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Southern Indian Ocean Fisheries Agreement

Accord relatif aux Pêches dans le Sud de l'Océan Indien

Convener's Report of the Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific Committee (SC) Workshop on the impact of using alternative trace types on the bycatch rate of sharks and target species (WS2025-DWS)

Virtual

6 November 2025

List of Annexes

Agenda item 1 – Opening of the Workshop

a. Welcome from Convener

1. The Workshop was convened by Dr Sebastián Rodríguez Alfaro (European Union).
2. The Convener opened the Workshop and welcomed the participants.

b. Introduction of meeting participants

3. The list of registered participants is included in Annex A.

Agenda item 2 – Administrative arrangements

a. Adoption of the meeting objectives and agenda

4. The meeting objectives (WS2025-DWS-ADM-03) and agenda (WS2025-DWS-ADM-04) were adopted.

b. Appointment of rapporteurs

5. The SIOFA Science Officer, Dr Marco Milardi, served as rapporteur and supported the Convener in preparing the Convener's report.
6. The Convener introduced the meeting and report arrangements.
7. The Convener noted that the draft convener's report would be circulated to the workshop participants by 17 November 2025 and invited them to provide their comments by 6 January 2026. The report, once revised, would be submitted to SC11 by the deadline for the submission of documents, on 21 February 2026.

c. Introduction of the existing documents in support of the specific meeting objectives

8. The Convener advised the Workshop that the meeting documents are available on the dedicated page on the SIOFA website (https://siofa.org/meetings/WS2025-DWS).

Agenda item 3 – Project "Development of protocols and guidelines for fishing gear to mitigate the ongoing impact of SIOFA fisheries on vulnerable deepwater sharks" (DWS-2024-02) on alternative trace types.

a. Presentation of results

9. Ms Vanessa Rojo Mendez (EU) presented the paper "Evaluating shark retention using nylon vs. wire branch lines: a pilot study in a demersal longline fishery" (WS2025-DWS-04). This experimental work was carried out in SIOFA Subareas 1 and 2, using an alternate branch design (wire vs braided nylons) fishing line. The main outcome of the study was that the braided nylon had a slightly (even if not statistically significant) higher retention of sharks compared to wire trace. Braided nylon branches also presented a higher hook loss (double) compared to wire traces snoods. These results might be explained by the properties of the snoods and the shark behaviour, rather than other causes. Further marginal effects analysis suggested that snood type had the greatest effect on the retention of shark catch while depth and soak time did not explain retention differences.
10. This study highlighted the importance of field testing in real conditions and with the actual species encountered during fishing operations, as it can yield results that are potentially counterintuitive based solely on the literature.
11. The Workshop congratulated the authors for the quality of the scientific work of the investigation and the cooperation with other CCPs in designing a robust study. The Workshop thanked the authors for the transparency and the quality of the data

provided. The Workshop also encouraged the authors to publish the results of this work, as it considered the scientific interest of this investigation would be high.

b. Discussion

12. The Workshop discussed the experimental setup of the study, specifically confirming the configuration of branch lines used in routine fishing operations by Spanish vessels in SIOFA. The authors of the study confirmed that the wire branch configuration used in this study was the same as that used in routine fishing operations of the Spanish fleet.
13. The Workshop discussed the thickness of the braided nylon line and its potential effect on retention of hooked sharks. The authors explained that a lower diameter or different breaking strength line would likely result in a lower catch rate and higher hook loss. This could be explored in future experimental trials.
14. The Workshop discussed the industry perspective and noted that the industry uses wires mainly to reduce the hook loss rates and thus have economic incentives to keep the current gear configuration.
15. The Workshop discussed the bycatch rates in this experimental work, but these had not yet been analysed, so no clear conclusions could be made at this time.
16. The Workshop discussed the CPUE calculated in the study, and the authors clarified that CPUE were calculated using total deployed hooks. The effect of lost hooks (around 3% of hooks deployed) is likely to be low but could be accounted for in future analyses.
17. The Workshop discussed the causes of the hook losses and whether there was any indication that hook losses resulted from snagging on the bottom or from shark byte-offs. The authors believed that the most likely cause of hook loss was bottom snagging, but that there was no indication to justify this conclusion.
18. The Workshop discussed the possibility of an effect of branch line colour on shark catches. The authors noted that this was unlikely given the constraints on shark visibility at the depth these hooks are deployed.
19. The Workshop discussed the definition of retained sharks in the study, and whether these only included sharks landed on deck. The authors clarified that 'retained sharks' included all sharks that were detected at the surface when retrieving the gear.
20. The Workshop discussed the use of biological measurements in the General Linear Model analysis, and the potential use of soak time and depth to complete the analysis. The authors noted that soak time and depth were equal for both branch configurations and therefore is unlikely to play a role in explaining the results obtained.
21. The Workshop discussed the effect of hooking location and soak time on the shark retention and survivability as Figure 9 in WS2025-DWS-04 suggested that lower soak times might have lower retention rates. The authors explained that all sharks were hooked by the mouth and that soak times were unlikely to have an effect on the catch and retention rates but might have an effect on survivability. These effects could be investigated in a future trial.
22. The Workshop discussed the effects of branch design on hook loss. The authors clarified that hooks on a nylon branch were more likely to move on the seafloor and snag on the bottom, which might explain the higher hook loss rates.
23. The Workshop discussed set-specific effects, illustrated in Figure 10 in WS2025-DWS-04, where a few sets had a higher hook loss rate than others, and whether these sets coincided with higher catches of sharks. The authors confirmed that this should be explored in a future investigation.

24. The Workshop discussed potential VMEs indicator species that were reported. The authors clarified that there was no differentiation in the VME reporting by trace type, but that could be explored.
25. Australia drew the attention to the big difference between the shark catch and the common mora catch: mora were less than 3% of total catch.
26. Spain noted that shark catches in other fisheries should also be considered in any spatial analysis.

c. Recommendations

27. The Workshop recommended that the authors of the wire trace trial study integrate their report with other investigations and the details discussed during this workshop and submit this to SC11 in 2026.
28. The Workshop noted that the trial showed that banning wire traces would seem to be less effective than expected in mitigating shark catch and retention. The Workshop recommended the SC notes that other forms of mitigation measures should be explored.

Agenda item 4 – Results obtained from the project "Tagging deepwater sharks in the Indian Ocean"

a. Presentation of results

29. Ms Cristina Rodriguez (EU) presented the "Main results of tagging deep-water sharks in the Indian Ocean (SIOFA area)" (WS2025-DWS-05), which reported the results of an EU-funded study conducted in 2022-24 in the Indian Ocean aimed at providing information on at-vessel mortality and post-release survival rates of sharks and improving the knowledge on their spatial and vertical distribution. Deepwater sharks were caught, tagged and released on fishing vessels operating along the Walter shoal, Madagascar Ridge and Broken Ridge. Only sharks in good conditions were selected for tagging to maximize the survival of individuals after tagging. Sharks were tagged both with passive (31 plastic T-bar) and active (35 electronic) tags, with the latter measuring light, depth, etc. over a range of times up to 2 years and programmed to detach at particular conditions (e.g., no movement for weeks). The study also investigated species-specific at-vessel mortality of deepwater sharks, which was in general found to be high. Five species of sharks were tagged which, in most cases showed, high mortality (some due to predation) over a short period of time after release. Of the tagged individuals that survived, some showed some short- to medium-range movement at tag detachment, as well as species-specific and individual-specific-behaviour. The deepwater sharks with highest probability of survival were *Squalus mitsukurii, Dalatias licha and Centrophorus granulosus*. The cost of tags prevents wider deployment so rationalizing deployment was a must.
30. The Workshop expressed its appreciation for the quality of the scientific work presented and encouraged the authors to publishing the results in the scientific literature, as it considered the scientific interest in this investigation would be high.

b. Discussion

31. The Workshop discussed the chances of recapture of plastic tags, even though the number of released tags was low. The authors clarified that the number of tags was

relatively low, and hence tag recaptures were unlikely.

32. The Workshop discussed the effects of soak time and the shark handling on board on the survivability of tagged sharks. The authors noted that sharks were carefully handled on board by the scientific observers to avoid further damage to the sharks before tagging, and also that lower gear soak times could reduce at-vessel and post-release mortality. Further, slower hauling of the gear may also increase shark survival. Although a commercial survey has proven to provide very useful information, it is recommended that a scientific survey be conducted in which all limiting variables can be controlled.

c. Recommendations

33. The Workshop noted that at-vessel mortality and post-capture mortality is high and unlikely to be reduced by gear- or operation-specific modification. The Workshop recommended the SC notes that other forms of mitigation measures should be explored.

Agenda item 5 – Latest developments on identifying ways to improve catch reporting of deepwater sharks and novel data gathering approaches in collaboration with the fishing industry.

34. Mr Paul Clerkin (SIODFA) presented the work on "Future Tools to Improve Shark Identification and Data Collection by Observers at Sea: Digital Smart Keys and AI Models" (WS2025-DWS-02 rev. 1), which described development of an electronic deepwater shark identification key in cooperation with FAO and the DSF project. The tool is intuitive and useful for shark identification and will be developed into an app in the near future. More pictures of sharks would be welcome to contribute to this tool.
35. The Workshop commended the work on the shark identification key and encouraged the further development of the tool for future use in SIOFA.
36. Ms Laís Vieira (EU) presented a paper on "Molecular Identification of Deepwater Sharks from SIOFA Area" (WS2025-DWS-03), which used DNA-barcoding methods (CO1) [1] to identify shark species from 92 deepwater shark samples from the SIOFA Area. From the samples identified as sharks by the genetic analysis, 66% confirmed the morphological identification onboard and 46% confirmed the species level identifications that were made by the observer on board at the genus level. This work showed that deepwater shark species of interest in the SIOFA Area can be identified through COI barcoding using different combinations of COIFish primer pairs.
37. The Workshop appreciated the high quality of the work.
38. The Workshop discussed the use of the CO1 gene used for this identification work, and noted that other work on deepwater shark genetics has found the ND2 gene to be more effective as it shows better alignment with the chondrichthyan Tree of Life sequences. The authors clarified that future work should include the use of other gene sequences for deepwater shark identification.
39. The Workshop discussed the challenges in collecting and sending genetic and biological samples across countries when international shipping is involved, and noted that there would be a need to streamline the process to facilitate the analysis of samples collected during fishing operations or research cruises.
40. The Secretariat flagged that discussions are ongoing to establish an Indian Ocean gene

[1] Mitochondrial cytochrome c oxidase subunit I (CO1), the gene most commonly used in DNA barcoding.

bank, based in Reunion Island, with startup funds provided by the South-West Indian Ocean Project (SWIOP) and jointly between SIOFA and IOTC.

Agenda item 6 – Recommendations for SC11 consideration

41. The Workshop recommended that the authors of the wire traces trial study integrate into their report additional investigations and the details discussed during this Workshop and submit this to SC11 in 2026.
42. The Workshop noted that the trial showed that banning wire traces would seem to be less effective than expected in mitigating shark catch and retention. The Workshop recommended the SC notes that other forms of mitigation measures should be explored.
43. The Workshop noted that post-capture mortality is high and unlikely to be reduced by gear- or operation-specific modification. The Workshop recommended the SC notes that other forms of mitigation measures should be explored.
44. The Workshop recommended that spatial analysis of deepwater shark catches could be carried out and presented to SC11, to inform potential area-based mitigation measures.
45. The Workshop recommended that the SC agenda contains a specific agenda item on shark mitigation measures during SC11 in 2026 and the Workshop encouraged the submission of papers related to shark captures and mitigation measures.

Agenda item 9 – Meeting Close

46. The Convener thanked the participants for their active contributions.
47. The meeting was closed at 08:55 a.m., UTC, 6 November 2025.

Annex A – List of registered participants

Delegation	Title	First name	Last name	Position	Organisation
Australia	Mr	Trent	Timmiss	HoD	DAFF
Australia	Mr	Patrick	Sachs	Alternate	DAFF
Australia	Mr	Adam	Camilleri	Alternate	DAFF
Australia	Dr	Lynda	Goldsworthy	Advisor	University of Tasmania
Cook Islands	Dr	Stephen	Brouwer	HoD	Ministry of Marine Resources Cook Islands
Cook Islands	Mr	Lualua	Tua-Trood	Alternate	Ministry of Marine Resources
Cook Islands	Ms	Tiare-Renee	Nicholas	Alternate	Ministry of Marine Resources
European Union	Ms	Laura	Marot	HoD MoP	EU
European Union	Ms	Olivia	Van Havre	Alternate	EU
European Union	Mr	Roberto	Sarralde Vizuete	Alternate	IEO
European Union	Ms	Vanessa	Rojo Méndez	Advisor	IEO
European Union	Ms	Laís	Vieira	Adviser	IEO-CSIC
European Union	Ms	Cristina	Rodriguez	Adviser	IEO-CSIC
France OT	Dr	Alexis	Martin	Head of Delegation	MNHN
France OT	Ms	Charlotte	Chazeau	Alternate	MNHN
France OT	Mr	Nicolas	Gasco	Expert	MNHN
Japan	Dr	Takehiro	Okuda	Head of Delegation Scientific Committee	Fisheries Resources Institute, Japan Fisheries Research and Education Agency
Japan	Dr	Midori	Hashimoto	SC Alternate	Fisheries Resources Institute, Japan Fisheries Research and Education Agency
Japan	Mr	Taisuke	Iwano	Alternate	Fisheries Agency Government of Japan
Japan	Mr	Kazuki	Tsuda	Advisor	Fisheries Agency Government of Japan
Japan	Mr	Hyoue	Suzuki	advisor	Fisheries Agency Government of Japan
Japan	Mr	Koji	Batori	advisor	Fisheries Agency Government of Japan
Mauritius	Dr	Luvna	Caussy	Scientific Officer	Ministry of Agro-industry, Food-security, Blue Economy & Fisheries
Mauritius	Mr	Kawol	Doorvanand	Senior	Ministry of Agro-industry,

Delegation	Title	First name	Last name	Position	Organisation
				Technical Officer	Food-security, Blue Economy & Fisheries
Seychelles	Ms	Sabrena	Lawrence	HOD	Seychelles Fisheries Authority
Seychelles	Ms	Dainise	Quatre	Observer	Seychelles Fisheries Authority
Thailand	Ms	Supranee	Chatthong	Alternate	Department of Fisheries
Thailand	Ms	Jidapa	Setthatham	Alternate	Department of Fisheries
Observers - DSCC	Mr	Barry	Weeber	HOD	DSCC
Observers - DSCC	Dr	Lydia	Koehler	Alternate	DSCC
Observers - FAO	Dr	Anthony	Thompson	Observer	Deep-sea Fisheries project, FAO
Observers - FAO	Dr	Keith	Reid	HoD	FAO Deep Sea Fisheries Project
Observers - SIODFA	Dr	Ross	Shotton	Exec. Sec	SIODFA
Observers - SIODFA	Mr	Paul	Clerkin	PhD student	VIMS
Convener	Dr	Sebastián	Rodríguez Alfaro	HoD	Marine Sciences/EU
SIOFA SC Chair	Mr	Alistair	Dunn	SC Chair	Ocean Environmental
SIOFA SC Vice Chair	Ms	Charlotte	Chazeau	SC Alternate	MNHN
SIOFA SC Vice Chair	Dr	Zhou	Fang	Alternate	Shanghai Ocean University
SIOFA Secretariat	Mr	Thierry	Clot	Executive Secretary	SIOFA Secretariat
SIOFA Secretariat	Mr	Pierre	Peries	Data Officer	SIOFA Secretariat
SIOFA Secretariat	Mr	Johnny	Louys	Compliance Officer	SIOFA Secretariat
SIOFA Secretariat	Dr	Marco	Milardi	Science Officer	SIOFA Secretariat