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

Expert Review for the Development of the SIOFA Precautionary Approach and Management Projects (PAM-2024-04_01)

Company for Open Ocean Observations and Logging (COOOL), SASU



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2. Executive summary

This report presents the findings of one half of the Expert Review Panel (PAM-2024-04_01) on the three SIOFA Precautionary Approach and Management (SIOFA-PAM) projects: PAM-2024-01 (Precautionary Approach Framework), PAM-2024-02 (Biological Reference Points), and PAM-2024-03 (Harvest Strategies). Overall, the Panel concludes that the PAM projects provide a strong foundation for advancing the implementation of a precautionary approach framework within SIOFA, while recognising that further harmonisation and operational development will support its effective application.

PAM-2024-01 establishes the conceptual structure and governance architecture of the Precautionary Approach Framework (PAF), including information classification, stock-status zones, and management procedures. The framework is well aligned with SIOFA's management context and provides a coherent structure for implementation. Streamlining of the Conceptual Framework and Technical Guidelines, and improving consistency of terms and definitions within PAM-2024-01 and across PAM-2024-02 and PAM-2024-03, would further improve clarity and usability.

PAM-2024-02 and PAM-2024-03 provide well-developed technical contributions that address their respective Terms of Reference. PAM-2024-02 presents a robust and internationally aligned framework for biological reference points across stocks with different information levels, while PAM-2024-03 demonstrates how harvest-strategy development and management strategy evaluation could be implemented within the SIOFA context. Together, these projects provide the analytical components needed to operationalise the precautionary framework. We note that, while the case studies appropriately focus on "high-information" stocks where modelling approaches are feasible, most SIOFA fisheries remain low-information. Additional work with case studies for low-information stocks would further strengthen the operationalisation of the framework.

This report has been updated to incorporate the changes made by the authors relative to the initial reviewers' report, with strong progress on structure, coherence, and integration and highlighting tasks remaining for the next iteration.

3. Overview of the SIOFA-PAM project

The EU-funded SIOFA Precautionary Approach and Management (SIOFA-PAM) project was established to strengthen the scientific basis for advice provided by the SIOFA Scientific Committee (SC) to the Meeting of the Parties (MoP), with the overarching objective of supporting sustainable fisheries management and minimizing environmental impacts within the SIOFA Area. The program responds to the specific challenges faced by SIOFA, notably the prevalence of data-limited fisheries and the need for coherent, precautionary, and transparent decision-making frameworks.

The SIOFA-PAM project comprises three interlinked technical projects and a fourth cross-cutting project providing independent expert review. Collectively, these projects aim to deliver a comprehensive management architecture that integrates precautionary principles, biological reference points, and harvest strategies, consistent with the objectives and general principles of the SIOFA Agreement.

The three core technical projects are:

PAM-2024-01, which develops a Precautionary Approach Framework (PAF) applicable to stocks across a gradient of data availability, including operational guidelines for implementation;

PAM-2024-02, which focuses on the development and evaluation of biological reference points (BRPs) for key SIOFA stocks, including default approaches for low-, medium-, and higher-information situations;

PAM-2024-03, which develops and tests harvest strategies and harvest control rules for selected priority stocks, taking into account uncertainty, risk, and multiple management objectives.

Together, these projects are intended to provide the Scientific Committee with a coherent, internally consistent suite of tools to support advice on sustainable exploitation rates, risk management, and ecosystem considerations.

3.1 Role and Objectives of PAM-2024-04: Expert Review Panel

PAM-2024-04 is the cross-cutting project that establishes an independent Expert Review Panel to provide external scientific scrutiny and strategic advice across the three core SIOFA-PAM projects. The primary objective of PAM-2024-04 is to ensure the **scientific robustness, internal consistency, and policy relevance** of the methods, assumptions, and outputs developed under PAM-2024-01, PAM-2024-02, and PAM-2024-03. The full Terms of Reference for this projects are included in Appendix 1.

Specifically, the Expert Review Panel is mandated to:

- review draft methods, analyses, and reports produced by the project teams;
- assess consistency across the PAF, BRPs, and harvest strategy development;
- provide constructive technical feedback to improve clarity, transparency, and alignment with international best practice;
- support the Scientific Committee by identifying strengths, limitations, and areas requiring further refinement prior to consideration by the SC and MoP.

The Expert Review Panel is composed of two sets of experts (PAM-2024-04-_01 and _02), which each provide their Draft Reviewers' Report of the three technical projects, synthesising the findings and recommendations of the Expert Review Panel based on its review of draft project outputs, workshop materials, and interim results. The report is intended to inform subsequent revisions of project deliverables, facilitate informed discussion within the Scientific Committee, and enhance confidence in the scientific advice ultimately provided to the Meeting of the Parties.

This reviewer report for PAM-20241_01 includes review comments from Dr Anne-Elise Nieblas, president of COOOL, a research and development company in marine and fisheries science and technology based in La Réunion, and Dr Sylvain Bonhommeau, fisheries research scientist at Ifremer Indian Ocean Delegation.

3.2 Timeline of the SIOFA-PAM project and summary of deliverables

Three workshops were held in 2025 to support the development of the SIOFA Precautionary Approach and Management (SIOFA-PAM) projects, with the Expert Review Panel (PAM-2024-04) and workshop participants providing independent scientific input throughout the process. Collectively, these meetings confirmed the overall direction of the PAM programme while identifying specific areas for refinement, integration, and prioritisation. The draft reports were provided to the SIOFA Secretariat in advance of the 11th Scientific Committee in March 2026 (SC11), with a review made by the Expert Panel (first draft of the current report). Many of the review comments were integrated into the final

reports of the consultants, which were presented to the SC11. Final reports by the consultants were delivered to the Secretariat to further integrate comments from the SC11. The Expert Panel reviewed the final drafts, noting where comments were fully addressed or where further work was necessary (“Final review” comments of the present document).

WS2025-PAM

The first workshop focused on introducing the three technical PAM projects and establishing coherence across the programme. The Advisory Panel endorsed the overall project structure and emphasised the importance of coordination across PAM-2024-01, PAM-2024-02, and PAM-2024-03. Key advice included ensuring alignment with international best practice, explicitly addressing uncertainty in stock structure, practical incorporation of climate-change into reference points and harvest strategies, and promoting cost-effective data collection for data-limited stocks. The panel also recommended development of standardised monitoring summaries, use of risk-based prioritisation tools, and open-science practices for analytical code and software. The workshop confirmed the importance of precautionary approaches for low-information fisheries and recommended continued technical dialogue across projects and stakeholders.

WS2025-PAM2

The second workshop conducted a detailed review of the draft Precautionary Approach Framework (PAF, PAM-2024-01). The Workshop endorsed the proposed three-component architecture as appropriate for SIOFA’s fisheries portfolio: Information Classification System, Three-Zone Stock Status System, and Management Procedures. Recommendations focused on clarifying links to the SIOFA Agreement and Performance Review, refining definitions of precaution and stock-status zones, and improving transparency and reproducibility of classification and decision processes. The Workshop supported prioritising the development of limit reference points for key species, adopting management procedures as the default management approach, and implementing the framework progressively. Advisory-panel input highlighted the importance of defining minimum data requirements for reference points, strengthening integration among PAM projects, and ensuring the framework supports transitions toward higher information levels over time.

WS2025-PAM3

The third workshop focused primarily on PAM-2024-02 (BRPs) and PAM-2024-03 (harvest strategies). The Workshop endorsed the tiered approach to reference-point development based on information availability and supported pragmatic methods for data-limited stocks. Recommendations included prioritising key SIOFA species for BRP development, defining minimum data requirements, and ensuring consistency with approaches used by CCAMLR, particularly for toothfish. For harvest strategy development, the Workshop supported continued testing of alternative harvest control rules through simulation, the development of breakout rules, and evaluation of robustness to uncertainty and climate-related changes in productivity. Advisory-panel input emphasised careful interpretation of CPUE indicators, comparison across multiple indicators, and continued improvement of data availability for low-information stocks.

Current report structure

Incorporating the discussions and recommendations from the three Workshops, draft final reports were delivered by consultants for PAM-2024-01, 02, and 03 by 31 December 2025. The current document reviews these reports in preparation for their submission to the SIOFA SC in March 2026.

This report is organised sequentially by the PAM projects (01, 02, 03). We first provide a short summary of each project document. We have reviewed these documents for their responses to the Advisory Panel comments made during the workshops to verify the status of the uptake of commentary, and we provide further comments where these may require further attention. Next, we make additional comments on the content and structure of the documents with the aim to ensure the

scientific robustness, internal consistency, policy relevance, and the clarity of the presentation of the proposed framework. Finally, we provide a conclusion and recommendations for each project.

PAM-2024-04 Milestones	Place	Date	Deliverables
Initiation of contract		3 October 2024	
Workshop to progress the SIOFA Precautionary Approach and Management Projects (WS2025-PAM1)	Virtual	3-4 February 2025	SIOFA-WS2025-PAM-Convener-Report.pdf - summary of expert advice and commentary
Workshop to progress the SIOFA Precautionary Approach and Management Projects (WS2025-PAM2)	Virtual	6 August 2025	WS2025-PAM2 Workshop Convener Report - summary of expert advice and commentary
Workshop to progress the SIOFA Precautionary Approach and Management Projects (WS2025-PAM3)	Virtual	7 October 2025	SIOFA-WS2025-PAM3-Conveners-Report.pdf - summary of expert advice and commentary
Delivery of draft report		06 February 2026	SIOFA-SC11-34
Delivery of final reviewer report		30 April 2026	Current document

4. Review of PAM-2024-01

Project PAM-2024-01 was established to develop a comprehensive PAF to support SIOFA in operationalising its obligations under international law and the SIOF Agreement to apply the precautionary approach in fisheries management. The project responds directly to recommendations of the SIOFA Performance Review Panel, notably the call for a structured framework for the provision of scientific advice and precautionary decision-making in a context characterised by substantial uncertainty and a high proportion of data-limited fisheries.

The project has provided four deliverables:

1. a Conceptual Framework, which sets out the principles, governance architecture, and decision-making logic underpinning the precautionary approach within SIOFA;
2. Technical Guidelines, which translate the conceptual framework into detailed operational guidance for implementation by the Scientific Committee and Meeting of the Parties; and
3. a draft report, which outlines the review comments and response, as well as remaining issues with the previous two deliverables.
4. a final report, which integrates the SC and PAM-2024-04 reviewers' final review.

Together, these outputs establish a management architecture built around three core components:

1. an Information Classification System that categorises stocks by data availability and assessment capability;

2. a Three-Zone Stock Status System (Healthy, Under Watch, Critical) based on reference points; and
3. tiered Management Procedures that define pre-agreed, precautionary management responses matched to both stock status and information level.

The framework is designed to ensure risk-equivalent management across all stocks, including low- and zero-information fisheries, while providing pathways for stocks to graduate to higher information categories as data improve.

A key result of PAM-2024-01 is the development of operational workflows, decision protocols, and checklists that enable the framework to be applied consistently across SIOFA's diverse fisheries. The framework aligns with SIOFA's institutional capacity and resource constraints and places emphasis on transparency, explicit treatment of uncertainty, adaptive management, and alignment with international best practice. It provides guidance for phased implementation, prioritising species of highest management relevance.

Overall, PAM-2024-01 has delivered a framework that provides a foundation for integrating biological reference points and harvest strategies developed under PAM-2024-02 and PAM-2024-03, and for strengthening the Scientific Committee's advice to the Meeting of the Parties.

4.1 Advisory Panel workshop advice for PAM-2024-01

The PAM-2024-01 consultants clearly responded to the advisory panel advice in their draft response report "PAM-01 Delivery of Draft Report". Here, we highlight further or remaining action that could be taken on some of these comments.

Clarify implementation pathways and timelines [to be addressed in next iteration]

The Conceptual Framework provides indicative rather than prescriptive timelines, which is appropriate at this stage. The Technical Guidelines give more concrete time ranges and review periods throughout the document, but a visual, consolidated timeline linked to a flow chart and/or a checklist of the different steps would be helpful. The "Roles and Responsibilities" section (p. 36) are particularly informative for these aspects and could serve as a very good basis for the timeline. In addition, linking in the steps where stakeholders can be consulted would address a key comment from the Advisory Panel ("*The involvement of all stakeholders in the process, including managers, industry, and observers, as soon as possible will be very helpful for facilitating discussions and further progress by ensuring that everyone is engaging in the process on the same basis and with the same understanding*").

Final Report review: The presentation of this document at the SC11 gave a clear implementation timeline that, unless we are mistaken, seems to be missing from this revised version. We recommend that the timeline presented at the SC is integrated into the Technical Guidelines in the next iteration.

Ensure consistency with neighbouring and overlapping management areas [to be addressed in next iteration]

The Framework and Technical Guidelines explicitly encourage alignment with approaches used in neighbouring jurisdictions and other RFMOs; however, the treatment of this point is somewhat cursory. Considering that at least one and likely many SIOFA and CCAMLR stocks are transboundary, a better understanding of how to incorporate neighbouring management organisations or countries into the PAF would be appreciated - at what stage? Should any formal procedures be anticipated?

Explicitly address spatial stock structure uncertainty [to be addressed in this iteration]

Limited knowledge of spatial stock structure is treated as a key source of uncertainty across information classification, reference point development, and management procedures, with default conservative responses applied where structure is poorly understood. It is listed as one of the “core elements” of stock information, but this status is progressively introduced. Please consider defining “core elements” earlier and more explicitly in the technical guidelines.

Final Report review: These elements are still introduced only in the Technical Guidelines. For the next iteration, essential data elements should be given more emphasis at the introduction to the information classification system in the Conceptual Framework.

Formalise minimum transparency standards [to be addressed in this iteration]

The Framework emphasises transparent documentation of assumptions, methods, and decision pathways, and encourages reproducible analytical workflows, supporting accessibility for the SIOFA scientific community. Consider explicitly stating that code, assumptions, and analytical workflows should be archived and accessible to the SC, even if not publicly released.

Final Report review: To our review, this point has not been addressed. A sentence such as: “All analytical work supporting classification, reference point estimation, and management procedure development should be fully documented and archived, including code, parameter assumptions, and workflows, and made accessible to the Scientific Committee.” would suffice.

Technical dialogue across PAM projects should be consolidated

PAM-2024-01 functions as the overarching architecture within which PAM-2024-02 and PAM-2024-03 outputs are implemented, demonstrating strong coherence in terminology, assumptions, and technical design. At this stage, more reference to the other 2 documents (PAM-02 and PAM-03) should be made in preference to reproducing this information in the Conceptual Framework or the Technical Guidelines **[to be addressed in this iteration]**. In a next step/project, we recommend that all the outputs of the PAM project be consolidated into a single reference document, which would support the implementation of the PAF **[to be addressed in next iteration]**.

Final Report review: The authors argue against the recommended consolidation to terminology across the projects. Further iterations should include coherence across projects and intersessional meetings between consultants could facilitate the coherence of the overarching framework.

4.2 PAM-2024-04_01 advice and commentary

Conceptual Framework document

Clarify priority species tiers [to be addressed in this iteration]

The Conceptual Framework document indicates that the PAF should be applied progressively to different stocks/species. The priority species and their associated tiers/classifications should be aligned, consistent between working documents, and clearly listed in an Annex of the Conceptual Framework document. The draft report for PAM-2024-01 calls these “primary species - CMM 17”, “primary species - other”, and “secondary”. The Conceptual Framework calls them Tier A, B and C and refers to both CMM 17 and Annex 2 of the same document. Annex 2 of the same document provides other definitions of species types, including target, target species, bycatch, retained bycatch and discarded bycatch. Given the length of the document, please remove any unnecessary definitions/text and simplify the list of species in either Tier A, B, and C or “primary”, “secondary” and “tertiary”. We

don't recommend "primary species - CMM 17" and "primary species - other", as this terminology may cause confusion.

Final Report review: Tiers A-C have been changed to "Groups A-C", and many unnecessary definitions have been removed from Annex 2. Annex 1 (noted in the text) no longer exists in the Conceptual Framework. The table in Annex 2 has not been updated to indicate "Group A-C" or "primary" and "secondary" species. The table caption is necessary, but missing. For further iterations, we would recommend these two Annexes be shortened to a single table with columns Group, Species, and source (e.g. CMM17, MoP10). Definitions are not necessary for the species annex. We note the authors consider recommending priority species as out of the scope of their work, and we clarify that this is not what we are seeking: we are recommending to clarify the species list introduced by the authors into a single list of species consistent with the main text.

Clarify information classification criteria [to be addressed in this iteration]

The criteria used to classify stocks according to their information level should be clarified to ensure that future Scientific Committees can use the definitions as guidelines. The definitions outlined in the Conceptual Framework should reflect the Technical Guidelines operational checklist and vice versa. The final criteria should be the same between the conceptual framework and the technical guidelines, and all annexes, which currently differ **[to be addressed in this iteration]**.

Final Report review: Currently the definitions are similar, but there is no problem if the definitions between the conceptual framework and the technical guidelines are exactly the same, as any uncertainty will at least be consistent between the two documents.

These criteria may need further discussion and revision by the SC as currently they may be inconsistent with SIOFA data levels. For example, in the worked example of orange roughy, considered a high information stock, we were not able to classify it as such using the operational checklist (see comment on Annex 2 of "PAM-01 Delivery of Draft Report").

Indeed, it should be considered whether these criteria should be developed relative to the SIOFA context (where possibly no stocks have highly comprehensive datasets according to the current guidelines), or relative to the international context to be able to compare to other RFMOs. This has implications in terms of which stock assessment models can be applied from these definitions ("Stock status assessment methods will be driven by a stock's Information Classification", p. 16 Technical Guidelines). For example, if most SIOFA stocks are considered low-information from the current criteria, technically no stocks should be assessed with an integrated model, while some stocks are currently assessed with these methods (e.g. orange roughy assessed with CASAL2). A comprehensive and subsequent work to classify all SIOFA stocks following these criteria, including the documented choices and identifying key missing information to improve the level of the stock would be a very useful document for SIOFA SC **[to be addressed in next iteration]**.

We note the review response by the consultants that a large work has been undertaken in PAM-2024-02 to review the data availability of SIOFA stocks (see Appendix 2 of PAM-2024-02). Indeed, this is a good basis for classification, but would require further work to clearly identify stocks as high, medium, and low. This classification should be made after considering the above recommendations on refining the criteria **[to be addressed in next iteration]**.

Different categories of tiers may cause confusion [to be addressed in this iteration]

The hierarchical organisation of the PAF is reasonable and welcome; however the use of "tiers" should be clarified and consistent. There are tiers for priority species (A-C), management procedures (1-3), reference points (1-3), performance indicator colored-flag tiers, The different tier categories and

how they fit together or not can be confusing. The terminology could be reviewed to ensure logical consistency. A graphic / flow chart on how these different tiers align (or not) would be welcome.

Final Report review: Priority species are no longer tiers but groups, and Figure 1 clarifies the different components of the classification system.

Consolidate and streamline text [to be addressed in this iteration where possible]

Throughout the Conceptual Framework draft, we provide comments where the authors can consolidate and streamline the text, including suggestions where detailed parts could be grouped, merged, or moved to an appendix.

Final Report review: We thank the authors for their efforts to address specific comments made on the text to consolidate and streamline text. Next iterations can further reduce the text quantity to ensure that the document(s) provides only the necessary concepts and content. We note that in future SIOFA projects, particularly with large documents, authors should respond to reviewers in track changes to clarify their responses to reviewers.

Clarify use of trigger reference points in the Conceptual Framework document [to be addressed in this iteration]

Currently, the use of LRPs and TRPs are well explained, and trigger reference points are mentioned but the reader is referred to the Technical Guidelines for more details, where many details are given. It should be better explained in the Conceptual Framework why these trigger reference points are included and how they are to be used.

Final Report review: The authors have provided a more detailed definition for trigger reference points in this last version.

Integrate small language/grammar edits made directly on draft document [to be addressed in this iteration]

Minor edits have been proposed in suggesting mode within the document. These edits can be accounted for.

Final Report review: To our review, these comments have been addressed; however, next iterations should provide a version in track changes to clarify responses to review comments.

Mapping to FAO State of Stocks Index

Final Report review: In the comments of the text and through Advisory Panel meetings, we requested that the authors ensure that these different zones can be mapped to international standards, particularly to FAO State of Stocks Index categories Overfished, Maximally Sustainably Fished, and Underfished, particularly with stocks with no reference points, as these outputs will be requested by FAO to SIOFA biannually. The authors have provided this footnote: "The three zones can be broadly mapped to FAO stock status categories for international reporting purposes: the Healthy Zone corresponds to *underfished* or *maximally sustainably fished*; the Under Watch Zone to stocks approaching or at maximum exploitation; and the Critical Zone to *overfished*. However, a precise equivalence is neither possible nor desirable. FAO's categories are fishing-pressure descriptors designed for aggregate global reporting, not biological management tools. SIOFA's zone system is a management framework grounded in biomass relative to biological reference points, which is consistent with the UN Fish Stocks Agreement and with the zone/tier systems used by ICES, NAFO, and other RFMOs." to address the comment; however, we're not sure to agree with their conclusion, noting that the FAO categories are based on different thresholds of Bmsy or proxies, similar to the PAM stock status classification approach (e.g. Figure 2, conceptual framework). We understand, however, that the SIOFA Secretariat will have a mandate to provide these mappings and this can be addressed in future works.

Technical Guidelines

Reduce document length [to be addressed in this iteration where possible]

Similar to the Conceptual Framework document, the Technical Guidelines are thorough, but too detailed. Efforts should be made to minimize to only necessary text and streamline the procedures, reducing repetition or excess detail. Some sections of the report are narrative text that could be made into graphics or tables to assist the user operationalise the PAF. Graphics and tables tend to be more intuitive and will reduce the length of the document. Bullet points with descriptions underneath may only need slightly more detail in the bullet point header, rather than a paragraph of narrative text. Refer to the draft document for specific recommendations.

Final Report review: We thank the authors for their efforts to address specific comments made on the text to consolidate and streamline text. Next iterations can further reduce the text quantity to ensure that the document(s) provides only the necessary concepts and content. As mentioned above, we note that in future SIOFA projects, particularly with large documents, authors should respond to reviewers in track changes to clarify their responses to reviewers.

Simplify the information classification procedure [to be addressed in this iteration]

Currently there are 7 steps. These can be reduced to 4 or 5.

Final Report review: This comment has been fully addressed.

Caution on defining default values for reference points [to be addressed in this iteration]

While a general range, common values used in SIOFA, or a rule of thumb are appreciated, I would hesitate to give default values to the reference points, as these should be discussed by the SC and decided by the MoP.

Final Report review: The authors have maintained default values for reference points and note that they are a “scientifically defensible starting point”. For future works, we recommend that references to relevant literature should be provided to support the default values provided.

Data collection priorities deserves its own section [to be addressed in this iteration]

Currently, it is a subsection of the Reference Point section, but it seems to me that it could be better highlighted, and minimum data requirements/data collection priorities should be considered to have its own section. A dedicated section would also be useful to address the Advisory Panel comment that stocks should have a clear pathway to improve their information classification level.

Final Report review: This comment has been fully addressed.

Reference list [to be addressed in this iteration]

Please ensure that all references cited in the guidelines or annexes are included here, and remove all references that are not cited.

Final Report review: Unless we are mistaken, we are still able to find references in the literature cited that are not included in the text, e.g. Canada. 2010. DEVELOPMENT OF A MANAGEMENT REGIME FOR STOCKS MANAGED BY THE INTER-AMERICAN TROPICAL TUNA COMMISSION. IATTC-81 INF-B. IATTC. https://www.iattc.org/getattachment/5abe936f-fe07-4adc-aa5d-4ce83cb9f625/IATTC-81-INF-B_CAN-Precautionary-approach.pdf.

Move worked example to Technical Guidelines [to be addressed in this iteration]

Annex 2 - Worked Example: Applying the Precautionary Approach Framework to Orange Roughy of the “PAM-01 Delivery of Draft Report” would be much better placed as an annex of the Technical Guidelines

Final Report review: This is now integrated as Annex 5 into the Technical Guidelines. Please consider aligning the formatting of the annex to the rest of the document. Please ensure that the header is incorporated into the Table of Contents, and please refer to the Annex in the main text.

Integrate language/grammar edits made directly on draft document [to be addressed in this iteration]

Final Report review: To our review, these comments have been addressed; however, next iterations should provide a version in track changes to clarify responses to review comments.

4.3 PAM-2024-04_01 Reviewers’ conclusions and recommendations for PAM-2024-01

The PAM-2024-01 Conceptual Framework and Technical Guidelines demonstrate a good responsiveness to Advisory Panel advice, as reviewed in the draft response report. The content of the documents are, on the whole, scientifically robust, precautionary, and well adapted to SIOFA’s data-limited context.

While the content is sound, the documents could be shortened and refer to each other for common parts (i.e. between the Conceptual Framework and the Technical Guidelines, but also between PAM-01, 02 and 03). For this reason, we recommend that the three works be consolidated into a single reference document. This document can include a first section about the Conceptual Framework, and a second part about the Technical Guidelines. We appreciate that this may take considerable effort, and can be considered for a subsequent work.

In the review above, we have tried to clarify which comments should be addressed in this iteration of the review, and which can be taken into account in a next project/iteration.

Final Report review: PAM-01 has responded constructively to many of the comments, particularly through substantial improvements in operationalisation. However, key cross-project issues, especially terminology harmonisation, integration with PAM-02/03, and finalisation of decision rules, remain unresolved or deferred to the Scientific Committee. Further, while the documents have been slightly shortened, a next iteration should be substantially shorter to reduce redundancy in the text, ensure only relevant information is included, ensure that tables and figures are properly explained and to ensure their utility as reference documents. The separate deliverables have been provided into one large document with different attachments, which makes navigating difficult. It is preferable to deliver the core deliverables (Conceptual Framework and Technical Guidelines) separately from the minor reports and responses to reviewer comments. Conceptual Framework and Technical Guidelines should have clear headers/footers to identify which document they are.

5. Review of PAM-2024-02

This document presents the outcomes of project PAM-2024-02, which develops a comprehensive framework for the specification and application of Biological Reference Points (BRPs) for fish stocks managed under the Southern Indian Ocean Fisheries Agreement (SIOFA). The tasks required for PAM-

2024-02 include providing analyses to support the development of biological reference points (BRPs) for key SIOFA stocks, including recommendations for interim default BRPs across information levels, using standard biomass- and fishing-mortality-based metrics and empirical indicators where necessary. The work should evaluate uncertainty and risk, illustrate implementation through case studies, and provide guidance on improving default BRPs and revising them as new information or changing conditions warrant.

The document reviews a wide range of stock assessment methods and reference point concepts, spanning data-rich integrated assessments through to empirical, length-based, productivity-based, and risk-based approaches applicable in low-information contexts. A central conclusion is that no single BRP approach is suitable across all SIOFA stocks. Instead, the authors propose a tiered framework in which the choice of indicators, reference points, and evaluation methods is explicitly conditioned on data availability, stock productivity, and assessment feasibility. This tiered structure aligns with international best practice and mirrors approaches adopted by other RFMOs, while remaining pragmatic given SIOFA's data constraints.

A strength of the report is its systematic treatment of reference points, clarifying their conceptual roles and operational use. The authors evaluate multiple candidate reference points, including MSY-based, B_0 -based, SPR-based, CPUE-based, and productivity-based proxies, highlighting their advantages, limitations, and suitability for different stock types.

The report also provides an extensive review of international practice, drawing comparisons with CCAMLR, ICCAT, IOTC, SPRFMO, NAFO, ICES, Australia, and New Zealand. This benchmarking demonstrates that SIOFA's proposed default reference points, particularly the use of 20% B_0 as a baseline LRP, with higher limits for less productive species, are broadly consistent with global norms, while allowing flexibility for stock-specific adjustment. Consistency with CCAMLR is explicitly maintained for Patagonian toothfish, as a shared transboundary stock.

The document provides species- and stock-specific BRP recommendations for the principal SIOFA stocks, including interim reference points already endorsed by the Meeting of the Parties for orange roughy, alfonsino, and toothfish. These recommendations are supported by detailed life-history synthesis and, where available, simulation testing results undertaken in parallel PAM work. The report also addresses the implications of climate variability and regime shifts, concluding that while dynamic reference points may be explored for data-rich stocks, a static BRP framework with enhanced monitoring and review triggers is currently the most precautionary and practical option for most SIOFA stocks.

Overall, PAM-2024-02 provides a foundational technical basis for BRP-based management within SIOFA. Its principal contribution lies in articulating a flexible, tiered, and internationally aligned framework that acknowledges data limitations while maintaining precaution.

5.1 Advisory Panel advice for PAM-2024-02

The Scientific Committee workshop and expert panel that reviewed progress of PAM-2024-02 gave several recommendations which were in general taken up in this next version of the PAM-2024-02 report; however, a couple points of clarification are requested below.

Trigger levels be developed for low-catch species

The Workshop recommended that trigger levels be used to signal when management attention or measures may be required for low catch species. Though trigger reference points are defined in the report, it's not clear how these are recommended in the SIOFA context.

Clarifying how interim BRPs would be updated over time, including establishing clear update processes.

The report makes clear that BRPs will need to evolve as new data become available, however the conditions for when/if the BRPs would need to be revised or reevaluated could be clarified.

Final Report review: Both items have been addressed by PAM-2024-02 authors. The trigger levels for low-catch species have been developed and linked to the tiered approach and the update process of BRPs have been developed and clarified (e.g. section 6 of the PAM-2024-02 final report).

5.2 PAM-2024-04_01 reviewers' additional advice and commentary

Consider including simple length-based indicators

The methods review section is very complete, but we suggest including simple length-based indicators as well. LBIs are particularly useful methods for very low information stocks. From your review of length-data (Table 10), it appears that many stocks may have sufficient length data to make this method a worthwhile first approach for low-information stocks.

Clarify recommendations

The recommendations can be clarified. Currently, there seems to be a recommendation at the end of page 15, Section 4.9, Section 7, and Table 11. Please consolidate to provide a single section where all recommendations are reviewed.

Verify table numbering

Table numbering seems offset from Table 6 or 7. Please verify and update.

Ensure terminology alignment with final versions of PAM-2024-01 and -03

For example, the latest version PAM-2024-01 proposes the term "Under watch" instead of "Cautious" for the stock-status zone classification. Please ensure that the final version of the PAM-2024-02 draft aligns terminology with the final version of PAM-2024-01 (and PAM-2024-03).

Integrate small language/grammar edits and address comments made directly on draft document

Minor edits have been proposed in suggesting mode within the document. These edits can be accounted for. Comments in the text generally explain the comments made in this document in more detail and can also be addressed directly.

Clearly identify how to define BRPs for qualitative methods

The authors refer to alternative methods (PSA, SAFE, EASI-Fish, SEFRA...), but it's not clearly explained how SIOFA should define BRPs when using these methods. Is it associated with risk-based thresholds or productivity-related parameters?

Final Report review: All items have been addressed by PAM-2024-02. Additional length-based indicators have been proposed (e.g. section 3.4.5 and Recommendation 4 of the final PAM-2024-02 report). A single recommendation list has been provided in section 7.2. Table numbering has been updated and Section 10 of the report provides the different tables. The terminology alignment with final versions of PAM-2024-01 and -03 have been accounted for (e.g. Table 9). Edits and comments have been addressed where needed. Extensive efforts have been carried out to define BRPs for qualitative methods (e.g. sections 3.6 to 3.9).

5.3 PAM-2024-04_01 reviewers' conclusions and recommendations for PAM-2024-02

PAM-2024-02 gives an overview of different stock assessment methods, reference points, minimum data requirements and their appropriateness in the SIOFA context. The report provides recommendations for reference points by species, based on data and assessment potential. These are in line with the SIOFA context, international norms, and represents a scientifically-robust recommendation, to the view of these reviewers. The report is concise, well-written, and easy to understand. It provides the appropriate level of detail, and relates each point to the SIOFA context, which is much appreciated by the reviewers. PAM-2024-02 has incorporated the comments from the Workshops appropriately.

While perhaps not in the scope of this iteration, the information provided in Appendix 2 of the PAM-2024-02 report is a good basis for the information classification of many SIOFA stocks, and clear classification is recommended as a first step to implementing the SIOFA PAF (see R4 above).

We recommend the authors review and address the above comments in this iteration, which primarily represent minor refinements.

Final conclusions and recommendations: The final revision of the PAM-2024-02 report has fully addressed the various comments and suggestions. The authors are commended for their substantial efforts in integrating this feedback and delivering a document of high quality.

6. Review of PAM-2024-03

Project PAM-2024-03 focuses on developing harvest-strategy concepts for SIOFA fisheries through the testing of candidate harvest control rules (HCRs) and management procedures using simulation-based approaches. The project builds on the precautionary architecture established under PAM-2024-01 and the biological reference-point work conducted under PAM-2024-02, providing the operational link between stock-status evaluation and management decision-making.

The report presents a structured approach to harvest-strategy development using Management Strategy Evaluation (MSE) methods. Case studies focused primarily on orange roughy and alfonsino, with consideration of how similar approaches could be applied to other SIOFA species. Patagonian toothfish assessment options were not developed directly, following workshop agreement to align with CCAMLR processes. A range of harvest control rule types were explored, including threshold (“hockey-stick”) rules, ramp-style rules, constant-F approaches, and constant-catch strategies. Simulation results demonstrated that different rules produce different balances between risk reduction and catch variability, highlighting the importance of selecting harvest strategies consistent with management objectives and information availability.

The report also explores how harvest strategies can be adapted across information levels. Model-based approaches were evaluated for “high-information” stocks, while CPUE-based indicators and length-based methods were examined as potential inputs for management procedures in “medium-” and “low-information” fisheries.

In addition to harvest control rule testing, PAM-2024-03 discusses the development of breakout rules, performance indicators, and review processes to support adaptive management. The report provides examples of how additional management objectives (ecosystem considerations, bycatch impacts, and environmental variability) could be incorporated into harvest strategies through performance metrics, although these elements remain at a conceptual stage.

Overall, PAM-2024-03 provides an initial demonstration of how harvest-strategy development could be implemented within the SIOFA management system. The report establishes proof-of-concept for applying MSE-based evaluation across stocks with different information levels. The work represents an important step forward, with further simulation testing, stakeholder input, and data improvements required before operational implementation.

6.1 Advisory Panel workshop advice for PAM-2024-03

The PAM-2024-03 report adequately reflects on and responds to advice provided across the three PAM workshops. We have no follow-up comments.

6.2 PAM-2024-04_01 advice and commentary

Check consistency between criteria for Information classification and the Information level specified in the report

It would be helpful to have a consistent use of the terms and definition described in PAM 01 about the “Information classification” about the stocks. Here, it is sometimes referred to as “data quality”, “level of data requirement”, “SIOFA stocks were classified in terms of data availability”, “different levels of data availability”.

On this topic, orange roughy is used to illustrate a “high information stock” but following PAM P01, it seems it doesn’t meet the criteria defined in Annex 1 (“Operational checklist for Information classification”). For example, I don’t think the stock structure is verified or well understood and I don’t think mixing rates are quantified for this species. Same for the productivity level that is not well-understood relative to fishing pressure. Are 2 out of 5 criteria for the ecosystem and environmental context met?

We have the same question for alfonsino. Can this species be ranked as a medium information stock following the criteria? The authors mentioned the “paucity of data” but ranked the species as “medium information” (and “low information” for the other simulations).

Final Report review: All items have been addressed by PAM-2024-03. The information classification proposed in PAM-2024-01 has been used (e.g. Table 2 and section 3.1). The information classification has been described according to the level of information available per area (e.g., “High /medium” for Walter-Shoal Ridge, see Table 2 for the different information levels). Alfonsino has also been proposed as having a “medium/low” information level (Table 2).

Provide additional context for the orange roughy stock assessment base case

While the report clearly refers to the Bayesian stock assessment models for orange roughy that have been developed in Hoyle & Mormede 2025; Mormede & Hoyle 2025b, 2025c, it would be useful to have a short summary of the main specifications of these base case models (l. 484-485). The PAM 03 report mentions in a previous section that Casal2 was used. The 2-3 lines of summary could group the main information about the base case (type of model, times series used for catch, abundance data, main life history parameters - age max, maturity age, M, steepness).

Final Report review: This item has been accounted for. Section 4.3 of the PAM-2024-03 provides all the information of the orange roughy stock assessment as an introduction paragraph.

Provide feedback on the potential use of integrated stock assessment models for alfonsino

The authors have used Casal2 on alfonsino data and they performed deep analyses to test MSE. While they clearly explain that “*These MSE simulations used alfonsino as a case study but are not intended to represent management advice for alfonsino.*”, it would be interesting to have a small paragraph of

discussion at the end of the section 4.4.5 to give feedback on whether further development of this approach could be investigated in the future. This could include information and model specifications that would need to be investigated so that the model provides robust results. This paragraph could use the “Alfonsino-specific results” in the discussion section.

Final Report review: The comment has been partially addressed. The final report provides additional discussion on the limitations of the alfonsino modelling framework and highlights the need for improved data inputs (e.g. length data, ageing, and biological parameters) to support more robust MSE applications. However, the suggestion to include a concise, forward-looking paragraph at the end of Section 4.4.5 specifically discussing the potential future development of integrated stock assessment approaches (e.g. Casal2), and outlining key model requirements, appears to have been only partially incorporated and could be further strengthened in future works.

Harvest-control-rule testing

The report provides an informative and wide comparison of several harvest control rule types. However, other candidate management procedures could be evaluated. Future iterations of the work could expand the testing of alternative harvest-strategy options and uncertainty scenarios to better inform Scientific Committee advice. The authors recommend “refine the rules tested” but we suggest that the set of rules be open for discussion to the SC/MoP and could even be expanded.

Final Report review: The comment appears to have been largely addressed. The final report maintains a broad comparison of harvest control rule types in Section 3.3 and through the simulation framework described in Section 3.7, with results synthesised in Section 4 and detailed further in Appendix H. The report explicitly acknowledges the need for further refinement and additional testing of management approaches, including alternative rules and improved data inputs. The recommendations in Section 6 also emphasise continued development and iteration of harvest strategies, which aligns with the suggestion to keep the set of candidate rules open for discussion. In future works, it would be interesting to expand the suite of candidate management procedures beyond those tested.

Incorporate examples of other SIOFA species in potential harvest control rules

Section 3.3 Potential harvest control rules reviews a series of different HCRs and relates their utility to orange roughy, alfonsino, and sometimes Patagonian toothfish. Noting the specific recommendation by the Advisory Panel to focus on alfonsino and orange roughy, and not recommending to provide any case studies at this stage, an idea of how the other SIOFA priority species would fit in this structure would still be of interest.

Final Report review: The section 3.3 focuses primarily on orange roughy and alfonsino, consistent with the Advisory Panel’s guidance. The final report provides some additional contextualisation by referring more broadly to how different categories of stocks (e.g. high-, medium-, and low-information stocks) could be matched to specific types of harvest control rules. This broader framing is also supported by the classification of SIOFA stocks in Section 4.1 and the summary provided in Appendix B, which give an indication of how other species might fit within the proposed management framework.

Format tables for performance measure indicators

Consider adding color to the tables (3,8) in the main text (color cells Green, Amber, and Red). Also please align terminology with PAM-01 (“Amber” instead of “Orange”). Unknown cells could be indicated in gray.

Final Report review: colors and terminology have been modified.

Length-based indicators should be tested in the next iteration

We agree that length-based indicators should be tested as a next step. These types of indicators can be particularly useful for very low information stocks, as are common in SIOFA. Further, as noted in Table 10 of PAM-2024-02, many SIOFA stocks have sufficient length measurements to make this a viable method. To ensure consistency across the projects, please coordinate with PAM-2024-02 to include LBIs in their report.

Final Report review: The comment appears to have been largely addressed. The final report explicitly recognises the potential of length-based approaches for low-information stocks and includes dedicated analyses of length-based spawning potential ratio (LB-SPR) for alfonsino in Section 3.5 and Section 4.4.2, with further detail provided in Appendix F. In addition, the recommendations in Section 6 call for further development of length-based management, including improvements in data collection and application of these methods, which is consistent with the suggestion to expand testing of length-based indicators in future iterations.

Integrate small language/grammar edits and address comments made directly on draft document

Minor edits have been proposed in suggesting mode within the document. These edits can be accounted for.

Final Report review: The comment appears to have been largely addressed. The final report shows overall improvements in clarity, consistency, and language compared to the draft, suggesting that many of the minor edits and in-text comments have been incorporated. However, without a detailed, line-by-line comparison in tracking change mode, it is difficult to confirm that all suggested edits have been fully implemented, and a final proofread could help ensure complete consistency throughout the document.

6.3 PAM-2024-04_01 reviewers' conclusions and recommendations for PAM-2024-03

PAM-2024-03 represents a solid and scientifically grounded step toward adaptive, precautionary fisheries management in the SIOFA region. This work helps progress the operationalisation of precautionary principles into a practical development of harvest strategies suited to fisheries operating under substantial uncertainty.

We recommend the authors incorporate the comments made above into this iteration.

Final conclusions and recommendations: The final revision of the PAM-2024-03 report has addressed the majority of the comments and suggestions provided, with clear improvements in structure, clarity, and technical content. The authors are thanked for their substantial efforts in integrating this feedback and delivering a high-quality and scientifically robust document. A few points could be further explored in future iterations, but overall, the report represents a solid and valuable contribution to the development of precautionary and adaptive fisheries management within the SIOFA framework.

7. Conclusions

The Expert Review Panel recognises the substantial work completed under the SIOFA Precautionary Approach and Management (SIOFA-PAM) programme. PAM-2024-01, PAM-2024-02, and PAM-2024-03 together provide robust scientific advice and a solid foundation for advancing a precautionary approach to fisheries management within SIOFA. The Precautionary Approach Framework (PAF) provides a clear management architecture, biological reference points are defined across information levels, and the case studies developed under PAM-2024-03 demonstrate the practical application of harvest strategies and management strategy evaluation. Overall, the Expert Review Panel concludes that the PAM programme provides a strong basis for implementation of a precautionary approach

within SIOFA, with future work focused on harmonisation, operational guidance, and application to low-information stocks **[see R1]**.

The three projects are clearly linked and mutually reinforcing, with PAM-2024-01 providing the framework and PAM-2024-02 and PAM-2024-03 supplying the technical components needed to operationalise reference points and harvest strategies. However, some inconsistencies in terminology and presentation remain across the documents, and understanding the full scope of the programme currently requires reviewing all three reports together. SIOFA may therefore wish to consider how these outputs should be organised for future use, whether through consolidation into an implementation-oriented framework document or through continued use as linked but autonomous reports. The Panel considers that PAM-2024-01 would benefit from streamlining to reduce repetition and clarify its role as a practical implementation framework. A useful next step would be to focus on refining the Technical Guidelines to an implementation-focused document that presents the framework in a step-wise and operational manner, supported by workflows, timelines, and checklists **[see R2 and R3]**.

We note that PAM-2024-02 and 03 apply the proposed stock information classification to orange roughy and alfonsino, and that Annex A of PAM-02 provides a good basis for information classification of many other SIOFA species. We suggest that clear information classification should be extended to all SIOFA stocks, using the criteria and operational checklists outlined in PAM-01 as an important starting point to prioritise the progressive implementation of the SIOFA PAF **[see R4]**.

While PAM-2024-02 and PAM-2024-03 successfully deliver the work requested in their Terms of Reference, focusing on orange roughy and alfonsino, classified in their report as high- and medium-information stocks, we note that most SIOFA stocks remain low-information. Additional work is therefore needed to illustrate how the framework should be applied to low-information fisheries and how stocks can transition toward higher information levels through monitoring and assessment development **[see R5]**.

All PAM projects reviewed have integrated international best practices and information on neighbouring management bodies. As the SIOFA PAF progresses, it will be important to maintain this harmonisation **[see R6]**.

PAM-2024-01, PAM-2024-02, and PAM-2024-03 outline candidate pathways for implementing the precautionary approach to management, including proposed default values consistent with current stock knowledge. The transparency and continuity of this approach could be ensured through the code availability **[see R7]**. Adoption of these elements will require case-by-case consideration and agreement by the SC and the MoP **[see R8]**. Finally, we note that in next iterations of the project, coherence across different elements should be promoted through more frequent intersessional meetings between the consultants **[see R9]**.

8. Acknowledgements

We thank the consultants of PAM-2024-01, 02, and 03 for their dedicated efforts and quality work. We thank Dr Nathan Walker of PAM-2024-04_02 for his relevant and constructive advice to advance this work. We would like to thank the SIOFA Secretariat for their efforts in developing this project, organisation and follow up of the dedicated workshops, as well as the project Advisory Panel and SIOFA Scientific Committee for furthering this framework. This work was funded by the European Union (grant number: 101182531).

Appendix 1. Terms of reference PAM-2024-04

Project title: Expert Review Panel for the Development of the SIOFA Precautionary Approach and Management Projects

Project Code: PAM-2024-04

Terms of Reference

Introduction

The SIOFA Precautionary Approach and Management (SIOFA-PAM) programme will further enhance the scientific advice of the SIOFA Scientific Committee (SC) for the SIOFA Meeting of the Parties (MoP), in particular towards ensuring the sustainable management of fish stocks and the environmental impacts associated with fishing.

The SIOFA-PAM programme has three main projects that focus on the development of a framework to ensure the sustainable management of fish stocks and managing the environmental impacts associated with fishing activities within the SIOFA Area. These aim to guide, inform, and enhance resource protection and to improve sustainable resource management measures, especially in the context of the information-limited fisheries. A fourth project provides for expert review and advice across the three main projects.

The specific projects of SIOFA-PAM are to:

PAM-2024-01: Develop the SIOFA Precautionary Approach Framework. This project involves establishing a framework for high, medium, and lower information stocks to apply the precautionary approach within the SIOFA Area. This framework will provide guidelines and principles to help ensure that fisheries management decisions are made in a precautionary manner using the best scientific evidence available, consistent with the Objectives (Article 2) and General Principles (Article 4) of the SIOFA Agreement (SIOFA, 2006).

PAM-2024-02: Determine Biological Reference Points (BRPs) for key SIOFA fish stocks. This project focuses on developing and scientifically evaluating BRPs for the key fish stocks within the SIOFA Area, based on the best available scientific data and methods.

PAM-2024-03: Develop harvest strategies for key SIOFA fish stocks. Building upon previous workshops and ongoing efforts by the SC and MoP, this project aims to develop formal harvest strategies for key fish stocks.

PAM-2024-04: Expert Review Panel for the Development of the SIOFA Precautionary Approach and Management. Provide external expert review and advice to the project teams and SC for the work and outcomes of the three main projects.

Collectively, these projects will provide the SC with the information required for it to advise the MoP on management approaches and actions to achieve sustainable exploitation rates while considering socio-economic factors and ecosystem impacts.

This project (PAM-2024-04) is for an Expert Panel who will provide external expert review and advice on the work and outcomes of the three main projects: PAM-2024-01 (Development of the SIOFA Precautionary Approach Framework), PAM-2024-02 (Determination of Biological Reference Points for key SIOFA fish stocks), and PAM-2024-03 (Development of Harvest Strategies for key SIOFA fish stocks).

The Expert Panel will consist of up to three scientific experts, each with specialist expertise in at least two of the PAM-2024-1, PAM-2024-02, and PAM-2024-03 projects. The panel will be formed from qualified applicants to ensure adequate coverage of the scientific methods and approaches across all projects.

Methods

As a part of the PAM-2024-01, PAM-2024-02, and PAM-2024-03 projects, the project teams will be required to present preliminary methods, draft reports and final reports for review to the Expert Panel (this project) and the project Advisory Panels (composed by members of the SC and the Secretariat), before presenting to project workshops and the SC.

The Expert Panel will be tasked with providing an external expert review, by providing verbal and written recommendations including feedback on methods and interpretation of results to the project Advisory Groups and the SC over the life of those projects.

Project objectives

1. Review the progress and outputs of projects PAM-2024-01, PAM-2024-02, and PAM-2024-03.
2. Provide expert advice to the consultants of projects PAM-2024-01, PAM-2024-02 and PAM-2024-03 to assist them in developing their project outputs and expert scientific review for each of these projects.

Relevant SIOFA information

SIOFA data (provided by the Secretariat upon request)

Terms of Reference for the provision of scientific services to SC for projects PAM-2024-01, PAM-2024-02, and PAM-2024-03.

Preliminary and final reports and presentations for projects PAM-2024-01, PAM-2024-02, and PAM-2024-03.

SIOFA spatial data layers. Available at:

https://github.com/SIOFASecretariat/SIOFA_SC_Spatial_layers

SIOFA reporting templates. Available at:

https://github.com/SIOFASecretariat/SIOFA_Reporting_templates

SIOFA reports:

- a. SIOFA SC, SC Working Groups and workshops, 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.

Key project indicators

1. Follow the project timeline as detailed in this agreement, including the submission of deliverables.
2. Collect any necessary data as early as possible, e.g. by submitting a data request to the Secretariat.
3. Attend the project initialisation meeting with the project consultants of the PAM projects and their Advisory Panels (composed by members of the SC and the Secretariat) to discuss the project setup and development. Further engage, as requested, to provide advice on relevant analyses or data interpretation for the project.
4. Provide verbal and written reviews and advice of any preliminary and final presentations and reports, as well as at any interim project meetings, to the project consultants of PAM projects and the projects Advisory Panels, and review any revised any project outputs based on that review.
5. Appropriately acknowledge the project funding source (i.e. the EU), with appropriate corresponding logos in prominent positions, within any project deliverables (logos available at https://github.com/SIOFASecretariat/SIOFA_Reporting_templates/tree/main/SC%20reports/EU%20logos).
6. Take into reasonable account the outcomes of the reviews and comments made by meeting participants when providing any written or verbal comments.

Deliverables

1. Attend (virtually) the project Advisory Panel meetings for the PAM projects and provide expert scientific advice and commentary on work deliverables under each project.
2. Attend (virtually) the SIOFA-PAM project workshops (virtual) to be organized during the SIOFA-PAM project timeline (tentatively Jan/Feb 2025 and Nov/Dec 2025) and provide expert commentary.
3. Attend (virtually) the presentation of methods and results of PAM projects to the SC annual meetings (March 2025 and March 2026) and provide expert scientific advice and commentary to these meetings on aspects of discussion related to the outputs of PAM projects.
4. A Draft Reviewers Report that addresses the draft outcomes of PAM projects. 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 review, conclusions, and concise recommendations. The Draft Reviewers Report will also be submitted to the SC.
5. A Final Reviewers Report that follows the guidelines and format available at https://github.com/SIOFASecretariat/SIOFA_Reporting_templates and includes any final review comments on the Final Report of PAM-2024 projects. The Final Reviewers Report will also be submitted to the SC.
6. Provide all the information collected to the Secretariat (including that sourced from the Secretariat) before the final payment of the contract. 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. All project meetings will take place virtually. No additional travel costs will be paid.

Acceptance of Draft and Final Reports

1. Draft and Final Review Reports must be submitted in English to the Project Coordinator at the SIOFA Secretariat.

2. Draft and Final Review 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.

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.

Work timeline and payment schedule

The funds for this project, budgeted under the SIOFA-PAM EU Grant (<https://siofa.org/eu-grants>), allow for a maximum total budget of 30,000 Euro (including all costs and any travel related expenses) for up to three expert review consultants (funds will be allocated according to the number of consultants appointed).

The consultants 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 2024	First instalment payment (30% of the total contract sum)
Delivery of draft reviewer report	31 January 2026	Second instalment payment (30% of the total contract sum) upon satisfactory submission of draft reviewer report, in a format suitable for submission to SC, to the Project Coordinator.
Delivery of final reviewer report	30 April 2026	Submission of final reviewer report in a format suitable for submission to SC and submission of all project information to the project coordinator.

Milestone	Date	Activities
		Final instalment payment (40% of the total contract sum) on acceptance of the final reviewer report by the advisory panel and the final submission of project information

Submission of applications

1. A current CV that summarises the applicant(s) relevant educational background and professional experience.
2. A brief letter (indicatively 1-2 page) outlining the consultants relevant experience and scientific background that is relevant to the three project and the qualifications for being on the expert panel.
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 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 12), and

Any additional relevant information the applicant(s) wish to submit.

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

The consultants for the Expert Panel must be independent of the consultants and organisations undertaking the work in Projects PAM-2024-01, PAM-2024-02, and PAM-2024-03. Once the consultants for those projects have been appointed, we may contact you for additional information on potential conflicts of interest before confirming the Expert Panel.

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 8th of September 2024, Reunion Island time, will be considered.

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.

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).

Contacts

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

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

References

Terms of Reference for the provision of scientific services to SIOFA Scientific Committee for projects:

PAM-2024-01 Development of the SIOFA Precautionary Approach Framework (PAF)
(<https://siofa.org/science/sc-works/PAM-2024-01>)

PAM-2024-02 Determine Biological Reference Points (BRPs) for key SIOFA fish stocks
(<https://siofa.org/science/sc-works/PAM-2024-02>)

PAM-2024-03 Develop harvest strategies for key SIOFA fish stocks
(<https://siofa.org/science/sc-works/PAM-2024-03>)