
   (c) An overall estimate of the total quantity (weight (kg) or volume (m^3)) 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 alfonsino)	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 or, if species do not have a FAO code, using scientific names.
   (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.

Annex 6

Implementation of the Adaptive Management for North Pacific armorhead
(in ~~2019 and 2020~~2021)

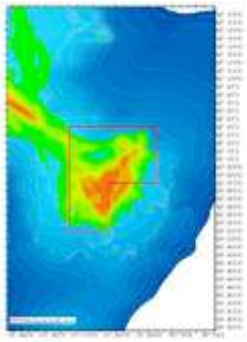
1. Monitoring survey for the detection of strong recruitment of North Pacific armorhead

(1) Location of monitoring surveys

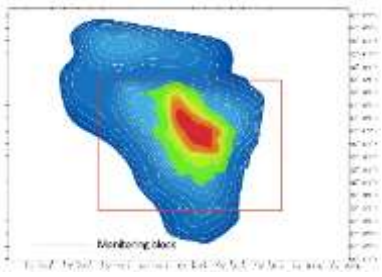
Monitoring surveys for the detection of strong recruitment of North Pacific armorhead will be conducted by trawl fishing vessels in the pre-determined ~~two~~four (~~2~~4) monitoring blocks of Koko (South eastern), Yuryaku, ~~and~~ Kammu (North western) and/or Colahan seamounts.

Monitoring blocks

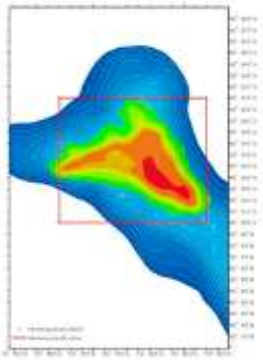
(1) Koko seamount (34°51' –35°04'N, 171°49' –172°00' E)



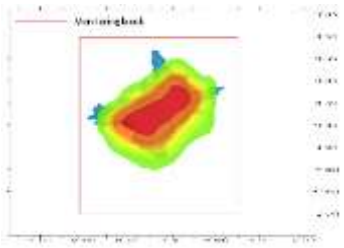
(2) Yuryaku seamount (32°35' –32°45'N, 172°10' –172°24'E)



(3) Kammu seamount (32°10'–32°21'N, 172°44'–172°57'E)



(4) Colahan seamount (30°57'–31°05'N, 175°50'–175°57'E)



(2) Schedule for monitoring surveys

Monitoring surveys will be conducted from March 1st to June 30th each year, with at least a one-week interval between monitoring surveys ~~in the same monitoring block~~. For each survey, a trawl fishing vessel will conduct a monitoring survey in one of the four monitoring blocks that is the nearest from the location of the trawl fishing vessel at the time of prior notification in (4) below. The base schedule for monitoring surveys will be notified to the Executive Secretary by the end of February of each year.~~is shown in the table below. In total, sixteen (16) monitoring surveys will be conducted each year.~~ The base schedule may be revised during the year subject to prior notification to the Executive Secretary.

(3) Data to be collected during monitoring surveys

For each monitoring survey, a trawl net will be towed for one hour. A scientific observer onboard the trawl fishing vessel will calculate nominal-CPUE (kg/hour) of North Pacific armorhead. The scientific observer will also calculate fat index* (FI) of randomly sampled 100 individuals of North Pacific armorhead by measuring fork length (FL) and body height (BH) of each individual.

(*fat index (FI) = body height (BH) / fork length (FL))

(4) Prior notifications and survey results

At least three (3) days before each survey, a prior notification with monitoring date/time, location and trawl fishing vessel name will be provided by the flag state of the trawl fishing vessel to the Executive Secretary.

No later than three (3) days after each survey, the survey result including date/time, location, catch, nominal-CPUE (kg/hour) and percentage of fish with fat index (FI)>0.3 will be provided by the flag state to the Executive Secretary.

The Executive Secretary will circulate these prior notifications and survey results to all Members of the Commission without delay.

2. Areas where bottom fishing with trawl gear is prohibited when high recruitment is detected

(1) Criteria for a high recruitment

It is considered that high recruitment has occurred if the following criteria are met in four (4) consecutive monitoring surveys ~~in each of the two (2) monitoring blocks~~.

- Nominal CPUE > 10t/h
- Individuals of fat index (FI)> 0.3 account for 80% or more

(2) Areas where bottom fishing with trawl gear is prohibited

Bottom fishing with trawl gear shall be prohibited in the following two (2) seamount areas (*) during the year when high recruitment is detected. In such a case, all monitoring surveys scheduled during the year will be cancelled.

- Northern part of Kammu seamount (north of 32°10.0′ N)
- Yuryaku seamount

(*) The catch of North Pacific armorhead in the above two seamounts accounts for a half of the total catch in the entire Emperor Seamounts area based on the catch records in 2010 and 2012.

(3) Notification by the Secretariat

When the criteria for high recruitment are met as defined in 2(1) above, the Executive Secretary will notify all Members of the Commission of the fact with a defined date/time from which bottom fishing with trawl gear is prohibited in the areas as defined in 2(2) above until the end of the year.