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Southern Indian Ocean Fisheries Agreement
Accord relatif aux Pêches dans le Sud de l'Océan Indien

Report of the Southern Indian Ocean Fisheries Agreement (SIOFA) Joint Meeting of Parties and Scientific Committee Intersessional Workshop to Define Harvest Strategy Management Objectives (WS2023-HSMO)

Virtual

7–8 November 2023

List of Annexes

Agenda item 1 – Opening of the joint SIOFA MoP-SC Workshop on Harvest Strategy Management Objectives (WS2023-HSMO)

1. The Workshop was co-convened by Mr Tae-hoon Won, Chair of the Meeting of the Parties (MoP), and Mr Alistair Dunn, Chair of the Scientific Committee (SC). The co-conveners welcomed the participants.
2. The list of registered participants is included in Annex A.

Agenda item 2 – Administrative arrangements

2.1. Adoption of the Terms of Reference and Workshop Agenda

3. The Terms of Reference, as drafted and circulated in SIOFA Circular-2023/43, were adopted (Annex B).
4. The preliminary agenda was adopted (Annex C).

2.2. Appointment of rapporteurs

5. The Workshop agreed to appoint Mr Alexander Meyer (Urban Connections, Tokyo) as rapporteur.

Agenda item 3 – Introduction to management objectives

3.1. An introduction to harvest strategy management objectives and software tools

6. The SC Chair presented an introduction to harvest strategy management objectives (WS2023-HSMO-01). The SC Chair provided an overview of harvest strategies, different types of reference points, different categories of management objectives, fisheries monitoring regimes, and management strategy evaluation (MSE). He also summarised relevant past discussions and decisions by the MoP, including the timeline for the development of harvest strategies, and interim Target Reference Points (TRPs) and interim Limit Reference Points (LRPs) for orange roughy, alfonsino, and toothfish.
7. The SC Chair introduced WS2023-HSMO-05, a blank table of management objectives by objective type and preliminary indicative performance indicators, as an example for facilitating the Workshop's discussions.
8. Dr Finlay Scott, Pacific Community (SPC), shared the experiences of the Western and Central Pacific Fisheries Commission (WCPFC) in harvest strategies capacity building, particularly the development and use of three publicly available harvest strategy training apps that introduce harvest control rules (HCRs), allow users to measure performance in a model fishery, and allow users to compare performance in a model fishery (WS2023-HSMO-PRES-01). Dr Scott also introduced other engagement tools such as an app for exploring the expected performance of candidate HCRs for Western and Central Pacific Ocean skipjack, and ongoing work to produce a series of videos explaining harvest strategies.
9. The Workshop thanked Dr Finlay for his presentation and noted the apps were available for the public to use at:
   https://ofp-sam.shinyapps.io/AMPLE-intro-hcr,
   https://ofp-sam.shinyapps.io/AMPLE-measuring-performance, and
   https://ofp-sam.shinyapps.io/AMPLE-comparing-performance.
   The Workshop also noted introductory videos on harvest strategies were available at
   https://www.youtube.com/watch?v=zM3B9DLmtZg and
   https://www.youtube.com/watch?v=fHkjguWG1JM.

3.2. An introduction to the orange roughy and toothfish fisheries and reference points

10. The SC Chair highlighted that the Overview of SIOFA Fisheries 2023 (WS2023-HSMO-02), SIOFA Fisheries Summary for orange roughy (WS2023-HSMO-03), and the SIOFA Fisheries

Summary for toothfish (WS2023-HSMO-04) had been submitted as background papers to the Workshop for facilitating its discussions.

11. The SC Chair recalled that, for orange roughy, the MoP had agreed on an interim TRP of 40% B_0, with a 50% probability of being above the target and an interim LRP of 20% B_0, with a 90% probability of being above the limit; and for toothfish, the MoP had agreed on an interim TRP of 50% B_0, with a 50% probability of being above the target and an interim LRP of 20% B_0, with a 90% probability of being above the limit (MoP10 report, paragraphs 77-78).
12. The Workshop noted that management objectives represent the outcomes that are to be achieved for a managed fishery and that they should form the basis of any harvest strategy. The Workshop further noted that performance indicators are an important component of measuring the achievement of management objectives.
13. The Workshop agreed that the development of management objectives is an ongoing process and that the set of management objectives identified by the Workshop can be modified in the future based on further discussions.
14. The Workshop noted that whereas other regional fisheries management organisations (RFMOs), such as WCPFC, manage larger fisheries with more data available for driving harvest strategies and stocks assessments, SIOFA has much smaller fisheries with fewer vessels and has limited data with shorter time series. The Workshop noted that this will be an important consideration in the development of SIOFA harvest strategies.
15. The Workshop noted that, while the harvest strategies for orange roughy, toothfish, and alfonsino fisheries should account for the specificities of each fishery, there should also be coherence across harvest strategies for SIOFA fisheries to the extent possible.
16. The Workshop noted that when developing SIOFA management objectives and harvest strategies for stocks that straddle the management areas of SIOFA and other jurisdictions (such as with toothfish stock straddling the area of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)), it will be necessary to give proper consideration to established management practices across the boundaries of the SIOFA Area.
17. Some participants pointed out that, in some cases, it may not be possible to provide reliable estimates of stock size or status due to insufficient data or high uncertainty in the associated mathematical calculations, and that in these cases, qualitative, rather than quantitative, management objectives would be more appropriate. Other participants acknowledged that concern, and noted that, wherever possible, management objectives should be quantitatively defined, particularly in relation to stock status.
18. The Workshop agreed that the definitions of the quantitative terms that it has used for describing probabilities (e.g., 'very likely') are tentative and requested the SC develop a formal set of definitions for these terms.

Probability Description	
> 99 %	Virtually Certain
> 90 %	Very Likely
> 60 %	Likely
40–60 %	About as Likely as Not
< 40 %	Unlikely
< 10 %	Very Unlikely
< 1 %	Exceptionally Unlikely

Agenda item 4 – Orange roughy

4.1. Determination of orange roughy management objectives

19. The Workshop drafted a table of potential management objectives and potential performance indicators for orange roughy (Table 1).

Table 1: Table summarising potential Management Objectives by Objective Type, and potential Performance Indicators for orange roughy. Please note that these Management Objectives and Performance Indicators are still in development and to be further revised during follow-up discussions and MSE.

No.	Objective Type	Potential Management Objective	Potential Performance Indicators
1	Stock status	Maintain the stock at, or fluctuating around (i.e., as likely as not) 40% B_0[1]	The stock is above 40% B_0 with a 50% probability
2	Risk/Safety	Ensure that it is very likely that the stock is above the limit reference point (LRP)	The stock is above 20% B_0 with a 90% probability
3	Economic, Yield	Maintain catch and effort at a given level consistent with Objectives 1 and 2	
4	Economic, Catch rate	Maintain CPUE at a given rate/level that is representative of a period of fishery stability [2]	CPUE levels are about as likely as not to be around the level of that in the chosen representative period
5	Economic, Stability	Minimize the variability of the catch/effort limits from year to year that should be within a specific range	The SIOFA SC to define a reasonable level (%) of annual change in catch/effort limits
6	Social goals	• Maintain/create employment opportunities and contribute to food security • Ensure safe and fair employment practices on vessels operating in this fishery	
7	Ecosystem goals	Maintain a healthy ecosystem	• Minimize the impact on Vulnerable Marine Ecosystems • Minimize the impact on species of special interest, and Endangered Threatened Protected species • Minimize the impact on any deepwater shark species listed in Annex 1 of CMM 12(2023) • Minimize the impact on seabirds (CMM 13(2022))

[1] Note that future work on MSE will evaluate alternative choices of the TRP and probability, for example 60% probability of being above 40% B_0

[2] Currently defined as 2015-2020 by SC7, but to be discussed and further defined by the SIOFA SC

20. The Workshop agreed that these management objectives are still in development and can be further refined in future discussions and the management strategy evaluation (MSE).

4.2. Identification of other orange roughy management objectives

21. The Workshop also discussed social and ecosystem goals as shown in Table 1.
22. The Workshop noted the need for the MoP to hold broader discussions regarding safe and fair employment practices on vessels operating across all SIOFA fisheries.
23. The Workshop recommended that the SC and the MoP consider and further refine the potential management objectives and performance indicators in Table 1.

Agenda item 5 – Toothfish

5.1. Determination of toothfish management objectives

24. The Workshop drafted a table of potential management objectives and potential performance indicators for toothfish (Table 2).

Table 1: Table summarising potential Management Objectives by Objective Type, and potential Performance Indicators for toothfish. Please note that these Management Objectives and Performance Indicators are still in development and to be further revised during follow-up discussions and MSE.

No.	Objective Type	Potential Management Objective	Potential Performance Indicators
1	Stock status	Maintain the stock at, or fluctuating around (i.e., as likely as not) 50% B_0[3]	The stock is above 50% B_0 with a 50% probability
2	Risk/Safety	Ensure that it is very likely that the stock is above the limit reference point (LRP)	The stock is above 20% B_0 with a 90% probability
3	Economic, Yield	Maximise catch at a level consistent with Objectives 1 and 2, in accordance with the proportion of the stock in the SIOFA Area	
4	Economic, Catch rate	Maintain CPUE at a given rate/level that is representative of a period of fishery stability[4]	CPUE levels are about as likely as not to be around the level of that in the chosen representative period
5	Economic, Stability	Minimize the variability of the catch limits from year to year that should be within a specific range	The SIOFA SC to define a reasonable level (%) of annual change in catch limits
6	Social goals	• Maintain/create employment opportunities and contribute to food production • Ensure safe and fair employment practices on vessels operating in these fisheries	
7	Ecosystem goals	Maintain a healthy ecosystem	• Minimize the impact on Vulnerable Marine Ecosystems • Minimize the impact on species of special interest, and Endangered Threatened Protected species • Minimize the impact on any deepwater shark species listed in Annex 1 of CMM 12(2023) • Minimize the impact on seabirds (CMM 13(2022))

[3] Note that future work on MSE will evaluate alternative choices of the TRP and probability, for example 60% probability of being above 40% B_0

[4] Different periods might be defined for the different toothfish SIOFA Management Units, and should be further considered by the SIOFA SC

25. The Workshop agreed that these management objectives are still in development and can be further refined in future discussions and the MSE.
26. The Workshop noted that it may be necessary to further refine the potential management objectives for toothfish to account for stocks that straddle the SIOFA and CCAMLR management areas and to carefully consider, in particular, the fact that the toothfish population in the Del Cano Rise accounts for a small proportion of the overall stock.

5.2. Identification of other toothfish management objectives

27. The Workshop also discussed social and ecosystem goals as shown in Table 2.
28. The Workshop recommended that the SC and the MoP consider and further refine the potential management objectives and performance indicators in Table 2.

Agenda item 6 – Identification of provisional responses to exceptional circumstances, such as dropout or breakout rules, in the implementation of harvest strategies, including conditions under which the harvest strategy would require review, revision, or re-testing

29. The Workshop agreed that breakout rules are an important component of harvest strategy development.
30. The Workshop requested the SC hold further discussions on the development of breakout rules. The Workshop noted that the following examples of exceptional circumstances, derived from the WCPFC (WCPFC Commission report ANNEX IV, Attachment G. Interim Skipjack Tuna Management Procedure, WCPFC 19th Regular Session 2022), could be considered and refined at future meetings.

31. The Workshop requested the SC consider the following aspects when developing breakout rules for SIOFA harvest strategies:
    a. A monitoring strategy that would be conducted by the SC for advising the MoP on the occurrence of exceptional circumstances based, for example, on the results of:
        i. Routine annual evaluation of potential exceptional circumstances based on information presented to and reviewed by SC.
        ii. Detailed evaluation of potential exceptional circumstances in years that are coincident with the stock assessment.
    b. Examples of what might constitute exceptional circumstances which may include, but not be limited to:
        i. Persistent low recruitment outside the range for which the harvest strategy was tested.
        ii. Substantial improvements in knowledge, or new knowledge, concerning the dynamics of the population which would have an appreciable effect on the operating models used to test the harvest strategy.
        iii. Non-availability of important input data resulting in an inability to run the harvest strategy.
        iv. Stock assessment biomass estimates that are substantially outside the range of simulated stock trajectories considered in the management strategy evaluations, calculated under the reference set of operating models.
        v. Failure of reported catches and effort to be within an acceptable range around the levels indicated by the harvest strategy.
        vi. Persistent or strong negative outcome in key objective indicators
        vii. When there is evidence that total catch is above the total allowable catch set.
    c. When determining that there is evidence for exceptional circumstances, the SC would consider the provision of advice to the MoP that may include, but not be limited to:
        i. The nature and considered severity of the exceptional circumstances
        ii. The necessary action required
            - Where the severity is considered to be high, the recommendation may be for a change to the catch/effort limits; and
            - Where the severity is considered to be low, the recommendation may be that the Scientific Committee review the harvest strategy earlier than scheduled.

Agenda item 7 – Future work plan (for joint MoP-SC workshop on development of harvest strategies)

32. The Workshop reviewed the timeline for the development of harvest strategies that was formulated by the SC (SC8 report, Annex G) and endorsed by the MoP (MoP10 report, paragraph 87).
33. The Workshop recommended that the SC and the MoP continue to work according to this timeline, while recognising the ambitious nature of the timeline and, based on the experience at other RFMOs, the need to be aware that there may be potential delays.
34. The Workshop agreed on the importance of closely monitoring the harvest strategy development process and requested the Secretariat to create a dedicated section for such information on the SIOFA website, for example under the "Works and projects of the Scientific Committee" page (https://siofa.org/scientific-committee/sc-works). The Workshop noted the WCPFC Harvest Strategy page (https://www.wcpfc.int/harvest-strategy) as a good example to consider referencing.

Agenda item 8 – Report adoption (via email)

35. The meeting was closed at 1:40 p.m. UTC, 7 July 2023.
36. The report was adopted via email on 6 December 2023.

Annex A – List of registered participants

Delegation	First name	Last name	Title	Position	Organisation
Australia	Adam	Camilleri	Mr	Alternate	Department of Agriculture, Fisheries and Forestry
Australia	Trent	Timmiss	Mr	Scientific HoD	Department of Agriculture, Fisheries and Forestry
Australia	Patrick	Sachs	Mr	Adviser	Department of Agriculture, Fisheries and Forestry
Australia	Danait	Ghebrezgabhier	Ms	Adviser	Australian Fisheries Management Authority
Australia	Claire	Wallis	Ms	Adviser	Australian Fisheries Management Authority
China	Heng	Zhang	Mr	HoD	East China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences
China	Haibin	Han	Mr	Alternate	East China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences
China	Zhou	Fang	Dr	Alternate	Shanghai Ocean University
China	Jun	Yu	Dr	Alternate	Shanghai Ocean University
Cook Islands	Stephen	Brouwer	Dr	HoD	Ministry of Marine Resources (Cook Islands)
Cook Islands	Tiare-Renee	Nicholas	Ms	Data manager	Ministry of Marine Resources (Cook Islands)
Cook Islands	Ian	Freeman	Mr	Alternate	Ministry of Marine Resources (Cook Islands)
European Union	Fiona	Harford	Ms	Head of Delegation	European Commission, Directorate-General for Maritime Affairs and Fisheries
European Union	Laura	Marot	Ms	Alternate representative	European Commission, Directorate-General for Maritime Affairs and Fisheries
European Union	Sebastián	Rodríguez Alfaro	Dr	EU Scientific representative	European Commission, Directorate-General for Maritime Affairs and Fisheries
European Union	Elodie	Seznec	Mrs	Advisor	Ministry of overseas territories, France
European Union	Margarita	Mancebo	Mrs	Advisor	Ministry of Agriculture, Fisheries and Food, Spain
European Union	Luis	Belmonte	Mr	Advisor	Ministry of Agriculture, Fisheries and Food, Spain

European Union	Roberto	Sarralde	Mr	Scientific advisor	IEO-CSIC, Spain
France OT	Jules	Selles	Dr	Alternate	MNHN
Japan	Ichiro	Nomura	Mr	Head of Delegation	Fisheries Agency Government of Japan
Japan	Masahiro	Akiyama	Mr	Alternate	Fisheries Agency Government of Japan
Japan	Hiroto	Nakamoto	Mr	Alternate	Fisheries Agency Government of Japan
Japan	Takehiro	Okuda	Dr	Advisor	Fisheries resources Institute, Japan Fisheries Research and Education Agency
Japan	Midori	Hashimoto	Dr	Advisor	Fisheries resources Institute, Japan Fisheries Research and Education Agency
Japan	Hiromi	Isa	Mr	Advisor	Japan Overseas Fishing Association
Republic of Korea	Hyejin	Song	Dr	Alternate	Distant Water Fisheries Resources Division, National Institute of Fisheries Science
Republic of Korea	Sanggyu	Shin	Mr	Delegate	Distant Water Fisheries Resources Division, National Institute of Fisheries Science
Mauritius	Luvna	CAUSSY	Dr	Participant	Ministry of Blue Economy, Marine Resources, Fisheries and Shipping
Mauritius	Doorvanand	KAWOL	Mr	participant	Ministry of Blue Economy, Marine Resources, Fisheries and Shipping
Chinese Taipei	Ching-Pin	Lu	Dr	HOD	Chinese Taipei
Chinese Taipei	Chia-Chun	Wu	Mr	Alternate	Chinese Taipei
Chinese Taipei	Chia-Jung	Wang	Ms	Assistant	Chinese Taipei
Thailand	Weerapol	Thitipongtrakul	Mr	Thailand HoD	Marine Fisheries Research and Development Division, Department of Fisheries Thailand
Thailand	Pavarot	Noranarttragoon	Dr	SC Vice Chair	Marine Fisheries Research and Development Division, Department of Fisheries Thailand
Observers	Ross	Shotton	Dr	Delegate member	SIODFA
Observers	Charles	Heaphy	Mr	Delegate member	SIODFA
Observers	Tim	Silverstone	Mr	Delegate member	SIODFA
Observers	Naohisa	Miyagawa	Mr	Delegate member	SIODFA
Observers	Steve	Parker	Dr	Observer	CCAMLR
Observers	Anthony	Thompson	Dr	Observer	FAO
Invited expert	Finlay	Scott	Dr	Invited expert	Pacific Community (SPC), Noumea

MoP Chair	Tae-hoon	Won	Mr	MoP Chair	Ministry of Oceans and Fisheries Republic of Korea
SC Chair	Alistair	Dunn	Mr	SC Chair	Ocean Environmental
Rapporteur	Alexander	Meyer	Mr	Rapporteur	Urban Connections
Executive Secretary	Thierry	Clot	Mr	Executive Secretary	SIOFA Secretariat
Compliance Officer	Johnny	Louys	Mr	Compliance Officer	SIOFA Secretariat
Data Officer	Pierre	Peries	Mr	Data Officer	SIOFA Secretariat
Science Officer	Marco	Milardi	Dr	Science Officer	SIOFA Secretariat

Annex B – Terms of Reference for WS2023-HSMO Workshop

1) The aim of the workshop is for the MoP to agree on Management Objectives for the development of Harvest Strategies for selected SIOFA stocks (MoP10 report, paragraph 91).

2) To do so, WS2023-HSMO needs to develop management objective categories and, within these, preliminary management objectives in the development of harvest strategies.

3) The workshop will focus on management objectives for orange roughy and toothfish (MoP10 report, paragraph 76). In particular, WS2023-HSMO will have the following specific objectives for orange roughy and toothfish:
   a) Agree on specific management objectives for the development of harvest strategies for orange roughy and toothfish.
   b) Identify any other relevant management objectives, for example bycatch objectives, ecosystem objectives, and fishery impact objectives for harvest strategies for orange roughy and toothfish.

4) Identify potential responses to exceptional circumstances, such as dropout or breakout rules, in the implementation of harvest strategies (MoP10 report, paragraph 89), that should be considered by the Scientific Committee.

Annex C – Agenda of the WS2023-HSMO Workshop

1. Opening of the joint SIOFA MoP-SC Workshop on Harvest Strategy Management Objectives (WS2023-HSMO)

2. Administrative arrangements
   2.1. Adoption of the Terms of Reference and Workshop Agenda
   2.2. Appointment of rapporteurs

3. Introduction to management objectives
   3.1. An introduction to harvest strategy management objectives and software tools
   3.2. An introduction to the orange roughy and toothfish fisheries and reference points

4. Orange roughy
   4.1. Determination of orange roughy management objectives.
   4.2. Identification of other orange roughy management objectives.

5. Toothfish
   5.1. Determination of toothfish management objectives.
   5.2. Identification of other toothfish management objectives.

6. Identification of provisional responses to exceptional circumstances, such as dropout or breakout rules, in the implementation of harvest strategies, including conditions under which the harvest strategy would require review, revision, or re-testing.

7. Future work plan (for joint MoP-SC workshop on development of harvest strategies)

8. Report adoption (via email)