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Development of a Scientific Data Management and Conservation Framework for SIOFA-Related Research Activities

Delegation of France Overseas Territories

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Abstract	<p>This paper proposes the development of a formal Scientific Data Management and Conservation Framework for datasets generated under SIOFA-related research activities that extend beyond routine fisheries catch and effort reporting.</p> <p>Recent surveys and collaborative scientific initiatives within the SIOFA Convention Area have generated substantial volumes of primary scientific data, including biological sampling records, VME observations, environmental DNA (eDNA) data, oceanographic measurements, acoustic datasets, bathymetric information, and high-resolution imagery and video records.</p> <p>While ownership and access provisions may be governed by programme-level arrangements, SIOFA does not currently operate a dedicated, formalised information management framework to ensure the long-term stewardship, integrity, traceability, and controlled accessibility of scientific datasets of which it is a partner or beneficiary.</p> <p>Given the increasing reliance on ecosystem-based management approaches, spatial modelling, and VME assessments, this paper recommends that the Scientific Committee request the Secretariat to develop and present a formal Data Management and Conservation Policy and to consider establishing a structured Scientific Data Information System (SDIS) for SIOFA-Related Research Activities.</p> <p>Proposed decision text is provided in Section 5.</p>

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.

Recommendations

The Scientific Committee is invited to:

- **Agree** that the long-term stewardship of scientific datasets generated under SIOFA-related research activities warrants the development of a formal management framework;
- **Agree** the creation of a dedicated steering committee including the CCPs;
- **Request** the Secretariat to develop and present, at the next meeting of the Scientific Committee, a Scientific Data Management and Conservation Policy applicable to scientific datasets beyond routine fisheries reporting;
- **Request** the Secretariat to outline the technical tools currently in use or envisaged, including proposed architecture, governance arrangements, data security measures, and access provisions;
- **Invite** the Secretariat to consult, as appropriate, with relevant partners and data custodians in the development of this framework;
- **Request** the Secretariat to report on progress at the next meeting of the Scientific Committee.

Development of a Scientific Data Management and Conservation Framework for SIOFA-Related Research Activities

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Executive Summary

This paper proposes the development of a formal Scientific Data Management and Conservation Framework for datasets generated under SIOFA-related research activities that extend beyond routine fisheries catch and effort reporting.

Recent surveys and collaborative scientific initiatives within the SIOFA Convention Area have generated substantial volumes of primary scientific data, including biological sampling records, VME observations, environmental DNA (eDNA) data, oceanographic measurements, acoustic datasets, bathymetric information, and high-resolution imagery and video records.

While ownership and access provisions may be governed by programme-level arrangements, SIOFA does not currently operate a dedicated, formalised information management framework to ensure the long-term stewardship, integrity, traceability, and controlled accessibility of scientific datasets of which it is a partner or beneficiary.

Given the increasing reliance on ecosystem-based management approaches, spatial modelling, and VME assessments, this paper recommends that the Scientific Committee request the Secretariat to develop and present a formal Data Management and Conservation Policy and to consider establishing a structured Scientific Data Information System (SDIS).

Proposed decision text is provided in Section 5.

1. Background

1. Recent research activities conducted within the SIOFA Convention Area, including collaborative surveys implemented with partner institutions and programmes, have generated significant volumes of scientific data.
2. These datasets extend beyond routine fisheries reporting and include, inter alia:
 - (a) biological observations of fish, sharks, benthic invertebrates, and VME indicator taxa;
 - (b) environmental DNA (eDNA) samples and associated metadata;
 - (c) oceanographic measurements (e.g. CTD parameters);

- (d) acoustic survey datasets and bathymetric data;
 - (e) baited remote underwater video (BRUV) footage and benthic video transects;
 - (f) specimen and habitat imagery; and
 - (g) seabird and marine mammal observations.
3. These datasets constitute primary scientific material, in many cases non-replicable, and may underpin future stock assessments, habitat modelling, VME evaluations, spatial management measures, and ecosystem-based analyses.
 4. The Scientific Committee has previously emphasised the importance of transparency, traceability, and scientific robustness in advisory processes.

2. Rationale

5. The increasing use of spatial analyses, habitat modelling, and ecosystem-based management approaches within the Convention Area reinforces the need for structured and secure scientific data stewardship arrangements.
6. Ensuring long-term preservation and traceability of primary scientific data is necessary to:
 - (a) safeguard institutional memory;
 - (b) support reproducibility of scientific advice;
 - (c) facilitate intersessional analytical work;
 - (d) strengthen confidence among Contracting Parties and Cooperating Non-Contracting Parties (CNCs); and
 - (e) align SIOFA practices with internationally recognised standards for scientific data management.
7. While certain datasets may be subject to programme-specific data policies and ownership arrangements, SIOFA does not currently operate a comprehensive and formalised framework for the long-term stewardship of scientific datasets of which it is a partner, beneficiary, or authorised recipient.
8. Establishing such a framework would not alter existing ownership provisions but would ensure structured governance, secure storage, and controlled accessibility consistent with applicable agreements.

3. Proposed Framework

9. It is proposed that the Secretariat develop a formal **Scientific Data Management and Conservation Policy** applicable to scientific datasets not limited to commercial fisheries reporting.
10. The policy should define:
 - (a) the scope of datasets covered;
 - (b) governance arrangements and responsibilities for data stewardship;
 - (c) procedures for data ingestion, validation, version control, and audit trails;
 - (d) data security, backup, and long-term archiving procedures;
 - (e) access and use conditions consistent with ownership and confidentiality provisions; and
 - (f) alignment with internationally recognised best practices, including the FAIR principles (Findable, Accessible, Interoperable, Reusable).
11. It is further proposed that the Secretariat consider establishing a structured **Scientific Data Information System (SDIS)** designed to ensure:
 - Long-term preservation of primary scientific datasets;
 - Integrity and version control of stored data;

- Traceability between analytical outputs and primary data;
- Interoperability with recognised biodiversity and geospatial standards; and
- Controlled and role-based access.

12. A phased implementation approach could include:

- (a) an inventory of existing datasets;
- (b) a gap analysis relative to best-practice standards;
- (c) development of the formal policy;
- (d) pilot deployment of technical architecture; and
- (e) progressive integration of legacy and future datasets.

4. Technical Considerations

13. The proposed SDIS may include:

- A relational database structure linking sampling events, environmental context, biological observations, and associated media;
- Spatial functionality (GIS-enabled database);
- A digital asset management component for high-resolution imagery and video;
- Persistent unique identifiers for datasets and media;
- Metadata alignment with recognised standards (e.g. Darwin Core for biodiversity data; ISO geospatial metadata standards).

14. Data security provisions may include:

- Automated and redundant backups;
- Disaster recovery planning;
- Use of open, non-proprietary archival formats;
- Periodic integrity checks;
- Role-based authentication and access control.

15. Non-replicable primary datasets (e.g. raw imagery, acoustic data, eDNA metadata) should be preserved for the long term.

5. Proposed Decision Text

The Scientific Committee is invited to:

1. **Agree** that the long-term stewardship of scientific datasets generated under SIOFA-related research activities warrants the development of a formal management framework;
2. **Agree** the creation of a dedicated steering committee including the CCPs;
3. **Request** the Secretariat to develop and present, at the next meeting of the Scientific Committee, a Scientific Data Management and Conservation Policy applicable to scientific datasets beyond routine fisheries reporting;
4. **Request** the Secretariat to outline the technical tools currently in use or envisaged, including proposed architecture, governance arrangements, data security measures, and access provisions;

5. **Invite** the Secretariat to consult, as appropriate, with relevant partners and data custodians in the development of this framework;
6. **Request** the Secretariat to report on progress at the next meeting of the Scientific Committee.