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

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Draft SIOFA Scientific Committee Medium-Term Workplan 2023-2026

The SIOFA Secretariat on behalf of the SIOFA Scientific Committee

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Abstract

A detailed draft SC workplan for 2023-2026 (hereafter referred to simply as SC workplan) was discussed and endorsed at the 8th meeting of the SIOFA Scientific Committee (Annex F of the SC8 Report). The SC noted it would allocate prioritisation to each of these projects following the meeting, by email.
This paper aims to present the draft SIOFA SC medium-term workplan for 2023-2026, along with the prioritisation scoring by CCPs, to the MoP for their consideration and adoption.

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Recommendations
• The SC recommends that the MoP **considers** the draft SC medium-term workplan for 2023-2026 and **adopts** a final SC medium-term workplan for 2023-2026

Draft SIOFA Scientific Committee Medium-Term Workplan 2023-2026

1. Background

A detailed draft SC workplan for 2023-2026 (hereafter referred to simply as SC workplan) was discussed and endorsed at the 8th meeting of the SIOFA Scientific Committee (Annex F of the SC8 Report). The SC noted it would allocate prioritisation to each of these projects following the meeting, by email.

The SC agreed that scores for each project would be given using a scoring system adapted from the Western and Central Pacific Fisheries Commission (WCPFC), as used in 2022 and reported in Table 1.

Table 1 – SC workplan project priority scoring table. Colours represent priority rankings (6,9 = High; 3,4 = Medium; 1,2 = Low).

		Importance to SIOFA Management Outcomes or to the functioning of the SC		
	Rank	Low	Moderate	High
Feasibility: Likelihood of Success	Low	1	2	3
	Moderate	2	4	6
	High	3	6	9

Importance criteria evaluate the significance of the outcomes of the proposal in contributing to the successful management of the SIOFA stocks or the functioning of the SC (e.g., is the proposal aligned with the SIOFA research and/or management priorities; does the proposal contribute to the effective planning and functioning of the SC; are the intended outputs/benefits well-defined and relevant; what is the level of impact and likelihood that the proposal outputs will be adopted; is the proposal cost effective). High= Essential; Moderate=Important but not essential; Low=Not Important.

Feasibility criteria evaluate the proposal's potential for success i.e., how likely is the proposal to achieve its stated objectives (e.g., are the objectives clearly stated, is the methodology sound, are the project objectives realistic and likely to be achieved, does the research team [if identified] have the ability, capacity and track record to deliver the outputs).

The Secretariat transmitted, on behalf of the SC Chair, a circular (SIOFA SC Circular 2023/13) to the SC HoDs on the 14th of April 2023, requiring them to provide national priority scores by the 12th of May 2023.

Few CCPs provided Feasibility and Importance prioritization scores for each SC workplan item to the SIOFA Science Officer by the deadline. According to the instructions of the SC, items in the workplan were then ranked according to their **average** score provided by CCPs. Items are presented in descending order of prioritization score to aid the considerations of the MoP.

Financial considerations associated with the SC workplan items are covered in detail in other documents presented to MoP10. However, this document identifies where funding from MoP is needed and highlights the availability of EU funds to support SC workplan items, with the purpose to better inform the MoP consideration of the SC workplan.

Recurring (annual) activities

Summary Title	Lead	Provider	Notes
Development of 3-5 yr. Scientific Committee budget	SC Chair	SC Chairs committee	See paper SC-08-INFO-03
Review of VME indicator taxa list	SC	SC Delegations	
Annual report of VME encounters	Data Officer	Secretariat	Secretariat will report if any VME encounters have been submitted by CCPs
Annual review of VME encounters	SC	SC	
Summary of SIOFA data	Data Officer	Secretariat	Secretariat will summarize the available data at SIOFA
Update fisheries overview	Science Officer	Secretariat	
Update ecosystem summary	Science Officer	Secretariat	
Create/update fisheries summary	Science Officer	Secretariat	Note different timelines for each species as indicated in respective reports: ORY, ALF, TOT, HAU, OIL/LEC, CYO, RIB, TAK

These are activities that the SC will tackle every year and have been already established.

2023-2024 Workplan

Project code	Lead	Summary Title	Budget	Funding source	Project Status	Priority
PAE2021-01b		Identification of representative protected areas within SIOFA (ToR2)	10,000 €	EU Grant (GO2)	Contracted (report due April 2023)	
PAE2021-01c		Investigate and advise on the use of habitat suitability modelling in predicting benthic species diversity and distribution in SIOFA (ToR3)	10,000 €	EU Grant (GO2)	Contracted (report due April 2023)	
PAE2021-01d		Holistic framework for assessing and preventing Significant Adverse Impacts (SAIs) on VMEs (ToR4)	10,000 €	EU Grant (2021-2023) (GO2)	Contracted (report due April 2023)	

Project code	Lead	Summary Title	Budget	Funding source	Project Status	Priority
PAE2021-01e		Identify and update existing and potential SAIs within the SIOFA management area (ToR5)	5,000 €	EU Grant (2021-2023) (GO2)	Contracted (report due April 2023)	
SER2022-TOP1		Toothfish stock structure (molecular analysis)	8,333 €	EU grant GO1	Contracted	
SER2022-ORY1		Orange roughy stock structure	8,333 €	EU grant GO1	Contracted	
SER2022-BYS1		Alfonsino stock structure	10,000 €	EU grant GO1	Contracted	
SER2022-BYS2		Alfonsino otolith ageing + age validation using bomb radiometry	10,000 €	Mop9 + EU grant GO1	Contracted	
PAE2022-MPA1		Protocols to designate and evaluate MPAs	18,000 €	EU SIOFA-SEAs	Contracted	
SER2022-TOP2		Toothfish population spatial structure	34,000 €	EU SIOFA-SEAs	Contracted	
SEC2022-OBS1		Harmonisation of Scientific Observer programmes	48,000 €	EU SIOFA-SEAs	TOR	
DWS-2023-01	EU (Roberto Sarralde)	Improving the scientific advice for data-limited deep-water sharks caught longline fisheries in the SIOFA Area	None required	EU internal funding	Planned	9
ORY-2023-01	COK (Steve Brouwer)	Age and growth of orange roughy	40,000 €	MoP	Planned	9
TOT-2023-01	EU (Roberto Sarralde)	Toothfish catch limits	None required~~10,000~~	EU internal funding~~MoP~~	Planned	7.5
DWS-2023-02	SIODFA (Paul Clerkin)	Identification and trends in Deepwater Sharks caught by the Southern Indian Ocean Benthopelagic Fishery	12,000 €	MoP	Planned	5.5
ORY-2023-02	COK (Steve Brouwer)	Orange roughy acoustics	25,000 €	MoP	Planned	4.5

A. Improving the scientific advice for data-limited deep-water sharks caught longline fisheries in the SIOFA Area (2023-2024)

Description:

To collect and analyse data for data-limited deep-water sharks caught using longline fisheries in the SIOFA Area.

Project objectives:

1. Design and implement a deepwater shark tagging project for sharks caught in longline fisheries in the SIOFA Area
2. Determine the post-release survival of these deep-water sharks
3. Collect biological data from deepwater shark species, including vertebrae and fin spines to assist in determining age composition, growth rates, and maximum age for each species, if possible within the project resources.

4. Identify and categorise shark biological stocks
5. Identify any other knowledge and data gaps
6. Conduct a conservation status assessment, if possible within the project resources.
7. Undertake an assessment of potential move-on rules for the CYO stock in SIOFA Subarea 2, with particular attention to catch rates in consecutive sets, spatial and depth distribution of fishing operations, and the distribution of the CYO population, if possible within the project resources.

Budget:

None (the project is funded by the EU).

Outputs:

1. To present reports to the SC that summarise the data collected and outcomes of scientific analyses with respect to the above objectives.
2. Develop a standardised CPUE index of abundance for CYO.
3. Develop a preliminary assessment of the stock status of CYO based on the above analyses.
4. Review of the current and previous management measures, including assessment of strengths and weaknesses of existing measures and consideration of how existing measures could be improved; a review of management measures employed by other jurisdictions; and the provision of mitigation measure recommendations.

Provide reports which describe the analyses to the SC9 (2024)

B. Toothfish catch limits (2023-2024)

Description:

Develop low information approaches to determining catch limit advice for Del Cano toothfish stocks

Project objectives:

1. Develop, using the CCAMLR trend analysis rules, a low information approach to proposing catch limit advice for Del Cano toothfish stocks.

Budget:

10,000 EURO

Project outputs:

To present reports to the SC that summarise methods and analyses based on data from the Del Cano region to SC9 (2024)

C. Age and growth of orange roughy (2023-2024)

Description:

This project builds on the work undertaken by Saunders (2021) and Brouwer et al. (2021) to develop growth and maturity curves for orange roughy (*Hoplostethus atlanticus*) on Walters Shoal (Walters

shoal, WSR and Seamounts) and on the southwest Indian Rise (Meeting, South Ridge, Middle Ridge and North Ridge) in the SIOFA area, using otoliths collected and held by the Cook Islands.

The previous age estimates should also be made available to be included in this analysis to evaluate changes in growth over time.

Note, it is possible that not enough otoliths will be available from Southwest Indian Rise to produce sex separated growth curves for that area.

Objectives:

1. Select 350 otoliths spanning the size range of fish caught at each of Walters Shoal and the Southwest Indian Rise in the SIOFA area (a total of about 700 otoliths).
2. Develop sex separated and combined sex growth curves for orange roughy in both areas and as single SIOFA growth curves.
3. Use the biological sampling to develop maturity curves for each area.
4. Provide growth parameters for the stock assessment.

Budget:

EUR40,000 (estimated at EUR50 per otolith + some report development time) (Sept 2023 – Jul 2024 to advisory panel and to SC10)

Project outputs:

Provide at least one report which will be presented to the project advisory panel in July 2024 and to SC10 in 2025

D. Orange roughy acoustics (2023-2024)

Description:

Acoustic data are used as abundance indices in the SIOFA orange roughy stock assessments. As such, SIOFA requires the existing acoustic data that are collected by commercial vessels fishing for orange roughy be collated, checked for quality control purposes and then develop abundance estimates for use in the orange roughy stock assessments. The acoustic data (2007-2021) from one trawl vessel (Cook Islands) are available. The outcomes of this work should be collated in a report and presented to SC9 in 2024.

Objectives:

1. Collate the existing acoustic data from Cook Island vessels with the assistance of the SIOFA Secretariat. For all the new and historical acoustic data, provide a descriptive analysis including sampling periods, locations, attributes, and other relevant information.
2. Provide an analysis of the data quality for the most recent data (post 2020) collated in ToR 1 using the same techniques applied in 2018 and 2021 assessing various levels of uncertainty (e.g., species identification, survey design, target strength, absorption, calibration, and other relevant factors) at Walters Shoal (Walters shoal, WSR and Seamounts) and on the southwest Indian Rise (Meeting, South Ridge, Middle Ridge and North Ridge). Make recommendations on which acoustic data are of sufficient quality for use in the 2024 stock assessment updates.
3. Using the data of appropriate quality estimate the biomass of orange roughy using the same techniques applied in 2018 and 2022 or other relevant techniques to provide a time series of the orange roughy biomass estimates.

Budget:

EUR25,000 (Sept 2023 – Jul 2024 to PAP and at SC10)

Note for ORY and ALF acoustics, the addition of a gear technician would improve the data collections. The additional funding required for this would be 30,000 EURO for both the ORY and ALF acoustic data collection.

Project outputs:

1. Table the acoustic survey protocol currently in use as an appendix to this document so that it is documented within the SC.
2. Provide at least one report which will be presented to the PAP in July 2024 and SC10

E. Identification and trends in Deepwater Sharks caught by the Southern Indian Ocean Benthopelagic Fishery (2023-2025)

Description:

Undertake a census of deep-sea sharks caught during one trip of a bentho-pelagic factory trawler to Walters Shoal and the SWIO Ridge in early 2024.

Objectives:

1. Compare to shark species and capture rates to the 2012 and 2014 survey to assess changes in shark abundance and biodiversity over the last ten years.
2. Collect spine and vertebrae samples of Portuguese dogfish to support the work under Project A.
3. Develop, test and optimise identification guides being developed with SIOFA and FAO's DSF Project.

Budget:

EUR12,000 to cover travel, equipment and sampling supplies, and shipping of samples to laboratories for analysis.

Project outputs:

A report describing the results of this research and updated identification guides will be presented to SC-10 in 2025.

2024-2025 Workplan

Project code	Lead	Summary Title	Budget	Funding source	Project Status	Priority
ALF-2024-01	JPN (Takehiro Okuda)	Age and growth of alfonsino	25,000 €	MoP	Planned	9
ORY-2024-01	COK (Steve Brouwer)	Orange roughy stock assessment	50,000 €	MoP	Planned	9
ALF-2024-02	JPN (Takehiro Okuda)	Alfonsino acoustics	10,000 €	MoP	Planned	3

F. Age and growth of alfonsino (2024-2025)

Description:

This project will contribute to the 2026 assessment and build on the work undertaken by Krusic-Golub K. and Robertson S.G. (2020), Brouwer et al. (2020), and Brouwer et al. (2021) to develop growth and maturity curves for Alfonsino (*Beryx splendens*) in the West and East SIOFA areas of the Southern Indian Ocean, using otoliths collected and held by the Cook Islands and Japan. Note that results from the bomb radiocarbon ageing project (SER2022-BYS2) will need to be considered if this indicates that the current ageing methodology needs revising)

The previous age data should also be made available to be included in this analysis to evaluate changes in growth over time.

Objectives:

1. Select 20 otoliths for each 5 cm length bin for both male and female fishes caught at each of the West and East SIOFA areas of the Southern Indian Ocean (about 400 otoliths in total).
2. Develop sex separated and combined sex growth curves for Alfonsino for both areas and combined area SIOFA growth curves.
3. Use the biological sampling to develop maturity curves in both areas.
4. Provide growth curve parameters suitable for use in a stock assessment for the stocks.

Budget:

EUR25,000 (estimated at EUR50 per otolith + some report development time) for ageing of otoliths from CCPs other than Japan. (In this project, otoliths collected by Japan will be processed and aged by Japanese scientists and incorporated into growth and maturity analysis).

Project outputs:

Provide reports which describe the analyses to the SC10

G. Alfonsino acoustics (2024-2025)

Description:

Acoustic data are used as abundance indices in the SIOFA orange roughy stock assessments, but there are questions regarding their feasibility for use for alfonsino. SIOFA requires the existing acoustic data, that are collected by commercial vessels fishing for alfonsino, be collated, checked for quality control purposes and then assessed for their feasibility for use as an abundance estimate for use in the alfonsino stock assessments. The acoustic data (2023/2024) from one trawl vessel (Cook Islands) will be available.

Objectives:

1. Collate the existing acoustic data from the Cook Island vessels.
2. Provide an analysis of the data quality for the data collated in ToR 1 using the same techniques applied in 2018, 2021 and 2024 orange roughy surveys assessing levels of uncertainty (e.g., acoustic signal vs catch, species identification, survey design, target strength, absorption, calibration, and other relevant factors). Make recommendations on the future feasibility of alfonsino acoustic surveys for assessing biomass trends for use in stock assessments.

Budget:

EUR10,000

Note for ORY and ALF acoustics, the addition of a gear technician would improve the data collections. The additional funding required for this would be 30,000 EURO annually for both the ORY and ALF acoustic data collection.

Project outputs:

Provide at least one report which will be presented to the SC10 (2025)

H. Orange roughy stock assessment (2024-2025)

Description:

Undertake a stock assessments of orange roughy stocks in the SIOFA area. This should build on and improve the work of the two previous assessments (Cordue 2018 and Roa-Ureta et al. 2022). While there could be multiple sub-stocks of orange roughy in the SIOFA area until work is completed on the stock structure two broad stocks should be assumed one on Walters Shoal (Walters shoal, WSR and Seamounts) and the other on the southwest Indian Rise (Meeting, South Ridge, Middle Ridge and North Ridge). The outcomes of this assessment should be collated in a report and presented to SC10 in 2024.

Objectives:

1. Meet with the SIOFA orange roughy assessment review pre-assessment review panel to discuss data input and potential assessment approaches.
2. Review the previous stock assessments, all new information (including updated growth, maturity and acoustic data), and other relevant information to undertake an age structured production model to estimate the stock status of orange roughy at Walters Shoal and the Southwest Indian Rise.
3. The SIOFA interim reference points (Target = 40%B0 and Limit = 20%B0), and if SIOFA has not yet adopted final target and limit reference points, then a range of other reference points should be considered and estimates of stock status, fishing mortality and biomass should be provided in the terminal year of the assessment and over time including, at least but not limited to status in relationship to B40% and B20%, MSY, SBMSY, SB0, SBF=0, SB/SBMSY, SB/SBF=0, SB/SB0, F, FMSY, F/FMSY.
4. Estimates of 20-year projected status (at 5-year intervals) under a range of future catch scenarios and appropriate estimates of future productivity (i.e., year class strengths)

Budget:

EUR50,000 (Mar 2024 – Mar 2025 at SC10)

Project outputs:

Provide at least one report which will be presented to the SC10.

2025-2026 Workplan

Project code	Lead	Summary Title	Budget	Funding source	Project Status	Priority
ALF-2025-01	JPN (Takehiro Okuda)	Alfonsino stock assessment	50,000 €	MoP	Planned	9

I. Alfonsino stock assessment (2025-2026)

Description:

Update the stock assessment of Alfonsino stocks in the SIOFA area. This should build on and improve the work of the previous assessment (Brandão et al. 2020). The outcomes of this assessment should be collated in a report and presented to SC11 in 2026.

Objectives:

1. Meet with the SIOFA Alfonsino assessment review pre-assessment review panel to discuss data input and potential assessment approaches.
2. Review the previous stock assessments, all new information (including updated growth, maturity and acoustic data), and other relevant information to undertake an age structured production model to estimate the stock status of Alfonsino.
3. The SIOFA interim reference points (Target = 40%B0 and Limit = 20%B0), and if SIOFA has not yet adopted final target and limit reference points, then a range of other reference points should be considered and estimates of stock status, fishing mortality and biomass should be provided in the terminal year of the assessment and over time including, at least but not limited to status in relationship to B40% and B20%, MSY, SBMSY, SB0, SBF=0, SB/SBMSY, SB/SBF=0, SB/SB0, F, FMSY, F/FMSY.
4. Estimates of 20-year projected status (in 5-year intervals) under a range of future catch scenarios and appropriate estimates of future productivity (i.e., year class strengths)

Budget:

EUR50,000 (Mar 2025 – Mar 2026 at SC11)

Project outputs:

Provide reports which describe the analyses to the SC11