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

WS2025-PAM2 Meeting

Virtual, 6 August 2025

WS2025-PAM2-02

Determination of Biological Reference Points (BRPs) for key SIOFA fish stocks

soFish Consulting (Simon Hoyle, Sophie Mormede)

Document type	working paper ☐ information paper ✔
Distribution	Public ☐ Restricted [1] ✔ Closed session document [2] ☐

Abstract

This report provides a snapshot of report development, to inform the WS2025-PAM2 meeting about progress in project PAM2024-02 on the development of biological reference points for key SIOFA fish stocks.

Funded by the European Union

[1] Restricted documents may contain confidential information. Please do not distribute restricted documents in any form without the explicit permission of the SIOFA Secretariat and the data owner(s)/provider(s).
[2] Documents available only to members invited to closed sessions.

1.1 Project Overview and Objectives

Project PAM-2024-02 is developing Biological Reference Points (BRPs) for key SIOFA fish stocks as part of the SIOFA Precautionary Approach and Management (PAM) programme. The project works in collaboration with PAM-2024-01 (Precautionary Approach Framework) and PAM-2024-03 (Harvest Control Rules) to establish science-based benchmarks for sustainable fisheries management in the Southern Indian Ocean.

The primary objectives include: (1) developing suitable BRPs for key SIOFA fish stocks and proposing interim default BRPs for low, medium, and higher information stocks; (2) evaluating standard biological reference points (B40%, B20%, MSY, SBMSY, etc.) with consideration of target ranges, threshold regions, and limit reference points; (3) reviewing risk calculation and uncertainty quantification methods; and (4) determining conditions for BRP revision and reevaluation.

- **Current Project Status**

Work Completed to Date:

- Literature review and preliminary analysis of international best practices across major RFMOs (CCAMLR, SPRFMO, WCPFC, ICCAT, IOTC, NAFO, ICES)
- Development of parameter reliability ranking system based on data source quality and regional relevance
- Compilation of biological parameters for 29 target species using systematic prioritization criteria
- Framework development for tiered approach addressing data-rich, medium-data, and data-poor species
- Risk assessment methodology review including SAFE and EASI-FISH approaches
- Species-specific biological parameter compilation with quality assessments

Current Status and Dependencies: The project is proceeding according to timeline but is experiencing some dependencies on related PAM projects. We are awaiting key outputs from PAM-2024-01 regarding policy settings and management approach frameworks that will inform our BRP recommendations. Additionally, we are waiting to coordinate with PAM-2024-03 on harvest control rules to ensure consistency in modelling frameworks and reference point applications.

Preliminary Findings: Analysis indicates that most SIOFA species are data-poor, requiring pragmatic approaches balancing scientific rigor with practical implementation. The tiered framework appears necessary for SIOFA's diverse species portfolio, as generic approaches across all species are not feasible due to varying data quality and stock characteristics. International alignment, particularly CCAMLR consistency for toothfish management, provides benefits through shared knowledge and coordinated management.

- **Species-Specific Progress**

Priority Species Analysis: Biological parameter compilation has been completed for all 29 target species identified in Appendix A of the SIOFA Fisheries Overview 2024. Current interim BRPs are in place for three key species: orange roughy and alfonsino (TRP = 40% B_o, LRP = 20% B_o), and toothfish (TRP = 50% B_o, LRP = 20% B_o, consistent with CCAMLR).

Data Quality Assessment - preliminary:

- **High assessment potential:** Orange roughy, toothfish, yellowfin tuna, emperor red snapper, splendid alfonsino

- **Moderate assessment potential:** Hapuka, escolar, billfish complex, other tuna species
- **Poor assessment potential:** Most carangids, oreo species complex, small coastal species
- **Data gaps:** Oilfish, threadfin bream, goldfin goatfish, aggregated species complexes

Parameter Reliability Rankings: Implementation of systematic reliability ranking system (0-10 scale) based on species specificity, geographic relevance, and data quality. SIOFA-area species-specific data receives highest priority (9-10), followed by Indian Ocean regional data (6-8), other ocean basins (3-5), and related species data (1-2).

- **Methodological Framework Development**

Tiered Approach Implementation:

- **Tier 1 (Data-rich):** Integrated stock assessment approaches for species with available data
- **Tier 2 (Medium data):** Surplus production and empirical approaches using available indices
- **Tier 3 (Data-poor):** Life history-based and risk assessment approaches with precautionary buffers

Risk Assessment Integration: Development of uncertainty quantification methods incorporating parameter uncertainty (natural mortality, growth, maturity), model uncertainty (assessment choices, population dynamics), and implementation uncertainty (catch reporting, environmental variability). SAFE and EASI-FISH methodologies are being adapted for SIOFA conditions.

- **International Best Practices Analysis**

Review of RFMO approaches reveals common themes: tiered systems based on data availability, precautionary buffers (LRPs typically 20-40% of virgin/MSY biomass), regular review schedules, species-specific flexibility, and transparent documentation. Key insights include universal data limitations across RFMOs, balance between framework consistency and species-specific needs, and importance of adaptive management with stakeholder engagement.

RFMO-Specific Recommendations:

- **Toothfish:** Maintain CCAMLR consistency (50% B_o target) while considering SIOFA-specific conditions
- **Orange Roughy:** Learn from SPRFMO experience with assessment reliability and Bmin as B_o proxy
- **Tropical Species:** Adapt IOTC approaches for similar species
- **Data-Poor Species:** Implement hierarchical approaches similar to WCPFC and NAFO frameworks
- **Next Steps and Timeline**

Immediate Priorities (August-December 2025):

- Complete sensitivity analysis for orange roughy and toothfish as required by MoP11
- Finalize BRP recommendations incorporating PAM-2024-01 framework outputs
- Conduct simulation testing and robustness evaluation
- Integrate harvest control rule coordination with PAM-2024-03

Key Dependencies: Project progress is contingent on receiving policy framework outputs from PAM-2024-01 and maintaining coordination with PAM-2024-03 simulation work. Expert Panel and Advisory Panel consultations continue to inform methodology refinement.

Deliverable Timeline:

- Draft report submission: December 31, 2025
- Final report and all project materials: April 1, 2026
- Scientific Committee presentations: March 2025 and 2026
- **Preliminary Recommendations**

Implementation Framework: Development of decision trees for BRP selection based on tier assignment criteria, operational guidelines for assessment frequency (annual updates for Tier 1, biennial for Tier 2, 5-yearly risk assessment for Tier 3), and management response frameworks with clear action triggers.

Adaptive Management: Establishment of revision criteria including data-driven triggers (new assessments, abundance changes), performance-based triggers (management objective failures), and environmental triggers (regime shifts, climate impacts). Five-year systematic reviews with expert panel evaluation and stakeholder consultation are proposed.

Note on Document Status: *The content in this summary represents preliminary findings and methodological approaches that are subject to refinement based on ongoing collaboration with PAM-2024-01 and PAM-2024-03 projects, as well as continued Expert Panel and Advisory Panel input. Final recommendations will be presented in the December 2025 draft report.*