

Terms of Reference (ToR) for the provision of scientific services to SIOFA Scientific Committee

Project title: Age and growth of orange roughy (*Hoplostethus atlanticus*)

Project Code: ORY-2023-01

1. INTRODUCTION

The SIOFA Scientific Committee (SC) is tasked to provide management advice for three important species (orange roughy, splendid alfonsino and Patagonian toothfish) to the Meeting of parties of SIOFA. CMM-15 (2020) paragraph 5 requires out that the orange roughy (*Hoplostethus atlanticus*) stocks shall assessed every three to five years. The first stock assessments of orange roughy were conducted in 2018 (Cordue 2018a, 2018b) and the second assessments were in 2022 (Roa-Ureta 2022). The next stock assessment is scheduled for completion for SC10 in 2025.

There is some uncertainty in the growth curve estimates and maturity ogive for orange roughy, and particularly if there are differences between sexes and different areas in the SIOFA Area. In addition, age composition data are also required. Analyses of these data will be used to inform the next stock assessment of orange roughy.

This project builds on the work undertaken by Saunders (2021) and Brouwer et al. (2021) by developing age composition data and updating the growth and maturity curves for orange roughy (*Hoplostethus atlanticus*) on Walters Shoal (Walter's 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 will be made available to be included in this analysis to complement the data provided to this project and to evaluate differences in growth by sex, between these areas, and 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. In addition, age composition analyses may need to use otoliths aggregated over 2-3 years to obtain an adequate number of samples. The outcomes of this work should be collated in a preliminary report and presentation for SC9 in 2024 and a final report for SC10 in 2025.

2. TERMS OF REFERENCE

2.1. 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 and maturity parameters for the stock assessments.

5. Develop age composition data using random age sampling for both Walters Shoal and the Southwest Indian Rise in the SIOFA area.

2.2. Reporting Requirements

1. Provide updates and engage with the project advisory panel that will assist the consultant access and interpret reports, data, and to provide advice on relevant analyses or data interpretation for the project.
2. Present the preliminary methods and results of the project as indicated in Section 3. Take into account any comments made during this presentation in the following part of the work.
3. Provide a draft report detailing the methods, outcomes of project objective investigation as listed in the overall objectives, conclusions, and recommendations to the SIOFA project advisory panel for review by the dates indicated in Section 3.
4. Update the draft report in by considering any comments and advice from the project advisory panel and submit this final report to SIOFA Secretariat for submission to the following SIOFA Scientific Committee annual meeting.
5. Provide 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.

Presentations of reports to the Scientific Committee may be given virtually and travel to the meetings is not obligatory.

2.3. Confidentiality and distribution of project outcomes

The Consultant shall not release confidential data provided for conducting this study to any persons nor any organisations, other than SIOFA Secretariat. The consultant shall delete all the confidential data after the completion of the contract. 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.

All reports and presentations will be reviewed by the SIOFA Secretariat prior to any form of further distribution. The Consultant will revise the report according to comments received from the review process before the report or presentation is accepted as a submission against the requirements in these Terms of Reference.

2.4. Relevant SIOFA information

1. SIOFA data (provided by the SIOFA Secretariat upon request)
2. SIOFA spatial data layers. Available on https://github.com/SIOFASecretariat/SIOFA_SC_Spatial_layers
3. SIOFA reporting templates. Available on 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 concerned CCPs.

3. WORK TIMELINE AND PAYMENT SCHEDULE

The funds for this project, budgeted under the SIOFA scientific funding scheme, allow for a maximum total budget of 40 000 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	30 September 2023	First instalment payment (30% of the total contract sum)
Presentation of preliminary results	18–27 March 2024	Presentation of preliminary methods and results to the SC9 meeting (virtual)
Delivery of draft report	15 April 2024	Second instalment payment (30% of the total contract sum) upon satisfactory submission of a draft report, in a format suitable for submission to SC, to the project coordinator. The draft report must account for any comments received during SC9.
Delivery of final report	1 September 2024	Submission of final report in a format suitable for submission to SC10 and submission of 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

4. SUBMISSION OF APPLICATIONS

1. A current CV that summarises the applicant(s) relevant educational background and professional experience
2. A brief proposal (indicatively 1-2 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

4. The proposed consultancy price (including all consultant expenses and project related costs), noting that the available budget for this work indicated in Section 3
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 6), and
7. Any additional relevant information the applicant(s) wish to submit.

The applicants should have appropriate experience and knowledge of fish ageing, fitting of growth curves and maturity ogives, and their use for stock assessment, preferably for orange roughy.

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 Friday the 1st of September, Reunion Island time, will be considered.

5. 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.

6. 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).

7. CONTACTS

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

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

8. REFERENCES

Brouwer, S.; Wragg, C.; Dunn, A.; Saunders, R. (2022). Orange roughy age and growth in SIOFA from the Cook Islands fishery. SERAWG-04-09. Southern Indian Ocean Fisheries Agreement (SIOFA), 38 p.

Cordue, P.L. (2018a). Stock assessment of orange roughy in the Walter's Shoal Region. SAWG-01-05 rev 1. Southern Indian Ocean Fisheries Agreement (SIOFA), 57 p.

Cordue, P.L. (2018b). Assessments of orange roughy stocks in SIOFA statistical areas 1, 2, 3a, and 3b. SAWG-01-06 rev 1. Southern Indian Ocean Fisheries Agreement (SIOFA), 11 p.

Roa-Ureta, R., Wiff, R., Flores, A. (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. Southern Indian Ocean Fisheries Agreement (SIOFA), 63 p.

Saunders, R. (2022). Orange roughy otolith ageing (Project SER2021-02). SC-07-25. Southern Indian Ocean Fisheries Agreement (SIOFA), 18 p.