



9<sup>th</sup> Annual Meeting of the Scientific Committee (SC9)

Bangkok, Thailand, 18–27 March 2024

SC-09-32-[Rev1](#)

# Deep-sea Fisheries Under an Ecosystem Approach Project (2022–2027)

The Deep-sea Fisheries Project (FAO) and the SIOFA Secretariat

<b>Document type</b>	working paper <input checked="" type="checkbox"/> information paper <input type="checkbox"/>
<b>Distribution</b>	Public <input checked="" type="checkbox"/> Restricted <sup>1</sup> <input type="checkbox"/> Closed session document <sup>2</sup> <input type="checkbox"/>
<b>Abstract</b>	<p>The “Deep-sea Fisheries under the Ecosystem Approach” (DSF) project is one of five projects in the GEF-7 ABNJ Common Oceans Program “Global Sustainable Fisheries Management and Biodiversity Conservation in the Areas Beyond National Jurisdiction (ABNJ)” (GEF, 2022; FAO, 2023a). The objective of the project is to ensure that DSF in the ABNJ are managed under an ecosystem approach that maintains demersal fish stocks at levels capable of maximizing their sustainable yields and minimizing impacts on biodiversity, with a focus on data-limited stocks, deepwater sharks and vulnerable marine ecosystems. The DSF Project is implemented by FAO and executed by the General Fisheries Commission for the Mediterranean (GFCM) and both the Programme and DSF Project are scheduled to run for five years from 2022 to 2027. SIOFA is a DSF project partner, together with six other RFMOs one other industry group (SIODFA), ICES and NOAA.</p> <p>This paper describes the work of the FAO Common Oceans Deep-sea Fisheries project of relevance to the SIOFA Scientific Committee.</p>

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<sup>2</sup> Documents available only to members invited to closed sessions.

## Recommendations

The Deep-sea Fisheries Project (FAO) and the SIOFA Secretariat recommend that the SC:

- **endorses** the proposed work for climate change and **suggests** potential consultant(s) that could take on this work.
- **assesses** interest level among SIOFA CCPs to engage in and **identifies** follow-up actions (as feasible) for participation in:
  - Partnering in stock assessment/rapid change work with DSF Project/ICES.
  - Working with FAO on stock status for SOFIA<sup>1</sup> 2026.
  - Planning of a joint Nansen cruise in the SIOFA Area (if approved by Nansen programme).
  - Identifying opportunities for training/capacity development (e.g. observer training) across SIOFA CCPs.

<sup>1</sup> <https://www.fao.org/3/cc0461en/cc0461en.pdf>

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## 1. Background

The “*Deep-sea Fisheries under the Ecosystem Approach*” (DSF) project is one of five projects in the GEF-7 ABNJ Common Oceans Program “*Global Sustainable Fisheries Management and Biodiversity Conservation in the Areas Beyond National Jurisdiction (ABNJ)*” (GEF, 2022; FAO, 2023a). The objective of the project is to ensure that DSF in the ABNJ are managed under an ecosystem approach that maintains demersal fish stocks at levels capable of maximizing their sustainable yields and minimizing impacts on biodiversity, with a focus on data-limited stocks, deepwater sharks and vulnerable marine ecosystems. The DSF Project is implemented by FAO and executed by the General Fisheries Commission for the Mediterranean (GFCM). The Programme and DSF Project are scheduled to run for five years from 2022 to 2027.

The DSF project focuses on four key areas of work:

- Component 1- Governance – strengthening and implementing regulatory frameworks
- Component 2 – Strengthening effective management of DSF
- Component 3 - Improving understanding and management of cross-sectoral interactions with DSF
- Component 4 – Knowledge management, communication and M&E

The DSF project is being delivered in collaboration with project partners, which include: the General Fisheries Commission for the Mediterranean (GFCM), the Northwest Atlantic Fisheries Organization (NAFO), the North East Atlantic Fisheries Commission (NEAFC), the North Pacific Fisheries Commission (NPFC), the South East Atlantic Fisheries Organisation (SEAFO), the Southern Indian Ocean Fisheries Agreement (SIOFA), the South Pacific Regional Fisheries Management Organisation (SPRFMO), the International Council for the Exploration of the Sea (ICES), the Southern Indian Ocean Deepsea Fishers Association (SIODFA), the International Coalition of Fisheries Associations (ICFA) and the National Oceanic and Atmospheric Administration (NOAA) of the United States of America.

This information note focuses on initiatives of relevance to SIOFA.

## 2. Climate change

The subject of climate change often dominates discussions, yet it is challenging to understand how it can be incorporated into the work of the deep-sea RFMOs. NAFO, NEAFC, NPFC and SPRFMO, have all adopted climate change resolutions and wish to see the effects of climate change incorporated into their regular work (NAFO, 2023; NEAFC, 2023; NPFC, 2023; SPRFMO, 2023). These follow from the UN General Assembly Sustainable Fisheries Resolution A/RES/76/71 that calls upon RFMOs to consider climate change in carrying out their work, and at the 35<sup>th</sup> meeting of FAO’s Committee on Fisheries that encourages FAO to increase the knowledge and awareness of climate change impacts in fisheries and aquaculture (UNGA, 2021; FAO, 2022).

FAO also organised a workshop entitled “*Mainstreaming climate change into international fisheries governance – the case of Regional Fisheries Bodies in the Indo-Pacific region*” conducted from 17 – 20 October 2023 in Chennai, India, and a report from this meeting is submitted as an information paper to the SC9 (SC-09-INFO-17).

To date, the incorporation of climate change effects and ecosystem impacts into the assessment and management of fish stocks is both challenging and limited, even though there is a growing body of scientific knowledge and predictions as to likely effects in the next 10, 20 and 50 years. The reason for this is because these predictive time scales are much longer than the 2–5 year time-scales fisheries work with.

But there are other aspects that RFMOs will need to consider. Climate change predictions include an increase in extreme events in addition to the more gradual longer-term temperature increases.

Further, RFMOs as custodians of the oceans' fish stocks are ideally placed to contribute to a more general understanding of the effects of climate change in the marine environment, since their work includes monitoring fisheries and fish stocks, and various physical, chemical and biological ocean variables.

## 2.1 DSF Project activities for Climate Change

The DSF Project would like to support 3–4 regional studies to review the existing and potential modalities for the incorporation of climate change effects into the work of RFMOs that have a mandate for the management for deep-sea fisheries. This will also contribute to the DSF Project work on climate change within the context of applying an ecosystem approach to fisheries management in the high seas. The following programme of work is proposed for a consultant working with FAO and SIOFA in the Indian Ocean:

- Summarize the literature and data available to address potential climate change impacts on managed stocks, non-target species and associated ecosystem.
- Describe the data available to determine climate change-related distributional shifts of the managed stocks across stock boundaries, including transboundary stocks.
- Review the most recent IPCC ocean climate change predictions for the following 10 years and 50 years, in the Indian Ocean, and using published findings and/or expert judgment, summarize how this may affect the ecosystem and the likely impacts on managed stocks and non-target species.
- Identify any new data requirements needed to detect and monitor climate-related changes in the key ocean variables, including fished stocks, bycatch species, and changes in catch and effort patterns and distributional shifts across stock boundaries. Comment on the existing and potential methods by which such data sets could be collected.
- With the objective of integrating climate change effects into stock assessments and fishery management advice, identify how the long-term unidirectional changes and shorter-term extreme variability in environmental conditions characteristic of climate change could be incorporated into both processes.

The above tasks should include consideration of all catch by commercial fishing vessels, including bycatch (especially deepwater shark species), and the protection of vulnerable marine ecosystems.

## 3. Assessing data-limited stocks and monitoring rapid change

The demersal fisheries in the ABNJ, with a few exceptions, are difficult to assess and monitor. A survey of the 49 high seas demersal finfish and shellfish stocks undertaken during the GEF-5 Deep-sea Project showed for 2014–2016 that 12 (25%) stocks were fished sustainably, 13 (26%) stocks were at an intermediate status, and 3 (6%) stocks were overfished or at very low levels. The status of the remaining 21 (42%) stocks was unknown (FAO, 2020).

ICES (2023) use a stock classification based on the type of information available for assessment which ranges from Category 1 (abundant catch and biological information, full analytical assessments with forecasts), through Category 4 (landings and effort data only), down to Category 6 (bycatch fisheries with negligible landings). Most DSF stocks fall into Categories 4–6.

The lack of information on reliable trends in stock biomass makes the application of adaptive management very difficult, but there is a need to develop mechanisms for precautionary management in the absence of full scientific assessments. It is particularly challenging to assess rapidly changing fisheries. There are three types of fisheries where rapid changes may occur:

- In an existing fishery (potentially as a need to change TACs or to close the fishery),

- In closed fisheries (as a requirement for re-opening the fishery), and
- In new/exploratory fisheries (that lack a catch and effort history).

### 3.1 DSF Project activities on assessing data-limited stocks and monitoring rapid change – Work with the International Council for the Exploration of the Sea (ICES)

The DSF Project would like to partner with ICES to examine data-collection requirements and assessment methods that will determine the status of the selected data-limited stocks and if their populations are “rapidly” increasing or declining.

A two-pronged approach will be taken to improve the assessment of data-limited and rapidly changing stocks, both being coordinated by ICES. The first activity will be to collaboratively identify appropriate assessment methodologies for selected fisheries, and the second will be to review data collection requirements needed to undertake these assessments. This will be compared with the type, quality and quantity of information currently collected.

Activities to be undertaken by ICES in collaboration with DSF Project partners:

- Activity 1: Review and develop assessment methodologies,
- Activity 2: Identify data collection needs to support the various assessment methodologies.

The plan is for assessment biologists from different regions to discuss and share their assessments and data-collection needs with each other to develop improved methods. This will be facilitated by an ICES consultant and in cooperation with various ICES working groups, as required. Note that this activity does not represent a partnership between any of the RFMOs and ICES, nor will ICES be providing any formal published advice. Also, please note that this activity is not intended to be a training course; participants should already be undertaking assessments for their RFMO scientific committee. It may be possible to offer training courses later, if desired.

### 3.2 DSF Project activities – Work with FAO on stock status

FAO monitors and reports on progress to achieve the SDG Target 14.4 “... restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield ...” with the indicator “Proportion of fish stocks within biologically sustainable levels” (UN, 2015). The DSF Project will support FAO in providing a contribution to “The State of World Fisheries and Aquaculture” in 2026 (FAO, 2023). This involves the DSF Project working with RFMOs and associated stock experts to assess the stock status according to the assigned criteria (biomass above or below 0.8B<sub>msy</sub>).

The DSF Project and FAO plan to work with deep-sea RFMOs to record the status of the deep-sea and small pelagic stocks under the management of deep-sea RFMOs for inclusion in SOFIA 2026 along with accompanying text. This will be the first time these stocks have been comprehensively included.

## [4. Identification of deepwater chondrichthyans](#)

[The DSF project has a focus on recording catches of deepwater chondrichthyans \(sharks, skates, chimera\) including those that are discarded. Globally catches of these slow-growing cartilaginous fish are a cause for concern, and SIOFA and SPRFMO are the only RFMOs to have undertaken risk assessments. Almost all RFMOs have measures to report all chondrichthyan catches \(retained and discarded\), but most only report those that are landed commercially. SIOFA has probably the best reporting of discarded chondrichthyan catches of all RFMO, but the identification difficulties make this difficult to do accurately at the genus/species level.](#)

[The following work on deepwater chondrichthyans is planned for August 2024 on the F/V Will Watch and is funded by SIOFA and the FAO DSF Project, and supported by United Frame Investments and SIODFA:](#)

- [Improve current identification key \(Ebert and Mostarda, 2013\) to make it more user friendly and interactive. This work is being undertaken in collaboration with Edoardo Mostarda \(FAO Consultant\).](#)
- [Desktop study and SWOT analysis on current data recording for onboard observers and crew.](#)
- [Record shark catches during the August 2024 cruise to the lowest taxonomic resolution.](#)
- [Document potential new species and describe \(at a later date\).](#)
- [Take photographs of the caught deepwater chondrichthyans to use in the amended identification key.](#)
- [Test the amended key with crew members and modify as required.](#)

[The interactive key, final report and catalogue of photographs should be completed by the end of 2024.](#)

#### 4.5. EAFM symposium

The DSF Project will hold a symposium in 2025 on the “*Application of the Ecosystem Approach to Fisheries Management in ABNJ – recent development in the monitoring, assessment and mitigation of ecosystem impacts of fisheries*”. This will be held jointly with NAFO, and a request is currently being made to ICES for their involvement. Initial ideas for the symposium focused on ecosystem production potential and preventing ecosystem overfishing (Koen-Alonso, 2019). However, when the project approached RFMO Secretariats, it was found that many wished for a more holistic approach covering all the biological aspects of EAF and how it may be initially implemented. The symposium will address the EAF aspects of retained species, discarded species and ecosystem effects. This wider more fundamental approach also fits well with the scope of a recent FAO eLearning package (FAO, 2023b).

The current plan is to hold a three-day symposium with:

- Day 1 – The scientific side of EAFM: Retained species, Discarded species and Ecosystem effects.
- Day 2 – Moving from science advice to management measures: Current scientific advice on EAF, data-collection, and significant adverse impacts.
- Day 3 – EAFM frameworks and guidance to RFMOs: Cross-sectoral considerations, a global EAFM framework, and way forward.

Rome has been suggested as a possible venue for the symposium and it will be in a hybrid format. However, in person participation is encouraged, and will be especially important for Days 2 and 3.

The DSF Project will circulate a call for papers in January 2024 and would welcome participation from SIOFA scientific and management committee members.

In order to guide discussions on Day 3 of the symposium, the DSF Project would like to support the development of a global EAF framework or roadmap for implementation relevant to RFMOs. The DSF project will approach RFMOs with a plan to develop a document for this.

## 5.6. [DSF Guidelines implementation review](#)

The DSF Project initiated a review of the implementation of the FAO DSF Guidelines (FAO, 2009) and held a meeting in London in December 2022 with participants present in the capacity of individual experts. The comments received at the expert workshop were very valuable in improving the draft.

A final draft has been developed and will be published in the *FAO Fisheries and Aquaculture Technical Paper* series in early 2024.

### [5.16.1](#) [Conclusions from implementation review](#)

In general, the review found good uptake in areas relating to VME protection and monitoring, control and enforcement (MCS), but with considerable variation among regions. The uptake with respect to managing retained and discarded catch and bycatch was found to be more challenging, especially regarding information on stock biomass (and status), establishing reference points and long-term management plans. Further details will be provided after the report is published.

### [5.26.2](#) [DSF Project activities](#)

Potential areas that require further work in implementation of the DSF Guidelines that could be supported or promoted by the DSF project are:

- Longer-term management plans and objectives and adoption of target reference points for target species.
- Better monitoring of changes in existing fishing patterns, also important for understanding ecosystem effects as well as potentially new impacts.
- Improved discard reporting including support to observers and vessel crew for achieving this. Potential use of bycatch limits especially for vulnerable species like deepwater sharks.
- Improved and more transparent recording of encounters with VME indicators including means of verification and potentially sub-threshold reporting. This is important to identify new VMEs within existing fishing areas.
- Identifying SAI on VMEs from bottom fishing or other anthropogenic sources, and assessment of ecosystem status for VMEs.

## [6.7.](#) [Joint cruise with R/V Nansen in the SIOFA Area](#)

The DSF Project document provides for the opportunity to work collaboratively with the EAF-Nansen programme supported by FAO, the Norwegian Agency for Development Cooperation (Norad) and the Institute of Marine Research (IMR) of Bergen, Norway (Nansen, 2024). This was reported to SIOFA SC6 and SC8 (SIOFA, 2021, 2023), as follows:

*One aspect that does require more advanced planning is the possible collaboration with the F/V Nansen. We are hoping that the vessel will be able to schedule research activities in the SIOFA region to support the SIOFA Science Committee objectives. This could include activities related to VMEs, deepwater sharks and alfonso assessment. The DSF Project will be happy to assist with coordination between SIOFA and the EAF-Nansen Programme, as and when necessary. A letter of expression of interest and more detailed discussions of the SIOFA programme of work, including identification of research priorities, may also be required. SIOFA feedback*

This is being discussed by the Nansen programme on 19–20 March 2024 and a decision should be made in time to report to this SIOFA SC10 meeting. Informal discussions indicated that the more formal approval processes and planning could only take place after the EAF-Nansen programme has agreed in principle to approve the cruise in the Indian Ocean that is requested for 2025 (or possibly 2026).



## 7.8. Deep-sea Fisheries E-learning Course

The DSF Project has developed an e-learning course on deep-sea fisheries management in the areas beyond national jurisdiction entitled “Strengthening deep-sea fisheries management in the ABNJ”. The course consists of five modules that each take approximately 45 minutes to complete, including:

Lesson 1: Introduction to deep-sea fisheries

Lesson 2: International obligations and responsibilities for the management of deep-sea fisheries

Lesson 3: Regional approach to fisheries management

Lesson 4: National legal and policy considerations

Lesson 5: Monitoring, control and surveillance and enforcement

The e-learning course will be launched in early 2024 and will be available free of charge on the FAO E-learning Academy website (<https://elearning.fao.org/>). The course will have a final certification exam that will allow the learner to earn a course badge proving competency in the subjects covered.

## 8.9. Training/Capacity Development

The 10<sup>th</sup> Meeting of the Parties received comments from the performance review panel which included use of the VME guide by observers (Recommendation 4), capacity building for bottom fisheries impact assessments (Recommendation 6), on the recording and assessments of deepwater sharks (Recommendation 19), and bottom fishing on Saya de Malha Bank (Recommendation 38). The Deep-sea Fisheries Project offered to collaborate with SIOFA to undertake capacity building and observer training activities (Paragraph 25, SIOFA, 2023b) in line with the project’s priorities with a special interest in supporting developing countries and countries with economies in transition.

At a more recent SIOFA workshop “Scientific Committee Workshop on the Harmonisation of Scientific Observers (WS2024-OBS)” (6-7 February 2024), it was highlighted that the recording of catch by FAO 3-alpha codes could be improved to avoid lumping much of the shark catch into a few very high-level codes (basically elasmobranch spp., etc). The DSF Project would like to also work with improving catch recording by observers or vessel personnel at a more appropriate finer taxonomic level.

The DSF Project has funding available to provide training through its partners, including SIOFA, on topics of relevance to the management of DSF, including notably training for observers, and on stock and impact assessments, and possibly others upon request. The DSF Project would like to invite the SIOFA SC to reflect on capacity needs and highlight these to the project for its consideration.

## 9.10. Acknowledgements

The DSF Project thanks SIOFA for their continued partnership with the DSF Project and looks forward to developing joint activities to contribute to strengthened global fisheries management and protection of biodiversity in the ABNJ.

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