



SIOFA | APSOI

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

Project title: Orange roughy stock assessment (2024-2025)

Project Code: ORY-2024-01

Terms of Reference

1. Introduction

The SIOFA Scientific Committee (SC) provides scientific advice to the Meeting of Parties (MoP) on the status of stocks and sustainable yields of deep-sea fisheries resources. In 2018, the SIOFA Scientific Committee (SC3) conducted the first orange roughy stock assessments in the SIOFA region and provided advice to the Meeting of Parties on the stock status and sustainable yields for orange roughy. An updated orange roughy stock assessment was conducted and presented to SC7 in 2022.

As required under SIOFA CMM 15, orange roughy stock assessments are conducted every 3-5 years, and the next Scientific Committee (SC10) (March 2025) will consider the new orange roughy stock assessments to provide its advice to the MoP.

Summaries of the Scientific Committees advice from previous assessments are available in the reports from SC3 and SC7.

2. Methods

Undertake assessments of the orange roughy stocks in the SIOFA area. This should build on and improve the work of the two previous assessments (Cordue 2018a and b, 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 stocks should be assumed: one on Long Walter's Shoal Ridge (LWSR, Walter's shoal, Walter's Shoal Ridge, and associated seamounts) and another on the South-west Indian Ocean Ridge (SWIOR, Meeting, South Ridge, Middle Ridge, and North Ridge) (Figure 1).

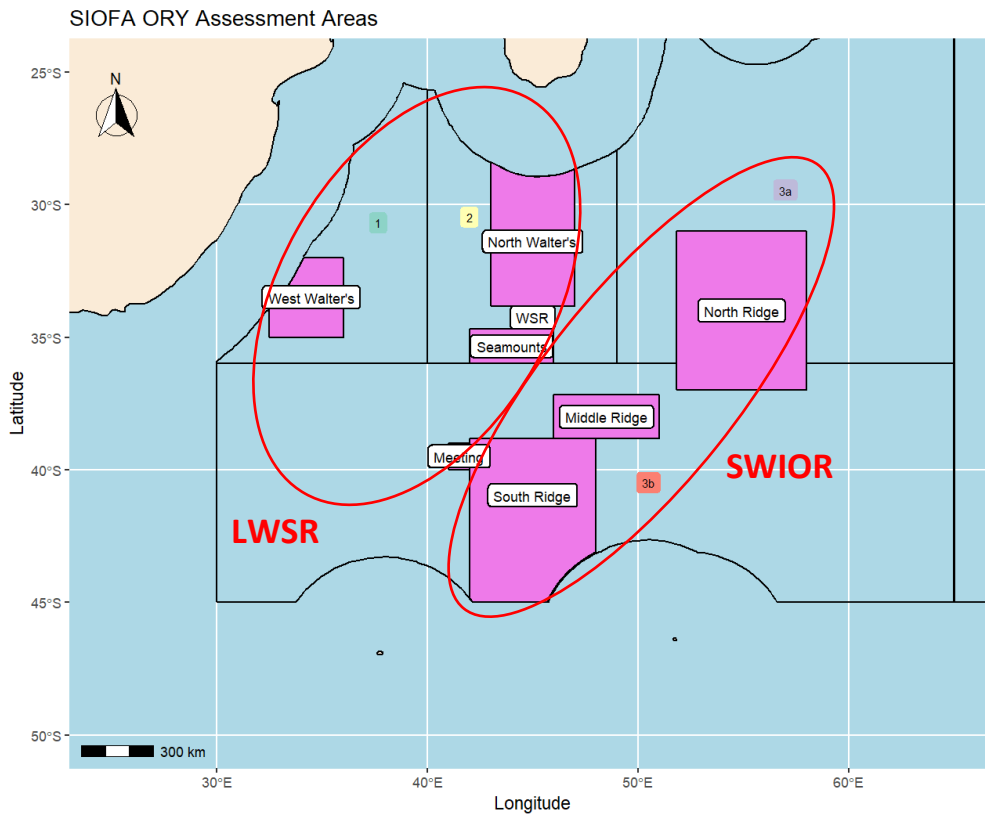


Figure 1 – Map of SIOFA Areas used for assessments (in magenta) for orange roughly as defined by Cordue (2018a, 2018b) and used by Roa-Ureta et al. (2022) (source: SIOFA Spatial layers). Labels indicate names of single assessment areas. Red ovals denote the grouping of single assessment areas into two larger management units for purposes of stock assessment by Roa-Ureta et al (2022). These management units are labelled Long Walter's Shoal Ridge (LWSR) and South-west Indian Ocean Ridge (SWIOR).

New information since the previous assessments include updated age and growth analyses, maturity analyses, acoustic biomass indices, and catch/effort data.

The outcomes of the assessments should be collated in a report and presented to SC10 in 2025. As a part of this project, the consultants will be required to present preliminary methods, draft reports, and results as they are developed to the project Advisory Panel for review.

3. Project objectives

1. During the project, present the work to the SIOFA orange roughly assessment Advisory Panel to discuss data inputs, the assessment approach, and preliminary results.
2. Develop standardised CPUE indices for each stock. Note this should standardise, to the extent possible, using factors such as location (e.g., area and seamount), season, gear parameters, alfonso bycatch, prevailing weather, etc. As the fishery has been undertaken by 1-3 vessels only, standardisation by vessel may not be possible.

3. Review the previous stock assessments, and use all new information (including updated growth, maturity, and local area acoustic abundance data), and other relevant information to undertake a statistical catch-at-age stock assessment to determine the stock status of orange roughy for Walters Shoal and the Southwest Indian Rise. The outcomes of the assessment should include the following:
 - a. Evaluation of the stock against the SIOFA interim reference points (Target = 40%B₀ and Limit = 20%B₀). A range of other reference points should also 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 B_{40%} and B_{20%}, MSY, SB_{MSY}, SB₀, SB_{F=0}, SB/SB_{MSY}, SB/SB_{F=0}, SB/SB₀, F, F_{MSY}, F/F_{MSY}, F_{40%B₀}.
 - b. Appropriate sensitivities to model structural assumptions, choices of biological parameters, acoustic and CPUE abundance indices, and age composition data.
 - c. 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). Analysis should include projections using constant catch and constant fishing mortality strategies with both annual and 5-year changes in catch limits.
 - d. Kobe I (stock status trajectories) and appropriate Kobe II (strategy risk matrix) summaries of the stock assessment results. Refer to Table 1 below as an example of the Kobe II risk strategy matrix from Indian Ocean Tuna Commission (IOTC), showing risk probabilities violating target and limit reference levels for F and B (biomass) next 3 and 10 years in 9 different catch levels (0%, ±10%, ±20%, ±30% and ±40% of the current level).
4. Provide relevant text to update Section 6 of the [SIOFA Fisheries Summary: orange roughy](#).

Table 1: Example of a Kobe II Risk Strategy Matrix.

Table 2. Albacore: SS3 aggregated Indian Ocean assessment Kobe II Strategy Matrix based on the model options (i) Model 1 (ii) Model 2 (iii) Model 3 (Model 4 was not used for management advice). Probability (percentage) of violating the MSY-based target (top) and limit (bottom) reference points for constant catch projections (2017 catch level, ± 10%, ± 20%, ± 30% ± 40%) projected for 3 and 10 years.									
Reference point and projection timeframe	Alternative catch projections (relative to the catch level for 2017) and probability (%) of violating MSY-based target reference points (SB _{targ} = SB _{MSY} ; F _{targ} = F _{MSY})								
	60% (22,901)	70% (26,718)	80% (30,534)	90% (34,351)	100% (38,168)	110% (41,985)	120% (45,802)	130% (49,618)	140% (53,435)
SB ₂₀₂₀ < SB _{MSY}	0.614	0.678	0.715	0.769	0.818	0.828	0.87	0.883	0.898
F ₂₀₂₀ > F _{MSY}	0.074	0.224	0.4	0.556	0.654	0.731	0.766	0.788	0.782
SB ₂₀₂₇ < SB _{MSY}	0.176	0.307	0.456	0.572	0.713	0.823	0.898	1	1
F ₂₀₂₇ > F _{MSY}	0.002	0.085	0.287	0.473	0.718	0.878	1	1	1

4. Relevant SIOFA information

1. SIOFA data (provided by the SIOFA Secretariat upon request)
2. SIOFA spatial data layers. Available at:
https://github.com/SIOFASecretariat/SIOFA_SC_Spatial_layers
3. SIOFA reporting templates. Available at:
https://github.com/SIOFASecretariat/SIOFA_Reporting_templates
4. SIOFA reports:
 - a. SIOFA SC, SC Working Group, and National Reports. Scientific Committee Meeting | SIOFA (<https://siofa.org/>)
 - b. SIOFA MoP reports. Meeting of the Parties | SIOFA (<https://siofa.org/>)
 - c. SIOFA technical and scientific reports (public reports and abstracts of restricted reports are available from <https://siofa.org/>, and full restricted reports will be made available by the SIOFA Secretariat to the project consultant upon request and after the approval of relevant CCPs.

5. Key project indicators

1. Follow the project timeline as detailed in this agreement, including the submission of deliverables, to meet the project objectives.
2. Collect any necessary data as early as possible, e.g., by submitting a data request to the SIOFA Secretariat.
3. Attend the project pre-assessment electronic meeting with the Advisory Panel (composed of members of the SIOFA Scientific Committee and the SIOFA Secretariat) to discuss the project setup and development. Further engage, as requested, with the Advisory Panel during the project to assist the consultant access and interpret reports, data, and obtain the Advisory Panels advice on relevant analyses, methods, and data interpretation for the project.
4. Present preliminary results during the project, as required, to the project Advisory Panel, and respond and revise any project outputs based on their review.
5. Provide regular (i.e. every 2-3 months), proactive updates to the Project Coordinator and the Advisory Panel throughout the project, in particular informing promptly of any unforeseen delay or variations to the project.
6. Submit deliverables on time and appropriately formatted, as required. Each deliverable will go through a SIOFA review to ensure that it meets the quality targets and the project objectives as set out in the Terms of Reference.
7. Appropriately acknowledge the project funding source (SIOFA) within each deliverable.
8. Take into reasonable account the outcomes of the SIOFA review or any comments made by meeting attendees, when revising the deliverables.

6. Deliverables

1. Attend (virtually) the project Advisory Panel meetings.
2. Presentation of methods and results to the SIOFA SC annual meetings (March 2025)
3. A Draft Report that addresses the project objectives and tasks as laid out in this contract. Revise and update the Draft Report based on review by the project Advisory Panel, and the SIOFA Scientific Committee. The report should follow the guidelines and format available at

https://github.com/SIOFASecretariat/SIOFA_Reporting_templates. In particular, the report should include a concise (max 300 words) summary, and should detail the methods, the outcomes, conclusions, and concise recommendations. The Draft Report will also be submitted to the SIOFA Scientific Committee.

4. Provide relevant revisions to Section 6 of the [SIOFA Fisheries Summary: orange roughy](#).
5. A Final Report that follows the guidelines and format available at https://github.com/SIOFASecretariat/SIOFA_Reporting_templates and includes any review comments from the SIOFA Scientific Committee on the Draft Report. The Final Report will also be submitted to the next SIOFA Scientific Committee.
6. Provide all the information collected as a part of this project to the SIOFA Secretariat (including that sourced from the Secretariat) before the final payment of the contract. Such information includes electronic data files, analysis code, biological samples, and other relevant data where applicable.
7. Presentations of reports to the Scientific Committee may be given virtually and travel to the meetings is not obligatory. All project meetings will take place virtually. No additional travel costs will be paid.

7. Acceptance of Draft and Final Reports

1. Draft and Final Reports must be submitted in English to the Project Coordinator at the SIOFA Secretariat.
2. Draft and Final Reports will be reviewed using the procedures outlined in paper MOP-09-12 (Annex B), see also: https://github.com/SIOFASecretariat/SIOFA_Reporting_templates/tree/main/SC%20reports/Review%20template%20for%20consultant%20reports.
3. Payment of contracts milestones will be subject to acceptance of the submitted reports by SIOFA.

8. Intellectual property clause and confidentiality

The Consultant shall submit all the information collected to the SIOFA Secretariat (including that sourced from the Secretariat) before the final payment of the contract is made to the consultant.

Such information includes electronic data files, analysis codes, biological samples, and other relevant data if applicable. Any arrangements for ownership, storage, or disposal of physical samples shall be agreed by SIOFA as a part of the contract. All Intellectual Property generated as a part of this contract shall become the property of SIOFA unless otherwise excluded in the proposal and agreed by SIOFA in the contract.

The Consultant shall not release confidential data provided for conducting this study to any persons nor any organizations, other than SIOFA Secretariat.

The Consultant shall delete all the confidential data upon the completion of the contract.

9. Work timeline and payment schedule

The funds for this project, budgeted under the SIOFA budget, allow for a maximum total budget of 50,000 Euro (including all costs and any travel related expenses).

The consultant shall follow the timeline described in Table 1 below.

Table 1: Timeline for payments, milestones, and report submission

Milestone	Date	Activities
Initiation of contract	September 2024	First instalment payment (30% of the total contract sum)
Delivery of draft report	30 January 2025	Second instalment payment (30% of the total contract sum) upon satisfactorily submission of draft report, in a format suitable for submission to SC, to the Project Coordinator. The draft report will be submitted to SC10 (on 15 February).
Presentation of preliminary results	17-26 March 2025	Presentation of preliminary methods and results to the SC10 meeting (virtual)
Delivery of final report	15 April 2025	Submission of final report in a format suitable for submission to SC and submission of all project information to the project coordinator. Final instalment payment (40% of the total contract sum) on acceptance of the final report by the advisory panel and the final submission of project information

10. Submission of applications

1. A current CV that summarises the applicant(s) relevant educational background and professional experience.
2. A brief proposal (indicatively 3-4 pages) outlining the proposed methods and analyses, including a description of how the objectives of the ToR will be achieved.
3. Any proposed exclusions to the intellectual property clause or variations to the work timeline and payment schedule.
4. The proposed consultancy price (including all consultant expenses and project related costs), noting that the available budget for this work indicated in Section 9.

5. Identification of any project risks and associated mitigation and management required to successfully complete the project.
6. A statement that identifies any perceived, potential, or actual conflicts of interest of the applicant(s), including those described in paragraph 4 of the SIOFA recruitment procedure (see Section 12), and
7. Any additional relevant information the applicant(s) wish to submit.

The applicants must have appropriate experience and knowledge of similar work in their portfolio.

Applications must be submitted to the SIOFA Science Officer Marco Milardi (marco.milardi@siofa.org, CC secretariat@siofa.org). Only those applications received before 12:00 PM (9:00 AM UTC) on Sunday the 1st of September 2024, Reunion Island time, will be considered.

11. Evaluation criteria for the selection of candidates

An evaluation panel, the SIOFA Secretariat, and the Chair and Vice-Chair of the SIOFA Scientific Committee will select one successful applicant for this contract. The selection criteria will include the following:

1. Adequate submission of information to allow the panel to evaluate the candidate
2. Evaluation of the proposal from the candidate, including the proposed contract price
3. Ability to undertake and complete the analyses or work required in this ToR
4. The candidate's agreement with confidentiality provisions required for the project
5. Acceptable conflict of interest statement
6. Agreement with the data submission and intellectual property terms required in this ToR, and
7. Financial and resourcing considerations.

12. Conflicts of interest. Paragraph 4 of SIOFA's Recruitment Procedure

To ensure that situations relating to potential and actual conflict of interests are avoided, persons falling into the following categories may not normally be considered for SIOFA consultancy: (i). any person designated as a designated representative or alternate representative of a CCP to the Meeting of Parties (MOP) as per Rule 3.1 of the Rules of Procedure, and to the SC and any other subsidiary bodies of the MOP, as per Rule 21.3 of the Rules of Procedure; (ii). Any person fulfilling the function of Chair or Vice-Chair of the MOP or Chair or Vice-Chair of a SIOFA subsidiary body or working group; (iii). Any person acting as a member of a delegation involved in the SIOFA decision-making process resulting in recommendations and/or approval for the SIOFA work requiring the engagement of a consultant; and (iv). Individuals who were SIOFA Secretariat staff members at the time when the recommendations and/or approval for the SIOFA works were adopted or who are members of immediate family (e.g., spouse or partner, father, mother, son, daughter, brother, or sister) of any Secretariat staff member or of the persons identified in 4 (i), (ii), and (iii).

13. Contacts

Project Coordinator – SIOFA Science Officer (Marco Milardi, marco.milardi@siofa.org)

Administration – SIOFA Executive Secretary (Thierry Clot, thierry.clot@siofa.org)

14. References

Cordue, P. 2018a. Stock assessment of orange roughy in the Walter's Shoal Region. SAWG(2018)-01-05 Rev1, SIOFA. Available at:

https://siofa.org/sites/default/files/documents/meetings/SC-03-07.1.1%2804%29%20Rev1%20Stock%20assessment%20of%20orange%20roughy%20Walter%27s%20Shoal.%20Cordue%2C%202018_0.pdf

Cordue, P. 2018b. Assessments of orange roughy stocks in SIOFA statistical areas 1, 2, 3a, and 3b. SAWG(2018)-01-06 Rev 1, SIOFA. Available at:

https://siofa.org/sites/default/files/documents/meetings/SC-03-07.1.1%2805%29Rev1%20Assessment%20of%20orange%20roughy%20stocks%20SIOFA%20Areas%201%2C%202%2C%203a%20and%203b.%20Cordue%2C%202018_0.pdf

Roa-Ureta R. et al. 2022. Stock Assessment of the orange roughy (*Hoplostethus atlanticus*) under management by the Southern Indian Ocean Fisheries Agreement (SIOFA): 2000 to 2020. SC-07-35, SIOFA. Abstract available at:

<https://siofa.org/sites/default/files/documents/meetings/SC-07-35-%5BABSTRACT%5D-ORY-stock-assessment-2021-v4-reduced.pdf> The full version will be made available on request to the successful consultant.