# Report of the Third Meeting of the Scientific Committee of the Southern Indian Ocean Fisheries Agreement (SIOFA)

La Réunion

20 – 24 March 2018

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## Agenda item 1 – Opening

### Agenda item 1.1 Opening statement from the Chair

1. The third meeting of the SIOFA Scientific Committee was opened at 9.02am on 20 March 2018 by Dr Ilona Stobutzki, Chairperson of the Scientific Committee (SC). Dr Stobutzki welcomed participants to the meeting and thanked the Executive Secretary for the last minute arrangements to secure an alternative meeting venue following the unexpected closure of the originally booked location.
2. The Chairperson noted the contributions of the Stock Assessment Working Group (SAWG) and working groups to work of the SC and SIOFA. The Chairperson thanked all Contracting Parties, SIODFA Observers and External experts for their constructive efforts in this regard.

### Agenda item 1.2 Introduction of participants

3. The Executive Secretary (Mr Jon Lansley) made a welcoming speech and thanked the hotel staff and the assistants for help with preparations for the meeting. He also introduced Mr Pierre Peries and welcomed him to the role of SIOFA Data Manager.
4. Contracting Parties (CPs), SIOFA Observers and External experts introduced themselves and a list of participants is at Annex A.
5. An apology was received from Korea.

## Agenda item 2 – Administrative arrangements

### Agenda item 2.1 Adoption of the agenda

6. The agenda was adopted (Annex B).
7. The Chairperson advised that Dr Rudy Kloser (CSIRO) will join the meeting at 9.00am on 21 March 2018 via Skype.

### Agenda item 2.2 Confirmation of meeting documents

8. The Chairperson noted that there were a number of late and revised papers that needed to be considered and formally accepted as working papers. The Chairperson noted that three of these papers came from the first meeting of the SAWG (SAWG1), as per the SAWG terms of reference.
9. The SAWG1 meeting report and papers updated during the SAWG1 meeting (SC-03-07.1.1(04)-Rev1 and SC-03-07.1.1(05)-Rev1) were accepted during as working papers.
10. The orange roughy stock assessment papers were originally listed as information papers (SC-03-INF08 and SC-03-INF09). The SC agreed that these papers be considered as working papers.
11. Korea's annual report (SC-03-03(07)) was accepted as a working paper.
12. A working paper produced by the Secretariat to develop a concept note for collaboration between SIOFA and SWIOFC was not accepted and reverted to an information paper (SC-03-INFO16).

13. The meeting documents (Annex C) and the table of agenda items with relevant papers (Annex D) were confirmed.

14. The SC **requested** the Secretariat to include a column that includes the date that meeting papers were submitted and uploaded to aid participants in preparing for the meeting, and that the Secretariat consider procedural efficiencies identified by other RFMOs in this regard.

#### Agenda item 2.3 Appointment of rapporteurs.

15. Mr Lee Georgeson was appointed to act as rapporteur, with assistance from delegations.

#### Agenda item 2.4 Review of functions and terms of reference

16. The Chairperson reminded the SC of SIOFA's objectives, the SC's functions and its Terms of Reference.

## Agenda item 3 – Annual National Reports

17. The Chairperson reminded Contracting Parties (CPs) of their obligation in accordance with CMM 2017/02 to provide a National Report that conforms with the Guidelines for annual national reports (SC-03-01 C). She also noted that some conservation and management measures (CMMs) contained requirements to report in the annual National Reports

18. Annual reports were submitted by Australia, Cook Islands, EU, France (Territories), Japan, Korea and Thailand. Annual reports were not submitted by Mauritius and Seychelles.

19. The Chairperson noted that China had submitted a draft annual national report during the meeting and that this was included as an information paper. During the course of the meeting China submitted a final version of their national report which, with the acceptance of the meeting, was added as an additional information paper (SC-03-INFO-17).

#### Cook Islands Annual Report: SC-03-03(01)

20. The Cook Islands annual report provides an overview of the trawl fishing activities in the SIOFA Area undertaken by Cook Islands vessels. It highlights activities during 2017 and takes the form of the Cook Islands National Report. In 2017 the Cook Islands authorised two vessels to operate in the SIOFA area, pursuant to High Seas fishing authorisations issued by the Ministry of Marine Resources (MMR). These vessels target deep-water finfish species, primarily Alfonsino (*Beryx splendens*) and Orange Roughy (*Hoplosthethus atlanticus*) using bottom and midwater trawl fishing methods. A list of species is given in Appendix 1 of the annual report. After the recommendation by the First Scientific Committee to close Benthic Protected Areas, and the recommendation made by the Third Meeting of the Parties for all Contracting Parties to note this advice, Cook Islands vessels are not permitted to fish within the areas listed in Appendix 2 of this national report, and additionally do not fish on the Del Cano Rise. Catch is unloaded in Mauritius and South Africa. Alfonsino are generally exported to Japan and Orange Roughy mainly to China or elsewhere in Asia. Some catch is sold in the local markets in Mauritius and South Africa. The social and

economic contribution the Cook's vessels provide, particularly for Mauritius, was highlighted in terms of jobs provided and by using local services.

21. The Cook Islands highlighted their ongoing concerns in relation to alfonsino stock status noting Interpreting catch per unit effort in targeted fisheries is complex and if not done correctly can result in errors of interpretation. It is informative to see how CPUE changes on an annual basis and, in the absence of other data, trends in CPUE then provide the only indicator as to the state of a stock. However, to increase fishing effort in any fishery where there is a decline in CPUE is not considered precautionary practice and is not supported by MMR. The SC discussed that the use of CPUE for assessing alfonsino stocks may be misleading as they are an aggregating species, and that acoustic and other data may be required as more robust inputs to stock assessment. The SC discussed that while CPUE may not be a robust abundance index it may provide a useful indicator to identify areas requiring further investigation.

22. The total alfonsino catch in 2017 was around 30% higher than the 1996-2016 period and it was queried whether this reflected increased interest and effort of the Cook Islands in relation to the alfonsino fishery. The increase in bluenose, boarfish and butterfish catches was also queried as to whether this may be a function of increased effort on other target species (i.e. alfonsino). The Cook Islands clarified this reflected a change from targeting orange roughy by an operator. The Cook Islands clarified that the decrease in catches for oreo dories was in response to market influences (i.e. a lack of market for oreo dories) and are reported to be actively avoided.

23. The Cook Islands also highlighted that all vessels follow the scientific data guidelines described in 2006 FAO Fisheries Circular 1020, updated in 2012 (FAO 2012). The 2012 document includes sampling methods for Alfonsino and recommendations on how to conduct acoustic surveys.

24. All Cook Islands vessels are required to undertake commercial fishing vessel surveys with calibrated echo-sounders, as recommended by the FAO Expert Consultations (FAO 2012) and the FAO Deepsea Guidelines (FAO 2009). The Cook Islands noted that this requirement has led to the data that supported the SIOFA acoustic review and the stock assessment of Orange Roughy.

25. The Cook Islands noted that in 2017 MMR established 100% Observer Coverage on Cook Islands vessels in the SIOFA area as an extension of the existing Cook Islands National Observer Programme (CINOP). With support from the FAO ABNJ Deep Seas Project, MMR and Cook Islands industry, seven experienced and high performing Pacific Islands Regional Programme (PIRFO) Observers (PIRFO) from the Cook Islands, Kiribati, Nauru, and the Solomon Islands were selected to attend SIOFA trawler cross-endorsement training at the Sealord port facility in Nelson. The Cook Islands implemented 100% coverage on schedule by 1 July 2017 with five trips covered between July and December 2017.

**Japan Annual Report: SC-03-03(02)**

26. Japan presented its annual report, which describes following seven items requested by the National Report Template, i.e., "1. Fisheries", "2. Catch, effort and CPUE", "3. Fisheries data collection and research activities", "4. VME Thresholds", "5. Biological sampling and length/age composition of catches", "6. Data verification mechanisms" and "7. Observer program". In the SIOFA Agreement Area, Japan has been operating two different types of fisheries discontinuously for 41 years (1977-2017), i.e., trawl fisheries targeting splendid alfonsino and bottom longline fisheries targeting Patagonian toothfish. Based on accumulated information, the seven items are described each for trawl and bottom longline fisheries.

27. The SC noted that it was not clear in Japan's annual report whether Japanese longline operations had any VME encounters that exceed the VME thresholds. Japan reported

that no thresholds were exceeded, but noted that in 2017, bottom longline vessels reported VME bycatch for three hauls.

**Thailand Annual Report: SC-03-03(03)**

28. The Thailand annual report includes the fisheries information during 2015-2017 of the 62 vessels with the 58 available logbooks. The fishing gears were trawling nets and portable traps. There was total effort of 9,455 fishing set. The highest input fishing effort was in 2016 of the total 4,560 sets. The total catch during 2015-2017 was 35,916.67 tonnes. The dominant catch species comprised round scad (*Decapterus* spp.) 29.78%, lizard fish (*Saurida* spp.) 25.66%, threadfin bream (*Nemipterus* spp.) 11.62%, goat fish (*Parupeneus* spp.) 5.59%, bigeye scad (*Selar* spp.) 4.79% and Indian mackerel (*Rastrelliger* spp.) 4.29%. The highest catch was in 2015 with the amount of 23,118.05 tons. Based on the observer data and report, the average sizes of two dominant species of fish including lizardfish (*Saurida undosquamis*) and round scad (*Decapterus russelli*) are larger than their sizes at maturity. They found no endangered, threatened and protected species, coral or sponge. However, logbook template of that period of fishing was not corresponding to all required or necessary data for analysis. For example, the starting and ending time of operation were not indicated. The logbook template had been updated to meet the requirement for scientific purposes. In addition to the human observer, the deriving information from VMS ERS and EMS will enhance the data collection for scientific purposes. Additionally, 100% coverage of transshipment observers and landing inspection will verify against to the information from logbook and relating documents. The authorized vessels are prohibited to fish within the BPA area and the “move on” rule must be applied when catch coral or sponge over the determined amount of benchmark. The benchmarks are categorized based on the gears types. Therefore, Thailand has improved the monitoring, control and surveillance (MCS) and data verification mechanism.

29. The SC thanked Thailand for their presentation, particularly given their recent engagement with SIOFA. It was noted that the Thai fishery appeared to be quite data-rich for the recent years, which was encouraging. It was noted that in terms of volume, the Thai catch for some species represents the largest catches in SIOFA. Thailand informed that new regulations are being formulated for Thailand’s SIOFA fisheries to ensure compliance and consistency with SIOFA CMMs.

30. Thailand elaborated on the electronic monitoring and logbook program. Currently both electronic and paper logbooks are in use. Transfer of crews and transhipment were discussed and Thailand noted that the use of electronic technology would make this a more efficient process. Thailand reported that observers have difficulties in electronic reporting back to the regulator/administrator because of system requirements.

31. Evgeny Romanov (External expert) queried whether any biomass estimates of species taken by Thai fisheries on the Saya de Malha bank were available. Thailand noted that MSY estimates, maximum allowable catches (MAC) and input controls were used to manage its domestic resources. This approach may be applied to Saya de Malha bank. In response to queries about regulation of Thai catches where biomass estimates were unavailable, Thailand noted that this is part of the reason for its engagement in SIOFA, as it is a very important to exchange and cooperate with other fishing nations who also operate in the same area, and that it was committed to compliance with and observance of SIOFA CMMs.

32. It was noted that SC2 Annex G developed guidelines for how the SIOFA SC may evaluate the use of electronic monitoring and that it would be useful for Thailand to evaluate how the use of electronic monitoring in Thailand’s SIOFA fisheries complies with the requirements of the data standards CMM 2017/02.

33. SIODFA acknowledge their gratitude and support for Thailand's voluntary adoption of the SIODFA Benthic Protected Areas (BPAs).

34. The SC noted that the SAWG/SC's workplan does not include consideration of species caught in Thai fisheries and requested discussion on this issue.

**Australia Annual Report: SC-03-03(04)**

35. Australia's annual report updates the SIOFA Scientific Committee on Australia's fishing activities in the SIOFA Area. Australian operators are currently authorised by the Australian Government to target various species with mid-water and demersal trawl, dropline, minor line, automatic longline and demersal longline. One multi-purpose trawl/longline vessel was active in the fishery in 2016. Twenty-six hours of midwater trawl effort was reported with catch principally comprised of blue-eye trevalla and alfonsino. Longline effort was 39600 hooks, with the catch predominantly comprised of hapuku. Australian fishing activities were restricted to Australia's demersal fishing footprint. Australian vessels did not undertake any fishing in the SIOFA area in 2017. No VME indicator thresholds were triggered during 2016 and 2017. One white-chinned petrel mortality was reported in 2016 in the non-trawl fishery.

**European Union Annual Report: SC-03-03(05)**

36. Two bottom longline vessels, one from EU-France and another from EU-Spain operated in the SIOFA agreement area in 2017, in the Saya de Malha Bank - area 8 (EU-France) and SIOFA areas 2 and 3b for EU-Spain vessel. Tables on catch composition and effort have been updated to 2017. Fishing effort remains stable for EU vessels. EU countries continue the process of recovering accurate and fine scale data from historical fishing activity in the SIOFA region. EU-Spain implemented a dedicated scientific observation in 2017 and EU-France is training specific observers for this region that will be on board of vessels operating in SIOFA in 2018.

37. The SC recognised that CPUE indices were not included in the EU's national report but that the data to generate this had been submitted to the Secretariat.

38. The SC noted that the bottom fishing CMM 2017/01 tasks parties to report on VME thresholds and encounters with VMEs. The EU reiterated that the SEAFO and CCAMLR encounter protocols were used and the SC **requested** a description of the protocols applied be included in future.

**France (Territories) Annual Report: SC-03-03(06)**

39. This report summarizes fishing activity by France for French Territories-flagged vessels in the SIOFA Area for 2017. The French Administration gave license to seven longliners and one trawler/potter vessel to target various species with pot, dropline, minor line, automatic longline and demersal longline. The French Administration defined 7 areas where the fishing activities were allowed (Annex I of SC-03-03(06)). In accordance with CMM 2017/02, The French historical data have been reported in the French Territory National Report 2017 (SC-02-04 (06) National Report (French Territory)). This scientific report described the French licensed fishery in the SIOFA area from 2013 to 2016 and the annual data for 2017.

40. The SC noted that the France (Territories) annual report does not specify the encounter thresholds and it was noted that these are included in the France (Territories) Bottom Fishing Impact Assessment (BFIA). No VME has been detected during France (Territories) fishing operations.

**Korea annual report: SC-03-03-(07)**

41. The Executive Secretary reported that Korea had advised that no new information was provided in its updated national report as presented at SC2 because there was no fishing effort in 2017.

**National reports general discussion**

42. The Chairperson reminded the SC of the importance of national reports in assisting with the development of the SIOFA Overview of Fisheries and other work.

43. The SC discussed that disaggregating catch and effort may be more useful for species where it is agreed that CPUE may not be a useful indicator of abundance (e.g. for aggregating species). If this was the case, future reports would be more informative if these data were plotted separately rather than CPUE indices.

**National report guidelines**

44. The SC noted that CMMs may specify reporting requirements for the national reports and agreed to a streamlined process for updating the guidelines. The SC **requested** that the Secretariat update the guidelines based on any new requirements arising from changes to CMMs and circulate these intersessionally to CPs for a short period of time for comment. If the updates are based on CMMs, any comment shall be restricted to ensuring they appropriately reflected the CMMs. The SC **requested** the revised guidelines be posted in the appropriate place on the SIOFA website.

45. The Data Manager requested that total catches are included in national annual reports. It was discussed that confidentiality restrictions would prevent this from occurring. Where catch data are confidential, these data could be provided solely to the Secretariat for cross-validation and for the purpose of compiling the Overview of SIOFA Fisheries.

## Agenda item 4 – Current and historical status of fishing activities

**Agenda item 4.1 Submission and consideration of historical catch and effort data**

46. SC-03-INFO15 provided information on the historical catch of orange roughy by Chinese vessels in SIOFA. The SC sought clarification on these orange roughy longline catches, as very few examples of longline catches of this species were known, despite extensive research trials to catch the fish by hook. China emphasized that the identification of orange roughy was mainly done by the crew, who may not have some professional skills and led to the misidentification of this species.

47. It was noted that the reconstruction of the orange roughy catch history was discussed by the SAWG (SAWG1 report paragraph 36 onwards) and that a confidential document detailing the reconstruction of historical orange roughy catch and effort will be provided to the Secretariat for use by the SAWG and SC at the end of the meeting.

48. Cook Islands estimated that approximately 15% of the orange roughy catch was taken by SIOFA CPs in the early years of the orange roughy fishery. The non-CPs that took a large amount of catch of orange roughy and other species, did not always have a requirement for vessels to report their catch records, as no flag state requirements were in place for data collection.

49. The Chair **noted** that the reconstruction of catch histories was a key challenge for the SC. The SC discussed the issue of these potentially unaccounted catch (mortalities) and the implications for the reconstruction of catch histories, including those used for stock assessment.

**Agenda item 4.2 Spatial extent of historic fishing effort data**

50. The SIOFA Data Manager provided an update on the status of submissions for the spatial extent of historical fishing effort data. This included a map showing the spatial distribution of historical fishing effort in SIOFA at 1 degree resolution for non-trawl (line, traps) and trawl (including bottom and midwater trawl) methods. The Data Manager noted that this scale was chosen as some historical data were only available at this scale. He also explained that some historical fishing effort data had been provided at a courser scale (e.g. FAO area) and these were not reflected in the maps.

51. The SC discussed that it would be more informative for the work of the SC to show fishing effort intensity. The SC noted the requirements of the data confidentiality CMM 2016/03 would need to be satisfied before this could be published.

52. The SC discussed the time period for the effort footprint period. CMM 2017/01 constrains the spatial distribution of fishing effort to recently fished areas but there is no definition of 'recently fished'.

53. The SIOFA Data Manager provided the 1 degree mapping showing the intensity of catches to aid the SC's work. The SC discussed that maps of this type should be clearly marked as confidential and that it was produced for the use of the SC and would not be made publically available. The SC requested that no photographs be taken during the presentation of this map. Due to concerns that a photograph may have been taken, this agenda item was postponed.

54. In relation to the recognition that a photograph may have been taken of confidential data, the SC Chairperson subsequently noted serious concerns about the confidentiality obligations of Observers. She noted that Observers responsible for understanding their obligations and are bound by these obligations under their engagement with the SC and SIOFA. It was noted that if there are other concerns or indication that confidentiality obligations are not being followed then a discussion would be had with Heads of Delegation in relation to closed sessions. If such a situation occurred, the Chairperson would write to the Meeting of the Parties to raise concerns that confidentiality obligations are not being followed. The SC Chairperson and Secretariat confirmed to the extent possible, that the photograph had been deleted.

**Agenda item 4.3 Overview of SIOFA fisheries 2017**

55. It was agreed that the reconstructed catch history that was used for the orange roughy stock assessment should be included but that data sources and limitations should be identified.

56. The overview currently includes information on alfonsino, orange roughy, toothfish and deepwater sharks. The small task group agreed to work with Thailand during the meeting to include catches of the key species in the Saya de Malha bank fisheries.

57. The Data Manager gave an update on the SIOFA Overview of Fisheries that was developed during the meeting. He noted that it was difficult to compile total catches from national reports as these sometimes did not accord with the database. The SC discussed that the review of catches in the database did not accord with catch reported in the Overview of Fisheries reported last year. Time constraints meant that it was not possible to compile a reliable update to the figures on catch volume for most species (Annex E).

58. It was possible to update the catch volume graph for deepwater sharks (Annex E) as there was consistency in recent years. The SC discussed that there has been a major

expansion in the deepwater shark fishery and that this indicates that data collection for this fishery should be a priority. The EU clarified that the earlier catch data collection was not as consistent as in recent years and data checking had identified some potential double counting. The EU is checking the records collected by industry and will provide any updates to the SIOFA database if required.

59. The Chairperson **noted** the constraints around the lack of availability of the data required for SC work, in particular catch and effort information. This was partly due to the delay in hiring the Data Manager and also because a proper quality control process has not yet been done. The Chairperson noted that it was undesirable to be in the same position in 2019, as it compromised the ability of the SC to undertake its work.

60. The SC **requested** that a draft overview report be provided by the Secretariat 30 days before the meeting. This would enable checks in consistency with the Secretariat's data holdings and those of CPs. The Data Manager noted that they could provide charts of the national report catches against the catches in the database to allow checks for consistency.

61. The Executive Secretary clarified that the SIOFA Data Manager would be working roughly two weeks on and two weeks off in line with the MoPs agreement that this be a 0.5 full time equivalent position. The SC **noted** that it was concerned that this may not be enough resourcing given the large amount of work required in the initial stages of the fully implementing the SIOFA database, including data validation and quality controls, and other related issues.

## Agenda item 5 – Scientific Data Standards

### Agenda item 5.1 SIOFA Scientific Database

62. The SIOFA Data Manager gave a presentation on the status of the SIOFA Scientific Database. The presentation described data flow (i.e. how data provided to the Secretariat are fed into the SIOFA database). Key databases (e.g. 'bins') underlying the database include the tow-by-tow data (fine scale data per fishing operation, e.g. catches and gear details per fishing operation), observer data (data collected by on-board observers, include catch and effort, biological data, environmental information etc.), catch summaries (aggregated based on national reports), codes list (e.g. code lists used in every database; each code has a unique identification number), and vessel information (each vessel has a unique SIOFA identifier code). All metadata are recorded with these data. Various levels of data aggregation are used depending on the data type and the requirements of CMM 2017/02 and CMM 2016/03.

63. The Data Manager noted that there have been some issues with species coding.

64. The Data Manager discussed the physical security of the SIOFA database and noted that the database is stored in a secure physical and electronic location (and is password protected). The Data Manager clarified that the IT manager of Direction de l'Alimentation, de l'Agriculture et de la Forêt de La Réunion (DAAF), the French administration building that hosts the SIOFA Secretariat, DAAF also has access to the locked room in which the database is held.

65. It was clarified that PostgreSQL and QGIS are the main software systems being used for the database and GIS applications, respectively.

66. The SC discussed sharing of SIOFA information relevant to scientific research with other RFMOs and the broader scientific community (e.g. the International Seabed Authority (ISA)) as potential collaborators. Collaboration was encouraged however for

any collaboration sharing of data would need to be consistent with CMM 2016/03 on data confidentiality.

67. The International Union for Conservation of Nature (IUCN) noted that the Biodiversity Beyond National Jurisdiction (BBNJ) September 2018 conference represented a chance to ensure RFMOs have a role in collaboration and noted the benefits of SIOFA expressing willingness to undertake a strong role in future work in this space.

68. The SC discussed the data confidentiality and security requirements for 'end-user' applications where the Secretariat provides data to an external party (e.g. end user). An issue to be resolved is the secure transmission of data, with respect to confidential data, with the preference to use a process that is more secure than email. It was also clarified that in line with the data confidentiality CMM 2016/03, end users cannot pass on confidential data and that they are required to destroy data once it has been used for the specified purposes. The end users usually have a legal requirement to do this.

69. The SC noted the work of the SAWG can include data that are not collected by observers (e.g. crew sampling of biological data, or sources of data such as processed age frequencies), and discussed whether the architecture of the database should be established such that this information is stored in a separate database in the information system. The Data Manager noted that they would investigate solutions to address this situation.

70. The SC noted these types of datasets are not normally submitted to SIOFA by CPs. The data standards CMM 2016/02 currently contains voluntary observer data standards.

71. Variation in vessel gear details were noted as an important aspect that can assist the SC's deliberations and the Data Manager noted that these characteristics could be included. It was also noted that these data could be commercially sensitive, and the SC noted that this fine-level information would not be included as part of the publicly available SIOFA vessel register.

72. The allocation and publication (on the vessel registry) of a SIOFA vessel identification number was discussed.

73. The Data Manager advised that the development of the observer database would be done over the next few months.

74. The SC discussed that the sharks ERA report highlighted the need for better identification of deepwater sharks, and that this requires harmonised methods and processes for collecting these data. It was recalled that the SAWG also discussed risk assessment work for multiple teleost species (including Thai fisheries) and that the outcomes of this work are dependent on the best available information. The SC discussed that mandatory observer standards would assist with this process.

75. In relation to agenda item 5.1, the SC:

    - **requested** the SIOFA Database Manager to investigate and implement protocols for the secure transfer of confidential data (for example file transfer protocol (FTP) or encryption methods) to end-users.
    - **requested** the Secretariat to prepare an annual data holdings report including challenges for presentation at each SC meeting to assist the SC in its deliberations.
    - **recommends** that additional work is required on the harmonisation of sampling protocols for the collection of biological and species identification data, particularly for bycatch species.

- **recommends** that work is progressed intersessionally in relation to data collection and sampling protocols for stock assessment inputs, including for acoustic and catch history data

*Agenda item 5.1.1 Exchange of SIOFA data*

76. The SIOFA Data Manager showed a summary of the current data holdings (i.e. data coverage by year and flag-state) for the tow by tow and summary catches databases.

77. The Data Manager asked that scientific names as well as common names are included in national reports. It was noted that the data standards CMM specifies the use of FAO Codes.

78. The SC **requested** that the Data Manager's report include the quality control process and issues that had been identified with data submission.

**Agenda item 5.2 Observer coverage**

79. Paper SC-03-05.2(01) introduced the Electronic Reporting and Electronic Monitoring System (ERS and EMS) that is the requirement by law for Thai oversea vessels. Although the priority of the use of ERS and EMS is for compliance purposes, the system has the capacity to record and report the scientific fisheries data and information to fulfil scientific purposes. The presentation of this paper is to recommend the SC to include study of Thailand on the efficiency of electronic observer program in the SC Workplan to identify the minimum requirement for electronic observer coverage levels to complement human observer coverage levels. The determination on the proportion of human observer to electronic observer coverage is the main objective of the proposed work plan.

80. The SC discussed the costs of electronic monitoring in terms of the equipment required, but also additional costs that are incurred on land by technicians and data processors. It was noted that Electronic Government Agency of Thailand received data sent from vessels via satellite and then the data will be interpreted for use by the Fisheries Monitoring Center and fisheries biologists of the Thai Department of Fisheries.

81. The SC discussed that different coverage levels, and combination of electronic monitoring/human observer coverage, should be considered in the context of the research (or compliance) needs. It was clarified that the intention of the use of electronic monitoring in Thai fisheries is to complement, rather than replace, human observers. Thailand noted that it is seeking advice on the proportion of coverage of electronic monitoring to human observers required to meet the observer coverage requirements.

82. Australia noted that its experience with electronic monitoring for domestic fisheries was that fishing operation information such as positioning, haul times etc. could be collected using electronic monitoring with good accuracy. For Australia's non-trawl fisheries, electronic monitoring has been used primarily as a verification tool for vessel logbook data. Australian applications of electronic monitoring includes 100% camera coverage with the minimum of a random 10% of the footage audited by its fisheries regulator. Australia commented that this process has increased the accuracy of logbook reporting for non-retained species. In terms of trawl fisheries, there remain challenges and there will need to be further research to improve its application in monitoring trawl vessels in Australian domestic fisheries.

83. The Chair noted that MoP adopted Annex G of SC2 report 'Guidelines for evaluating and approving electronic observer programs for scientific data collection' in 2017. It

was noted that the SC's conclusion at SC2 was that 'electronic monitoring complements rather than replaced on-board observers and could free up observers to undertake other activities'. Therefore, the SC could not develop guidelines to approve an electronic observer program as a whole, but rather guidelines to review how electronic monitoring equipment satisfies each data fields in the data standards' (paragraph 44 SC2 report).

84. The Chairperson reminded the meeting that, in accordance with CMM 2017/01 paragraph 32, the SC is required to review the observer coverage levels prescribed in paragraph 31 at its ordinary meeting in 2018. The observer coverage levels are 100% for bottom trawl and 20% for all other bottom fishing methods.

85. No papers were provided in relation to this specific requirement.

86. It was discussed that different levels of observer coverage are required for different purposes. The SC discussed the role of observer data is not just the biological information it can provide, but also for the verification of logbook data (both of which are used in stock assessment).

87. The SC discussed that while there are standards for the provision of data, there are no SIOFA standards for the collection of biological data. It was suggested that sampling protocols for CP observer programs were put forward to the SC, or that the SC decide on its own suite of protocols. Annex B of CMM 2017/01 does not specify protocols in detail. The Cook Islands noted that all the biological data made available for the orange roughy stock assessments had been collected under the protocol established in FAO 1020 that was updated in 2012, and it would be valuable to maintain the standard in future data collection for all CPs. It was noted that in 2017 the sampling regime for orange roughy was amended, to allow age composition data to be collected.

88. The SC noted that the Secretariat is unable to generate a data inventory of observer programs, by CP, fishery and species to understand what has been collected and the coverage, due to the limited submissions of observer data. Observer data has only been submitted by one CP. Providing a data inventory of current observer data programs will require substantial work to be undertaken and completing this by SC4 may be best achieved by a consultancy.

89. Thailand requested the SC to include the study on observer coverage in the work plan.

90. In response to the requirement to review observer coverage levels (CMM 2017/01 paragraph 32) the SC:

- **Noted** that additional background information is required to consider the types and level of observer coverage in relation to specific research, scientific committee work and/or other needs. This includes consideration of the needs of the Compliance Committee, which are beyond the remit of the SC.
- **Agreed** that a review of data holdings (i.e. an inventory) of observer data held by CPs (by fishery, species) be compiled intersessionally using a consistent template. The template should include information on the sampling protocols/regimes. In this regard, CPs were **requested** to provide a summary of relevant data holdings and the SC **noted** that resourcing would be required for this work
- **Agreed** that an investigation of observer coverage type and levels (i.e. %) of coverage should be included explicitly in the SC's workplan, and that this investigation consider the type of data required for scientific processes. This includes investigation of data collection plans that are in place, and a useful starting point would be to consider whether data currently being collected can be used to inform stock assessment. This investigation could be structured

against the requirements of the SC's workplan in terms of whether requirements for observer coverage levels and types (e.g. human vs. EM) would provide suitable information to assist in the SC's work. In this context, the SC **requests** the ERAWG and SAWG to provide guidance on the types of observer data required to support their key functions.

- **Advises** the Meeting of the Parties that the SC cannot currently review the appropriateness of the current observer coverage levels, as there is little observer coverage data being provided at this point in time and the question of the appropriateness of coverage levels is dependent on the specific scientific needs and uses for these data. The SC should be able to undertake this review if the data inventory and other steps described above are completed before SC4.

#### Agenda item 5.3 Voluntary observer data

91. In accordance with CMM 2017/02 paragraph 13, the SC is required to review CMM 2017/02 Annex B Voluntary Observer Data.

92. In relation to its review of Annex B Voluntary Observer Data, it was noted that there may be a contradiction between the requirements of the bottom fishing and data standards CMM in that the former requires 100% observer coverage, and yet provision of observer data is voluntary. The SC indicated that that the collection of observer data would ideally be mandatory, and not voluntary, to better assist the SC and its working groups to meet their objectives. However, consensus could not be reached as it was thought there was still work to be done on various aspects, in particular consistent protocols for the collection of observer data.

93. In relation to the requirement to review CMM 2017/02 Annex B, the SC **advises** the Meeting of the Parties that the SC cannot currently review Annex B Voluntary Observer Data, as there is little observer coverage data being provided to the Secretariat at this point in time. The SC should be able to undertake this review if the data inventory and other steps described above (paragraph 90) are completed prior to SC4.

## Agenda item 6 – Vulnerable Marine Ecosystems

94. Paper SC-03-06(02) describes a new data acquisition protocol for benthos bycatch in the French fisheries of the Indian Ocean and the Southern Ocean. In 2015, the *Muséum national d'Histoire naturelle* began development of a new data acquisition protocol for benthos bycatch in the French fisheries of the Southern Ocean (statistical areas 58.5.1, 58.6, 58.4.3a, 58.4.4b, 58.4.2) and the Indian Ocean (SIOFA Area). France (Territories) proposes this protocol to be adopted by SIOFA for all the fisheries of the area. This protocol aims at producing presence and abundance data of the benthic macro-invertebrates collected by the fishing gears. The main objective is to increase knowledge on the benthic ecosystems impacted by the French fishing activities, in a context marked by the CCAMLR conservation measures for Vulnerable Marine Ecosystems (VME) protection and the Marine Protected Areas (MPA) development and in the short term to decrease this impact. The protocol is based on collecting, weighing and photographic sampling of the benthic macro-invertebrate specimens. A description of the protocol is provided in SC-03-06(02). Preliminary results on quality and quantity of produced data are provided as well some examples of scientific exploitation. The new protocol provided significant results. SIOFA could

use part or whole of the protocol to implement in the fisheries scientific monitoring activity.

95. The SC queried whether there were difficulties with the large number of samples that could be collected and whether this could become a large workload for the *Muséum national d'Histoire naturelle*. It was noted that the main time cost is in the laboratory rather than on the boats. It was noted that trained technicians in the laboratory can do the identification efficiently, and that some parts of the identification and record keeping process can be automated. It was noted this has been adopted voluntarily in France (Territories) fisheries.

96. The SC discussed whether the databases generated from the provision of samples would be open-source or whether they would be retained internally by the *Muséum national d'Histoire naturelle*. It was noted that systems to spread the data and employ a collaborative approach to research could be developed.

97. The relationship between this work and considerations of the SC was highlighted, including the potential use of such data for informing the implementation of protected areas.

98. It was clarified that the current database includes data from longline and research trawl vessel interactions with benthic taxa. The Kerguelen map showed only data from 27 taxa with which trawl vessels interacted. The SC discussed that the use of such a technique may be limited in situations where only a very small proportion of habitat on or around a particular feature could be fished.

99. The SC queried whether such a technique could be used for fish species as well as taxa. In response, it was noted that sampling fisheries may be at such a scale that it would be too time consuming but would need further reflection.

100. In relation to paper SC-03-06(02), the SC welcomed the efforts made by France (Territories) to develop the protocol, and noted that it represented a significant step forward in understanding of identification and distribution of benthic taxa.

101. The Cook Islands noted the recording of sharks and fragile benthos in South Indian Ocean program that is under way at FAO with the Smartforms program, as part of the ABNJ Deep Seas Project. This system is now in rapid development, and is linked to the long term time series of VME indicator species and interactions under a standardised format that was had been used by the trawl fleet in SIOFA since 2006. The Cook Islands suggested this is the preferred system for such data collection in SIOFA, supported by FAO with a global team of specialists in both shark identification and benthic species. This is the system being used by the Cook Islands observers.

**Agenda item 6.1 Maps of where VMEs are known to occur, or likely to occur, in the agreement area**

102. CMM 2017/01 paragraph 5b tasks the SC with developing maps of where VMEs are known to occur, or likely to occur, in the Agreement Area.

103. At SC2, the SC requested that the Secretariat create maps using georeferenced data, and requested that Parties provide or facilitate provision of other data available from surveys to be incorporated into these maps (paragraph 61 of SC2 report). The SC also requested that the Secretariat work with the FAO ABNJ Deep Seas Project on their planed mapping of data from VMEs in the SIOFA Area (paragraph 62 of SC2 report).

104. The Executive Secretary noted that the progress on the ABNJ project has been limited for some time due to the departure of the former project coordinator. A project steering committee meeting will occur around mid-April, which the Executive Secretary will

attend. The Executive Secretary offered to take any advice or requests from the SC to the meeting.

105. The SC discussed that the France (Territories) benthic taxa sampling protocol could provide inputs for habitat mapping and assist with meeting the SC's requirement to develop maps of where VMEs are known (or are likely) to occur.

106. The FAO VME database was discussed. This database is based on VME maps reported to FAO, and these reported VMEs are placed into a global map. It was understood that no VME reports from the Indian Ocean had been placed into the database and that an update of this information was required. A key difference between the SIOFA database and the FAO VMEs database is that the FAO database contains data from other sources (e.g. IUCN). Collaboration with or use of the FAO VME database may assist the production of maps of the distribution of VMEs.

107. In response to the recognition that VME locations were being identified through the Bottom Fishing Impact Assessment (BFIA) and protected areas' proposal review process, it was noted that any SIOFA VME maps would need to be updated to include this information.

108. VME data submissions to the Secretariat were discussed. The observer database, once finalised, includes fields for the incorporation of VME data. The SC recognised that the SIOFA database may need to hold other VME data.

109. The SC **requested** the Secretariat consider how additional VME data would be included in the database.

110. The SC discussed that the mapping of where VME are located cannot yet been done by the SC due to the fact that necessary raw data have not been transmitted from the CPs to the Secretariat.

111. Discussions of the SC highlighted three important issues about VME mapping:

- The need to have a common definition of the "VME" concept, including indicator species, in SIOFA
- The need to have a common data collection protocol
- The need to share the data about VME locations.

112. It was discussed that VMEs are defined in CCAMLR as both a scientific and regulatory concept, whereby a series of taxa (e.g. sponges, corals and other groups) are considered to be indicators of VMEs. It was noted that VMEs are defined in line with CCAMLR rules when a catch of certain thresholds (e.g. 10 units or litres for longline) is met or exceeded. The CCAMLR, "VME" includes three nested concepts:

- benthic organisms
- a list of taxa considered to be VME bioindicator, mostly taxa of builder animals and/or suspension feeders
- thresholds of catching limits of benthic organisms belonging to VME bioindicator taxa. These thresholds depend on the fishing gear.

113. The SC discussed that other RFMOs have also discussed this issue and the SC could consider approaches applied to the definition of VMEs elsewhere (e.g. CCAMLR or RFMOs).

114. In the absence of a SIOFA definition of the VME concept,

- **agreed** that a common definition of the VMEs is required

- **agreed** that a common data collection protocol should be adopted by the CPs. The benthos data collection framework presented by France (Territories) could be a source to build such a common protocol.
- **Noted** that data sharing could be done through the Protected Areas and Ecosystems Working Group and a common database.

**Agenda item 6.2 Bottom Fishing Impact Assessments (BFIA)**

115. The SC recalled, that in accordance with CMM 2017/01 paragraph 14, any Contracting Party, CNCP or PFE that authorises or is seeking to authorise any vessel flying its flag to bottom fish in the Agreement Area, shall, at least 30 days prior to the commencement of the ordinary meeting of the Scientific Committee in 2018, submit to the Secretariat a Bottom Fishing Impact Assessment (BFIA) for its individual bottom fishing activities. BFIA were submitted by Japan, Cook Islands, Thailand, Australia, EU (EU-Spain and EU-France) and France (Territories).

116. The SC is required to review submitted BFIA in accordance with CMM 2017/01. The SC shall consider all BFIA and provide advice in its meeting report as to:

    (a) the likely cumulative impacts of bottom fishing impact activity from vessels flying the flag of a Contracting Party, CNCP or PFE in the Agreement Area; and
    (b) whether each BFIA meets an appropriate standard in light of international standards and the SIOFA Bottom Fishing Impact Assessment Standard (BFIAS), where applicable.

117. The Chairperson highlighted that given the age of Australia's assessment (published 2011), Australia had undertaken a review (SC-03-06.2(08) of the level of alignment between its BFIA and the SIOFA BFIAS. Australia presented this review to the SC. This review noted areas of the BFIAS that were not thought to be useful for informing the assessment of fishing impact and risk.

118. Japan presented papers SC-03-06.2(01), SC-03-06.2(02) and SC-03-06.2(03) report the provisional BFIA for Japanese bottom trawl, midwater trawl and bottom longline fisheries in the SIOFA Area in accordance with CMM 2017/01 paragraph 14 and the SIOFA BFIAS (Annex I, SC2 report). In the SIOFA Area, only three exploratory research fishing cruises were conducted by Japanese bottom trawl vessels in 1977, 1978, and 2012. Based on best available information, Japan conducted the impact assessment on Japan's bottom trawl fishing operations. At present, there is no schedule for bottom trawl operation by Japanese vessels in SIOFA area. This document reports impact assessment based on past operation records. In the future, when a Japanese vessel carries out bottom trawling operation in SIOFA area, the revised BFIA will be prepared based on the operation plan. For the midwater trawl fishery, there were 11 years of operations in 2001–2002, and 2009–2017 by the three vessels. Although all vessels conduct midwater trawl operation with basically no contacts between seabed and fishing gears, actual trawling forms differ depending on the vessels equipment, especially power of main trawl winch. Based on best available information, Japan conducted the impact assessment on Japanese midwater trawl fishing operations by two trawling types separately. For the longline fishery, there were 9 years of operations in 2004-2010, 2013 and 2017 by the same vessel. Based on best available information, Japan conducted the impact assessment on Japan's bottom longline fishing operations.

119. In relation to Japanese orange roughy catches for 2001, it was discussed that total catch associated with a daily position could be provided but that tow-by-tow data were not available. It was noted that Japan submitted the 2001 data with 30 minute resolution to the Secretariat for orange roughy stock assessment.

120. The SC discussed the bottom trawl exploratory research fishing noted in Japan's BFIA. It was clarified that catches from this exploratory fishing are sold into the market but that these operations differed from commercial fishing operations.

121. The Cook Islands presented Paper SC-03-06.2(04) the BFIA of Cook Islands. The Cook Islands presented their comprehensive BFIA, and noted that it met the minimum standard of the BFIAS, and took into account the cumulative impact of all trawling activity. Full habitat mapping of the SIOFA area had been undertaken, and that the Cook Islands was the only CP to undertake such work, and that much of this had been undertaken prior to the start of fishing, well before it formed part of the United Nations Resolution. This had enabled the definition of some VMEs in the region, and fishing vessels to avoid adverse impacts. The full habitat mapping also allowed a robust calculation of the fishable habitat between 1 and 1500 metres in the SIOFA area. The cumulative impacts of trawling were addressed in several ways. Target bottom trawling was described and the short duration of most trawls with over 35% being less than 10 minutes with bottom contact. A large set of fine scale bottom trawl data, to 10 metre accuracy, was processed in a GIS system by the Cook Islands data manager and this allowed the fished footprint to be calculated. This analysis followed the same approach as carried out by Australia and New Zealand for the bottom fishing impact in SPRFMO, except for more precise data being used by the Cook Islands. It was noted that SPRFMO had noted that scale was important in assessing impacts. An assessment of fished area using the swept area of the groundrope of a bottom trawl, for the Walters Shoal region was only 0.16% of the fishable habitat in the area, and 0.74% for the Southwest Indian Ridge. This was likely to be the total cumulative impacted area for the entire historical bottom trawl fishery, as almost all of the limited number of trawl corridors in the SIOFA region are known and fished by the Cook Islands vessels. This fished area was critical for the risk assessment put forward.

122. The Cook Islands scoping analysis looked at the likelihood of a target orange roughy trawl shot being carried out on a VME. This was extremely low and fishing was independent of VME distribution, because global evidence showed that most orange roughy do not aggregate over VMEs, and extensive research in SIOFA had confirmed this. However even if it was assumed that 100% of the 1-1500 m habitat in the SIOFA area was VME, less than 1% could have had a significant adverse impact. It was noted that many of the earlier predictive models used to assess potential VME habitat in the past had often excluded zero data, and this had proven to be a critical issue in spatial planning. When zero data are included, stony corals have been found to be patchy in their distribution, and often localised in areas of steep and rough topography. The relatively small spatial scale of biological distribution compared to the relatively large-scale environmental parameter knowledge is a challenge. The Cook Islands did not support this type of research continuing to be part of any BFIAS requirement.

123. The Cook Islands BFIA noted the extensive research programs carried out by Cook Islands vessels over many years, and how this underpinned the current orange roughy stock assessment. The SAWG has now confirmed the sustainable fishery that has been operating. For other species the BFIA noted that the extensive research data, including acoustic surveys gathered for Alfonsino would assist stock assessment for this species in 2018.

124. The Cook Islands noted that the full historical fished footprint at 20 by 20 minute resolution, that complied with both the SC and Commission protocols, including shapefiles has been provided to the SIOFA Secretariat.

125. The Cook Islands noted the full compliance with the requirements of CMM 2017/01 relating to the provision of a BFIA and that the BFIA satisfies the requirements of the SIOFA BFIAS and international standards in accordance with paragraph 15(b) of CMM 2017/01.

126. In relation to the Cook Islands BFIA, DSCC (Deep Sea Conservation Coalition) noted that there is significant research that considers the impact of various fishing gear on specific species even for short periods of encounter. There is also documentation on the duration of impact. DSCC asked whether this information was reviewed in the analysis. In response, the Cook Islands noted that the impact and duration was acknowledged to be high and long term but that the assessment of impact is 'low' when considered as a proportion of the total fishable area.

127. DSCC also queried the seven VMEs that had been identified through the habitat mapping and hoped that these would be included in the VME map being compiled by the Secretariat. The Cook Islands noted that this mapping identified habitat that was sandy or muddy habitat that was previously thought to be VMEs.

128. The Cook Islands stated that the analysis of trawl tracks used in their analysis were for Cook Islands and Australian fishing operations, and as such the Cook Islands BFIA considers cumulative impacts. Cook Islands acknowledged that any trawl impact on a VME was likely to be severe and long term, but that impact was considered in the context of the proportion of fishable areas.

129. The Cook Islands advised that Paper SC-03-06.2(05) detailed the Cook Islands Seabird Mitigation Plan, which was provided to support the Cook Islands BFIA. A full Vessel Seabird Management Plan (VSMP) has been in operation on Cook Island vessels since 2012. These measures were adopted to ensure there is now zero risk to seabirds from the fishing operation, and follows the approach successfully adopted for factory fishing vessels in New Zealand.

130. In relation to this paper, the SC discussed the requirement to report interactions with seabirds and describe mitigation measures in national reports, and as such, suggested that consideration of seabirds interactions may be of limited relevance in the consideration of bottom fishing impact.

131. Thailand presented Paper SC-03-06.2(06) which details Thailand's BFIA for the SIOFA Area. This BFIA intends to assess the potential impacts of the bottom fishing activities of Thai vessels on relevant VMEs and deep sea fish stocks in the SIOFA area. The assessment used data and information from fishing logbook and observer reports of the trawl and trap fishery from June 2016 to February 2017. The information shows that fishing activities of the Thai fleet did not impact to any current Benthic Protected Area (BPA) as defined by SIODFA. Thailand acknowledged the assistance of the Secretariat for encouraging Thailand to provide data to SIOFA to ensure compliance with the relevant CMMs. Thailand noted that their BFIA had been peer-reviewed.

132. The SC discussed whether there was knowledge of VMEs in the Saya de Malha bank fisheries. Thailand clarified that the information provided was based on the historical logbook data, which included fields to record general bycatch but there were no specific fields to record corals or sponges. It was also discussed that bycatch is sometimes reported as a combined catch, and fine-scale information (e.g. on species) is sometimes not recorded. It was noted that this is a gap that needed to be addressed in future. There were observer reports of no catch of corals or sponges and Thailand suggested that this may be indicative of a lack of VMEs in the Saya de Malha bank area. The SC noted the very limited data available and the need for information from other fisheries in the region, observers and benthic habitat surveys.

133. The SC was informed that from the 4th May to 4th June 2018 there is a bottom habitat survey planned under the EAF-Nansen Programme on the Saya de Malha bank, which may help assess habitat and VMEs in this area. It was noted that Seychelles and Mauritius are involved in this survey.

134. Australia presented paper SC-03-06.2(07) Australia's BFIA for the SIOFA Area. As part of Australia's response to UNGA Resolutions 61/105 and 64/72 and the FAO

International Guidelines for the Management of Deep-sea Fisheries in the High Seas (FAO 2008), Australia produced a Bottom Fishing Impacts Assessment for SIOFA in 2011 (Williams et al. 2011). This BFIA considered the impact, risk and existing monitoring, management and mitigation measures in assessing the potential for Significant Adverse Impacts (SAIs) on Vulnerable Marine Ecosystems (VMEs). The long-term sustainability of deep-sea stocks was assessed on the basis of trends in historical catch and effort because quantitative methods of stock assessment (including those based on harvest strategies) require estimates of total catches in the SIOFA Area (from all Flag States and non-signatories). The BFIA conducted for Australian vessels fishing in the SIOFA Area concluded that overall risk of SAIs on VMEs by Australian vessels fishing with bottom trawls and bottom-set auto-longlines was low. The BFIA concluded that the current overall risk of SAIs on VMEs from midwater trawling and drop-lining by Australian vessels was negligible.

135. France (Territories) noted that the Australian BFIA was a good example of the BFIA that all CPs should produce.

136. Australia presented paper SC-03-06.2(08) that summarises Australia's BFIA for SIOFA fisheries in accordance with the requirement under CMM 2017/01. It describes the alignment between Australia's BFIA (published in 2011), CMM 2017/01 (adopted in 2016) and the SIOFA BFIAS (adopted in 2017). In relation to papers SC-03-06.2(07) and SC-03-06(08), Australia noted that its review of the level of alignment between its BFIA and the BFIAS identified a number of areas in the SIOFA BFIAS that do not appear to assist in the assessment of bottom fishing impact. In this regard, it was noted that there was potential duplication between the requirements of the BFIAS and other SIOFA requirements (e.g. CMMs, national reports etc.).

137. The EU presented paper SC-03-06.2(09) that provides a preliminary assessment of bottom fishing impact for the EU fisheries in the SIOFA Area. The EU BFIAs were prepared following the SIOFA BFIA standards (SIOFA CMM 2017/01) which in turn were in accordance with the FAO Guidelines. The two main fishing fleets operating in SIOFA CA are the Spanish Longline fleet and the French Longline Fleet. Two BFIAs were prepared one for each of those fleets. Each BFIA make technical description of the fishing gear used, the fishing fleet size (composition), the fishing effort given in appropriated units (e.g total length of the fishing gear laid over the bottom) for year and by bathomes (*sensu* Last et al., 2010).

138. The BFIA for the Spanish fleet provides estimates of footprint index and footprint impact, which were determined following the methodology developed by CCAMLR for the autoline longline system (SC-CAMLR XXX, Annex 7, Appendix D). For this purpose, a 10'x10' grid was adopted and such spatial resolution may produce an overestimate of the impacted area. A brief note regarding the VME taxa potentially affected was included but a quantitative study on VME is now going on at the Spanish Institute (IEO).

139. The BFIA for the French fleet also included a list of target species, the ratings of benthic habitat and by-catch impacts for longline-demersal hook and line (Chuenpagdee et al., 2003 & Williams et al. 2011b). A footprint map is presented, which put into evidence that fishing is concentrated on the Saya de Malha Bank, north east of La Réunion. The footprint used a 1ºx1º grid which may also overestimate the impacted area by longlines. Important to note that French authorities allow only a total 233 days of fishing activity per year in SIOFA CA. This period is equal to the fishing effort performed by the French fleet in 2013. The 2013 fishing effort was frozen and adopted by France accordingly to the SIOFA resolution 2017/01).

140. The SC discussed the need for information on the status of the stocks that are being targeted. The EU clarified that the species noted in BFIA for the French fleet included deepwater snappers and groupers in the Lutjanid and Etelis families, ornate jobfish (*F.*

*Pristipomoides*). The need to provide scientific names (and FAO codes) was reiterated.

141. The SC discussed the spatial extent of fishing and impact indices for the autoline longline system presented in the EU BFIA. EU noted the sources of these methods (e.g. SC-CAMLR XXX, Annex 7 Appendix D). The EU clarified that it was thought the current fishing effort and location would be maintained for the foreseeable future.

142. France (Territories) presented the BFIA for France (Territories) (SC-03-06.2(10)), noting that its fishing in SIOFA is undertaken opportunistically by vessels that are fishing on Kerguelen and Crozet fishing grounds. It was discussed the effort quota for France (Territories) is divided by the number of vessels in the fishery (7), i.e. the total days fished remains the same and if the seven vessels fish, effort is required to be shared. It was clarified that the total effort quota is not currently used by the two active vessels. The SC sought clarification of the total extent of fishing effort, and it was noted that the Figure 6 in the France (Territories) (SC-03-06.2(10)) BFIA shows where fishers are authorised to fish.

143. A small working group (SWG) was formed to consider the alignment between BFIA and the BFIAS and to provide advice in this regard. The SWG discussed the BFIAS and noted the different interpretation placed on these standards by the CP. A Working Document summarising all the BFIAs was briefly reviewed, and an agreement reached for each CP to review this report and revise the summaries of their BFIAs as necessary (Annex F).

144. The SWG discussed that identifying gaps in the BFIA would aid with developing SC guidance on the next steps for estimating the cumulative impacts of SIOFA fisheries. The SWG examined the Australian BFIA review (SC-03-06.2(08)) as a template for this gap analysis. The SWG found there was not uniform agreement on many aspects of the standard that had been set for the contents of the BFIAs (Annex G). This analysis also identified that there were different calculations and interpretations of risk among the BFIAs

145. It was agreed a recommendation should be made to MoP that there was not satisfactory agreement on what the Standard may require and thus further effort will be required to progress the SCs work on cumulative impacts. This was not least because the different interpretations had resulted in CPs taking different approaches in the provision of the BFIAs, even though in some cases similar data had been available at the national level to satisfy what was required.

146. There was discussion about the differences between the trawling BFIAs and the static gears BFIAs. It was agreed that the trawl BFIAs of Australia and the Cook Islands had access to more data and were thus able to meet most components of the BFIAS. Australia's static gear BFIA also met most components of the BFIAS.

147. The other static gear fisheries were more data limited and many of the risk assessments were more qualitative in the methods applied. The BFIAs for static gears however had mitigated risks from fishing on benthic habitats by the various measures that had been adopted by CPs to minimise impact. The SWG agreed that the BFIAS provided a benchmark to try to meet, and should promote continuous improvement as data are accumulated.

148. The SWG also had preliminary discussion on the benefits of a specific research framework to collect and analyse potential VME areas and benthos. The outlined framework discussed was oriented towards a robust spatial mapping of benthos organisms and/or of potentially spatial distribution of VME areas. This would be specially designed to improve the qualitatively and quantitatively benthos data collected on-board commercial vessels operating in SIOFA by scientific observers, or even by non-specialized observers. Collection and reporting of interactions with

benthic organisms under this common framework would improve the SC's capacity for quantifying impacts of fishing as the data is accumulated through time. The SC discussed that few (if any) BFIA are able to address cumulative impact across all fisheries. Some of the terms being used may have qualitative interpretations (e.g. significant adverse impacts), which is a key challenge in that attempts are being made to apply these terms in a quantitative context. A qualitative approach cannot consider cumulative impact unless all information is considered at the same time, highlighting the need for a collaborative approach.

149. With regard to assessing the cumulative impact of SIOFA fisheries, the SC:

- **Recommend** to the MoP that it was not possible to provide an assessment of the cumulative impact of all SIOFA fisheries at this time from vessels flying the flag of a Contracting Party, CNCP or PFE in the Agreement Area in accordance with CMM 2017/01. This was due to the differences in data and approaches in the BFIAs provided.
- As the Secretariat holds the available fine scale fishing effort data, they are **requested** to assist CPs in undertaking GIS work on the spatial extent of fishing to aid CP work to assess cumulative impacts. This will depend on the availability of the Database manager
- Progress could be made for particular gears/fisheries, where similar data and the impact assessment approach are available (bottom trawl, static gears and for the trawl fisheries on the Saya de Malha bank). The SC **requested** the CPs who share particular fishing/gear characteristics to work together to develop a cumulative impact assessments for each fishery type as describe above. These cumulative assessments will be considered by SC4

150. A working document was tabled that provided a summary of the interpretation of risk and impact, the methods used for assessing risk and impact, and the overall findings from the CP's BFIA (Annex F).

151. In relation to all BFIA, the SC:

- **Noted** the efforts made by Australia, Cook Islands, EU, France (Territories), Japan and Thailand to comply with the requirements of CMM 2017/01 and the SIOFA BFIAS.
- **Noted** that there are large differences in the submitted BFIA in terms of the interpretation of, and methods used to determine, 'impact' and 'risk'
- **Noted** that there are varying levels of alignment between the submitted BFIA and the SIOFA BFIAS and FAO International Guidelines for the Management of deep-sea fisheries in the high seas
- **Reiterated** that the overarching objective of this work is to consider the cumulative impact and risk by all fleets/methods of fishing across the entire SIOFA Area
- **Reiterated** the need to review the SIOFA BFIAS (as per the SC's Workplan and CMM 2017/01) to ensure SIOFA's objectives in this regard are met.

#### Agenda Item 6.3 SIOFA Standard protocols for future protected areas designation

152. The Chairperson reminded the SC that the SIOFA Standard protocol for future protected areas designation ('the protocol'; Annex H of SC2 report) was adopted at the 2nd meeting of the SIOFA Scientific Committee in March 2017 and by the 4th Meeting of the Parties in June 2017.

*Agenda item 6.3.1 SIOFA Protected areas working group*

153. The protocol (Annex H SC2 report) included the creation of a dedicated working group within the SIOFA SC to analyse information in relation to protected areas, with such a group to prepare reports to be considered by the SIOFA SC (at least 30 days before meetings). This working group was not formally established during 2017, although a meeting of an informal steering committee on Australia's initiative was convened in November 2017 to provide guidance on the formulation of proposals for protected areas and a review of the protocol (see SC-03-INFO-06). The proposed date to meet for this steering committee did not enable all members to participate. The progress and conclusion of this group were transmitted to the Secretariat before the SC meeting and uploaded on the website for consideration.

154. The SC agreed that while this element of the protocol had not been implemented yet, this did not prevent the SC testing the protocol and discussing the submitted proposals against the protocol to determine whether or not the protocol's criteria were pertinent and clear enough.

*Agenda item 6.3.2 Proposed protected areas*

155. The following proposals were submitted by Australia for evaluation by SC3 against the SIOFA Standard protocol for future protected areas designation:

- East Broken Ridge (SC-03-06.3.2(01))
- Atlantis Bank (SC-03-06.3.2(02))
- Banana (SC-03-06.3.2(03))
- Bridle (SC-03-06.3.2(04))
- Coral (SC-03-06.3.2(05))
- Del Cano Rise (SC-03-06.3.2(06))
- Fools Flat (SC-03-06.3.2(07))
- Gulden Draak (SC-03-06.3.2(08))
- Mid Indian Ridge (SC-03-06.3.2(09))
- Middle of What (MoW) (SC-03-06.3.2(10))
- Rusky (SC-03-06.3.2(11))
- Walters Shoal (SC-03-06.3.2(12))

156. IUCN noted that since 2006, it has supported the voluntary effort and preservation of areas by SIODFA. IUCN noted that it was convinced of the value of working with industry to ensure resources are managed sustainably and biodiversity is conserved. IUCN noted that SIOFA is fortunate to have such strong engagement with industry, and that this is not always the case in other RFMOs. IUCN stated that it was pleased that Australia has put forward these proposal based on the SIODFA benthic protected areas.

157. France (Territories) noted its position that it supported protected areas in principle and noted that it protects large areas through various mechanisms, such as the interdiction to fish between 0 and 500m. Its view was that the original SIODFA proposals did not provide enough information and data and proposals were never officially proposed to the SC. It was noted that the protection of an area requires a level of information and

data sufficient to estimate that there is a risk that measures would need to be taken. It was stated that the deliberations of the SC need to be based on scientifically verifiable information. France (Territories) requested that all sources to support proposals for protected areas must be given to the SC to ensure that everything can be checked. It was noted that some protected areas proposals were based on GEBCO bathymetry and that this information was thought to be of low quality. There was also concern about the real position of seamounts and VMEs and that more precise information was required. France reminded that 6 protected areas' proposals were defined by Australia in its proposal as low-information ones.

158. Japan thanked Australia for the review of criteria and the proposal of protected areas. They noted the requirement to include detailed spatial information as to the location of protected areas, as there were some industry concerns in this regard.

159. Australia presented a summary of the proposals against the criteria. Australia considered that six proposed areas were information rich. Australia stated that for these proposals, compelling evidence of VMEs had been provided. It was stated that it would be likely that all forms of fishing under SIOFA's jurisdiction could damage and degrade the attributes of each area listed if contact by fishing gears occurs. No fishing currently occurs in any of the areas except for Del Cano Rise. The Del Cano Rise area straddles CCAMLR which has also identified this feature for protection.

160. Australia regarded the other six areas were defined to be more uncertain in terms of the evidence available. They generally satisfied fewer criteria. All had some evidence of VMEs except for Gulden Draak.

161. The SC recalled that in MoP4 report paragraph 12b the MoP requested the SC consider that there are various management measures possible (i.e. not just closure to fishing).

162. The SC discussed the following points in relation to the proposed protected areas:

- There may be a need to consider proposals against the spatial extent of fishing to assess the likely level of impact in these areas and evaluate the level to which some of these areas are considered as pristine or disturbed
- In the absence of perfect information, how does the precautionary approach apply when evaluating against the protocol
- Protected areas may need to be representative of the entire SIOFA area, in order to build an appropriate network of protected areas. Some areas (e.g. west) may be over-represented in the current set of proposals while other areas (e.g. north and east) may be underrepresented.
- Clarification of the definition of VMEs would assist in the assessment of proposals for protected areas
- The protocol does not specify the level of evidence required in proposals, and further clarification of this, including the level of quantitative evidence required, should be provided
- A lack of data should not be used as a reason to postpone the SC discussion of the proposals
- The timeframe for designation and review of protected areas could be considered based on the evidence available and the level of certainty around this information
- Temporary closures or other interim measures may help reduce risk to suspected or known VMEs until better information becomes available

- The protocol considers individual areas but that it was important to consider these areas in terms of broader networks of protected areas
- The citing of publicly available references in support of closed areas should be regarded as adequate evidence. IUCN noted that peer-reviewed data should be regarded as sufficient evidence, but where peer-reviewed info is not available then the detailed data should be provided by the proponent/s
- Fine scale data on the distribution of VMEs should ideally be provided in support of proposed protected areas
- Regarding Del Cano Rise, it was noted that collaboration with CCAMLR was required in terms of the species that are moving from CCAMLR to the SIOFA area, and that this information could be lost if this area was closed.

163. SIODFA noted that as an industry group, it acknowledges that it must avoid gratuitous destruction of biomass. Its value is an existence value from a societal point of view. Industry does not want to destroy VMEs if it can be avoided. SIODFA recognise that it must be demonstrated to stakeholders (importantly, buyers) that society expects industry to behave in a certain way. SIODFA noted that proposal of its bottom protection areas is the first step. If areas with high benthos density are encountered, and these can be closed, then they should be, particularly if there is no cost to industry. SIODFA noted that it advocated a step by step approach that did not rely on perfect information to implement a precautionary approach.

164. A small working group was established to consider revisions to the SIOFA Standard protocol for future protected areas designation and to test the revised protocol against some proposals. They reported that the revised protocol worked well in considering the 'tested' protected area proposals and proposed that the SC request the MoP to define Objectives to be included in the protocol.

165. The Scientific Committee **adopted** the revised SIOFA Standard protocol for future protected areas designation (Annexes H and I)

166. The SC accepted the following additional suggestions made by the small group to assist in the evaluation of specific proposals:

- all references in proposals be provided to the SIOFA secretariat, made available to those evaluating proposals and also archived with the secretariat.
- fishing effort and footprint information be provided by secretariat (if not included in a proposal).
- Additional detail in the number and details of any VMEs or VME encounters referenced in a proposal and whether a threshold was triggered be provided, and, where feasible, provided to the Secretariat to assist with the task of VME mapping

167. The SC discussed the confidentiality issues around location-specific information.

168. The SC then reviewed the protected areas proposals against the revised Protocol.

169. The following advice in respect of protected areas was formulated by the SC.

170. In relation to the Atlantis bank (SC-03-06.3.2(02)), the SC **noted** that the strong evidence presented satisfied criteria 5b Biodiversity representation and 6a Scientific interest of the revised protocol. The SC **recommends** to the MoP:

- that this site could be designated as a protected area; and
- that the MoP consider that fishing with all gears were identified as activities that may degrade the scientific and biodiversity value of the area.

171. The SC **noted** that the area contains VMEs and **recommended** that this information (such as taxa, location and quantities) be provided to the Secretariat. In line with the revised protocol, a research and management plan should be prepared for Atlantis bank within the next 12 months.

172. In relation to the Coral feature (SC-03-06.3.2(05)), the SC noted that the evidence presented satisfied criteria 3b Bioregional representation, 5b Biodiversity representation and 6a Scientific interest of the revised protocol. The SC **recommends** to the MoP:

- that this site could be designated as a protected area; and
- that the MoP consider that fishing with all gears were identified as activities that may degrade the scientific and biodiversity value of the area.

173. In relation to the need for more information to evaluate social, cultural and economic interest, the SC **requested** the Secretariat to provide relevant fishing and effort data for the area to assist the MoP's discussions. In line with the revised protocol, a research and management plan should be prepared for the Coral feature within the next 12 months.

174. In relation to the Fool's flat feature (SC-03-06.3.2(07)), the SC noted that the evidence presented satisfied criteria 3b Bioregional representation, 4a Geographic and/or unique representation and 5b Biodiversity representation of the revised protocol.

175. The SC **recommends** to the MoP:

- that this site could be designated as a protected area; and
- that the MoP consider that fishing with all gears were identified as activities that may degrade the biodiversity value of the area.

176. In relation to the need for more information to evaluate social, cultural and economic interest, the SC **requested** the Secretariat to provide relevant fishing and effort data for the area to assist the MoP's discussions. In line with the revised protocol, a research and management plan should be prepared for Fool's Flat within the next 12 months.

177. In relation to the Middle of What feature (SC-03-06.3.2(10), the SC noted that the evidence presented satisfied criteria 3b Bioregional representation of the revised protocol.

178. The SC **recommends** to the MoP that this site could be designated as a protected area.

179. In relation to the need for more information to evaluate social, cultural and economic interest of the Middle of What feature, the SC **requested** the Secretariat to provide relevant fishing and effort data for the area to assist the MoP's discussions. In line with the revised protocol, a research and management plan should be prepared for Middle of What within the next 12 months.

180. In relation to the Walter's Shoal feature (SC-03-06.3.2(12), the SC **noted** that the evidence presented satisfied criteria 3b Bioregional representation, 5b Biodiversity representation and 6a Scientific interest of the revised protocol.

181. The SC **recommends** to the MoP:

- that this site could be designated as a protected area; and
- that the MoP consider that fishing with all gears were identified as activities that may degrade the scientific and biodiversity value of the area.

182. In relation to the need for more information to evaluate social, cultural and economic interest, the SC **requested** the Secretariat to provide relevant fishing and effort data for the area to assist the MoP's discussions. In line with the revised protocol, a research and management plan should be prepared for Walters Shoal feature within the next 12 months.

183. In relation to the Del Cano Rise feature (SC-03-06.3.2(06)), the SC could not reach consensus that the evidence presented satisfied criteria 3b Bioregional representation, 4a Geographic representation and 5b Biodiversity representation of the revised protocol. One CP noted that the justification for the proposal for this area had a greater focus on mesopelagic and pelagic processes, and that more information was required on the benthic ecosystem in the area. As this is an area that shares boundaries with CCAMLR and national jurisdictions, the SC **agreed** that a collaborative approach to its consideration as a protected area was necessary.

184. The SC **noted** that it could not reach consensus for the other six proposed areas. The SC discussed that the key challenge was related to a trade-off between the requirement to apply a robust scientific approach and the need to be precautionary. The example was given of where move on thresholds may have been consistently triggered, or vessels had reported bycatch of VME indicator species, but that there was no peer-reviewed or other robust evidence available. It was discussed that in these circumstances, there is a risk that if fishing is allowed to continue, then the assets may be further degraded. DSCC noted that in other RFMOs, a consistent triggering of VME thresholds would be considered as adequate evidence for interim closures.

185. Some CPs noted that for sites that have been reviewed by CBD and listed as an EBSA, which involves numerous scientists in review, SIOFA's decision in relation to its protocol needs to be defensible. In relation to EBSA areas that overlapped proposed areas that were not included in the above recommendations, there was discussion that additional intersessional work would be required. The SC indicated that swathe mapping, where cited as available, should be included in any of these proposals.

186. Proposals such as those for Banana (SC3-06.3.2(03), Bridle (SC3-06.3.2(04), East Broken Ridge (SC3-06.3.2(01), Gulden Drake (SC3-06.3.2(08), Mid Indian Ridge (SC3-06.3.2(09) and Rusky Knoll (SC3-06.3.2(11) are scientific data limited. However, for some CPs the known records that VME thresholds have been triggered on these sites and other evidence (e.g. acoustic surveys for some locations) indicating the potential for VME presence and the need to consider precautionary management arrangements until improved information is obtained to assess them under the protocol as BPAs.

187. The SC discussed whether work on proposed protected areas could be considered intersessionally. It was clarified that any intersessonal advice on protected areas would need to be submitted to the MoP by 25 May 2018.

*Agenda item 6.3.3 SIOFA Standard protocol for future protected areas designation*

188. The SC recalled that the protocol included that: *the SC will review the draft criteria for recommending protected areas after the first submission of a working paper proposing a protected area recommendation. The criteria will be revised accordingly and agreed as a criteria for recommending protected areas*.

189. Paper SC-03-06.3(01) was presented by Australia, which details their review of the protocol and proposed amendments. The paper also proposes a template for the proposal and assessment of protected areas. Australia noted the need to consider the type of closure in the context of what information was available to support closure and

how this might influence the review period. For example, an evidence rich proposal/protected area may have a review period of 10+ years, whereas an evidence poor proposal/protected area may have a review period of within 5 years.

190. The Scientific Committee **requests** the MoP to define the objectives to be included in the SIOFA Standard protocol for future protected areas designation.

191. The SC **recommends** to the MoP that it adopts the revised SIOFA Standard protocol for future protected areas designation (Annexes H and I)

## Agenda item 7 – Stock assessment

### Agenda item 7.1 Stock Assessment Working Group (SAWG)

192. The SC recalled paragraph 6a of CMM 2016/01 that actions the SIOFA Scientific Committee to provide advice and recommendations to the Meeting of the Parties on the status of stocks of principal deep-sea fishery resources targeted, and, to the extent possible, taken as bycatch and caught incidentally in these deep-sea fisheries, including straddling fishery resources by 2019.

193. Dr Nishida, Chairperson of the SAWG, presented the report of the first meeting of the SAWG (SC-03-07.1.1(03)). The main areas of discussion centred around:

- A tiered assessment framework for SIOFA fisheries
- Stock assessment for seven orange roughy sub-regions
- Future work, including that planned for alfonsino, Patagonian toothfish and other species.

194. The SAWG Chairperson presented the discussion and outcomes regarding the SAWG's consideration of a tiered assessment framework for SIOFA fisheries (based on SAWG(2018)-01-INF06). Such a framework will provide direction for future work of the SC/SAWG and may increase the efficiency of the SC/SAWG's considerations given the large number of species with which SIOFA fisheries interact. It was noted that the quantity, quality and suitability of data will vary among species over space and time and that this variability is likely to influence the parameters that can be estimated, and the associated uncertainties. The tiered framework for prioritising stocks for status assessment was proposed based on the parameters that can be estimated given the data available. Such a tiered framework may eventually assist the SAWG and SC with developing transparent decision rules for advice on recommended biological catches and potential buffers (e.g. 'discount factors') that may be applied to account for assessment uncertainty. The recommended tiered levels consist of:

- Tier 1 Benchmark assessments that utilise catch data from fishery monitoring, ideally in combination with stock abundance from independent surveys, catch rates and biological data with the purpose of estimating depletion levels and fishing mortality rates.
- Tier 2 Data limited assessments that may utilise catch-only or simple indicators to track status (e.g. CPUE, size composition, Productivity-Susceptibility Analysis).
- Tier 3 No assessment necessary.

195. This tiered framework is not equivalent to those applied in some management approaches, where the tiers have been established to guide the application of harvest control rules and generate effort or quota outputs. Examples of these types of tiered

frameworks were presented in papers SAWG(2018)-01-INF06, SAWG(2018)-01-INF07 and SAWG(2018)-01-INF11.

196. Categorisation into Tier 1 and Tier 2 of the framework should be based on the data available. Species/stocks with data suitable for estimation of current fishing mortality and depletion should be categorised to Tier 1. Species/stocks initially considered for Tier 1 may be subsequently classified for Tier 2 assessment if the Tier 1 assessment diagnostics fail to satisfy SAWG review. Prior to categorisation into Tier 1 or Tier 2 the SAWG may place some species into Tier 3 (No Assessment required) based on the presentation of sufficient evidence that the species rarely interact with the SIOFA fisheries. Species not placed into Tier 1 or Tier 3 categories by default are placed in Tier 2. For a species with multiple stocks in the SIOFA area, stocks may be classified into separate tiers if appropriate.

197. A Scoping Analysis for each SIOFA species should be undertaken to assist categorising each stock into Tier 1 or Tier 2. The Scoping Analyses should include, a description of the fishery, the entire catch history and other relevant data available (such as length frequency, ageing, surveys, stock structure information etc). The Scoping Analysis should also include documentation of management objectives (if defined), existing management measures (if any) and the risks associated with fishing. Much of this information is already contained with Parties' Bottom Fishery Impact Assessments and other papers to the Scientific Committee. Catch data, observer records, expert opinion, and/or species distribution maps should also be considered as part of the Scoping Analysis. Fishing-specific risks may include (but not limited to): capture and retained; capture and discarded, capture and live release; and direct impact without capture.

198. Species/stocks placed into Tier 2 should be subjected to semi-quantitative risk assessment methods such as Productivity-Susceptibility-Analyses (PSA) and/or Sustainability Assessment for Fishing Effects (SAFE). These methods rank species/stocks into priority from high to low relative risk, with SAFE also being capable of generating proxy estimates of fishing mortality. This step should identify to the SAWG the Tier 2 species/stocks requiring immediate attention (if any). It may be determined by the SAWG that stocks assessed to this level may not require further assessment if the risks from fishing are assessed to be low, or if adequate management measures are in place to mitigate moderate or high risks. Tier 2 and 3 species may require the application of annual reporting on indicators that are designed to identify when the fishery has changed sufficiently to warrant new or further assessment.

199. Australia noted that SC-03-07(01) provides an example of potential responses for various assessment outputs derived from the application of methods such as ecological risk assessment.

200. The SAWG noted the following implications for future work:

- Scoping Analysis – this should provide direction to future assessment work on fisheries. The SAWG may wish to consider this as a living document that is updated annually (or as required) as new information becomes available. It could act as a list of data holdings for SIOFA species.
- Tier 2 risk analyses should be included in the SAWG and ERAWG workplans.

201. In relation to the tiered assessment framework and based on the recommendations from the SAWG, the SC:

- **Adopts** the tiered assessment framework for SIOFA fisheries to provide direction for future assessment work and speed the SAWGs processes in developing analyses for the SC (Annex J).

- **Requests** CPs cooperate in the development of Scoping Analyses for the species caught by their SIOFA fisheries.
- **Amended** the SC operational research plan to include the activities described above.
- **Requests** the SIOFA data manager to support these activities.

*Agenda item 7.1.1 Orange roughy*

202. Dr Simon Nicol (Australia) presented the orange roughy stock assessments (SC-03-07.1.1(04)-Rev1 and SC-03-07.1.1(05)-Rev1) on behalf of the SAWG.

203. Paper SC-03-07.1.1(04)-Rev1 detailed the stock assessment of orange roughy undertaken for the Walter's Shoal Region (WSR) (defined to be the region enclosed by the rectangle 33 50' to 34 41' S, 44 00' to 46 00' E). Biological data, including age composition data, were used in conjunction with a stock hypothesis, a catch history, and acoustic biomass estimates to perform a Bayesian stock assessment using NIWA's stock assessment package CASAL.

204. The following aspects of the assessment methods were described: stock structure hypotheses; catch history considerations; biological parameters; treatment of acoustic estimates; model structure; and assumptions for the base model and eight sensitivity runs. Results were presented and covered Markov chain Monte Carlo (MCMC) diagnostics, model fits to priors and year class strength deviations, as well as estimates of current and projected depletion for the entire stock and the individual features.

205. The preliminary stock structure hypothesis included consideration of geomorphological features, presence and timing of spawning aggregations and length frequency of the catches (preliminary); Annex F of the SAWG1 report provides the evidence for delineating these stock boundaries. The structure used was considered a preliminary delineation of stock boundaries in SIOFA.

206. The catch history is well defined from 2002 onwards but is very uncertain in the years 2000 and 2001 when a large number of non-CP vessels were fishing within the SIOFA area. There was little catch in the WSR before 2000. For the purposes of the stock assessment the best educated guess was used to increase the reported catches in 2000 and 2001 for the base model (2000 t and 750 t in 2000 and 2001, respectively). Sensitivity runs were done at half and double the assumed increase in catches (i.e. three scenarios: a low catch, best educated guess catch, high catch).

207. The biological parameters described included growth, length-weight, natural mortality, stock recruitment relationship, maturation parameters, and age compositions. The age frequency described included fish aged to ~140 years and represented most age classes. It was noted that age frequency information suitable for assessment was only available from one feature in WSR (Sleeping Beauty) and for 2017 only.

208. The use of acoustic estimates was described. Eight acoustic survey biomass estimates were available that have been reviewed and refined; these were from five different features collected from 2007 to 2015 during peak spawning. A much larger set of acoustic estimates were available but had not been reviewed and refined; these were used in a sensitivity run.

209. Potential biases in acoustic estimates can arise from three factors: target strength, error in the absorption coefficient that was used, and the analysis method. Double counting and species mix was not an issue for the reviewed surveys. Three different treatments were used for the acoustic estimates in sensitivity runs to explore the influence of this uncertainty on assessment results.

210. The model structure was single-sex with categories for age and maturity. The stock was described by seven areas: 'Home', 'Other' and five numbered features (these being where validated acoustic data was available). 'Other' was an aggregation of the six other features in WSR where validated acoustic information was not available. Biomass in 'Home' were immature fish. Informed priors were used on parameters and Bayesian estimation used to generate posterior distributions. Age-frequency data was down-weighted.

211. To examine the robustness of the assessment results to different levels of uncertainty the following sensitivities were included in the analyses in addition to the base model:

| Model Name | Description |
|---|---|
| Base | Middle value for early catch history; middle value for acoustic data, effective sample size for the age frequency was 40, informed priors on *M* (0.045, cv=15%), acoustic q (0.8, cv=25%), proportion migrating to 'Other' (mean 20%), and the maturation parameters (means of 37 years and 12 years) |
| Low | This has the low treatment of the acoustic biomass estimates and only 10% of mature fish to migrate to 'Other' |
| High | This has the high treatment of the acoustic biomass estimates and 30% of mature fish to migrate to 'Other' |
| Uniform | This has a uniform prior on both maturation parameters |
| AF80 | Increase the effective sample size on the age frequency to 80 |
| Low catch | The amount of catch added on to reported catch for 2000 and 2001 is half that assumed in the base model |
| High catch | The amount of catch added on to reported catch for 2000 and 2001 is double that assumed in the base model. |
| Low & low *M* | The low treatment of the acoustic data and a fixed *M* = 0.036 (20% less than the mean of the prior in the base model). |
| More acoustics | Include the additional acoustic biomass estimates (that have not been revised/refined) |

212. Model diagnostics did not indicate any poor fits to the data or conflicts between data inputs.

213. The results of the assessment estimated that spawning stock biomass in 2017 compared to virgin spawning stock biomass ($ss_{17}$ ($SSB_{17}/SSB_0$)) was above 50% for the base model and all sensitivities evaluated for entire stock (Table I).

**Table I: MCMC estimates: medians and 95% CIs for spawning stock biomass ($ss_{17}$ ($SSB_{17}/SSB_0$)) for the base model and sensitivities (see the text for the description of each run, paragraph 211). The estimated probability (%) of current spawning biomass being above 30% $SSB_0$ or 50% $SSB_0$ is also given.**

| | $ss_{17}$ (%$SSB_0$) | | P($SSB_{17}$ > 30%$SSB_0$) | P($SSB_{17}$ > 50%$SSB_0$) |
|---|---|---|---|---|
| Base | 76 | 63-87 | 100 | 100 |
| Low | 65 | 53-77 | 100 | 100 |
| High | 85 | 76-94 | 100 | 100 |
| Uniform | 75 | 63-86 | 100 | 100 |
| AF80 | 74 | 62-85 | 100 | 100 |

| | | | | |
|---|---|---|---|---|
| Low catch | 77 | 65-88 | 100 | 100 |
| High catch | 73 | 60-84 | 100 | 100 |
| Low and low *M* | 63 | 53-75 | 100 | 99 |
| More acoustics | 76 | 64-87 | 100 | 100 |

214. Some potential for depletion on individual features was estimated (Table II). The estimated spawning stock biomass in 2017 (ss17) was lower on feature 1 and 4 in comparison to the other named features. Local depletion within the 'Other' group was plausible for the 'Low' and 'Low and low M' model runs (Table II).

**Table II: MCMC estimates: medians and 95% CIs for the $ss_{17}$ of the numbered features and 'Other' for the base model and sensitivities (see the text for the description of each run, paragraph 211).**

| | Other | | Feature 1 | | Feature 2 | | Feature 3 | | Feature 4 | | Feature 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base | 75 | 60-87 | 66 | 51-79 | 99 | 90-107 | 89 | 80-98 | 66 | 49-80 | 71 | 57-83 |
| Low | 30 | 11-54 | 57 | 44-71 | 98 | 90-107 | 86 | 77-95 | 56 | 40-71 | 64 | 51-77 |
| High | 90 | 81-98 | 76 | 64-86 | 99 | 91-107 | 93 | 84-101 | 77 | 64-87 | 79 | 67-89 |
| Uniform | 74 | 59-85 | 65 | 50-78 | 97 | 88-105 | 88 | 78-96 | 65 | 48-79 | 70 | 56-82 |
| AF80 | 74 | 59-85 | 65 | 50-78 | 97 | 88-105 | 88 | 78-96 | 65 | 48-79 | 70 | 56-82 |
| Low catch | 80 | 67-91 | 66 | 51-79 | 99 | 91-107 | 89 | 80-98 | 66 | 48-80 | 75 | 62-87 |
| High catch | 65 | 44-80 | 66 | 51-79 | 99 | 90-107 | 89 | 80-98 | 66 | 48-80 | 64 | 50-77 |
| Low and low *M* | 25 | 8-49 | 56 | 43-70 | 99 | 91-106 | 86 | 77-94 | 55 | 39-70 | 62 | 50-75 |
| More acoustics | 76 | 61-87 | 64 | 48-78 | 99 | 89-107 | 90 | 80-99 | 66 | 51-80 | 70 | 54-84 |

215. Projections of constant catch for the next 5 years using catch as reported in 2017 were run for the base and low model (Figure I). The results did not indicate that the median ss17 would reduce below 50% under either model scenario (~5% reduction in the median estimate of ss17 for the base model and ~9% reduction in the median estimate of ss17 for the Low model).

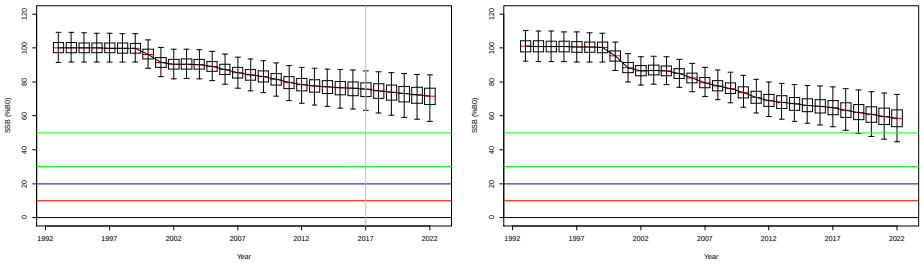


**Figure I: Base model MCMC (left) and Low model MCMC (right): constant catch projection at current levels: box and whiskers plot of the spawning biomass trajectory for the whole stock. Each box covers the middle 50% of the distribution and the whiskers extend to a 95% CI.**

216. A further seven orange roughy stocks were considered for assessment (SC-03-07.1.1(05)-Rev1). There was little catch and no acoustic estimates for one of these stocks, Western Walters, and no assessment was undertaken. For the remaining six stocks a catch-history based assessment was performed. For three of those six stocks a simple Bayesian assessment was also done using acoustic biomass estimates from features within the stock boundaries and results from the WSR assessment. The acoustic estimates for these stocks had not been revised/refined. Early catch histories for these stocks were uncertain and revised using information provided by non-CPs and sectors of the fishing industry.

217. For the catch-history based assessment, maximum exploitation rates ($U_{max}$) of 5% and 40% was used to estimate a plausible range of $ss_{17}$ estimates for each stock.

218. For the catch history-only based method, the estimates of $ss_{17}$ were above 50% $SSB_0$ for all stocks assessed when $U_{max}$ was assumed to be 5%. Under the assumption of $U_{max}$ at 40% the $ss_{17}$ estimate for the 'Seamounts' region was 22% $SSB_0$ and 43% $SSB_0$ for the 'South Ridge Ridge' region. All other stocks were above 50% $SSB_0$ under this assumption (Table III).

**Table III: The calculated values of $ss_{17}$ for each assessed stock and the two levels of historical maximum exploitation rate.**

| | | $ss_{17}$ (%$B_0$) |
|---|---|---|
| **Meeting** | $U_{max}$ = 40% | 77 |
| | $U_{max}$ = 5% | 97 |
| **N. Walters** | $U_{max}$ = 40% | 57 |
| | $U_{max}$ = 5% | 94 |
| **Seamounts** | $U_{max}$ = 40% | 22 |
| | $U_{max}$ = 5% | 84 |
| **N. Ridge** | $U_{max}$ = 40% | 50 |
| | $U_{max}$ = 5% | 93 |
| **M. Ridge** | $U_{max}$ = 40% | 59 |
| | $U_{max}$ = 5% | 94 |
| **S. Ridge** | $U_{max}$ = 40% | 43 |
| | $U_{max}$ = 5% | 92 |

219. The three stocks assessed using the simple Bayesian assessment with acoustic biomass estimates estimated $ss_{17}$ for all stocks to be above 50% $SSB_0$ (Table IV). The 'Seamounts' region was one of the stocks assessed using this more information rich method. The estimate for 'Seamounts' from this method indicated that the assumption of $U_{max}$ at 40% when using the catch-history-only method for this region was unlikely to be correct.

**Table IV: The MPD estimates of virgin biomass (SS$B_0$), current biomass (SS$B_{17}$), and current stock status ($ss_{17}$) for each assessed stock and each of the three different treatments of the acoustic biomass estimates.**

| | | $B_0$ (000 t) | $B_{17}$ (000 t) | $ss_{17}$ (%$B_0$) |
|---|---|---|---|---|
| **N. Walters** | Low | 9.7 | 8.5 | 88 |
| | Middle | 13 | 12 | 91 |
| | High | 19 | 17 | 94 |
| **Seamounts** | Low | 24 | 17 | 70 |
| | Middle | 31 | 24 | 77 |
| | High | 45 | 38 | 84 |
| **M. Ridge** | Low | 55 | 46 | 84 |
| | Middle | 75 | 66 | 88 |
| | High | 108 | 99 | 92 |

220. The SC was reminded that a caveat to these results is that the parameterisation of CASAL considered all stock biology and dynamics to be equivalent to that assumed for the WSR region (and that the assessment for the WSR region borrowed parameters and dynamics from New Zealand assessments).

221. The following key research priorities were identified:

- Stock structure remains uncertain and the SC should consider options for obtaining information to better support stock definitions.
- Age frequency data should be collected routinely and to a preferred protocol.
- Target strength remains an important uncertainty in the analyses of acoustics.

222. The following key data issue was identified:

- The Secretariat does not hold all orange roughy data to the specifications of CMM 217/02 for the early part of the catch history. This does not allow the SC to be assured by the Secretariat that the catch information included in the assessment is verified.

223. The SC discussed the catch histories and queried the best-estimates of catches taken in the early history of the fisheries. It was clarified that the best 'guesstimate' was used for catches in 2000-2001 and additional catches were assumed (sensitivities were run to explore half and double of these catch assumptions). CPs noted that orange roughy were purchased from other non-CPs during the early years of the fishery, and that there was a low level of concordance between data held by the Secretariat and what was indicated by early commercial records. The main objective of the data history recovery was to get a best estimate of the minimum amount of catches taken during the early years of the fishery. Very few parties fishing in these earlier years of the fishery were required to collect and/or retain these catch records.

224. The SC commented that the greater the breadth of model exploration that can be done, the better the assessment. The assessment was very time constrained (~1 month). The SC suggested that it was important to start assessment work earlier (e.g. October/November) to enable full model exploration and propose different sensitivity runs.

225. DSCC noted that the various assumptions and uncertainties in the assessment necessitated the use of a precautionary approach. It was suggested that SIOFA could request historical data from non-CPs. Without these data being available to all CPs it was, DSCC noted that the outputs should be regarded as guesstimates.

226. The SC **agreed** that that the outputs of the SAWG and stock assessment could be used to provide advice. The SC **noted** that since the MoP had not provided any instruction on its preferred reference points for this stock, advice on status would not be made but instead the $ss_{17}$ estimates and the ranges around these estimates would be presented.

227. Management Strategy Evaluation (MSE) was discussed and it was noted that MSE could be undertaken to test different harvest strategies for SIOFA stocks.

228. In relation to the reconstruction of catch histories, it was discussed that a list of vessels and flag states active in the fishery could be sent to CPs and flag states asking whether vessels were present in the fishery and if data can be supplied.

229. The SC **requested** that the Secretariat write to the relevant non-CPs, stating the understanding that vessels were active in the fishery in these years, and asking whether they hold relevant catch and effort data and if they would be willing to supply this to SIOFA.

230. **In relation to the biological information used for the orange roughy stock assessments, the SC noted that:**

- There is uncertainty in the biological parameters that underpin all the assessments performed.
- The results of the ageing work carried out under agreed protocols are valid inputs to the orange roughy assessments

- The age composition data are valid inputs to assessment of biological parameters for the assessment of orange roughy Stocks in SIOFA
- Indicated that it would support the development of a draft protocol for the collection of orange roughy age/length frequencies and otoliths, as based on FAO protocol 1020.

231. **In relation to stock structure assumptions, the SC:**

- **Noted** uncertainty in stock structure delineation
- **Noted** that the sub-regions assumed for the assessments are preliminary and based on the available information and expert judgement.
- **Supported** the application of genetic techniques to delineate stock structure, as described in SAWG1 paragraphs 153 and 154
- **Supported** the inclusion of the proposed work (SAWG1 paragraphs 153 and 154) in the SC's workplan.

232. **In relation to the review of acoustics to support orange roughy assessments, the SC:**

- **Agreed** that standardised reporting should be adopted and acoustic data workshop/reviews should be held prior to biomass estimates being used in stock assessments
- **Agreed** that key metadata and data storage methods should be developed and adopted so that results can be replicated.
- **Agreed** that further investigations should be made to resolve the analytical difference in the geostatistical and transect mean and variance estimates that could affect all surveys.
- **Noted** that subject to the outcome of the previous recommendation, that for closely spaced parallel grid based surveys the EDSU mean and geostatistical variance should be adopted as used in current Australian and New Zealand stock assessments (the SAWG identified that New Zealand does not always use this approach).
- **Agreed** that the net attached AOS should be used in areas of complex species mixing and or steep slopes to reduce biomass estimation bias and uncertainty.
- **Agreed** to resolve the potential target strength bias of a factor of 2 more visually verified target strength measurements should be obtained ideally with a net attached AOS on selected grounds (this was identified as a key priority).

233. **In relation to the assessment approaches for orange roughy in the SIOFA Area, the SC noted:**

- The three assessment approaches can be regarded as data rich (1 sub-region (WSR) using catch history, acoustic indices and age-frequency data), data moderate (three sub-regions using only the simple Bayesian model incorporating acoustic indices and no age-frequency data) and data poor (three sub-regions using the catch-history only method).
- The three assessment approaches are considered suitable for providing advice on the current stock depletion for the seven sub-regions assessed.

234. **In relation to the orange roughy assessment outputs, the SC notes the following advice to the Meeting of the Parties:**

- All three assessment approaches indicated that $ss_{17}$ for the 7 sub-regions assessed was likely to be above 50%$SSB_0$.
- The median estimates for the Walters Shoal Region from the base model and eight sensitivities evaluated varied between 63%$SSB_0$ and 85%$SSB_0$. The median estimate of the Base model was 76%$SSB_0$.
- Projections for the Walters Shoal Region (assuming the Base model current stock spawning biomass estimate of 67–87%) indicate that the stock in this sub-region is unlikely to be depleted to levels below 60%$SSB_0$ in the next 5 years if future catches in these years do not exceed those reported in 2017.
- The absolute scale of the Walters Shoal Region stock is very uncertain because the true scale of the acoustic biomass estimates is poorly known. Virgin biomass ($B_0$) is very likely to be in the range of 25,000–90,000 t.
- The assessments of North Walters, Seamounts and Middle Ridge using the data moderate method (simple Bayesian assessment with acoustic biomass estimates) estimated $ss_{17}$ to be at or above 70%$SSB_0$ for each of these stocks.
- The assessments of Meeting, South Ridge and North Ridge stocks using the catch-history-only method estimated $ss_{17}$ for all stocks to be at or above 43%$SSB_0$ assuming 40%$U_{max}$ and above 92%$SSB_0$ assuming 5%$U_{max}$.
- The SC requires further direction from the Meeting of the Parties on the establishment of reference points, as it is not possible to develop advice on status or specific catch limits without reference points.
- The SC noted that it would annually review orange roughy catch and effort statistics to inform future timing for the cycle of assessments. A 3-5 year assessment schedule was considered appropriate but if catch oror effort change by 20% or more in any year this would trigger SC discussion on the timing of a new assessment (i.e. an earlier assessment may be required.

*Agenda item 7.1.2 Alfonsino*

235. The SAWG Chairperson provided an update on the SAWG's work in relation to alfonsino, noting the work plan and indicative timeline for alfonsino stock assessment (see SC-03-07.1.1(03)).

236. The SC discussed that the acoustic data available have a different type of reliability for predicting the abundance of alfonsino and that they have not been through analysis and review. The SAWG Chair noted that the use of CPUE as an indicator of biomass had been discussed and that this was regarded as unlikely to be a robust indicator. The SAWG Chair noted the FAO review of alfonsino and that this may provide useful inputs to the work plan. There was discussion on the uncertainty in the target strength estimates; this was a critical parameter to resolve if acoustic estimates were to be used as more than a relative estimate in the stock assessment. It was noted that due to the large numbers of acoustic surveys substantial resources were required to process the acoustic data.

237. In relation to alfonsino stock assessment, the SC:

- **Notes** the indicative work plan (Annex K) and efforts are being made to progress the assessment of alfonsino stock/s in SIOFA
- **Notes** that due to the unresolved complexities relating to alfonsino catch histories, biological data, stock structure and acoustic data, an integrated assessment may be overambitious to achieve prior to SC4

- **Notes** that data-poor assessment approaches (e.g. SRA or catch-only methods) will be considered as part of the indicative work plan if an acoustics-based assessment is not possible within this timeframe.

*Agenda item 7.1.3 Patagonian toothfish*

238. The SAWG Chair gave an update on the indicative work plan for Patagonian toothfish (Annex K). The collaborative approach with CCAMLR was highlighted. It was recalled that the SAWG discussed the CCAMLR stock assessment approach for data poor areas and that this could potentially be applied in the relevant region for SIOFA (CPUE by seabead method). It was requested that results of such analyses are provided to SAWG2 in March 2019.

239. The SAWG Chair recalled that SC2 tasked the SC Chairperson and France (Territories) with furthering collaboration with CCAMLR in relation to the use of data in CCAMLR assessments, including in relation to the provision tag of recaptures collected by vessels from SIOFA Contracting Parties to CCAMLR. This collaboration should extend to South Africa and Australia. The SC **requests** CPs to assist in these discussions and work with the Secretariat and Chairperson to coordinate this.

240. The SC **supported** the indicative work plan and **agreed** with the SAWG's recommendations.

*Agenda item 7.1.4 Other species*

241. The SAWG Chair summarised the consideration of other species by the SAWG1 meeting. It was noted that there are other species for each method that may require further consideration. The Saya de Malha bank was an area where additional work may be required as recent catch volumes in the area are high those species caught have not been considered to date by the SAWG. The SAWG **requested** the SC's advice on the prioritisation of other species for which advice on status may be required.

242. The SC discussed that information recently provided through China's national report (SC-3-INFO15) included at least one fishery that was not being considered (light seine fishing for Pomfret, *Brama spp,* was cited).It was also noted that Chinese vessels were fishing on the Saya de Malha fishery. The SC **agreed** on the importance of progressing work on the species taken on the Saya de Malha bank, given catches of certain species has reportedly exceeded 30,000 tonnes over recent years. It was suggested that the ERAWG may be able to progress some of this work due to the data-limited nature of some of these fisheries. The SC **requested** the ERAWG to consider progressing this work.

243. In relation to activities that may require additional resources, the following priorities were noted:

    - Establishment of a Target Strength and length relationship for alfonsino (data collection has already been done) (cost uncertain)
    - Analysis and review of alfonsino acoustic surveys (cost uncertain)
    - Otolith preparation and reading for ageing for alfonsino, orange roughy or other species (estimated for 1 age composition of 400 otoliths, approx. 8,000 EUR)
    - Genetics work to provide equipment for SNP analyses to postgraduate students (estimated 5,000 EUR)

- Stock assessment consultant for alfonsino work
- Investigation of 'new' fisheries (e.g. characterisation of Thai fisheries on Saya de Malha, identification of key knowledge gaps).

244. The SC considered these activities in its review of the Operational Research Plan.

245. The SC **recommended** that the SIOFA Chairperson send a letter to FAO regarding coding issues for orange roughy, as described in SAWG1 Report (SC-03-07.1.1(03)).

**Agenda item 7.2 Ecological Risk Assessment Working Group (ERAWG)**

246. The SC considered the proposal to amalgamate the SAWG and ERAWG. Co-chairs were proposed with Australia leading on ERA and Japan on stock assessment.

247. The SC **recommended** the MoP adopt the proposal to amalgamate the SAWG and the ERAWG and the revised Terms of Reference is, which are included at Annex K.

248. The ERAWG Chairperson (Dr Simon Nicol, Australia) updated the SC on the first meeting of the SIOFA ERAWG held on 23-24 October 2017 in Hobart, Australia (SC-03-INFO-05). The meeting focused on the ecological risk assessment for deepwater chondrichthyans in the SIOFA Area.

*Agenda item 7.2.1 Deepwater chondrichthyans*

249. Australia presented paper SC-03-07.2.1(01) that provides an update to the SIOFA SC on the ecological risk assessment (ERA) for the effects of fishing on deepwater chondrichthyans in the SIOFA Area using Productivity-Susceptibility Analysis (PSA) and Sustainability Assessment for Fishing Effects (SAFE) methods. The assessment identified a number of species categorised at high or extreme risk from fishing using demersal trawl, midwater trawl, demersal longline and gillnet gears. A supplementary paper (SC-03-INFO-12) provided a sensitivity analysis that explored different scenarios around the proportion of overlap between fishing effort and species' distributions, and noted that risk scores were not particularly sensitive to the changes.

250. Australia noted that the assessment is conducted in a relatively data-poor space and that records of bycatch are sparse. The presenter noted that the results highlight the importance of getting better information on shark bycatch and identification, as well as noting the lack of productivity/biological data for some species. The presenter noted results for the PSA and SAFE assessments; modifications made to the input data; sensitivity analyses run; data input and modelling limitations

251. Australia also presented SC-03-07(01) which describes potential management actions in response to certain outputs from the SAFE assessments. The relationship between this framework and the SIOFA tiered assessment framework (Annex J) was described.

252. The SC discussed the uncertainties in the assessment additional analyses that could assist in identifying and correcting any potential erroneous categorisations.

253. The SC discussed that the work of JCU (Dr Cassandra Rigby) has produced a comprehensive dataset on the biology of deepwater sharks, and that an important piece of work for the SC is to analyse these data in more detail. The work of CSIRO was acknowledged. The ERA online tool developed by CSIRO was discussed and it was noted that this adds an important element of transparency to the assessment process.

254. The SC discussed that information on stock structure for deepwater chondrichtyans is lacking and is a key uncertainty.

In relation to the deepwater chondrichtyan risk assessment, the SC:

- **Noted** the results as presented in papers SC-03-07.2.1(01) and (SC-03-INFO-12).
- **Noted** that it is likely that these results include a number of yet to be identified false positives and false negatives.
- **Noted** that the ERA has prioritised species for which better information is needed and those for which explicit management actions may be required.
- **Requested** CPs to continue collaboration on this work, including the provision of data that has not yet been included in this assessment.
- **Recommends** to the Meeting of the Parties that FAO identification guides for deepwater chondrichthyans in the Indian Ocean are implemented on fishing vessels to improve the collection of sharks catch information, and that CPs consider the use of the Smartforms when available.

## Agenda item 8 – Proposals to bottom fish in the Agreement Area in a manner at variance with Established Measures

255. The SC did not receive any proposals submitted in accordance with paragraph 21 of CMM 2017/01.

## Agenda item 9 – Scientific Impact Assessments

### Agenda item 9.1 Demersal gillnet operations

256. The SC did not receive any proposals submitted in accordance with paragraph 2 of CMM 2017/02.

## Agenda item 10 – Cooperation with other RFMOs and international bodies

### Agenda item 10.1 FAO ABNJ Deep Seas Project update

257. The Secretariat gave an update on the FAO ABNJ Deep Seas project (SC-02-INFO-04). In 2016, the ABNJ Deep Seas Project, in association with the other projects of the FAO Deep-seas fisheriesProgramme, produced a range of publications including technical papers on the biology and assessment of alfonsino (www.fao.org/3/a-i5336e.pdf ) and a report on VME – processes and practices (http://www.fao.org/3/a-i5952e.pdf ), and an introduction to marine datasets of biodiversity importance in the Western Indian Ocean (http://wcmc.io/WIOdata ).

258. The SC recalled the SC2 report (paragraphs 121 and 122), which requested that the Executive Secretary engage with the FAO ABNJ project on:

- The planned mapping work, to accelerate the availability of these maps to the SC;
- The planned assessment of the likely impact of gear types; and
- Possible support for ecological risk assessment work.

259. In relation to the planned mapping work and assessment of likely impacts of gear types, the departure of the project coordinator delayed progress. The new post is due to start soon.

260. The Executive Secretary noted that the SIOFA Secretariat had contributed to the mid-term review of the ABNJ Project and would be attending the mid-April 2018 meeting of the ABNJ project steering committee. The Executive Secretary will circulate an agenda for the meeting once this becomes available and offered to take any advice from the SC to this meeting. The SC **requested** the Executive Secretary continue to engage with a focus on the areas of work identified in the SC2 Report.

261. Cook Islands noted that it was also on the Steering Committee and highlighted a range of ABNJ projects underway in the Cook Islands. These are documented in the Cook Islands national report. The SC clarified that there are no opportunities for new work under this project because all funding was committed.

262. The SC noted that the Common Oceans Project is considering a Phase 2, and considered that discussions on SIOFA links with this work should start soon. The SC asked the Executive Secretary to investigate the key objectives and themes for Phase 2 and **requested** that he flag SIOFA's interest in engaging with this project. The SC noted that the main focus so far has been around improving governance, and that this is relevant to some of SIOFA's work, referring to the SAWG report, the SC noted that technical work can fit under this umbrella as it required linkage to historical data recovery. Phase two is probably 2-4 years away. Noting that Phase 2 is likely to be 2-4 years away, the SC considered that co-funding may be possible through the GEF funding, recalled that the initial elements of the acoustics review was funded by ABNJ, and noted that target strength research for orange roughy (Sealord Group-CSIRO-FAO collaboration) has been approved for under the ABNJ Project.

263. It was noted that GEF was intending to reprioritise its theme on large marine ecosystems. The SC discussed whether this could be expanded to SIOFA

264. The Executive Secretary gave an update on the EAF-Nansen program, reporting that the R.V Dr Frietjof Nansen is currently undertaking scientific surveys in the southern Indian Ocean focusing on fisheries impacts, oil and gas pollution impacts and climate change impacts. Mauritius and Seychelles are participating in the 4th May - 4th June 2018 survey. FAO has indicated a willingness to discuss informal collaboration with SIOFA around this program. Cook Islands noted that it was working with this program to address absorption issues with acoustic data.

265. The SC **requested** the Executive Secretary to maintain contact with the FAO ABNJ Deep Seas Project, EAF-Nansen program and the Seychelles and Mauritius.

**Agenda item 10.2 Southwest Indian Ocean Fisheries Commission (SWIOFC)**

266. The 8th session of the scientific committee of the SWIOFC took place in Maputo, Mozambique, from 11–15 February 2018.

267. Each CP presented its fisheries and stock status. The Committee noted the effort provided by developing countries despite the few information they may have access to and the large coastline of some of them. The Committee agreed that shrimp was a priority species to manage in the region's EEZ, as recruitment problems have been detected in most of EEZ. The committee also asked each CP to identify and better manage at least 2 priority species of their choice.

268. The committee also considered the opportunity of creating a working group on artisanal fisheries, as well as training for members on stock evaluation models use, especially for small pelagic fishes. This is still a proposal.

269. The secretariat proposed to launch a 3-year intersessional work to produce a bibliographic synthesis of the knowledge on fisheries. This work will begin at a small scale, with each CP defining on an excel template the existing biological parameters for its main exploited species. This could enable the SWIOFC to coordinate evaluations of the straddling stocks. This was proved necessary as the scientific committee because they noted that some evaluations proposed by CPs may be wrong, because of the use of parameters that are not adapted to the considered stocks. This issue was concluded by some discussions on the pertinent indicators to use in order to correctly evaluate stocks.

270. The SC discussed that linkages with SIOFA were unclear at this stage, but that it looked forward to future updates.

**Agenda item 10.3 Collaboration with CCAMLR on stock assessment and tagging**

271. Discussed in the context of the Patagonian toothfish assessment, and for the Del Cano Rise proposal for the protected areas.

**Agenda item 10.4 Agreement on the Conservation of Albatrosses and Petrels (ACAP)**

272. SC-03-10.4 (01) contains a Proposal for a Memorandum of Understanding between SIOFA and the Agreement on the Conservation of Albatrosses and Petrels (ACAP). ACAP is a multilateral agreement that seeks to achieve and maintain a favourable conservation status for albatrosses and petrels globally. The most significant threat facing albatrosses and petrels is mortality arising from interactions with fishing gear. ACAP has developed a range of materials, including best practice guidelines, to assist ACAP Parties, Range States and international organisations, in addressing these threats. In addition to individual nations taking measures to protect albatrosses and petrels, international cooperative action is also required. In order to enhance the cooperation and information exchange with relevant organisations, ACAP has signed Memoranda of Understanding or Cooperation Agreements with a range of RFMOs and other Conservation Bodies. Recently, the ACAP Parties authorised the Secretariat to commence negotiations for the development of a MoU with the Southern Indian Ocean Fisheries Agreement. A template is provided in ANNEX 1 of SC-03-10.4(01) for the consideration of the SIOFA Scientific Committee.

273. The Chair recalled SC1, which noted the importance of collaboration with organisations such as ACAP.

274. The Executive Secretary read a statement from the Secretariat of ACAP and summarised the MoU.

275. In relation to the draft MoU, the SC noted its desire for ongoing cooperation with ACAP and that an MoU may facilitate this**.**

276. In relation to collaboration with international bodies, IUCN noted that the United Nations are about to launch an intergovernmental conference on developing a new international legally binding instrument under the UN Convention on the Law of the Sea for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction. The first substantive meeting will take place in September this year. IUCN noted that this instrument will change the way human activities are managed on the high seas across global oceans, which will have implications for RFMOs. IUCN urged SIOFA to be proactive in its approach to collaboration with organisations (such as ISA and AMO) to work towards the sustainable use of resources and the conservation of biodiversity.

## Agenda item 11 – Scientific Committee Work Plan

277. The SC noted it did not need to review its overarching work plan at SC3.

### Agenda item 11.1 Long term research plan

278. The SC is required by its Terms of Reference to review its workplan annually, at each ordinary meeting.

279. The SC noted that it did not need to review this at this meeting.

### Agenda item 11.2 2016–2019 Operational work plan and budget

280. The Chairperson noted the operational workplan has a timeframe of 3-5 years and is to be reviewed annually by the SC.

281. The SC discussed that this be addressed using two documents: 1. A review of the 2016-2019 workplan (Annex L) and 2. An updated 2018-2021 workplan (Annex M). The SC notes the review of its 2016-2019 operational workplan be considered by the MoP as an indicator of the progress made towards the SC's objectives. The SC adopted the updated Operational 2018-2021 workplan (Annex M).

282. The SC flagged the need to consider that consultants may be required. The SC noted research activities that should be considered in the SIOFA budget, and **recommend** the following priorities:

- Establishment of a Target Strength and length relationship for alfonsino (data collection has already been done) (cost uncertain)
- Analysis and review of alfonsino acoustic surveys (cost uncertain)
- Otolith preparation and reading for ageing for alfonsino, orange roughy or other species (estimated for 1 age composition of 400 otoliths, approx. 8,000 EUR)
- Genetics work to provide equipment for SNP analyses to postgraduate students (estimated 5,000 EUR)
- Stock assessment consultant for alfonsino work (approx.. 30,000 EUR)
- Consultants to compile the biological data to support the risk assessments of teleosts, particularly in relation to species caught on the Saya de Malha bank (supporting the SAERWG work plan, if CP require assistance) (up to approx.. 20,000 EUR)
- To inform the review of observer coverage and data standards, a consultant to intersessionally review observer data holdings (i.e. an inventory) of CPs (by fishery, species). This will require a consistent template,that also captures information on the sampling protocols/regimes. (approx. 20,000 EUR)

## Agenda item 12 – Advice to the Meeting of Parties

### Agenda item 12.1 Draft CMM on fishing research

283. In accordance with MoP4 Report paras 39-41, SC is requested to provide advice and recommendations in relation to the development of the EU's proposal for a CMM to regulate fisheries research in the Agreement Area (Paper SC-03-12(01)), with particular regard to the questions listed in paragraph 41.

284. The Secretariat presented the draft CMM as described in SC-03-12(1). The SC discussion was structured around the key advice requested

285. The SC discussed in the feasibility of SC reviewing and providing comment on research proposals. The discussion also considered whether the current draft CMM encourages or facilities research or may prevent some of the current research activities being undertaken. The discussion included the need for the CMM to consider the diversity of approaches to providing research, such as including voyages for permanent research vessels (sometimes planned well in advance, e.g. 2 years) and ad hoc opportunistic acoustic surveys by commercial fishing vessels.

286. The SC considered the need to incorporate guidance for non-contracting parties research vessels.

287. The SC discussed the need to define fishing research plans that would be considered by the SC. These could assist in facilitating SC engagement.

288. The SC discussed the implications for stock assessment and that the application of relevant CMMs may need to be judged on a case by case basis.

289. In relation to paper SC-03-12(01), the SC **recommends** that a revised draft is provided to the SC for review and that in producing the next draft, the SC **recommends** that the revised draft:

- Provides the objectives/purpose of the draft CMM
- That the CMM should focus on encouraging research and collaboration and facilitating the flow of information from this research to the SC to enhance SC activities
- Explicitly take into account the range of approaches to conducting research, including through commercial vessels (such as collection of length frequency data, otoliths for aging; ad hoc acoustic surveys)
- Explicitly includes the process for the SC to review and comment on reseach plans and receive the outcomes of the research
- Consider mechanisms to engage with research activities conducted by non-CPs
- Define what would be included in a fishing research plan
- Consider that the exemption of research activities from CMMs may be a case by case issue. There may be some provisions of CMMs from which some research activities could be exempted, e.g. in some cases it may be appropriate to be outside the defined footprint. However, this is dependent on the type of research and needs further consideration.
- Consider the FAO deep-sea guidelines and other guidelines on fisheries research.

**Consolidation of advice to the Meeting of the Parties**

In relation to agenda item 5.1 Scientific Data Standards, the SC:

- **requested** the SIOFA Database Manager to investigate and implement protocols for the secure transfer of confidential data (for example file transfer protocol (FTP) or encryption methods) to end-users.
- **requested** the Secretariat to prepare an annual data holdings report including challenges for presentation at each SC meeting to assist the SC in its deliberations.
- **recommends** that additional work is required on the harmonisation of sampling protocols for the collection of biological and species identification data, particularly for bycatch species.
- **recommends** that work is progressed intersessionally in relation to data collection and sampling protocols for stock assessment inputs, including for acoustic and catch history data. (Paragraph 75)

In response to the requirement to review observer coverage levels (CMM 2017/01 paragraph 32) the SC:

- **Noted** that additional background information is required to consider the types and level of observer coverage in relation to specific research, scientific committee work and/or other needs. This includes consideration of the needs of the Compliance Committee, which are beyond the remit of the SC.
- **Agreed** that a review of data holdings (i.e. an inventory) of observer data held by CPs (by fishery, species) be compiled intersessionally using a consistent template. The template should include information on the sampling protocols/regimes. In this regard, CPs were **requested** to provide a summary of relevant data holdings and the SC **noted** that resourcing would be required for this work
- **Agreed** that an investigation of observer coverage type and levels (i.e. %) of coverage should be included explicitly in the SC's workplan, and that this investigation consider the type of data required for scientific processes. This includes investigation of data collection plans that are in place, and a useful starting point would be to consider whether data currently being collected can be used to inform stock assessment. This investigation could be structured against the requirements of the SC's workplan in terms of whether requirements for observer coverage levels and types (e.g. human vs. EM) would provide suitable information to assist in the SC's work. In this context, the SC **requests** the ERAWG and SAWG to provide guidance on the types of observer data required to support their key functions.
- **Advises** the Meeting of the Parties that the SC cannot currently review the appropriateness of the current observer coverage levels, as there is little observer coverage data being provided at this point in time and the question of the appropriateness of coverage levels is dependent on the specific scientific needs and uses for these data. The SC should be able to undertake this review if the data inventory and other steps described above are completed before SC4. (Paragraph 90)

In relation to the requirement to review CMM 2017/02 Annex B, the SC **advises** the Meeting of the Parties that the SC cannot currently review Annex B Voluntary Observer Data, as

there is little observer coverage data being provided to the Secretariat at this point in time. The SC should be able to undertake this review if the data inventory and other steps described above (paragraph 90) are completed prior to SC4. (Paragraph 93)

With regard to assessing the cumulative impact of SIOFA fisheries, the SC:

- **Recommend** to the MoP that it was not possible to provide an assessment of the cumulative impact of all SIOFA fisheries at this time from vessels flying the flag of a Contracting Party, CNCP or PFE in the Agreement Area in accordance with CMM 2017/01. This was due to the differences in data and approaches in the BFIAs provided.
- As the Secretariat holds the available fine scale fishing effort data, they are **requested** to assist CPs in undertaking GIS work on the spatial extent of fishing to aid CP work to assess cumulative impacts. This will depend on the availability of the Database manager
- Progress could be made for particular gears/fisheries, where similar data and the impact assessment approach are available (bottom trawl, static gears and for the trawl fisheries on the Saya de Malha bank). The SC **requested** the CPs who share particular fishing/gear characteristics to work together to develop a cumulative impact assessments for each fishery type as describe above. These cumulative assessments will be considered by SC4. (Paragraph 149)

In relation to the Atlantis bank (SC-03-06.3.2(02)), the SC **noted** that the strong evidence presented satisfied criteria 5b Biodiversity representation and 6a Scientific interest of the revised protocol. The SC **recommends** to the MoP:

- that this site could be designated as a protected area; and
- that the MoP consider that fishing with all gears were identified as activities that may degrade the scientific and biodiversity value of the area.

The SC **noted** that the area contains VMEs and **recommended** that this information (such as taxa, location and quantities) be provided to the Secretariat. In line with the revised protocol, a research and management plan should be prepared for Atlantis bank within the next 12 months. (Paragraphs 170-171)

In relation to the Coral feature (SC-03-06.3.2(05)), the SC noted that the evidence presented satisfied criteria 3b Bioregional representation, 5b Biodiversity representation and 6a Scientific interest of the revised protocol. The SC **recommends** to the MoP:

- that this site could be designated as a protected area; and
- that the MoP consider that fishing with all gears were identified as activities that may degrade the scientific and biodiversity value of the area.

In relation to the need for more information to evaluate social, cultural and economic interest, the SC **requested** the Secretariat to provide relevant fishing and effort data for the area to assist the MoP's discussions. In line with the revised protocol, a research and management plan should be prepared for the Coral feature within the next 12 months. (Paragraphs 172-173)

In relation to the Fool's Flat feature (SC-03-06.3.2(07)), the SC noted that the evidence presented satisfied criteria 3b Bioregional representation, 4a Geographic and/or unique representation and 5b Biodiversity representation of the revised protocol.

The SC **recommends** to the MoP:

- that this site could be designated as a protected area; and
- that the MoP consider that fishing with all gears were identified as activities that may degrade the biodiversity value of the area.

In relation to the need for more information to evaluate social, cultural and economic interest, the SC **requested** the Secretariat to provide relevant fishing and effort data for the area to assist the MoP's discussions. In line with the revised protocol, a research and management plan should be prepared for Fool's Flat within the next 12 months. (Paragraphs 175-176)

In relation to the Middle of What feature (SC-03-06.3.2(10), the SC **noted** that the evidence presented satisfied criteria 3b Bioregional representation of the revised protocol.

The SC **recommends** to the MoP that this site could be designated as a protected area.

In relation to the need for more information to evaluate social, cultural and economic interest of the Middle of What feature, the SC **requested** the Secretariat to provide relevant fishing and effort data for the area to assist the MoP's discussions. In line with the revised protocol, a research and management plan should be prepared for Middle of What within the next 12 months. (Paragraphs 177-179)

In relation to the Walter's Shoal feature (SC-03-06.3.2(12), the SC **noted** that the evidence presented satisfied criteria 3b Bioregional representation, 5b Biodiversity representation and 6a Scientific interest of the revised protocol.

The SC **recommends** to the MoP:

- that this site could be designated as a protected area; and
- that the MoP consider that fishing with all gears were identified as activities that may degrade the scientific and biodiversity value of the area.

In relation to the need for more information to evaluate social, cultural and economic interest, the SC **requested** the Secretariat to provide relevant fishing and effort data for the area to assist the MoP's discussions. In line with the revised protocol, a research and management plan should be prepared for Walters Shoal feature within the next 12 months. (Paragraphs 180-183)

In relation to the Del Cano Rise feature (SC-03-06.3.2(06)), the SC could not reach consensus that the evidence presented satisfied criteria 3b Bioregional representation, 4a Geographic representation and 5b Biodiversity representation of the revised protocol. One CP noted that the justification for the proposal for this area had a greater focus on mesopelagic and pelagic processes, and that more information was required on the benthic ecosystem in the area. As this is an area that shares boundaries with CCAMLR and national jurisdictions, the SC **agreed** that a collaborative approach to its consideration as a protected area was necessary. (Paragraph 184)

In relation to the orange roughy assessment outputs, the SC notes the following **advice** to the Meeting of the Parties:

- All three assessment approaches indicated that ss17 for the 7 sub-regions assessed was likely to be above 50%SSB0.
- The median estimates for the Walters Shoal Region from the base model and eight sensitivities evaluated varied between 63%SSB0 and 85%SSB0. The median estimate of the Base model was 76%SSB0.

- Projections for the Walters Shoal Region (assuming the Base model current stock spawning biomass estimate of 67–87%) indicate that the stock in this sub-region is unlikely to be depleted to levels below 60%SSB0 in the next 5 years if future catches in these years do not exceed those reported in 2017.
- The absolute scale of the Walters Shoal Region stock is very uncertain because the true scale of the acoustic biomass estimates is poorly known. Virgin biomass (B0) is very likely to be in the range of 25,000–90,000 t.
- The assessments of North Walters, Seamounts and Middle Ridge using the data moderate method (simple Bayesian assessment with acoustic biomass estimates) estimated ss17 to be at or above 70%SSB0 for each of these stocks.
- The assessments of Meeting, South Ridge and North Ridge stocks using the catch-history-only method estimated ss17 for all stocks to be at or above 43%SSB0 assuming 40%Umax and above 92%SSB0 assuming 5%Umax.
- The SC requires further direction from the Meeting of the Parties on the establishment of reference points, as it is not possible to develop advice on status or specific catch limits without reference points.
- The SC noted that it would annually review orange roughy catch and effort statistics to inform future timing for the cycle of assessments. A 3-5 year assessment schedule was considered appropriate but if catch effort change by 20% or more in any year this would trigger SC discussion on the timing of a new assessment (i.e. an earlier assessment may be required). (Paragraph 234)

The SC **recommended** that the SIOFA Chairperson send a letter to FAO regarding coding issues for orange roughy, as described in SAWG1 Report (SC-03-07.1.1(03)). (Paragraph 245)

The SC **recommended** the MoP adopt the proposal to amalgamate the SAWG and the ERAWG and the revised Terms of Reference is, which are included at Annex K. (Paragraph 247)

In relation to the deepwater chondrichtyan risk assessment, the SC **recommends** to the Meeting of the Parties that FAO identification guides for deepwater chondrichthyans in the Indian Ocean are implemented on fishing vessels to improve the collection of sharks catch information, and that CPs consider the use of the Smartforms when available. (Paragraph 254)

The SC flagged the need to consider that consultants may be required. The SC **noted** research activities that should be considered in the SIOFA budget, and **recommend** the following priorities: Establishment of a Target Strength and length relationship for alfonsino (data collection has already been done) (cost uncertain)

- Analysis and review of alfonsino acoustic surveys (cost uncertain)
- Otolith preparation and reading for ageing for alfonsino, orange roughy or other species (estimated for 1 age composition of 400 otoliths, approx. 8,000 EUR)
- Genetics work to provide equipment for SNP analyses to postgraduate students (estimated 5,000 EUR)
- Stock assessment consultant for alfonsino work (approx.. 30,000 EUR)
- Consultants to compile the biological data to support the risk assessments of teleosts, particularly in relation to species caught on the Saya de Malha bank

(supporting the SAERWG work plan, if CP require assistance) (up to approx.. 20,000 EUR)

- To inform the review of observer coverage and data standards, a consultant to intersessionally review observer data holdings (i.e. an inventory) of CPs (by fishery, species). This will require a consistent template,that also captures information on the sampling protocols/regimes. (approx. 20,000 EUR) (Paragraph 282)

In relation to paper SC-03-12(01), the SC **recommends** that a revised draft is provided to the SC for review and that in producing the next draft, the SC **recommends** that the revised draft:

- Provides the objectives/purpose of the draft CMM
- That the CMM should focus on encouraging research and collaboration and facilitating the flow of information from this research to the SC to enhance SC activities
- Explicitly take into account the range of approaches to conducting research, including through commercial vessels (such as collection of length frequency data, otoliths for aging; ad hoc acoustic surveys)
- Explicitly includes the process for the SC to review and comment on reseach plans and receive the outcomes of the research
- Consider mechanisms to engage with research activities conducted by non-CPs
- Define what would be included in a fishing research plan
- Consider that the exemption of research activities from CMMs may be a case by case issue. There may be some provisions of CMMs from which some research activities could be exempted, e.g. in some cases it may be appropriate to be outside the defined footprint. However, this is dependent on the type of research and needs further consideration.
- Consider the FAO deep-sea guidelines and other guidelines on fisheries research. (Paragraph 289)

## Agenda item 13 – Election of Chairperson and Vice Chairperson

290. The Chairperson noted that the two year timeframe had ended for the current Chair (Dr Ilona Stobutzki) and vice-Chair (Dr Tsutomu Nishida).

291. Australia was nominated as Chair. The SC agreed to appoint Dr Ilona Stobutzki as SIOFA SC Chairperson for an additional 12 months.

292. Japan was nominated for vice-Chair. The SC agreed to appoint Dr Tsutomu Nishida as SIOFA SC Vice-Chairperson for an additional 12 months.

## Agenda item 14 – Future meeting arrangements

293. No offers were made to host SC4. CPs were encouraged to consider this intersessionally.

## Agenda item 15 – Other business

294. The rapporteur was thanked for his efforts in compiling the SC meeting report and support from other participants also gratefully acknowledged.

295. The small working group, SAWG and ERAWG Chairs were thanked for their efforts during the meeting and intersessionally.

## Agenda item 16 – Adoption of the meeting report

296. The report of the 3rd meeting of the SIOFA SC was adopted at 5.31PM, 24 March 2018.

## Agenda item 17 – Close of meeting

297. The Chair closed the meeting at 5:34PM

3rd Meeting of the Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific Committee

20-24 March 2018

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Mr Jonathan Hoarau
Meeting Assistant/Student

# Agenda

## 3rd Meeting of the Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific Committee

20-24 March 2018, Hôtel Mercure Créolia 14, rue du Stade Montgaillard,

Saint-Denis La Réunion

Meeting Room – SALON GUETALI

Chair: Dr Ilona Stobutzki

The provisional agenda for the 3rd meeting of the SIOFA Scientific Committee has been developed to focus on the areas of work identified in SIOFA CMM 2017/01 and CMM 2017/02, the SC Work Plan 2016-19 (SC2 Report Annex M) and previous Ordinary Meetings Meeting of SIOFA to meet the governance requirements set out in the SC's terms of reference.

Registration will be open from 08:00 and the meeting will start 09:00 on the 20th March.

A Heads of Delegation meeting will be held on the 20th March 08:00 – 08:45.

NOTE: Prior to this meeting the SIOFA Stock Assessment Working Group will convene 15-18 March 2018 at the same location.

1. Opening
   - 1.2 Opening statement from the Chair
   - 1.2 Introduction of participants

2. Administrative arrangements
   - 2.1 Adoption of the Agenda
   - 2.2 Confirmation of meeting documents
   - 2.3 Appointment of rapporteurs
   - 2.4 Review of functions and terms of reference

3. Annual National Reports

   *In accordance with paragraph 8 of CMM2017/02 each Contracting Party, CNCP and PFE shall provide to the SC an annual National Report. Guidelines for the annual National Reports can be found at Annex F SC3 Report. In addition, in accordance with paragraph 12 of CMM 2016/01 and Annex 1 thereof, each Contracting Party, CNCP and PFE shall report in their National Report any VME encounter above the thresholds established under paragraph 11 of CMM 2016/01 to the SC including action taken in respect of the relevant site.*

4. Current and historical status of fishing activities
   - 4.1 Submission and consideration of historical catch and effort data

   *In accordance with CMM 2017/02 paragraph 9, Contracting Parties Contracting Parties, CNCPs and PFEs shall provide to the Secretariat, by 31 January 2017, historical catch, effort and, if available, observer data for period 2000 to 2015 and any previous years, where available. Any unverified data submitted to be updated with verified data before 31 January*

*2018. Any State or fishing entity that becomes a party to the Agreement, CNCP or PFE after date of CMM adoption shall provide this data within 12 months of becoming Party to the Agreement, or becoming a CNCP or PFE.*

### 4.2 Spatial extent of historic fishing effort data

*In accordance with 2017/01 para 13, Contracting Parties Contracting Parties, CNCPs and PFEs shall, at least 30 days prior to the commencement of the ordinary meeting of the SC in 2018, submit to the Secretariat relevant data on the spatial extent of its historical bottom fishing effort in the Agreement Area and any other data considered useful in developing the SIOFA Bottom Fishing Impact Assessment (BFIA).*

### 4.3 Overview of SIOFA fisheries 2017

*Preparation of an overview based on the National Reports and data submissions.*

## 5. Scientific data standards

### 5.1 SIOFA scientific database

*Update from the secretariat on progress.*

#### 5.1.1 Exchange of SIOFA data

*Discussion on data exchange protocols.*

### 5.2 Observer coverage

*In accordance with 2017/01 para 32, the SC shall review the observer coverage levels prescribed in para 31 at its ordinary meeting in 2018 and provide advice to the MoP.*

### 5.3 Voluntary observer data

*In accordance with 2017/02 para 13, Contracting Parties, CNCPs and PFEs shall endeavour, for all observed trips, to collect data in accordance with the relevant sections of Annex B. All observer data collected shall be reported to the Secretariat by 31 May each year for the previous calendar year. Annex B will be reviewed by the SC at its ordinary meeting in 2018 based on the observer data provided.*

## 6. Vulnerable marine ecosystems

### 6.1 Maps of where VMEs are known to occur, or likely to occur, in the agreement area

*In accordance with 2017/01 para 5, The SC shall, by no later than the close of the ordinary meeting in 2017, and thereafter whenever a substantial change to the fishery has occurred or new data has otherwise been provided to the SC warranting changes, develop and provide advice and recommendations to the MoP on maps of where VMEs are known to occur, or likely to occur in the Agreement Area.*

*Update on progress on maps of VME encounter/indicator data (secretariat in collaboration with ABNJ project)*

### 6.2 Bottom Fishing Impact Assessments (BFIA)

*Review of submitted BFIA in line with CMM 2017/01. Any Contracting Party, CNCP or PFE that authorises or is seeking to authorise any vessel flying its flag to bottom fish in the Agreement Area, shall in accordance with CMM 2017/01 para 14, at least 30 days prior to the commencement of the ordinary meeting of the SC in 2018, submit to the Secretariat a Bottom Fishing Impact Assessment for its individual bottom fishing activities.*

*The SC shall consider all BFIA received at its ordinary meeting in 2018 and provide advice in its meeting report as to;*

*(a) the likely cumulative impacts of bottom fishing impact activity from vessels flying the flag of a Contracting Party, CNCP or PFE in the Agreement Area; and*

*(b) whether each BFIA meets an appropriate standard in light of international standards and the SIOFA Bottom Fishing Impact Assessment Standard (BFIAS), where applicable.*

### 6.3 SIOFA Standard protocols for future protected areas designation

*The MoP4 adopted the standard protocol for future protected areas designation as recommended by the SC2 (Annex H, SC2 Report) The MoP noted the planned work, led by Australia, to assess the Benthic Protected Areas. The MoP requested that the SC consider that there are various management measures possible.*

#### 6.3.1 SIOFA Protected areas working group

*The standard protocol includes the creation of a dedicated working group within SIOFA SC to analyse the information and prepare a report to be considered by SIOFA SC meeting (at least 30 days before the meeting). Review of administrative arrangements and work undertaken to date.*

#### 6.3.2 Proposed protected areas

*Review of any proposed protected areas using the criteria in the standard protocol (Annex H SC2 Report).*

#### 6.3.3 SIOFA standard protocol for future protected areas designation

*As per the standard protocol, the SC will review the draft criteria for recommending protected areas after the first submission of a working paper proposing a protected area recommendation. The criteria will be revised accordingly and agreed as criteria for recommending protected areas.*

## 7. Stock assessment

### 7.1 Stock assessment working group (SAWG)

*Outcomes from the SAWG meeting, including progress as per CMM 2017/01 para 6, which states that the SC shall, by no later than the close of the ordinary meeting of the SC in 2019,.. develop and provide advice and recommendations to the MoP on the status of stocks of principal deep-sea fishery resources targeted, and, to the extent possible, taken as bycatch and caught incidentally in these deep-sea fisheries, including straddling fishery resources.*

#### 7.1.1 Orange Roughy

#### 7.1.2 Alfonsino

#### 7.1.3 Patagonian Toothfish

#### 7.1.4 Other Species

### 7.2 Ecological risk assessment working group (ERAWG)

*Outcomes from the ERAWG and related process as per CMM 2017/01 para 6.*

#### 7.2.1 Deepwater Chondrichthyans

*Presentation and review of ecological risk assessment work.*

## 8. Proposals to bottom fish in the Agreement Area in a manner at variance with established measures

*In accordance with paragraph 20 of CMM 2017/01 a Contracting Party, CNCP and PFE seeking to authorise any vessel flying its flag shall submit to the SC, at least 30 days prior to an ordinary meeting of the SC, a proposal to undertake that activity or activities.*

## 9. Scientific impact assessments

*In accordance with SIOFA SC Operational Work Plan 2016-2019*

### 9.1 Demersal gillnet operations

*In accordance with CMM 2016/05 para 2, Contracting Parties, CNCPs and PFEs recommend that deepwater gillnets not be used in the Agreement Area by any vessel flying the flag of a Contracting Party, CNCP or PFE until such time as the Meeting of the Parties has received a recommendation from the SC.*

## 10. Cooperation with other RFMOs and international bodies

### 10.1 FAO ABNJ Deep Sea project update

### 10.2 Southwest Indian Ocean Fisheries Commission (SWIOFC)

### 10.3 Collaboration with CCAMLR on stock assessment and tagging

### 10.4 Agreement on the Conservation of Albatrosses and Petrels (ACAP)

## 11. Scientific Committee Work Plan

### 11.1 Long term research plan

*Review and update if required*

### 11.2 2017 – 2019 operational work plan and budget

*Review and update if required. Discussion on potential projects and collaboration. Discussion on the science budget to provide advice to the Meeting of the Parties.*

## 12. Advice to the Meeting of Parties

### 12.1 Draft CMM on fishing research

*In accordance with MoP4 report paras 39-41, SC is requested to provide advice and recommendations in relation to the development of the EU's proposal for a CMM to regulate fisheries research in the Agreement Area, with particular regard to the questions listed in para 41.*

## 13. Election of Chairperson and Vice Chairperson

*In accordance with para 3 of SC ToR and Rule 5.1, the Scientific Committee shall elect its Chairperson and Vice Chairperson from representatives of Contracting Parties or cooperating non-Contracting Parties to the Scientific Committee. Individuals who fulfil the role of Chairperson and Vice Chairperson should be able to demonstrate an understanding and proven ability to lead discussions on the technical matters dealt with by the Scientific Committee. Each Chairperson and Vice Chairperson shall serve for a maximum of two years and shall be eligible for re-election for one additional term of two years. The Chairperson and Vice-Chairperson shall be from different Contracting Parties.*

## 14. Future meeting arrangements

*The SC is asked to agree to (approximate) dates and location for the 4th meeting of the SIOFA SC.*

## 15. Other business

## 16. Adoption of the meeting report

## 17. Close of meeting

3rd Meeting of the Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific Committee

20-24 March 2018

# List of Meeting Documents

| Document Reference N° | Document | Relevant agenda items |
|---|---|---|
| SC-03-01 | Meeting notice | - |
| SC-03-02 (01) Rev3 | Provisional agenda for the SIOFA Scientific Committee meeting | 2 |
| SC-03-02 (02) | Provisional agenda for Heads of Delegation meeting | 2 |
| SC-03-02 (03) | List of Meeting Documents | 2 |
| SC-03-02 (04) | Table of agenda items and related papers | 2 |
| SC-03-02 (05) | Scientific Committee Terms of Reference | 2 |
| SC-03-02 (06) | SIOFA SC3 List of Participants | 2 |
| SC-03-03 (01) | Annual National Report (Cook Islands) | 3 |
| SC-03-03 (02) | Annual National Report (Japan) | 3 |
| SC-03-03 (03) | Annual National Report (Thailand) | 3 |
| SC-03-03 (04) | Annual National Report (Australia) | 3 |
| SC-03-03 (05) | Annual National Report (EU) | 3 |
| SC-03-03 (06) | Annual National Report (French Territory) | 3 |
| SC-03-03 (07) | Annual National Report (Korea) | 3 |
| SC-03-05.2 (01) | National Observer Program – Thailand | 5.2 |
| SC-03-06 (01) | Proposal to create a permanent group for Ecosystem Monitoring and Management | 6 |
| SC-03-06 (02) | New data acquisition protocol for benthos bycatch in the French fisheries of the Indian Ocean and the Southern Ocean | 6 |
| SC-03-06.2 (01) | Bottom Fishing Impact Assessment (BFIA) – Japan bottom trawl | 6.2 |
| SC-03-06.2 (02) | Bottom Fishing Impact Assessment (BFIA) – Japan midwater trawl | 6.2 |
| SC-03-06.2 (03) | Bottom Fishing Impact Assessment (BFIA) – Japan bottom longline | 6.2 |

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|---|---|---|
| SC-03-06.2 (04) | Bottom Fishing Impact Assessment (BFIA) – Cook Islands | 6.2 |
| SC-03-06.2 (05) | Vessel Seabird Management Plan (VSMP) – Cook Islands | 6.2 |
| SC-03-06.2 (06) | Bottom Fishing Impact Assessment (BFIA) – Thailand | 6.2 |
| SC-03-06.2 (07) | Bottom Fishing Impact Assessment (BFIA) – Australia | 6.2 |
| SC-03-06.2 (08) | Bottom Fishing Impact Assessment (BFIA), Review – Australia | 6.2 |
| SC-03-06.2 (09) Rev1 | Bottom Fishing Impact Assessment (BFIA) – EU | 6.2 |
| SC-03-06.2 (10) | Bottom Fishing Impact Assessment (BFIA) – French Territory | 6.2 |
| SC-03-06.3 (01) | Protected areas protocol review | 6.3 |
| SC-03-06.3.2 (01) | Proposal for Protected Area – EAST BROKEN RIDGES | 6.3.2 |
| SC-03-06.3.2 (02) | Proposal for Protected Area – ATLANTIS BANK | 6.3.2 |
| SC-03-06.3.2 (03) | Proposal for Protected Area – BANANA | 6.3.2 |
| SC-03-06.3.2 (04) | Proposal for Protected Area – BRIDLE | 6.3.2 |
| SC-03-06.3.2 (05) | Proposal for Protected Area – CORAL | 6.3.2 |
| SC-03-06.3.2 (06) | Proposal for Protected Area – DEL-CANO-RISE | 6.3.2 |
| SC-03-06.3.2 (07) | Proposal for Protected Area – FOOLS-FLAT | 6.3.2 |
| SC-03-06.3.2 (08) | Proposal for Protected Area – GULDAN DRAAK | 6.3.2 |
| SC-03-06.3.2 (09) | Proposal for Protected Area – MID-INDIAN-RIDGE | 6.3.2 |
| SC-03-06.3.2 (10) | Proposal for Protected Area – MIDDLE-OF-WHAT (MOW) | 6.3.2 |
| SC-03-06.3.2 (11) | Proposal for Protected Area – RUSKY-KNOLL | 6.3.2 |
| SC-03-06.3.2 (12) | Proposal for Protected Area – WALTERS SHOAL | 6.3.2 |
| SC-03-07 (01) | Proposed framework for low-information species ERA | 7 |
| SC-03-07.1.1 (01) | Orange roughy biomass estimation in SIOFA - Review of the use of acoustics from industry vessels. CISRO, Feb 2018. | 7.1.1 |
| SC-03-07.1.1 (02) | Review of SIOFA orange roughy (Hoplostethus atlanticus) acoustic data. CISRO, Feb 2018. | 7.1.1 |
| SC-03-07.1.1 (03) | SAWG1 Meeting Report | 7.1.1 |
| SC-03-07.1.1 (03) | Annex F Info. used to support or stock structure assumptions_reduced | 7.1.1 |
| SC-03-07.1.1 (04) Rev1 | Stock assessment of orange roughy Walter's Shoal. Cordue, 2018 | 7.1.1 |

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|---|---|---|
| SC-03-07.1.1 (05) Rev1 | Assessment of orange roughy stocks SIOFA Areas 1, 2, 3a and 3b. Cordue, 2018 | 7.1.1 |
| SC-03-07.2.1 (01) | Ecological Risk Assessment for Deepwater Chondrichthyans in the Southern Indian Ocean | 7.2.1 |
| SC-03-10.4 (01) | Proposal for a Memorandum of Understanding between SIOFA and the Agreement on the Conservation of Albatrosses and Petrels (ACAP) | 10.4 |
| SC-03-12 (01) | Draft CMM on fishing research | 12.1 |
| SC-03-INFO-01 Rev1 | MoU for the accreditation and coordination of Southwest Indian Ocean Coastal State Scientific Observers at sub-regional level and the exchange of Observer data | 5.2 |
| SC-03-INFO-02 | SIOFA, Resource Management of Alfonsino and Harvest Control Rules. R. Shotton, January 2018 | 7 |
| SC-03-INFO-03 | Treatment of Zero-Catch Observations in CPUE Analysis of Tow Results. R. Shotton, SIODFA, January 2018 | 7 |
| SC-03-INFO-04 | Considerations on the Purpose of Benthic Protected Areas in the Southern Indian Ocean Fisheries Agreement Area, R. Shotton, SIOFDA. | 6.3 |
| SC-03-INFO-05 | Summary of the 1st Meeting of the SIOFA Ecological Risk Assessment Working Group | 7.2 |
| SC-03-INFO-06 | Summary of the November 2017 meeting of the informal protected areas 'steering committee' | 6.3.1 |
| SC-03-INFO-07 | Report on the South East Atlantic Fisheries Organisation (SEAFO) 2017 Scientific Committee. Provided by the European Union. | 11 |
| SC-03-INFO-10 | Assessment of orange roughy stocks SIOFA Areas 1, 2, 3a and 3b. PRESENTATION | 7.1.1 |
| SC-03-INFO-11 Rev1 | Summary of historical orange roughy catch (Mar 6 2018) | 7.1.1 |
| SC-03-INFO-12 | Sensitivity Analyses supporting ERA for Deepwater Chondrichthyans in the SIO | 7.2.1 |
| SC-03-INFO-13 | Stock assessment of orange roughy Walter's Shoal PRESENTATION | 7.1.1 |
| SC-03-INFO-14 | Comoros status of fishing activity - historic catches within EEZ | 4 |
| SC-03-INFO-15 | Historical catch by China on orange roughy in SIOFA Area | 4 |
| SC-03-INFO-16 | SIOFA_SWIOFC Collaboration - A Concept Note | 10.2 |
| SC-03-INFO-17 | National Report （China) | 3 |

3rd Meeting of the Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific Committee

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# Table of agenda items and related papers

| Agenda Item | Related Papers |
|---|---|
| 1. Opening<br>1.1 Opening statement from the Chair<br>1.2 Introduction of participants | *No papers provided for this item.* |
| 2. Administrative Arrangements<br>2.1 Adoption of the agenda<br>2.2 Confirmation of meeting documents<br>2.3 Appointment of rapporteurs<br>2.4 Review of functions and terms of reference | SC-03-02 (01) Provisional Agenda Rev3<br>SC-03-02 (03) List of meeting Documents<br>SC-03-02 (04) Table of agenda items and related papers<br>SC-03-02 (05) SC ToR<br>SC-03-02 (06) SC3 List of participants |
| 3. Annual National reports | SC-03-03 (01) Annual National Report Cook Islands<br>SC-03-03 (02) Annual National Report Japan<br>SC-03-03 (03) Annual National Report Thailand<br>SC-03-03 (04) Annual National Report Australia<br>SC-03-03 (05) Annual National Report EU<br>SC-03-03 (06) Annual National Report French Territory<br>SC-03-03 (07) Annual National Report Korea<br>SC-03-INFO-14 Comoros status of fishing activity - historic catches within EEZ<br>SC-03-INFO-17 National Report (China) |
| 4. Current and historical status of fishing activities | SC-03-INFO-14 Comoros status of fishing activity - historic catches within EEZ |

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| | SC-03-INFO-15 Historical catch by China on orange roughy in SIOFA Area |
| 4.1 Submission and consideration of historical catch and effort data | *To date no papers provided for this item* |
| 4.2 Spatial Extent of historical fishing effort data | *To date no papers provided for this item* |
| 4.3 Overview of SIOFA fisheries 2017 | *To date no papers provided for this item* |
| 5. Scientific Data Standards | |
| 5.1 SIOFA scientific database | *To date no papers provided for this item* |
| 5.2 Observer coverage | SC-03-05.2 (01) National Observer Program – Thailand<br>SC-03-INFO-01 Rev1 MoU for the accreditation and coordination of Southwest Indian Ocean Coastal State Scientific Observers at sub-regional level and the exchange of Observer data |
| 6. Vulnerable Marine Ecosystems | SC-03-06 (01) Proposal to create a permanent group for Ecosystem Monitoring and Management<br>SC-03-06 (02) New data acquisition protocol for benthos bycatch in the French fisheries of the Indian Ocean and the Southern Ocean |
| 6.1 Maps of where VMEs are known to occur, or likely to occur, in the Area | *To date no papers provided for this item* |
| 6.2 Bottom Fisting Impact Assessments (BFIAs) | SC-03-06.2 (01) BFIA Japan bottom trawl<br>SC-03-06.2 (02) BFIA Japan midwater trawl<br>SC-03-06.2 (03) BFIA Japan longline<br>SC-03-06.2 (04) BFIA Cook Islands<br>SC-03-06.2 (05) Vessel Seabird Management Plan Cook Islands<br>SC-03-06.2 (06) BFIA Thailand<br>SC-03-06.2 (07) BFIA Australia<br>SC-03-06.2 (08) BFIA Review Australia<br>SC-03-06.2 (09)Rev1 BFIA EU |

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| | SC-03-06.2 (10) BFIA French Territory |
| 6.3 SIOFA Standard protocols for future protected areas designation | SC-03-06.3 (01) Protected areas protocol review<br><br>SC-03-INFO-04 Considerations on the Purpose of Benthic Protected Areas in the Southern Indian Ocean Fisheries Agreement Area. R. Shotton, SIOFDA. |
| 6.3.1 SIOFA Protected areas working group | SC-03-INFO-06 Summary of the Nov 2017 meeting of the informal protected areas 'steering committee' |
| 6.3.2 SIOFA Proposed protected areas | SC-03-06.3.2 (01) Proposal – EAST BROKEN RIDGE<br><br>SC-03-06.3.2 (02) Proposal – ATLANTIS BANK<br><br>SC-03-06.3.2 (03) Proposal – BANANA<br><br>SC-03-06.3.2 (04) Proposal – BRIDLE<br><br>SC-03-06.3.2 (05) Proposal – CORAL<br><br>SC-03-06.3.2 (06) Proposal – DEL-CANO-RISE<br><br>SC-03-06.3.2 (07) Proposal – FOOLS-FLAT<br><br>SC-03-06.3.2 (08) Proposal – GULDAN DRAAK<br><br>SC-03-06.3.2 (09) Proposal – MID INDIAN RIDGE<br><br>SC-03-06.3.2 (10) Proposal – MIDDLE-OF-WHAT (MOW)<br><br>SC-03-06.3.2 (11) Proposal – RUSKY-KNOLL<br><br>SC-03-06.3.2 (01) Proposal – WALTERS SHOAL |
| 6.3.3 SIOFA standard protocol for future protected areas designation | *To date no papers provided for this item* |
| 7. Stock Assessment | SC-03-07 (01) Proposed framework for low-information species ERA<br><br>SC-03-INFO-02 SIOFA, Resource Management of Alfonsino and Harvest Control Rules. R. Shotton, January 2018<br><br>SC-03-INFO-03 Treatment of Zero-Catch Observations in CPUE Analysis of Tow Results. R. Shotton, SIODFA, January 2018 |

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| 7.1 Stock assessment working group (SAWG) | SC-03-07.1.1 (01) Orange roughy biomass estimation in SIOFA - Review of the use of acoustics from industry vessels. CISRO, Feb 2018.<br><br>SC-03-07.1.1 (02) Review of SIOFA orange roughy (Hoplostethus atlanticus) acoustic data. CISRO, Feb 2018.<br><br>SC-03-07.1.1(03) SAWG1 Meeting Report<br><br>SC-03-07.1.1(03) Annex F Info. used to support or stock structure assumptions_reduced<br><br>SC-03-07.1.1(04) Rev1 Stock assessment of orange roughy Walter's Shoal. Cordue, 2018<br><br>SC-03-07.1.1(05) Rev1 Assessment of orange roughy stocks SIOFA Areas 1, 2, 3a and 3b. Cordue, 2018<br><br>SC-03-INFO-10 Assessment of orange roughy stocks SIOFA Areas 1, 2, 3a and 3b. PRESENTATION<br><br>SC-03-INFO-11 (Rev_1) Summary of historical orange roughy catch (Mar 6 2018)<br><br>SC-03-INFO-13 Stock assessment of orange roughy Walter's Shoal PRESENTATION |
| 7.2 Ecological risk assessment working group (ERAWG) | SC-03-INFO-07 Summary of the 1st meeting of the SIOFA Ecological Risk Assessment Working Group |
| 7.2.1 Deepwater Chondrichthyans | SC-03-07.2.1 (01) Ecological Risk Assessment for Deepwater Chrondrichthyans in the Southern Indian Ocean<br><br>SC-03-INFO-12-Sensitivity Analyses supporting ERA for Deepwater Chondrichthyans in the SIO |
| 8. Proposals to bottom fish in the Agreement Area in a manner at variance with established measures | *To date no papers provided for this item* |
| 9. Scientific impact assessments | *To date no papers provided for this item* |
| 9.1 Demersal gillnet operations | *To date no papers provided for this item* |
| 10. Cooperation with other RFMOs and International Bodies | |
| 10.1 FAO ABNJ Deep Sea project update | *To date no papers provided for this item* |

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| 10.2 Southwest Indian Ocean Fisheries Commission (SWIOFC) | SC-03-INFO-16 SIOFA_SWIOFC Collaboration - A Concept Note |
| 10.3 Collaboration with CCAMLR on stock assessment and tagging | *To date no papers provided for this item* |
| 10.4 Agreement on the Conservation of Albatrosses and Petrels (ACAP) | SC-03-10.4 (01) Proposal for a Memorandum of Understanding between SIOFA and the Agreement on the Conservation of Albatrosses and Petrels (ACAP) |
| 11. Scientific Committee Work Plan | SC-03-INFO-08 Report on the South East Atlantic Fisheries Organisation (SEAFO) 2017 Scientific Committee. Provided by the European Union. |
| 11.1 Long term research plan | *To date no papers provided for this item* |
| 11.2 2017-2019 operational work plan and budget | *To date no papers provided for this item* |
| 12. Advice to the Meeting of the parties | |
| 12.1 Draft CMM on fishing research | SC-03-12.1 (01) Draft CMM on fishing research |
| 13. Future meeting arrangements | *To date no papers provided for this item* |
| 14. Other business | *To date no papers provided for this item* |
| 15. Adoption of the meeting report | *To date no papers provided for this item* |
| 16. Close of meeting | *To date no papers provided for this item* |

# Overview of SIOFA fisheries 2017

## Fleet composition

In the seven years 2011 to 2017 (the most recent years reported by all parties), between 7 and 65 vessels fished each year in the SIOFA Area, across all the parties and one non-contracting party, China (Table 1).

Table 1. Provisional list of vessels (trawl, bottom longline and gillnet) undertaking fishing in the SIOFA area by Contracting Parties and China, a non-contracting party.

| Flag | Gear | Year | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Australia | Trawl | 1 | 1 | 1 | 1 | 1* | 1* | 0 |
| | Bottom Longline | 0 | 0 | 0 | 0 | 1* | 1* | 0 |
| Cook Islands | Trawl | 3 | 3 | 2 | 2 | 2 | 2 | 2 |
| European Union | Bottom Longline | 2 | 2 | 2 | 1 | 1 | 2 | 2 |
| | Gillnet | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| France Overseas Territories | Bottom Longline | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Japan | Trawl | 1 | 2 | 2 | 1 | 2 | 2 | 2 |
| | Bottom Longline | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Korea | Trawl | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| | Bottom Longline | 1 | 1 | 3 | 0 | 0 | 0 | 0 |
| Thailand | Trawl | | | | | 57** | 60** | 13** |
| | Trap - Seine | | | | | 0 | 1 | 1 |
| China[1] | Trawl | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Longline | 20 | 17 | 3 | 0 | 0 | 0 | 0 |
| | Seine | 0 | 0 | 0 | 6 | 6 | 8 | 5 |
| **Total Trawl** | | **6** | **7** | **6** | **4** | **62** | **65** | **17** |
| **Total Bottom Longline** | | **25** | **22** | **11** | **3** | **2** | **5** | **4** |
| **Total Other** | | | | **1** | **7** | **7** | **9** | **6** |

1 China as non-contracting party
* vessel is multipurpose (trawl and bottom long-line)
** most vessels have GT < 500.

## Fishing Effort

Provisional estimates of aggregated Trawl effort (days) across CPs varied between 674 and 789 days between 2011 and 2014 (Table 2). In 2015, this increased to 1065 days (Table 2). In 2016, a proper computation is not relevant as Thailand do not report trawl effort by days or hours. Trawl hours are also reported except for the Cook Islands where reporting at this level is not applicable.

Provisional estimates of aggregated longline effort (hooks) across CPs and China show that the reported number of hooks was over 13 million in 2011. This has subsequently reduced with 3.5 million hooks reported in 2016.

Table 2. Provisional estimates of effort in the SIOFA fisheries between 2011 and 2016. Note Cook Islands are currently unable to report trawl hours. In 2016, units are not homogeneous enough to compute a proper total trawl days or hours. All trawl hours exclude the Cook Islands.

| Flag | Gear | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|
| Australia | Trawl days | 132 | 104 | 32 | 63 | 12 | - | - |
| | Trawl hrs | 294 | 252 | 62 | 106 | 14 | 26 | - |
| | Longline hooks | 0 | 0 | 0 | 0 | 1,800 | 37,800 | - |
| Cook Islands | Trawl days | 599 | 490 | 524 | 523 | 501 | 455 | 495 |
| European Union | Longline hooks | na | na | na | na | 2,221,000 | 3,335,000 | 3,218,859 |
| | Gillnet km | 0 | 0 | 5,442 | 4,945 | 1,121 | 0 | 0 |
| France Overseas Territories | Longline hooks | 509,414 | 503,478 | 731,883 | 634,682 | 443,492 | 1,200 | 1,980 |
| Japan | Trawl days | 58 | 90 | 118 | 126 | 356 | - | n/a |
| | Trawl Hrs | 550 | 528 | 1,001 | 707 | 2,260 | 2,500 | n/a |
| | Longline hooks | 0 | 0 | 96,480 | 0 | 0 | 0 | n/a |
| Korea | Trawl days | 50 | 238 | 217 | 0 | 0 | 0 | 0 |
| | Trawl hrs | 286 | 623 | 233 | 0 | 0 | 0 | 0 |
| | Longline hooks | 355,192 | 2,193,460 | 1,023,252 | 0 | 0 | 0 | 0 |
| Thailand | Trawl tows | | | | | 4,090 | 4,552 | nei* |
| | Traps | | | | | 0 | 8 | nei* |
| China [1] | Longline hooks | 12,375,000 | 5,010,000 | 2,050,000 | 0 | 0 | 0 | 0 |
| | Seine hours | 0 | 0 | 0 | ~4,500 | ~10,000 | ~4,000 | 300 |
| **Total Trawl days** | | **839** | **922** | **891** | **712** | **869** | **-** | |
| **Total Trawl hrs*** | | **1130** | **1403** | **1,296** | **813** | **2,274** | **-** | |
| **Total hooks** | | **13,239,606** | **7,706,936** | **3,901,615** | **634,682** | **2,664,492** | **3,374,000** | |
| **Total Gillnet km** | | **0** | **0** | **5,442** | **4,945** | **1,121** | **0** | |

*not enough information, only 2 months available
~ approximate values

## Catch composition

The catch of trawl vessels is predominantly alfonsino and orange roughy. Species also caught by trawling include pelagic armourhead, bluenose warehou, violet warehou, ocean blue-eye trevalla and oreo dories, cardinal fish, hapuku wreckfish. The addition of Thailand's fishery added Lizardfish and scads as a major catch from small trawlers since 2015.

The catch of longline vessels differs between two groups. There are longline vessels (reported by Japan, Korea and France Overseas Territories) that catch Patagonian toothfish and associated species such as blue antimora. The other longline vessels catch hapuku wreckfish and ocean blue-eye trevalla, pelagic armourhead, deepwater sharks (Squalidae), alfonsino, rubyfish and common mora.

The catch of the gillnet vessels was predominantly deepwater sharks (Squalidae), there is uncertainty on the species composition within this group.

China's light seining fishery is targeting mackerel and *Brama* species (such as *Brama japonica*) and its bottom longline fishery is targeting ruby snapper and other species in the Lutjanid family.

## Catch volume

Provisional catch time series for 2006 to 2016 for Alfonsino, Orange Roughy, Patagonian Toothfish, deep water sharks (starting 2010), scads and lizardfish are presented in Figures 1, 2, 3, 4 and 5 respectively.

NB: Due to the differences observed between the recent SIOFA database and the 2017 version of the overview reports, it was not possible to provide a validated update on the catches for species in figures 1 , 2 and 3.


Figure 1 Provision catch annual catches (tonnes) between 2006 and 2015 (x-axis) for alfonsino. Note this figure was not updated from 2016 and the catch history does not include the historical or current catch of non-contracting parties.


Figure 2 Provision catch annual catches (tonnes) between 2006 and 2015 for orange roughy (x-axis). Note this figure was not updated from 2016 and this catch history does not include the historical or current catch of non-contracting parties

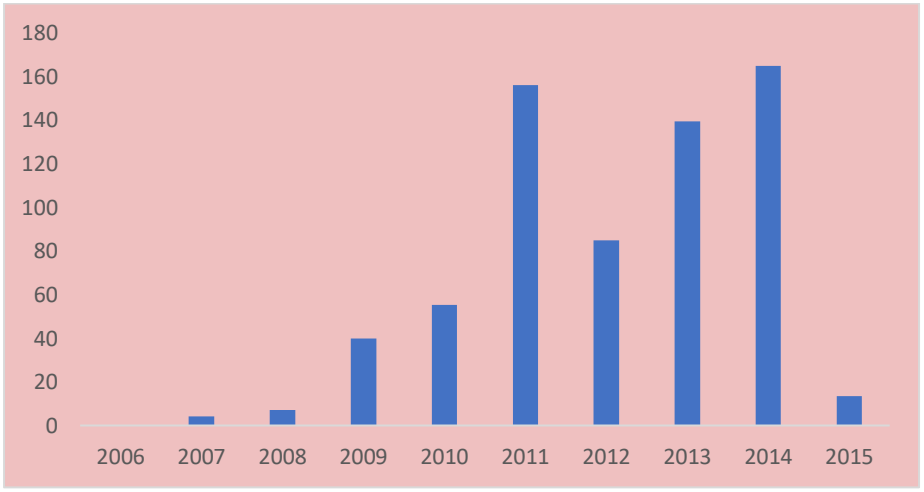


Figure 3 Provisional annual catches (tonnes) between 2006 and 2015 (x-axis) for Patagonian Toothfish. Note this figure was not updated from 2016 and this catch history does not include the historical or current catch of non-contracting parties.

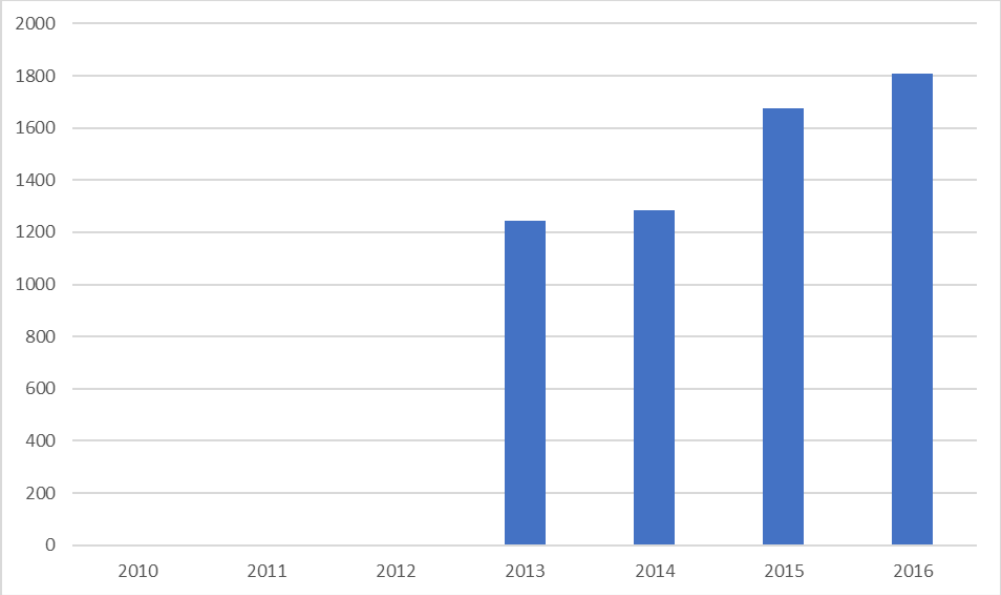


Figure 4 Provisional annual catches (tonnes) between 2010 and 2016 for deep water sharks. Note this catch history does not include the historical or current catch of non-contracting parties

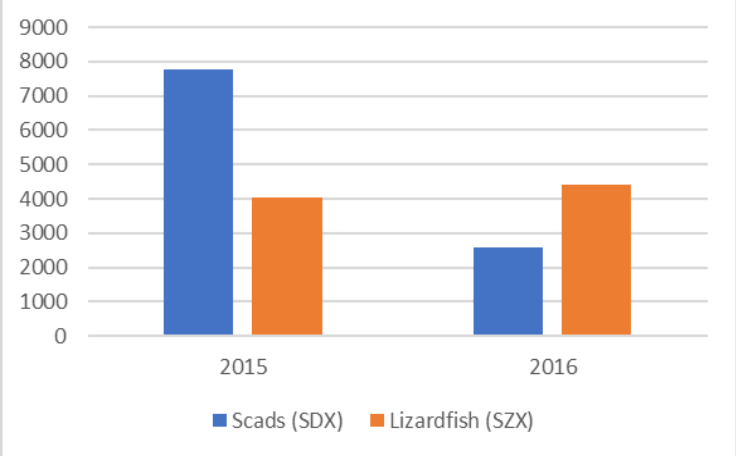


Figure 5 Annual catch (tonnes) between 2015 and 2016 for scads (*Decapterus* spp) and lizardfish (*Saurida* spp) from Thailand fishery.

**Vulnerable Marine Ecosystems**

One of the tools SIOFA implements to manage impacts on Vulnerable Marine Ecosystems (VME) from fishing is the application of move-on rules when thresholds of VME indicators are reached. Table 3 provides a summary of the thresholds and move-on rules applied by each Flag.

## Observer programs

SIOFA requires its members to implement Scientific Observer programs. Table 4 provides a summary of the observer programs implemented by each Flag.

Table 3. Summary of VME thresholds and Management Responses that were provided in the 2017 National Reports submitted to SC3.

| Flag | VME Threshold | Management Response |
|---|---|---|
| Cook Islands | Trawl tow, the presence of more than 60 kg of live coral and/or 400 kg of live sponge. | Reported to Cook Islands within 24 hrs of encounter |
| | If any subsequent trawl within 1nm of the encounter trawl contains more than 30 kg of live coral/and or 200 kg of live sponge | The vessel must not fish within 5nm of that area until the Ministry of Marine Resources has completed an investigation.<br>However, if the vessel deploys an underwater camera system on the trawl net, and the Cook Islands Observer verifies that no substantial VME structures are present, fishing can continue. |
| | | Cook Islands vessels intending to transit any Benthic Protected Area shall:<br>a. Give at least 24 hours advance notice to MMR prior to entering or exiting any Benthic Protected Areas;<br>b. Ensure their vessel monitoring system polls once every hour while in the Benthic Protected Area; and<br>c. Require that fishing gear is properly stowed before entering, and in transit through, a Benthic Protected Area and not able to be deployed. |
| Korea | The threshold for all bottom fishing vessels: > 60kg of coral per set or over 800kg of sponges per set. | If the amount of VME that exceeds the weight specified in the criteria, the vessel shall apply a 2 nautical miles move-on rule to resume its fishing operation.<br>The vessel shall relocate its fishing position until it reaches a point where no VMEs are confirmed.<br>In accordance with Article 15 of Distant Water Fisheries Development Act, an automatic location communicator shall be installed on all vessels conducting bottom fishing activities, and an observer shall be on board each vessel for over 50% of the total number of days fished during the trip. |

| Flag | VME Threshold | Management Response |
|---|---|---|
| Australia | Trawl > 50 kg of corals or sponges in a shot for trawlers<br>Line >10 kg of corals or sponges per 1000 hooks or 1200 metre section of line (whichever is shorter) | In the SIOFA area of waters<br>(a) if the combined catch of coral or sponge in any one trawl shot exceeds 50kgs the holder must cease fishing within an area two nautical miles either side of the trawl track extended by two nautical miles at each end of the trawl track; or<br>(b) if the combined catch of coral or sponge in any one shot for line method exceeds 10kgs for any 1000 hook section of line or a 1200 metre section of line, whichever is the shorter; the holder must cease fishing within a radius of one nautical mile from the midpoint of the line segment.<br>The holder most not fish in that area using the same method as used for that shot that triggered the limit until AFMA notifies otherwise.<br>In the SIOFA area of waters if a vessel exceeds the catch limit for coral and sponge then as soon as practicable, but in any event no later than 24 hours after the shot, the concession holder must notify AFMA's Service One section. The notification must include details of the shot including the location. |
| Japan | | Following Article 11 CMM 2016/01, Japan temporally establishes threshold levels for encounters with VMEs and move-on protocols. For trawl fisheries, as they operate in the mid-water, no threshold levels have been established.<br>The threshold levels will be established when the observer recognizes that the operation is likely to come in contact with the seafloor or benthic organisms. As for the bottom longline fisheries, Japan applies those used in CCAMLR. |
| European Union | | The EU-Spain bottom longline fleet is applying the rules adopted by the Fishing Administration, similar to those applied in SEAFO and CCAMLR in the definition of the VME encounter and thresholds, together with the protocols adopted in the CMM 2016-01. |
| Thailand | Bottom trawl: sponges >700 Kg, corals >60 Kg per operation<br>Longline: 10 Kg sponges or corals / per 1000 hooks or per 1,200 meters<br>Trap: >10 Kg sponges or corals | 1. Stop fishing operations and move:<br>- for bottom trawl: at least 2 nautical miles from area,<br>- for longline: at least 1 nautical mile away from centre of line segment,<br>- for traps: at least 1 nautical mile away from the area.<br>2. Report to Department of Fisheries within 24 hours |
| China [1] | *No significant adverse impact by Chinese bottom fisheries on VMEs were found, and no interactions with threatened, endangered and protected species were reported for the past bottom fisheries.* | |

Table 4. Summary of Observer Programs that were provided in the 2017 National Reports submitted to SC3.

| **Country** | | **Position** |
|---|---|---|
| Australia | Coverage | Trawl gear – 100% since 2010 |
| | | Non-trawl – 20% |
| | Training | AFMA operated: Need relevant scientific or fishing experience: currently 16 |
| | Collection | Data on vessel characteristics, fishing activity, catch composition, discarding and bycatch.<br><br>Do not record bycatch of marine mammals, seabirds or marine reptiles |
| | Port Sampling | No: Landings monitored thru verified catch disposal records |
| Cook Islands | Coverage | 35% 2015-2017; 100% by 1 July 2017 from Cook Islands National Observer Programme |
| | Training | Undertaken in 2017, cross-validation of Pacific Islands Regional Programme Observers |
| | Collection | |
| | Port Sampling | Vessels are monitored by port landing state; Cook Islands Observers |
| EU | Coverage | 20%; national observers; IOTC scientific observation system |
| | Training | IEO observer program; French observer program |
| | Collection | |
| | Port Sampling | No |
| France (overseas territories) | Coverage | 100% |
| | Training | |
| | Collection | |
| | Port Sampling | Catch control on port for TOP |
| Japan | Coverage | 100% |
| | Training | Initiated September 2016 |
| | Collection | Trawl Fisheries: items listed in Annex B, CMM 2016/02<br><br>Bottom longline fisheries: use CCAMLR |
| | Port Sampling | |
| Korea | Coverage | 100% (to2013) |
| | Training | Initiated 2012: overseen by NIFS; must have specified scientific or fishing experience |
| | Collection | |
| | Port Sampling | No |
| Thailand | Coverage | Bottom trawl 100%, Other 20%, At sea transhipments 100% |
| | Training | FAO Guidelines for Developing an at-Sea Fisheries Observer Program |

| Country | | Position |
|---|---|---|
| | Collection | |
| | Port Sampling | All landing inspected on port but no sampling for biological data. |
| China [1] | Coverage | Bottom longline fishery only |
| | Training | |
| | Collection | |
| | Port Sampling | 2015-2016 light seine fishery only |

FAO species codes and alternative names used by members of the Scientific Committee

| FAO common name | FAO code | Scientific name | Alternative common name |
|---|---|---|---|
| Alfonsinos nei | ALF | *Beryx* spp. | Alfonsino |
| Splendid alfonsino | BYS | *Beryx splendens* | Alfonsino |
| Bluenose warehou | BWA | *Hyperoglyphe antarctica* | Blue-eye trevalla, Antarctic butterfish |
| Orange roughy | ORY | *Hoplostethus atlanticus* | |
| | | *Schedophilus labyrinthicus** | Ocean blue-eye trevalla |
| Violet warehou | SEY | *Schedophilus velaini* | Indian Ocean trevalla |
| Pelagic armourhead | EDR | *Pentaceros richardsoni* | Southern boarfish |
| Patagonian toothfish | TOP | *Dissostichus eleginoides* | |
| Common mora | RIB | *Mora moro* | Ribaldo |
| Wreckfish | WRF | *Polyprion americanus* | |
| Portuguese dogfish | CYO | *Centroscymnus coelolepis* | |
| Hapuka | HAU | *Polyprion spp.* | Antarctic butterfish (Japan?) |
| Rubyfish | RYG | *Plagiogeneion rubiginosum* | |
| | | *Plagiogeneion spp.* | Rubyfish |
| Smooth oreo dory | SSO | *Pseudocyttus maculatus* | |
| Spiky oreo | ONV | *Neocyttus rhomboidalis* | |
| Blue antimora | ANT | *Antimora rostrata* | |
| Hapuku wreckfish | WHA | *Polyprion oxygeneios* | Hapuku |
| Cardinalfishes nei | APO | *Apogonidae* | |
| Cardinal fishes nei | CDL | *Epigonidae* | Deepwater cardinalfishes |
| Oreo dories nei | ORD | *Oreosomatidae* | |
| Blackbelly rosefish | BRF | *Helicolenus dactylopterus* | |
| Lizardfish | SZX | *Saurida undosquamis* | |
| Scads | SDX | *Decapterus russelli* | Round scad |
| Ruby snapper | ETC | *Etelis coruscan* | |

*scientific name unaccepted, accepted species name is *Schedophilus velaini*, however reported in some fisheries as *Schedophilus labyrinthicus*

## Gap Analysis of CP BFIAs against BFIA standards

| BFIAS section | Requirement | Status of completion (in BFIA) | Comments |
|---|---|---|---|
| 5.1 Description of the proposed fishing activities | General | BFIAs not received from Korea, Mauritius, Seychelles | |
| | Details of the vessels to be used | ALL except those not submitting BFIAs, | All complied |
| | Data Standards for vessel data, and confirmation that they appear on the list of approved SIOFA vessels | ALL | |
| | Detailed description of fishing methods, range in fishing height off bottom, net opening and any factors affecting gear selectivity | All | |
| | Seabed depth range to be fished | Yes | |
| | Target species, and likely or potential by-catch species | Yes | |

| BFIAS section | Requirement | Status of completion (in BFIA) | Comments |
|---|---|---|---|
| | Intended period and duration of fishing | Yes | |
| | Effort indices: How many vessels, how many tows (cumulative effects), estimated tow durations or distance (ranges) | | Cumulative effects not clearly described. Length of static gear as measure of effort needs to be specified. Soak time, number of traps for trap gear not available (Thailand). Effort indices not always clear |
| | Estimated total catch and discard quantities by target and bycatch species | Not (always?) cumulative – i.e. the entire catch history. | |
| 5.2 Mapping and description of proposed fishing areas | General | | |
| | Maps of the (intended) fishing areas, at the appropriate resolution in relation to the most recent SIOFA maps of historically fished areas | AUS, CKI, JPN, EU, THA, FR(OT) | Resolution required not defined but 20' is the minimum specified requirement. Is important to specify if this is not used for whatever reason.<br>Some JPN fishing intentioned reported by 30' resolution. |
| | Area, or topographic features ***likely*** to support such VMEs | AUS, CKI, | CKI notes that the UN implied method is not suitable for addressing this issue. References conflict in advice they give. |
| | Mapping of all known VMEs, or evidence of VMEs | AUS, CKI, JPN | FR(OT) noted that got one 'VME' organism. Thailand report that they found no VMEs. EU has data yet to be analysed. JPN can make map available |

| BFIAS section | Requirement | Status of completion (in BFIA) | Comments |
|---|---|---|---|
| | Mapping of the results of predictive habitat modelling for VMEs | None | EU suggests that there is insufficient data to do this, but with a coordinated approach could make it possible. CKI believes that this activity gives inaccurate results and is unjustifiable. FR(OT) is of a contrary view – but need a common data collection framework to do. |
| | Baseline data and description of the proposed fishing areas | AUS, CKI, FR(OT); EU &THA - at least in part | |
| 5.3 Impact assessment | Scoping of issues of concern | AUS, CKI | |
| | Risk assessment | AUS, CKI, EU - 1,2,3, & 4; FT(OT) | FT(OT) had such little effort that a risk effort was scarcely useful |
| | Determination of the level of risk posed by an activity, against 1. Intensity, 2. Duration, 3. Spatial extent and 4. Cumulative impact | | FR(OT) had few data; it did not enable a detailed assessment |
| | Overall risk | AUS (qualified), CKI, FT(OT), JPN, THA (general statement) | NB: is risk both to environment and to the stocks including bycatch. Difficult/impossible/meaningless to combine qualitative and quantitative components of the risk assessment within and among fishing countries. Parties concluded that their own operations had 'low' risk but these assessments are not comparable among parties, a difficulty that may be unavoidable. |
| | Interactions with VMEs: Impacts ***likely*** to result from the fishing gears to be used | AUS, CKI, JPN, THA, FT(OT) | FT(OT) - not possible with available data. EU used CCAMLR standards to assess. |

| BFIAS section | Requirement | Status of completion (in BFIA) | Comments |
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| | Interactions with VMEs: The probability, likely extent (% of habitat targeted) and intensity of the interaction between the proposed fishing gear/targeting practices on the VMEs | AUS, CKI, FT(OT), THA | Can map and calculate % habitat but not of all this area will contain VMES – %s must be overestimate. FR(OT) concludes low level of fishing activity must result in negligible impact. |
| | Interactions with VMEs: Characteristics of the habitats and benthic communities that may be impacted | AUS, CKI, JPN, THA | JPN longline fishery, EU and FR(OT) had insufficient data. |
| | Interactions with VMEs: Diversity of the ecosystem in the proposed fishing areas, and will fishing reduce this biodiversity? | AUS, CKI, JPN, THA (partial) | JPN longline fishery, EU and FR(OT) had insufficient data. |
| 5.4 impact on the status of deep sea stocks to be fished | | CKI, THA (partial) | |
| 5.5 Mitigation Measures | | ALL | |

**Summary of Contracting Parties' BFIAs presented, completed by the individual Contracting Parties.**

| Contracting Party | BFIA submitted | Interpretation of BFIA requirements | Method/data used and results | Overall assessment of impact/risk |
|---|---|---|---|---|
| **Australia** | Y | This BFIA has focussed primarily on the risk of direct impacts by bottom fishing on VMEs characterised by benthic fauna because of the potential for widespread and long-lasting effects.<br><br>There is less emphasis on the status of deep water stocks because impacts assessment requires knowledge of total catch by all fleets in the SIOFA Area.<br><br>Assessing the potential for SAI on VMEs needs to consider 'impact' and 'risk' (the intensity, duration, spatial extent and cumulative effects of fishing activities), and define the dependency of these elements on spatial and temporal scales. In this BFIA, the 'overall risk' is considered as the risk remaining after monitoring, management and mitigation measures are accounted for. This BFIA used a qualitative framework because data paucity and knowledge uncertainties preclude a quantitative analysis of risk – especially of cumulative impacts. Semi-quantitative metrics are incorporated for fishing | Operations for the SIOFA Area were selected from general high seas logbook data if the spatial location of the start coordinates of fishing operations occurred within the SIOFA Area boundary as defined by its GIS shape file (FAO 2010). Operations represent the unit of logbook recording which is equal to one trawl shot or one longline/dropline set. Gridded analysis for two spatial scales, 20' x 20' (the standard SPRFMO footprint grid cell) and 0.1° x 0.1° (6 minutes – approaching the limit of logbook resolution of 1 minute) was generated in Oracle using Oracle spatial intersect functions SDO_RELATE.<br><br>To map fishing footprint and effort distribution, fishing operations reported in AFMA logbooks from 1999-2009 were assigned to grid cells based on their start position only if no end point was reported. Where an end point was reported, and the length of a straight line between start and end points was <6 km, all grid cells (of either scale) touching any segment of the straight line were retained as part of the footprint and the fishing effort distribution; where the distance to the end point was >6 km only the start position was used. Six kilometres is used in domestic Australian deepsea fisheries as a limit for filtering tow lengths as part of data quality assurance; it was assumed to be a realistic limit for high seas data. Fishing effort distribution will be underestimated by logbook records that lack an end position. For the creation of the 20'x20' permit footprint these records were mapped and examined individually. Four blocks were added by AFMA because the reported start position was within close vicinity (within a margin of reporting error) of the block boundary and related trawl tracks and seabed features were such that it was more than likely that the added block had been fished within the relevant period. An additional block was added by AFMA to ensure the footprint is able to be implemented | This BFIA conducted for Australian vessels fishing in the area to be managed under the SIOFA (SIOFA Area), concludes that the current overall risk of SAI on VMEs by Australian vessels fishing with bottom trawls and bottom-set auto-longlines is low. The BFIA concludes that the current overall risk of SAI on VMEs from mid-water trawling and drop-lining by Australian vessels is negligible.<br><br>Despite the potential for demersal trawling and auto-longlining to severely impact VME fauna at fine ('site') scales, and for impacts to persist and to accumulate through time, the current risk of SAI at the scale of the fishery was considered as low when the following factors are accounted for:<br><br>- low current fishing effort by Australian vessels<br>- few areas of high fishing intensity<br>- restriction of fishing to a 'footprint' area – although this permits access to 45% of deep upper slope depths (700-1000 m) and 45% of seamounts most likely to support VMEs<br>- limited spatial extent of Australian fishing effort: mostly low spatial overlap with the bathomes most likely to support VMEs, but medium overlap on the deep upper slope (700-1000 m depths) and on seamounts |

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| | | intensity, and the overlap of fishing with the predicted locations of VMEs in bathomes and on seamounts. | in permit conditions. Furthermore, any part of the 20' grid-cells overlying national EEZs or the BPAs (voluntary closed areas, see section 3.1.4) were excluded from the permit footprint.<br><br>Overlap analyses between the 0.1º mapped fishing distribution and depth zones (at 30 arc seconds, 0.2 n.m. resolution) were performed in ArcGIS using the Intersect analysis function.<br><br>Areas for calculating the proportion overlap between fished grid cells and depth zones were calculated using a Lambert Azimuthal Aqual Area projection centred on the SPRFMO Area (PROJECTION: Lambert Azimuthal Equal Area, DATUM: WGS84, SPHEROID: WGS84, Central_Meridian: 75.0, Latitude_Of_Origin: -20.0). Where grid cells containing fishing effort crossed the SIOFA boundary they were clipped to the boundary extent. It should be noted that the depths reported here refer to the centroid depths of the grid-cells, derived from the bathymetry grid, not the reported operation depth. The form of the analytical result is therefore limited by the resolution of the underlying data (also see Section 4.1.4). For area and overlap analyses of seamount features, the Yesson et al. (2011) seamounts and knoll polygons were combined into one flat (planar) polygon area classified as 'area under seamounts', this polygon was subdivided into the bathomes and intersected with the 1º mapped fishing distribution.<br><br>The footprint covers 0.84% of the SIOFA Area, but overlays up to 45% of the area of individual fishable bathomes (Table 3.1.2.1). The historical Australian fishing effort has been focussed on two distinct and separate regions: (1) the southern Madagascar Plateau and the Southwest Indian Ridge; (2) the intersection of Ninety East Ridge and Amsterdam Fracture Zone. Fishing distribution has been mapped separately for nine 'fishing grounds' within these two fishing regions (see section 4.2.3). | - management arrangements to monitor and mitigate impacts and risks. |
| **Cook Islands** | Y | This report is a bottom fisheries impact assessment on the operations of Cook Islands vessels in SIOFA. The | The assessment took into account habitat mapping which provided a full dataset on the fishable region between 1 and 1500 metres in the entire SIOFA region. This provided a quantitative assessment. | **Intensity** - The crux of this criterion is 'what is the specific site being affected'? The sea floor that is affected is where there is contact with the bottom trawl. As indicated in |

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| | | BFIAS also specifies that elements of risk, management and mitigation be considered. Many elements of the ecological and fishery risk in this assessment are quantitative, as result of the extensive data collection and research programs undertaken by the Cook Islands, including habitat mapping prior to fishing.<br><br>The status of deep water stocks is described, based on the stock assessment work promoted by the Cook Islands for orange roughy. The UN requirement to monitor the status of harvested fishstocks to ensure the CP is fishing sustainably, has been followed throughout the history of the fishery.<br><br>However other elements are qualitative, as it was not possible to take account of the cumulative impacts of other threatening activities in the SIOFA region, such as bottom longlining impacts on deepwater sharks | The fine scale bottom trawl data for the FV Will Watch was used to develop a bottom fished footprint for the SIOFA area using data from 1997 to 2016.<br><br>In total 5,139 fine scale bottom trawl shots with both start and end position were available for spatial analysis from a total of 11,051 bottom trawl shots, and these were assumed to cover all of the historical fishing grounds in SIOFA. For midwater trawling a further 5,673 trawls were available with both start and finish position, out of 11,945 trawls.<br><br>To generate estimates of actual seabed swept area from the tow-by-tow data, all tows were buffered assuming a 25 metre swept area of the groundrope. The trawl doors and sweeps do not touch the bottom in normal trawling operations in the SIOFA region, thus this was considered the appropriate swept width. However, analyses with a 160 metre swept width between trawl doors were also done, which is the maximum door spread normally achieved by these vessels, as measured by door sensors. The buffering was carried out by implementing an ArcGIS spatial buffer of 12.5 m either side of each tow.1 The resulting 25 m wide polygon trawl tracks were dissolved (ArcGIS / Dissolve) by fishing area for the whole period, to produce complex merged polygons of swept area as shown in Figure 18.<br><br>The result of dissolving is a full fine-scale analysis of actual true footprint impact. Fine scale data accurate to within 10 metres of the actual position, have been used.<br><br>The results of the analysis are shown in Table 5. Ninety East Ridge and Broken Ridge are not included in the analysis, as the bottom fished area in this region is insignificant (<.001%). Using the swept area of the groundrope for the Southwest Indian Ridge, the fished habitat is 0.74% of the total. If the distance between the doors is used, it increases to 3.31%. For the Walter's Shoal region, the bottom trawl impact is only 0.16%, increasing to 2.61%.<br><br>If the whole region of SIOFA is considered, only 0.16% of the potential fishable habitat from 0 metres to 1500 metres has ever been potentially impacted by bottom | sections 2.2, 4.2 and 4.5 of this BFIA, tows are usually undertaken on highly-defined lanes. In general, where fishing occurs, the impact will be intense, chronic and have severe impacts. However, of relevance is the intensity or severity of the impact of the bottom trawl on the ecosystem, community, habitat or population as a whole. These concepts are frequently confounded, even though they are different and raise different considerations. The FAO Guidelines refer to 'ecosystem integrity', i.e. the state of being whole and undivided, which again raises immediate difficulties in interpretation. The intensity can be set at severe at the local scale, but this is not appropriate for the BFIA, which should consider the wider VME impact, and is indeed noted in paragraph 18 of the Guidelines that notes that when determining the scale and significance of an impact, among the factors to be considered is "the spatial extent of the impact relative to the availability of the habitat type affected".<br><br>**Duration** – The duration of the impact, depending on the species, may be long, if a VME is actually impacted. This is well documented in a range of studies that are not reported in this BFIA. However, recent research shows that it is not uncommon to find VMEs that have been destroyed naturally.<br><br>**Spatial extent** – The spatial impact relative to the distribution of any VMEs has been described quantitatively in this assessment as being extremely small. For the seamounts and ridges of the Southwest Indian Ridge, 99.29% of the fishable habitat is untouched, and much is untouchable. And for the slopes, banks and knolls of Walter's, large areas are impossible to fish with a bottom trawl. |

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| | | | trawling. If we assumed that all midwater trawling touched the bottom for the entire tow, this increases to 0.28%.<br><br>It is not possible to calculate the bottom area impact of midwater trawls by the Cook Islands vessels, as noted earlier. This is because only a relatively small (21.7%) proportion of the tows actually touch the bottom, and of these 36.3% had bottom contact for I minute or less. The actual contact point cannot generally be recorded, as the skipper are usually very intent on keeping the gear clear of the bottom as the fish are positioned in the mouth of the net. If the net does touch the bottom, the groundrope parts as the breakaway link does its job, and the net will need to be repaired. Hence it is an accident when the bottom is touched, but is a possibility. The method has been rated as low impact in SPRFMO.<br><br>An assessment of likely VME habitat and the low likelihood of overlap with the trawl fisheries was presented. A large proportion of the habitat, in depths of 400-1500 m is simply unfishable by bottom trawl. If the potential VME habitat was considered to be 100% of the fishable depths down to 1500 metres, which is what early predictive models suggested, then the analysis indicates that 99% of the VME habitat is not at risk from the fishery.<br><br>The stock status of key harvested species has been monitored throughout the history of the fishery by conducting and analysing research surveys to assess the status of these stocks. The stock status results from these surveys were confirmed in the 2017 SAWG by the stock assessment for the orange roughy fishery. | **Cumulative impact** - The risk from cumulative impact is low, as most trawls are carried out on repeat trawl lines. If the trawl removes the benthos, the duration will be long for that site, but it is not possible to remove what is not there. Hence the impact remains constant, not cumulative.<br><br>All known VMEs are closed to fishing by Cook Island trawl vessels, which reduces risk even further.<br><br>Management arrangements to monitor and mitigate impacts and risks are in operation |
| **European Union – Spain** | Y | This BFIA presents estimates of the i) accumulated historical impact and ii) the recent impact over the seabed of the Spanish longline fleet. These two information sets are the input required for the future estimation of the potential impact of this fleet. | The assessment uses data from 2003-2017 (Table 1), the period for which bottom longline data were available. This table includes the total extension of the fishing gear (in Km) deployed in each fishing season and in each area.<br><br>The footprint defines an area determined by the bottom longline distribution of the historical fishing activity in 10' square grids, considering the total length of fishing sets to define grid intersections (Fig. 2). As shown in figure 2, | Although the impact on VME taxa is considered to be low, the preliminary data on taxa potentially impacted are Sponges (Demospongia (DMO) and Hexactinellida(HXY)), Cnidarians from the Stylasteridae family (AXT), Cnidarians from the Order Gorgonacea (family Isidiidae and others-GGW), Cnidarians from the order Actiniaria (ATX) and Echinodermata from the Euryalidae family (OEQ). Data on VME taxa |

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| | | To address this latter objective the data on the total extension of the fishing gear over the bottom for the each fishing haul was included in the report.<br><br>The area impacted by the longline fishery is presented and mapped. The maps were constructed based on georeferenced data on a set-by-set basis.<br><br>Information on the relative area impacted by the longline fishery is also presented.<br><br>It is proposed that both the footprint index and the impact index estimated by CCAMLR for autoline be used in SIOFA area for this fishing fleet and gear.<br><br>No qualitative assessment on the impact of EU-Spain longline fishery is presented. | most of the fishing activity took place in the areas 2 and 3b of SIOFA CA, and most of the grids has been moderately fished (3-50 sets).<br><br>The overlap of the EU-Spanish footprint (10'x10' grid) in the SIOFA Area has been calculated for the historical data as well as for the last fishing year (2017). The historical footprint overlap covers 0.39% of the total SIOFA area, being the footprint of the last year only the 0.16%. When comparing the same data using the SIOFA area up to 2000m, the overlap results are 22.59% for the historical data and 9.42% for the 2017 data (Table 2). As there are not SIOFA official surface areas available, it has been used the estimations provided by Australia in the 2011 report for SIOFA (CSIRO, 2011). | by-catch are improving its quality once scientific observation on board is in place, apart from the application of protocols to fulfil the incidental by-catch VME thresholds.<br><br>Estimates of fishing "footprint index" (km2 per unit of fishing effort) and "impact index" have been developed for the autoline longline system in CCAMLR (SC-CAMLR XXX, Annex 7, Appendix D) waters: Footprint index: mean = 6.67 x 10–3; median = 5.26 x $10^{-3}$; 95% quantile = 12.1 x $10^{-3}$ (km2 of seabed area per km of longline deployed)<br><br>Impact index: mean = 5.07 x 10–3; median = 4.70 x $10^{-3}$; 95% quantile = 9.04 x $10^{-3}$<br><br>. |
| **European Union – France** | Y | This BFIA presents the historical footprint for the EU-France longlilen Fishery. The fishing areas are concentrated on the Saya de Malha Bank, north east of La Réunion (SIOFA area 8).<br><br>A semi-quantitative assessment of the impact of two the EU-France fisheries is presented. This is based on the Impact ratings for different gears proposed by Chuenpagdee et al. (2003). Considerations on the rating | The historical footprint of EU_france longline fishery overlap covers 0.64% of the total SIOFA area. Although this footprint surface overestimates the impacted area when using 1ºx1º, which are not fully impacted by the longlines. | The ratings of benthic habitat and by-catch impacts for each gear class are:<br><br>Longline-demersal:<br><br>Physical 2 Biological 2<br><br>Hook and line (dropline):<br><br>Physical 1 Biological 1<br><br>The ratings scale is from 1 (very low) to 5 (very high). |

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| | | as proposed by (Williams et al. 2011b) are also given.. | | |
| **France (Territories)** | Y | The French BFIA report was realized using the framework provided by the SIOFA.<br><br>All the required items have been checked and provided in the report, when available.<br><br>The BFIA calculation was obtained using a spatial analysis, in accordance to the requirements of the framework.<br><br>The main limit of the French BFIA is due to the little activity of the French vessels in the SIOFA area. The analysis possibilities, such as stock assessment approaches or VME mapping, are limited due to the data gaps. | From 2013 to 2017 6 vessels obtain authorization for their fishing activities using longline or pot gear (Table 1). Impact ratings for different gears were by Chuenpagdee et al. (2003) with rating considerations proposed by (Williams et al. 2011b).<br><br>The BFIA is evaluated using both a spatial analysis approach and the fishing effort data available for French fleet within the period 2013-2017.<br><br>Spatial analysis<br><br>Firstly, the surface of the different bathomes in the whole SIOFA area is considered (Table 5). Secondary, the area of each bathome within each French fishing zone (Table 6) and the area of the fishable bathomes in the whole French fishing zones (Table 7) are calculated. We have considered the limit of 500 meters, upper depth where longline fishing is not allowed. Finally, a French theoretical fishing footprint is obtained (Table 8) which corresponds to the maximum area potentially impacted. Furthermore, the percentage of each bathome of French fishing zones in the SIOFA area is provided.<br><br>The French theoretical fishing footprint comparing to the whole SIOFA area is 0.22% (Table 8). However, the French theoretical fishing footprint can reach up to 56% when considering the bathomes separately (for example the bathome 701-1000 m, Table 8).<br><br>Real footprint in the 2013-2017 period<br><br>The real footprint of the French fleet is calculated for the 2013-2017 period. The data available for the bottom longline operations is used. All the operations are plotted using a GIS software. The whole area covered by the longlines represents a surface of 2679 km² and 0.0099 % of the SIOFA area, which corresponds to the French cumulative impact in recent years (Table 8). | The rattings of benthic habitat and by-catch impacts for each gear class are : :<br><br>Longline-demersal : Physical 2 Biological 2<br><br>Pots and traps : Physical 3 Biological 2<br><br>The ratings scale is from 1 (very low) to 5 (very high). |
| **Japan** | Y | Intensity and spatial extent assumed to be small – 3 years | 2012 : density of corals was roughly estimated as less than 1.0 kg / km2 except for 2 hauls (5.8 kg / km2 and | Japanese bottom trawl exploratory fishing was conducted only three cruises in 1977, |

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| | | of exploratory fishing only. Map of footprint provided. | 2.8 kg / km2) by calculating from by-catch amount of corals including VME indicators and trawling areas. Assumed very low probability of interactions with VME due to limited operations over only 3 years. No surveys undertaken. No stock assessments. Location of vessels verified through VMS. Catch and effort data collection system also in place. (Doesn't say these applied in 1970s, nor does it say it doesn't). No scientific observer coverage | 1978, and 2012, thus cumulative impacts is considered as minimal. |
| **Thailand** | Y | Analysis of impact of 62 active fishing vessels 2015-2017, primarily otter board trawl, 14 vessels active in June 2016-2017; 7.5%of trawlable area on continental shelf (0.12% of total SIOFA area) – 33,336 sq km, continental shelf and shallow upper continental slope. BFIA is prepared in accordance with the FAO deep-sea fisheries Guidelines and the SIOFA BFIA Standard. The assessment uses the data and information from fishing logbook and observer report of the trawl and trap fisheries during the year 2016-2017. Thailand has adopted the SIODFA BPA restrictions. | Utlises mandatory levels of observer coverge, move-on requirement (>60k accidental catch of corals and <700 kg sponges), restrictions on some gear, restrictions within footprint defined 2016-2017. Thailand controls their fishing activities in the SIOFA Area of competent and taken all necessary precautionary approach to prevent the adverse impact to the ecosystem. (Section 4.5). Some of those measures include: - limits on total capacity of Thai fleet; - constraints on the spatial distribution of bottom fishing effort; - legal provisions to ensure that bottom fishing will not have significant adverse impacts on VMEs; and - legal provisions ensuring that any vessel flying Thai flag is not authorized to fish in any areas that the Meeting of the Parties has decided to close to fishing. Used logbook data, 5% scientific observer reports from June 2016-February 2017, 1 paired trawler, 11 otter board trawlers and 1 fish trap vessel, Saya de Malha bank – from a total of 61 vessels. Adopted a protocol for detection of VMEs evidence drawn from NAFO and SEAFO – 60kg corals and 600 kg of sponges. Move on at least 2 nm for trawler; for longliner, move on 1 nm when 10 kg / 1000 hooks/1200 m longline. Move on 1 nm for fish trap if coral or sponge catch is more than 10 kg. Committed to refresh training for observers and fishermen, EM tools for inspectors reviewing data collection. Requested capacity building | • Thai fishing ground cover 7.15% of trawlable area mainly on continental shelf or 0.12% of total SIOFA area. This fishing ground was not close to the Benthic Protected Areas (BPAs) that defined by Southern Indian Ocean Deepwater Fisheries Association (SIODFA) even the nearest, Mid-Indian Ridge. So, the fishing activities of Thai fleet did not impact to any current BPAs.<br>• Although the trawlers targeted demersal fish, the fishing ground was in the area of 0-200 and 200-700 meters that allowed the possibility of catching of pelagic species which move between the water columns e.g. round scad, Indian mackerel.<br>• For this assessment, the two major species, lizardfish (*Saurida undosquamis*) and round scad (*Decapterus russelli*) are analyzed as representatives of demersal fish and pelagic fish species. The average length of lizardfish and round scad is mostly larger than the length at first maturity. |

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| | | | | • There is no record in logbook and observer report that these fishing activities encounter with Endangered, Threatened or Protected (ETP) species neither marine mammals, corals or sponges and it was suggested that this may be indicative of a lack of VMEs in the Saya de Malha bank area. |
| **Korea** | N | N/A | | N/A |

# SIOFA Standard protocol for future protected areas designation

## PROCESS FOR PROPOSAL AND REVIEW

As described in the terms of reference for the Protected Areas and Ecosystems working group (PAEWG, SC3 Report Annex I)

## CRITERIA FOR EVALUATING PROTECTED AREA PROPOSALS

1. The objective/s for the protected area is clearly stated and the proposal clearly demonstrates which of the criteria are met.

The proposal should then state which of the following criteria meet the objectives with "the list below having no particular ranking of importance".

2. VMEs are known to occur and/or triggering of VME indicator thresholds reported for the area proposed
    a. Closure may be warranted if there are known or consistent triggering of VME indicator thresholds of CPs, indicating potential VME.
3. Bioregional representation
    a. Area is known to contain unique, rare or distinct, habitats or ecosystems that fishing operations will disturb.
    b. Area with a comparatively higher degree of naturalness due to zero or a low level of human-induced disturbance or degradation from, for example, historical fishing activity.
4. Geographic and/or geomorphological representation
    a. The area provides for important or desirable geographic representation within the SIOFA area
    b. The area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage.
5. Biodiversity representation
    a. The area is known to contain unique or rare (occurring in only a few locations) species, populations or communities.
    b. The area is known to contain a high diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.
    c. The area is known to contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery.
6. Scientific interest
    a. The area has scientific research interest associated with understanding ecosystem, biological, geological and biodiversity processes in the SIOFA region.
7. Areas of special significance for threatened or important species or ecosystem properties
    a. There is evidence that the area is of special importance for life history stages of species and/or threatened species.

   b. There is evidence that the area contains habitat for the survival and recovery of endangered, threatened, declining species or is an area with significant assemblages of such species.

Other principles to be considered in formulating recommendations for protected areas

8. Best available information should be used to support protected area proposals and designation. This information should be sufficiently substantiated and/or verified (and preferably provided), for example through the referencing of available literature/research. Mechanisms such as statements and observation made by skippers and crew could be used as supporting information to scientific validated data. In the absence of information, a precautionary approach should be applied.
   a. Recommendations must be informed by the available information. Best available information should include ecological, environmental, social, cultural and economic aspects of the marine environment that is available without unreasonable cost, effort or loss of timeliness.
   b. Recommendations to implement spatial management measures should not be postponed because of a lack of full scientific certainty, especially where significant or irreversible damage to ecosystems could occur or indigenous species are at risk of extinction.
9. Adverse impacts on existing users should be evaluated.
   a. Where there is a choice of several sites, which if protected would add a similar ecosystem or habitat to the closure network, and only one, or some of the sites are to be closed, the site(s) recommended should minimise adverse impacts on existing users. Where there is a choice to be made among minimum impact sites, selection may also be guided by:
      i. ease of management and enforcement; and
      ii. if there are other benefits such as education or eco-tourism.
10. The rationale used to recommend spatial management measures should be consistent and transparent.
11. There should be an evaluation of existing closures when making recommendations and explanation as to how a new management measure will assist in achieving MoP objectives.
   a. An enumeration of spatial management measures should be prepared to assess progress towards achieving the policies.

Considerations for determining boundaries of protected areas

12. Dimensions of the area
   a. The recommended area should, as far as practicable, include continuous and contiguous depth.
   b. Area designation should be based on seafloor features such as geomorphic features
   c. Size and shape should be orientated to account for inclusion of connectivity corridors and biological dispersal patterns within and across closures.

   i. Where this is unavailable, protected area proposal and designation may consider linkages with adjacent protected areas, or research from other oceans to inform inferences on biological dispersal patterns.
d. Boundary lines should be simple, as much as possible following straight latitudinal/longitudinal lines and, where possible, coinciding with existing regulatory boundaries.
e. The size and shape of each area should be set to minimise socio-economic costs.

## GUIDANCE FOR SC RECOMMENDATIONS TO THE MEETING OF THE PARTIES

The SC should make a recommendation to the MoP based on how the proposal satisfies one or more of the criteria of the protocol.

If the scientific evidence to support protecting area using the protocol is uncertain or insufficient, more data may be required.

If the proposal documents the necessary data and scientific information to support a protected area using protocol, different measures could be applied, such as management measures, technical measures, closures.

In case of an area becoming protected, a management and research plan shall be associated to it on the year to come. It will include:

- The measures in place in the protected area;
- The time of review of the protected area;
- If needed, the research that should be undertaken in the area. To this end, the parties should consider to ask for international funds.

## SIOFA PROTECTED AREAS PROPOSALS AND DESIGNATION TEMPLATE

| | |
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| Name | *This field will contain the name of the proposed protected area* |
| Details of the proponent/s | *This field should contain details of the proponent/s* |
| Geographic description | *This field should contain the coordinates of the proposed area's spatial boundaries. It may also contain maps showing the spatial area and/or bathymetry, or other spatial information of relevance to the proposal* |
| Objectives | *This field will explicitly detail the objective/s that designation of the proposed protected area would address (i.e., the primary reason/s for protection)* |
| Criteria that the protected area meets | *This field would contain the specific criteria that the protected area meets, structured against the* SIOFA Standard protocol for protected areas designation*. This field will also contain evidence in support of each criteria that the area meets. This evidence may include, but is not limited to:*<br><br>- *Information from scientific or other surveys*<br>- *References to peer-reviewed literature*<br>- *Photographs, graphs and figures supporting the proposal*<br>- *Fishing data analysis to support the proposal*<br>- *Appropriately substantiated reports and/or statements from skippers or observers to justify the proposal.* |
| Social, cultural and economic interests | *This section would consider existing fisheries interests and possible adverse impacts of Protected Area designation on those interests. This section may also consider potential future interests. Any social or cultural interests or values should also be included. This section should be backed up by data, formal statements and references in the literature.* |
| Risks to the proposed area | *This section should contain detailed information on the scope of the Protected Area designation in terms of what activities would be restricted or prohibited. If the proposal is that some activities are restricted, this section should contain information on how these activities will be monitored.* |
| Review periods | *This section should contain an anticipated review period to review whether the Protected Area is achieving its objectives, including consideration of whether any new information has become available that may enhance or degrade the justification for protection.* |
| Outline of monitoring and/or research needed | *This section will contain an outline of monitoring and/or research needed to maintain, update or review the Protected Area.* |

# Terms of Reference for the protected areas and ecosystems working group (PAEWG)

## Objectives and background

Following the adoption of UNGA Resolution 61/105 in 2006, 64/72 in 2009 and 66/68 in 2013 on deep-sea fisheries, the management of bottom fisheries and protection of deep-sea ecosystems on the high seas has been a priority for the international community.

Measures to implement these UNGA Resolutions have been put in place by a number of States and through RFMOs, including those active in high seas bottom fisheries in the Southern Ocean, North East Atlantic, North West Atlantic and South East Atlantic Oceans.

UNGA Resolution 61/105 calls on high seas fishing nations and RFMOs to take urgent action to protect vulnerable marine ecosystems (VMEs) from destructive fishing practices. In particular, Resolution 61/105 calls on States to:

- Conduct impact assessments to determine whether bottom fishing activities would have significant adverse impacts on VMEs, and ensure effective management to prevent such impacts, or else prohibit the activity;

- Close areas of the high seas to bottom fishing where VMEs are known or likely to occur unless fishing in these areas can be managed to prevent significant adverse impacts to such ecosystems; and

- Establish and implement protocols requiring vessels to cease fishing in areas where an encounter with VMEs occurs and to report the encounter so that appropriate measures can be adopted in respect of the site.

An evaluation of the status of biotic components in an ecosystem assessment will depend upon an adequate understanding of the components. Further, a successful predictive ability will require a good understanding of current and past ecosystem dynamics and how they are likely to change in the future. An important adjunct to the ecosystem assessment process would be a continual review of the information required to understand the system sufficiently to make effective assessments. This review would include reappraisal of, *inter alia*, the taxa considered as key species within the dependent and harvested components, spatial and temporal aspects, and the most appropriate parameters to measure.

In accordance with Article 7(a) of CMM 2017-01 the SC will establish by no later than the close of its ordinary meeting in 2020 will recommend an appropriate SIOFA bottom fishing footprint.

Finally, in accordance with CMM 2017/01 paragraph 35, if the Meeting of the Parties, taking into account advice provided by the Scientific Committee, determines that bottom fishing may have significant adverse impacts on VMEs in areas where VMEs are known to occur, or a likely to occur, based on the best available scientific information, it may take a decision to close such areas to bottom fishing, either entirely or with respect to bottom fishing by a particular gear type or types. In this context, SC2 was requested by MoP3 to provide standard protocols to assist the development of protected area designation (areas which should be closed to fishing) by no later than the close of the ordinary meeting of the SC in 2017.

The MoP4 adopted the standard protocol for future protected areas designation as recommended by the SC2 (Annex H, SC2 Report). The SC has recommended to the MoP5 that a revised protocol be adopted (Annex H Standard protocol for future protected areas, SC3 Report).

The main focus of the SS regarding ecosystem monitoring and management will be on the review of protected areas proposals, their management and the potential improvement of the protocol for protected areas designation. Under these Terms of Reference, participants will commit to involvement in the process. All of those guidelines will be consistent with the SC Terms of Reference, and so are not included here.

Terms of reference

1. The Scientific Committee's PAEWG tasks will include:

    - to review the protected areas proposals in SIOFA;

    - to provide advice on an ecosystem assessment combining information from dependent and harvested species and the environment;

    - to use this assessment to provide advice on management and/or research plans in the proposed and/or validated protected zones;

    - when a CP proposes a modification of the protocol, to review of the usefulness and application of the SIOFA Standard protocol for protected areas designation; and

    - to formulate other relevant advice for the SC and Meeting of the Parties, as required.

2. Any CP that wishes to propose a protected area is strongly encouraged to ask for guidance from the working group through intersessional exchanges by email.

3. The working group can conduct its work intersessionally.

*Regarding protected area proposal(s):*

4. The working group shall be provided with a CP's protected area proposal's project at least 60 days before the SC meeting for discussion.

5. The PAEWG shall provide its conclusions, including minutes of its discussions and eventual proposals on the project, at least 30 days before the SC meeting. If there is no clear conclusions, the PAEWG can also advise for further debate during the SC.

6. The SC will submit its recommendations regarding the protected area proposals to the MoP.

# Stock assessment framework for bottom fisheries within the SIOFA Area

## 1. Rationale for a Tiered Assessment Framework

The SIOFA SAWG may be requested to prepare analyses on stock status for over 10 demersal species (see Table 1), as well as advice on the impact of fishing on associated and dependent species with which the fishery interacts. The quantity, quality and suitability of data will be variable among species over time and space. This variability is likely to influence the parameters that can be estimated and associated uncertainties which, in turn, will influence the type of analyses and assessments that the SAWG can provide to the Science Committee. To improve the efficiency of processes run by the SAWG, a tiered framework for assessing and prioritising stocks for status assessment is proposed based on the parameters that can be estimated given the data available. Such a tiered framework is expected to assist the SAWG with developing transparent decision rules for prioritising data collection needs and investments in stock assessment. The recommended tiered levels consist of:

1. Benchmark Assessment that utilises catch data from fishery monitoring, ideally in combination with stock abundance from independent surveys, catch rates and biological data with the purpose of estimating depletion levels and fishing mortality rates;
2. Data Limited Assessment that may utilise catch only or simple indicators to track status (e.g. CPUE, size composition, Productivity-Susceptibility Analysis);
3. No assessment necessary.

## 2. Categorisation of stocks into the Tiered Framework

A Scoping Analysis for each SIOFA demersal stock should be undertaken to initially categorise each stock into Tier 1 or Tier 2. The Scoping Analyses should include, a description of the fishery, documentation of management objectives (if defined) and existing measures (if any), the risks associated with fishing, and where possible, the entire catch history for each species and other data available. Much of this information is already contained with Members' Bottom Fishery Impact Assessments and other papers to the Scientific Committee. Catch data, observer records, expert opinion, and/or species distribution maps should also be considered as part of the Scoping Analysis. Fishing-specific risks may include (but not limited to): capture and retained; capture and discarded, capture and live release; direct impact without capture; disturbance of physical processes.

Prior to categorisation into Tier 1 or Tier 2 the SAWG may place some species into Tier 3 (No Assessment required) based on the presentation of sufficient evidence that the species rarely (if ever) interact with the SIOFA demersal fisheries.

Categorisation into Tier 1 and Tier 2 of the framework should be based on the data available. Species/stocks with data suitable for estimation of current fishing mortality and depletion should be categorised to Tier 1. Species/stocks initially considered for Tier 1 may be subsequently classified for Tier 2 assessment if the Tier 1 assessment diagnostics fail to satisfy SAWG review. Species not placed into Tier 1 or Tier 3 categories by default are placed in Tier 2.

Species/stocks placed into Tier 2 should be subjected to semi-quantitative risk assessment methods such as Productivity-Susceptibility-Analyses and/or Sustainability Assessment for Fishing Effects (SAFE). These methods rank species/stocks into priority from high to low relative risk, with SAFE also being capable of generating proxy estimates of fishing mortality. This step should identify to the SAWG the Tier 2 species/stocks requiring immediate attention (if any). It may be determined by the SAWG that stocks assessed to this level may not require further assessment if the risks from fishing are assessed to be low, or if adequate management measures are in place to mitigate moderate or high risks. Tier 2 and 3 species may require the application of annual reporting on indicators that are designed to identify when the fishery has changed sufficiently to warrant new or further assessment.

## 3. Implications of Assessment Framework for the SAWG Workplan

- Scoping Analysis – this should provide direction to future assessment work on bottom fisheries. The SAWG may wish to consider this as a living document that is updated annually (or as required) as new information becomes available. It could act as a list of data holdings for SIOFA demersal species.
- Tier 2 risk analyses should be included in the SERAWG workplan

**SIOFA Stock and Ecological Risk Assessment Working Group (SERAWG)**

**Terms of Reference**

Co-Chairs: Australia (ERA part) and Japan (SA part) to continue same workload. AUS to chair SERAWG meeting

Objectives

Paragraph 6a of CMM 2016/01 actions the SIOFA Scientific Committee to provide advice and recommendations to the Meeting of the Parties on the status of stocks of principal deep-sea fishery resources targeted, and, to the extent possible, taken as bycatch and caught incidentally in these deep-sea fisheries, including straddling fishery resources by 2019.

The key objective for this group will be to provide guidance and support in the development and execution of stock assessments and ecological risk assessments or species with which SIOFA fisheries interact. The Terms of Reference are focused on the practical aspects of progressing work related to stock assessments in SIOFA.

Under these Terms of Reference, participants will commit to involvement in the process. All 'rules' of the SERAWG will be consistent with the SC Terms of Reference, and so are not included here.

Terms of Reference

1. The SERAWG is tasked with developing a research and review plan for implementation of stock assessments and ecological risk assessments (and related processes) for progressing the objectives of the SIOFA SC and Meeting of the Parties.

2. To facilitate efficiency, the SERAWG will consider assessments in the context of the SIOFA tiered assessment framework (Annex J, SC3 report)

3. To facilitate timely development of stock assessments and ecological risk assessments, and while the SIOFA database is still under development, Contracting Parties agree to provide the necessary and available data to the working group within two months of a request, noting that appropriate data confidentiality protocols (as per CMM 2016/03 and domestic data and privacy policies) will apply.

4. The requesting party will need to confer with the data custodian to ensure the appropriate data confidentiality agreements and other relevant processes are followed.

## Indicative workplan

### Stock assessment workplan

| Time line of Alfonsino stock assessments (SA) (SIOFA SAWG) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Activities | | Responsibility | 2018 | | | | | | | | | 2019 | | |
| | | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| Data | Data Inventory | SAWG Chair with Parties + Data manager | | | | | | | | | | | | |
| | Data submission | Parties and Secretariat | | | | | | | | | | | | |
| | Database | Secretariat | | | | | | | | | | | | |
| | Acoustic data preparations (*) | SAWG Chair with Parties | | | | | | | | | | | | |
| Analyses | Scoping analyses | SAWG Chair with Parties | | | | | | | | | | | | |
| | Decision on assessment approach | SAWG Chair with Parties + Consultant (if required) (*) | | | | | | | | | | | | |
| | Appointment of consultant/s | SAWG Chair + Secretariat | | | | (*) | | | | | | | | |
| | Assessment analyses | Consultant and/or SAWG members | | | | | | | | | | | | |
| SAWG02 | | SAWG Chair with Parties + Secretariat | | | | | | | | | | | | |

*(*) TS vs length relationship and acoustic data process (QC)*

| Time line of Patagonian toothfish stock assessments (SA) (SIOFA SAWG) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Activities | | Responsibility | 2018 | | | | | | | | | 2019 | | |
| | | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| by CCAMLR | Discussion on collaborative approach with CCAMLR, relevant states | SAWG Chair/Nominated Parties (TBC) | | | | | | | | | | | | |
| within SIOFA | Data Inventory + scoping analyses | SAWG Chair with Parties + Data manager | | | | | | | | | | | | |
| | Data submission | Parties and Secretariat | | | | | | | | | | | | |
| | Database | Secretariat | | | | | | | | | | | | |
| | Decision on assessment approach | SAWG Chair with Parties + collaborators | | | | | | | | | | | | |
| | Assessment analysis | SAWG members + collaborators | | | | | | | | | | | | |
| | SAWG02 | SAWG Chair with Parties + Secretariat | | | | | | | | | | | | |

**Ecological Risk Assessment Workplan**

The following workplan was devised for 2018–19

1. Continue progress on the ecological risk assessment for deepwater chondrichthyans in the SIOFA area
    a. Refine results based on collaboration with Contracting Parties
    b. Compile any additional biological and/or effort data that may be available to improve the reliability of the results
    c. Investigate development of a collaborative SIOFA paper for publication in a peer-reviewed journal
    d. Provide final results of risk assessment to SC4 (2019)
    e. Provide relevant advice to the SC and Meeting of the Parties.
2. Extend the PSA and SAFE methods to teleost species with which the fishery interacts
    a. With the permission of CPs that have provided data for the risk assessment of deepwater chondrichthyans, use available effort data to extend the PSA and SAFE methods to an assessment of teleost species with which SIOFA species interact
    b. Present results of this work intersessionally and consider advice and recommendations for the SC and MoP.

# Review of SIOFA Scientific Committee Operational Work Plan 2016-2019

The SIOFA Scientific Committee (SC) Operational Work Plan 2016-2019 contained immediate research priorities that were in progress or planned for the duration of the workplan. This document reviews progress made against the 2016-2019 workplan. The 2016-2019 workplan was replaced with 2018-2021 workplan at SC3.

| **Review of 2016-2019 Operational Work Plan** | | |
|---|---|---|
| **Theme** | **Research activities** | **Progress at SC3 (2018)** |
| **1. Scientific data standards for the collection, reporting, verification and exchange of data** | • Review of current data holdings and other relevant research | • Catch and effort data (tow-by-tow) has been provided the Secretariat by all CPs where it has been collected; Historical data at a coarser spatial scale has been submitted by all CPs<br>• A data holdings and quality control report is requested at SC4<br>• The Secretariat was requested to ask for data from non-CPs |
| | • Identify data gaps | • The main gaps identified are scientific observer data, including actual locations of VME indicator catches; Consolidation of historical data; Data from non-members (particularly in relation to catch histories) |
| | • List Agencies and States working on data related to SIOFA | • This relates to mapping process – see below |
| | • Guidelines for evaluating and approving e-monitoring programs for scientific data collection | • Cook Islands updated SC on 'smart forms' trials at SC2 and SC3<br>• Paper by Australia submitted to SC2 |

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| | | • Annex G Guidelines for evaluating and approving electronic observer programmes for scientific data collection) adopted at SC2<br>• The SC has been asked by Thailand to continue consideration of the proportion of EM to human observer coverage required for specific research and scientific needs |
| | • Development of database for compilation of relevant data | • Database is built and can accept data; Some data inputted; some refinements are required<br>• Database for observer data is still under development<br>• Comprehensive update presented to SC3 |
| | • Development of identifications guides for sponges and corals to enable better collection of data | • SIOFA members using Australian, NZ, CCAMLR and SEAFO reference documents at present<br>• FAO smart forms in development |
| | • Development of identifications guides for deepsea sharks to enable better collection of data | • FAO shark guides prepared for deepwater chondrichthyans in the southern Indian ocean deepwater available and being used by some CPs<br>• Recommendation at SC3 to improve the identification of deepwater chondrichthyans using the FAO shark guides and other mechanisms, if available |
| | • Periodic review of scientific data standards as and when required | • SC 3 requested the SIOFA Database Manager to investigate and implement protocols for the secure transfer of confidential data (for example file transfer protocol (FTP) or encryption methods) to end-users. |

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| | | • SC3 requested the Secretariat to prepare an annual data holdings report including challenges for presentation at each SC meeting to assist the SC in its deliberations.<br>• SC3 advised the Meeting of the Parties that the SC cannot currently review Annex B Voluntary Observer Data, as there is little observer coverage data had been provided. |
| | • Trialling of 'smart forms' | • Cook Islands is working with FAO on trial<br>• Australia uses electronic reporting<br>• Updates given to SC2 and SC3 |
| **2. Advice on vulnerable marine ecosystems** | • Contribute information to FAO VME database | • Process of information exchange has been initiated<br>• SC3 reported that information had not yet been provided because the SIOFA database does not currently hold this information |
| | • Mapping of bottom fishing effort and VME occurrence | • Secretariat does not yet hold data on VME occurrence<br>• Confidential maps of bottom fishing effort were produced by the Secretariat for use by SC3 |
| | • Develop standard protocols for future protected area designation | • Protocol developed at SC2 and reviewed/revised at SC3<br>• Protocol applied to the proposal for a number of protected areas at SC3 |
| | • Development of a bottom fishing impact assessment standard | • Bottom Fishing Impact Assessments were provided to SC3 by six Contracting Parties<br>• SC3 has reviewed these BFIA against the BFIAS and provided advice to the MoP on the level of |

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| | | alignment between the BFIA and the BFIAS and the ability of the SC to assess cumulative impacts. |
| | • Assessment of likely impact of specific gear types - including review of existing information (see also theme 5 below) | • Nil |
| | • List Agencies and States working on data related to mapping in SIOFA | • Secretariat advised SC3 that progress on this had been limited |
| **3. Current and historical status of fishing activities** | • Scientific impact assessments on demersal gillnet operations | • No papers and no gillnetting reported since 2015 |
| | • Scientific impact assessment on other gillnets and developing gillnet fisheries | • No papers and no gillnetting reported since 2015 |
| | • Develop advice on reference periods for effort, footprints and spatial control | • Recommendations to the MoP on appropriate SIOFA bottom fishing footprint (by 2020) to be formulated at SC4<br>• The requirement to provide recommendations to the MoP on the most appropriate response to the VME encounter (by 2019) was not able to be covered during the 2016-2019 workplan. |
| | • Characterisation of historical and current deepsea shark fisheries (see also theme 5 below) | • ToR agreed for SAWG and adopted by MoP<br>• AU papers on deepwater chondrichthyans ERA to SC2 and SC3<br>• EU work on characterisation of target fisheries (EU Report)<br>• Recommendations on improved identification and data for deepwater chondrichthyans formulated for MoP at SC3 |

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| **4. Stock assessments for key targeted species**<br>**- Orange roughy**<br>**- Alfonsinos**<br>**- Toothfish** | • Collection, analysis and reporting of essential biological and fisheries information, including:<br>• Age composition data<br>• Length and age<br>• Growth<br>• Reproductive biology<br>• Maturity ogives<br>• Natural mortality | • ToR agreed for SAWG and adopted by MoP<br>• Research work plan for implementation of stock assessments and related processes for orange roughy, alfonsino and Patagonian toothfish<br>• Recommendations provided by SC3 to the MoP on the status of orange roughy |
| | • Spatial structure for management purposes | • Work on stock delineation progressed by SAWG1, SC3 and intersessionally |
| | • Determination of biological reference points and associated development of harvest strategies | • Not addressed |
| | • Survey indices/abundance estimates as inputs to assessment model | • Work completed by SAWG1 and SC3 in relation to acoustic indices<br>• Recommendations made by SC3 in relation to the use of acoustic data for use in some stock assessments |
| | • Analysis of data from existing acoustic surveys | • Review completed for orange roughy Walters Shoal Region<br>• ABNJ workshop held<br>• Reviewed acoustic data used for WSR stock assessment and other acoustic data used for MPD-based assessments |
| | • Evaluation of alternative indices | • SAWG1 and SC3 have considerd the use of alternative indices, including through the tiered assessment framework |
| | • Conduct a stock assessment for orange roughy in the SIOFA Area | • Assessments for 7 sub-regions (‘stocks’) at SC3<br>• Focus of SAWG1 meeting and intersessional work |

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| | • Engage with the CCAMLR Secretariat to discuss collaboration on toothfish assessment | • Initiated discussions on stock assessment and tagging<br>• Collaboration with CCAMLR on stock assessment and tagging (France and SC Chair) has been limited |
| **5. Advice on the impacts of fishing on associated and dependent species** | • Risk assessment of effects of fishing on non-target, associated and dependent species (see also theme 2 above) | • AU papers on ERA for deepwater sharks<br>• Recommendations to MoP in relation to identification and data for deepwater chondrichthyans<br>• ToR for ERAWG adopted by MoP |
| | • Seek advice from expert groups, such as Birdlife International and the Agreement for the Conservation of Albatross and Petrels, in relation to risk assessments completed for species in the SIOFA Area | • SC Chair requested and provided information |
| **6. Any other advice that the Meeting of the Parties (MoP) requests** | • *This may be updated following the fourth Meeting of the Parties to SIOFA (26-30 June 2017)* | |

# SIOFA Scientific Committee Operational Work Plan 2018-2021

The SIOFA SC Work Plan is agreed by the MoP and provides direction to the SC activities. The SC Operational Work Plan 2018-2021 contains research priorities that are in progress or to be proposed for 2018-2021.

The Operational Work Plan will be reviewed annually by the SC.

| Theme | Research activities | Timeline | Responsibility |
|---|---|---|---|
| **1. Scientific data standards for the collection, reporting, verification and exchange of data** | • Review of current data holdings and other relevant research - through an annual data holdings report from the Secretariat that would include information on the quality control process and any issues identified; data inventories in support of species assessments | • SC4 - annual data holdings report<br>• SC4 - data inventory for Alfonsino and Patagonian toothfish | • Secretariat<br>• SERAWG and CPs |
| | • Consolidation of historical data from non-CPs, this includes the historical catch data identified through the orange roughy stock assessment | • SC4 – report on progress for data sources identified with respect to orange roughy, alfonsino and species from the Saya de Malha Bank | • Secretariat to write to relevant non-CPs<br>• SERAWG and CPs |
| | • Evaluation of proposed e-monitoring programs for scientific data collection | • SC4 – if a CP makes a proposal against the Guidelines | • Relevant CP to make a proposal, SC to review against the Guidelines. |

| Theme | Research activities | Timeline | Responsibility |
|---|---|---|---|
| | • Completion of the database to hold observer data and population from submissions | • SC4 | • Secretariat |
| | • Development and adoption of standard protocols for data collection, such as age frequency information. Including drawing on the FAO guidelines for protocols for fisheries research and the FAO Deep seas Bottom Fisheries Guideline | • SC4 and ongoing | • CPs to propose to protocols to SC for consideration |
| | • Review of observer data coverage requirements and observer data standards:<br>  • Collate background information to consider types and levels of observer coverage in relation to specific research, scientific committee work.<br>  • Review of observer data holdings (inventory) of CPs in a consistent template, including collection protocols in place | • Data inventory to be completed prior to SC4<br>• Review of investigation at SC4 | • Secretariat and CPs |

| Theme | Research activities | Timeline | Responsibility |
|---|---|---|---|
| | • Investigation of observer coverage type and levels against the requirements of the SC workplan | | |
| | • Broaden use of identifications guides for deepsea sharks to enable better collection of data | • As soon as possible | • CPs to ensure identification guides are in use by observers and crew |
| | • Smart forms for collection of deepsea shark and benthos data | • SC4 - Progress report on trials | • CI to report on outcomes of trials<br>• CPs to consider potential use of Smart forms |
| | • Periodic review of scientific data standards as and when required | • | • Review of Annex B of CMM 2016-02 'Voluntary observer data' in line with CMM 2016-02 (SC-03) |
| **2. Advice on vulnerable marine ecosystems** | • Contribute information to FAO VME database | • Ongoing | • Secretariat and CPs as appropriate |
| | • Develop SIOFA definition of VME indicator species:<br>• Consider VME indicator species identified in other relevant RFMOs or other bodies (e.g. CCAMLR, SPRFMO etc)<br>• Test whether these are appropriate for SIOFA area | • SC5 | • SC to consider based on papers from CPs |

| Theme | Research activities | Timeline | Responsibility |
|---|---|---|---|
| | • Mapping of VME/VME indicator species occurrence, including collaboration with ABNJ Deep Seas Project FAO VME database, IUCN and other relevant projects. | • SC5 | • Depending on the development of collaboration, particularly with ABNJ Deep Seas Project, through Secretariat.<br>• CPs to identify other opportunities to progress this. |
| | • Consider benthic sampling protocol for mapping distribution of VME indicator species and predicting benthic community structure | • SC5 | • France (Territories) to lead and report to SC for discussion |
| | • Cumulative impact assessment of SIOFA fisheries:<br>  • Refine process to advance, given the disparate nature of information available.<br>  • Undertake cumulative impact assessment for groups of fisheries/gear (eg orange roughy bottom trawling, long lining, Saya de Malh trawl) using a consistent methodology across the gear. | • SC4 – report on progress on cumulative impact assessments for fisheries/gears | • Relevant CPs to progress cumulative impact assessments<br>• Review of cumulative impact assessments by SC |
| | • Assessment of likely impact of specific gear types – | • Dependent on ABNJ Deep Seas Project timeframe | • Progress report from ABNJ Deep Seas Project global analysis (SC-03) |

| Theme | Research activities | Timeline | Responsibility |
|---|---|---|---|
| | potential collaboration with ABNJ Deep Seas Project | | |
| | • Revise and improve the SIOFA BFIAS | • SC4 – if proposed changes are brought forward. | • CPs |
| | • Consider proposals for protected areas against the Standard protocol | • As per process in PAEWG ToR | • Proposals from CPs<br>• PAEWG and SC |
| **3. Current and historical status of fishing activities** | • Scientific impact assessments on demersal gillnet operations | • When provided by the CP proposing to commence demersal gillnet operations | • Relevant CP |
| | • Spatial extent of historical and current fishing | • SC4 | • Secretariat |
| | • Develop advice on reference periods for effort, footprints and spatial control | • SC5 - Recommendations to the MoP on appropriate SIOFA bottom fishing footprint (by 2020)<br>• SC4 - Recommendations to the MoP on the most appropriate response to the VME encounter (by 2019) | • CPs and SC |
| | • Characterisation of historical and current deepsea shark fisheries (see also theme 5 below) | • If required to refine the ERA for deepsea chondrichthyans | • SERAWG and CPs |
| **4. Stock assessments for** | • Implement the tiered assessment framework, | • SC4 – consideration of progress on scoping analyses | • SERAWG and CPs |

| Theme | Research activities | Timeline | Responsibility |
|---|---|---|---|
| **key targeted species** | supported by scoping analyses | | |
| | • Orange roughy:<br>• Stock structure delineation<br>• Age frequency data<br>• Target strength for acoustic data<br>• Development of a draft protocol for the collection of orange roughy age/length frequencies and otoliths | • Annually review catch and effort trends<br>• SC4 – progress reports<br>• SC5 – consideration of outcomes | • Stock structure delineation – AUS and CI in collaboration with Victoria University<br>• Age frequency data – CI and AUS<br>• Target strength – CI, possibly in collaboration with ABNJ Deep Seas Project<br>• Draft protocol - CI |
| | • Alfonsino:<br>• Data inventory<br>• Acoustic data preparations (target strength evaluation and acoustic data analysis and review)<br>• Scoping analysis<br>• Decision on assessment approach<br>• Stock assessment analysis | • SC4, to provide advice in line with CMM Bottom Fishing (2019) | • Relevant SERAWG, relevant CPs and SC |
| | • Patagonian toothfish:<br>• Data inventory<br>• Scoping analysis | • SC4, to provide advice in line with CMM Bottom Fishing (2019) | • Relevant SERAWG, relevant CPs and SC<br>• SC Chair, France (Territories) and relevant CPs to work with the Secretariat to progress collaboration |

| Theme | Research activities | Timeline | Responsibility |
|---|---|---|---|
| | • Decision on assessment approach<br>• Stock assessment analysis | | with CCAMLR and relevant states (France, South Africa) |
| | • Other teleost species, in particular those caught in the Saya de Mahl Bank:<br>• Apply PSA and SAFE approaches to assess these species | • SC4, to provide advice in line with CMM Bottom Fishing (2019) | • SERAWG, relevant CPs |
| | • Deepwater chondrichtyans:<br>• Refine the analysis with data from additional CPs and additional biological data. | • SC4, to provide advice in line with CMM Bottom Fishing (2019) | • SERAWG, relevant CPs |
| | • Collection, analysis and reporting of essential biological and fisheries information, including:<br>• Age composition data<br>• Length and age<br>• Growth<br>• Reproductive biology<br>• Maturity ogives<br>• Natural mortality | • Ongoing, with priorities determined by species scoping analyses and assessment research plan | • Guidance on priorities from SERAWG |
| | • Determination of biological reference points and | | • SC |

| Theme | Research activities | Timeline | Responsibility |
|---|---|---|---|
| | associated development of harvest strategies | | |
| **5. Advice on the impacts of fishing on associated and dependent species** | • Risk assessment of effects of fishing on non-target, associated and dependent species (see also theme 2 above) – through implementation of the tiered assessment framework | • Ongoing | • SERAWG |
| | • Seek advice from expert groups, such as Birdlife International and the Agreement for the Conservation of Albatross and Petrels, in relation to risk assessments completed for species in the SIOFA Area | • Ongoing, request input prior to SC meetings | • Request input prior to SC (Secretariat) |
| **6. Any other advice that the Meeting of the Parties (MoP) requests** | *This may be updated following the MoP5* | | |