

# Report of the 22<sup>nd</sup> Session of the IOTC Working Party on Ecosystems and Bycatch – Data Preparatory meeting

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Online via Zoom, 15 – 16 April 2026

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## ACRONYMS

ABNJ	Areas Beyond National Jurisdiction
ACAP	Agreement on the Conservation of Albatrosses and Petrels
BPUE	Bycatch Per Unit of Effort
BSH	Blue shark
CITES	Convention on International Trade in Endangered Species
CKMR	Close-Kin-Mark-Recapture
CMM	Conservation and Management Measure (of the IOTC; Resolutions and Recommendations)
CMS	Convention on Conservation of Migratory Species of Wild Animals
CPCs	Contracting Parties and Cooperating Non-Contracting Parties
CPUE	Catch Per Unit of Effort
EEZ	Exclusive Economic Zone
EMS	Electronic Monitoring System
ERA	Ecological Risk Assessment
ETP	Endangered, Threatened and Protected Species
EU	European Union
EU-DCF	European Union Data Collection Framework
F	Fishing mortality; $F_{2015}$ is the fishing mortality estimated in the year 2015
FAD	Fish Aggregation Device
FAO	Food and Agriculture Organization of the United Nations
$F_{current}$	Current period/time, i.e. $F_{current}$ means fishing mortality for the current assessment year
FOB	Floating Object
$F_{MSY}$	Fishing mortality at MSY
GAM	Generalised Additive Model
GLM	Generalised linear model
HBF	Hooks Between Floats
IO	Indian Ocean
IOTC	Indian Ocean Tuna Commission
IOSEA	Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia
IO-ShYP	Indian Ocean Shark multi-Year Plan
IPOA	International Plan of Action
IUU	Illegal, Unreported and Unregulated fishing
IWC	International Whaling Commission
LL	Longline
LSTLV	Large-scale tuna longline vessel
MoU	Memorandum of Understanding
MPF	Meeting Participation Fund
MSY	Maximum sustainable yield
N/A	Not applicable
NDF	Non Detriment Finding
NGO	Non-Governmental Organisation
NOAA	National Oceanic and Atmospheric Administration
NPOA	National Plan of Action
PCA	Principal Components Analysis
PSA	Productivity Susceptibility Analysis
RPOA	Regional Plan of Action
ROS	Regional Observer Scheme
SC	Scientific Committee of the IOTC
SB	Spawning Biomass (sometimes expressed as SSB)
$SB_{MSY}$	Spawning Stock Biomass which produces MSY
SMA	Shortfin mako shark
SWO	Swordfish
Taiwan,China	Taiwan, Province of China
UN	United Nations
WPDCS	Working Party on Data Collection and Statistics, of the IOTC
WPEB	Working Party on Ecosystems and Bycatch, of the IOTC
WWF	World Wildlife Fund

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## KEY DEFINITIONS

Bycatch	All species, other than the 16 species listed in Annex B of the IOTC Agreement, caught or interacted with by fisheries for tuna and tuna-like species in the IOTC area of competence.
Discards	Any species, whether an IOTC species or bycatch species, which is not retained onboard for sale or consumption.
Large-scale driftnets	Gillnets or other nets or a combination of nets that are more than 2.5 kilometres in length whose purpose is to enmesh, entrap, or entangle fish by drifting on the surface of, or in, the water column.

## STANDARDISATION OF IOTC WORKING PARTY AND SCIENTIFIC COMMITTEE REPORT TERMINOLOGY

SC16.07 (para. 23) The SC **ADOPTED** the reporting terminology contained in Appendix IV and **RECOMMENDED** that the Commission considers adopting the standardised IOTC Report terminology, to further improve the clarity of information sharing from, and among its subsidiary bodies.

### HOW TO INTERPRET TERMINOLOGY CONTAINED IN THIS REPORT

**Level 1: *From a subsidiary body of the Commission to the next level in the structure of the Commission:***

**RECOMMENDED, RECOMMENDATION:** Any conclusion or request for an action to be undertaken, from a subsidiary body of the Commission (Committee or Working Party), which is to be formally provided to the next level in the structure of the Commission for its consideration/endorsement (e.g. from a Working Party to the Scientific Committee; from a Committee to the Commission). The intention is that the higher body will consider the recommended action for endorsement under its own mandate, if the subsidiary body does not already have the required mandate. Ideally this should be task specific and contain a timeframe for completion.

**Level 2: *From a subsidiary body of the Commission to a CPC, the IOTC Secretariat, or other body (not the Commission) to carry out a specified task:***

**REQUESTED:** This term should only be used by a subsidiary body of the Commission if it does not wish to have the request formally adopted/endorsed by the next level in the structure of the Commission. For example, if a Committee wishes to seek additional input from a CPC on a particular topic but does not wish to formalise the request beyond the mandate of the Committee, it may request that a set action be undertaken. Ideally this should be task specific and contain a timeframe for the completion.

**Level 3: *General terms to be used for consistency:***

**AGREED:** Any point of discussion from a meeting which the IOTC body considers to be an agreed course of action covered by its mandate, which has not already been dealt with under Level 1 or level 2 above; a general point of agreement among delegations/participants of a meeting which does not need to be considered/adopted by the next level in the Commission's structure.

**NOTED/NOTING:** Any point of discussion from a meeting which the IOTC body considers to be important enough to record in a meeting report for future reference.

**Any other term:** Any other term may be used in addition to the Level 3 terms to highlight to the reader of an IOTC report, the importance of the relevant paragraph. However, other terms used are considered for explanatory/informational purposes only and shall have no higher rating within the reporting terminology hierarchy than Level 3, described above (e.g. **CONSIDERED; URGED; ACKNOWLEDGED**).

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### Executive summary

The 22<sup>nd</sup> Session of the Indian Ocean Tuna Commission's (IOTC) Working Party on Ecosystems and Bycatch - WPEB Data Preparatory meeting was held online via Zoom from 15-17 April 2026. A total of 48 participants (42 in 2025, 55 in 2024, 100 in 2023, 103 in 2022, and 93 in 2021) attended the Session. The list of participants is provided in [Appendix I](#). The meeting was opened by the Chairperson, Dr Charlene da Silva from South Africa, who welcomed participants and formally opened the meeting.

WPEB22(DP).01 (Para. 35) The WPEB **NOTED** that CITES listings for some vulnerable shark species pose challenges for sampling and the transport of samples to where they will be analysed. The WPEB **NOTED** that, in coastal waters, CPCs may be able to negotiate directly with their CITES Management Authorities regarding sampling requirements, whereas this is more difficult on the high seas. The WPEB **NOTED** the suggestion that engagement with CITES should occur at the RFMO level, which could coordinate negotiations to obtain sampling permits but further **NOTED** that previous efforts to streamline permitting processes at the RFMO level were not successful. The WPEB also **NOTED** that CITES has been developing mechanisms to collaborate with countries and to support this type of research and **ENCOURAGED** WPEB scientists to get in touch with the CITES Secretariat to try to overcome some of these challenges. The WPEB further **RECOMMENDED** that the SC **ENCOURAGE** the Commission to consider engaging directly with the CITES Secretariat to explore options for addressing these challenges at a broader institutional level.

WPEB22(DP).02 (para. 36) The WPEB **NOTED** that for endangered shark species, close-kin mark-recapture (CKMR) may be one of the few viable approaches to obtain reasonably accurate population size estimates. The WPEB **NOTED** its overall support for the CKMR approach, which has been shown to work well for pelagic sharks, particularly in cases where traditional assessment methods are likely to fail due to insufficient data. The WPEB **RECOMMENDED** that the Scientific Committee give serious consideration to applying CKMR approaches to shark species, and emphasized the importance of initiating sampling sooner rather than later.

## 1 Opening of the meeting

1. The 22nd Session of the Indian Ocean Tuna Commission’s (IOTC) Working Party on Ecosystems and Bycatch - WPEB Data Preparatory meeting was held online via Zoom from 15-17 April 2026. A total of 48 participants (42 in 2025, 55 in 2024, 100 in 2023, 103 in 2022, and 93 in 2021) attended the Session. The list of participants is provided in [Appendix I](#). The meeting was opened by the Chairperson, Dr Charlene da Silva from South Africa, who welcomed participants and formally opened the meeting.

## 2 Adoption of the Agenda and arrangements for the Session

2. The WPEB **ADOPTED** the Agenda provided in [Appendix II](#). The documents presented to the WPEB are listed in [Appendix III](#).

## 3 Review of data available at the Secretariat for bycatch species

### 3.1 Review of the statistical data available for bycatch species

3. The WPEB **NOTED** paper IOTC-2026-WPEB22(DP)-03 which provided an overview of the data available at the IOTC Secretariat for sharks for the period 1950–2024, with focus on silky shark (*Carcharhinus falciformis*), oceanic whitetip shark (*Carcharhinus longimanus*) and scalloped hammerhead shark (*Sphyrna lewini*), the species under review this year.
4. The WPEB **NOTED** that sharks are mostly reported as aggregated species which represents around 50% of the total retained shark catches. Silky shark represents 7 % of the total shark catches while oceanic whitetip shark and scalloped hammerhead shark account for less than 1% of the total shark catches.
5. The WPEB **NOTED** that coastal line and gillnet fisheries are primarily responsible for the reported retained catches of the three species under review.
6. The WPEB **NOTED** that most of the hammerhead sharks were reported as aggregated species, accounting for 84% of the total catch series of hammerheads. Catches at species level have been reported since 1986, with smooth hammerhead and scalloped hammerhead sharks dominating and making a similar contribution to the total over the entire period, although there has been high variability between years.
7. The WPEB **NOTED** that was a significant increase in the catches reported in recent years for the three species of interest for this year. The WPEB further **NOTED** that in the case of silky shark and oceanic whitetip shark, these changes are thought to be driven by modifications in the data collection and data reporting, particularly from Indonesian fisheries.
8. The WPEB **NOTED** that some CPCs with historical reporting of largely aggregated shark catch data, have recently improved their monitoring programmes by collaborating with NGOs suggesting that, particularly in the case of hammerhead sharks, the increase in catch observed could be due to improved collection and reporting at species level rather than an actual increase in catches.
9. The WPEB **NOTED** that silky shark is the dominant shark species recorded by observers (98%) in association with purse seine fisheries activities, and 96% of the recorded silky sharks are discarded.
10. The WPEB **NOTED** that onboard observers recorded oceanic whitetip shark in purse seine fisheries over time at a level that represented only 1.5 % of the observed shark interactions with purse seine fisheries and 90 % of these interactions were reported as discards. The WPEB also **NOTED** that interactions with scalloped hammerheads in purse seine fisheries are negligible.
11. The WPEB **NOTED** that in observers' data from longline fisheries, silky sharks are the most recorded species, followed by oceanic whitetip sharks. These two species are both widespread in the western Indian Ocean while hammerhead sharks' records are more concentrated in coastal areas.

12. The WPEB **NOTED** that the size distribution of the catch of silky shark differs substantially across fisheries with deep-freezing longline and purse seine fishing on free-swimming schools reporting larger individuals, although many sharks recorded were below the length at maturity previously reported by studies in the Indian Ocean.
13. The WPEB **NOTED** that the size data available for oceanic whitetip sharks coming from the longline industrial fishery differed depending on whether it came from observer data or logbooks.
14. The WPEB **NOTED** that with very limited coverage and a concentration of samples from coastal and artisanal gears (gillnets), the size distribution of scalloped hammerhead shark and smooth hammerhead sharks are strongly dominated by small sizes as previously documented.

## 4 Review information on biology, ecology, fisheries and environmental data relating to sharks

### 4.1 Review new information available on the biology, stock structure, their fisheries and associated environmental data for sharks

15. The WPEB **NOTED** paper IOTC-2026-WPEB22(DP)-06 on Preliminary study of standardised catch per unit efforts (CPUE) of blue shark (*Prionace glauca*) in the Eastern Indian Ocean, including the following abstract provided by the authors:

*“Catch per unit effort (CPUE) standardization is important for accurate stock assessments of highly migratory species like blue shark (Prionace glauca), particularly in the longline fishery. Moreover, biases from spatiotemporal heterogeneity, seasonal variations, and gear configurations can mislead abundance trends. This study standardizes CPUE data from 2005 to 2025 using a generalized linear model (GLM) with negative binomial distribution including categorical covariates: year (20 levels), quarter (4 levels), area (tropical vs. temperate), number of hooks between floats (NHBF: shallow, intermediate, deep), and length of float lines (LFL: short vs. long), offset by log(effort). The GLM analysis showed significant temporal increases in standardized CPUE relative to the 2005 baseline (lowest at 1 catch/1,000 hooks), highest in 2023 (9 catches/1,000 hooks), with mixed differences during years. There was no seasonal effect on blue shark catch ( $p>0.05$ ), while tropical areas exhibited lower CPUE ( $p<0.05$ ) than temperate zones. Intermediate NHBF maximized selectivity ( $p<0.05$ ), and longer LFL enhanced efficiency ( $p<0.05$ ). Nominal and standardized series closely mirrored each other and reached the peak in 2023. These findings indicate blue shark stock resilience and GLM analysis usefulness in generating indices for stock assessments.”*

16. The WPEB **NOTED** that the nominal and standardized indices are almost identical, indicating that standardization has had little to no effect on catch rates.
17. The WPEB **NOTED** that there has been a recent change in the observer program, with management of the program being transferred to the Ministry of Fisheries.
18. The WPEB **ENCOURAGED** the continuation of this work as it will be useful for inclusion as an index for blue shark stock assessments in the future.
19. The WPEB **NOTED** paper IOTC-2026-WPEB22(DP)-07 on Estimation of the Indonesian shark production, including the following abstract provided by the authors:

*“This study examines the historical production trends of several shark species in Indonesia from 1950 to 2023. These species are blue shark (Prionace glauca), silky shark (Carcharhinus falciformis), oceanic whitetip shark (Carcharhinus longimanus), porbeagle (Lamna nasus), shortfin mako (Isurus oxyrinchus), and scalloped hammerhead (Sphyrna lewini). The data from 1950 to 2009 was the estimation of existing data from 2010-2023. The results indicate distinct temporal patterns among species, with some showing clear increases followed by recent declines. Blue shark production increased from 1990 to 2006 and continued to fluctuate before reaching a peak of approximately 1,800 tons in 2018, after which catches declined to around 800 tons in 2023. Silky shark production reached its highest level in 2006 at nearly 600 tons, followed by a gradual decline to about 100 tons*

*by 2023. Oceanic whitetip shark production remained low, with catches below 100 tons in most years, except for a spike of approximately 1,300 tons recorded in 2011. Other species exhibited relatively low or sporadic production. Porbeagle sharks were absent from the records, with only a single catch event of approximately 4.5 tons in 2018. Shortfin mako production increased to a peak of more than 300 tons in 2016 before declining sharply to around 20 tons in 2023. Similarly, scalloped hammerhead production reached a maximum of about 85 tons in 2016 but decreased substantially afterward, with almost no reported catches in 2023.”*

20. The WPEB **NOTED** that this estimation method was also presented to the WPDCS meeting in 2025, and there have been no updates since then.
21. The WPEB **NOTED** that the method utilizes two data sources: observer data from the longline fishery, and landing data from fishing ports (PIPP) for other fisheries. PIPP reports are collected from multiple fishing ports, but the number of ports reporting has been declining over time.
22. The WPEB **NOTED** that the recent sudden increase in OCS catches in 2011 is mostly attributed to purse seine (PS) fisheries. Since observer coverage for this fishery only began in 2025, there are no other independent data sources available to verify the increase. The drivers underlying this increase remain uncertain and are the subject of ongoing investigation.
23. The WPEB **NOTED** that shark catches are mostly taken outside Indonesia’s territorial waters (EEZ) in the eastern Indian Ocean.
24. The WPEB **NOTED** paper IOTC-2026-WPEB22(DP)-INF01 on Update of wire-leader used on longline fishery in Indonesia.
25. The WPEB **NOTED** that information was collected from observers onboard 15 vessels in the month of October in 2025. The WPEB **NOTED** that four of these vessels were reported as using wire leaders during this time.
26. The WPEB **NOTED** that it is unclear whether all branch lines, or only some, are equipped with wire leaders on the four vessels which were reported as using wire leaders, as this information is not currently available. The WPEB **ENCOURAGED** Indonesia to collect more detailed information on gear configuration onboard these vessels to present in the future.
27. The WPEB **NOTED** that these longline sets are targeting tuna but sharks are taken as bycatch. The WPEB **NOTED** that while the longline sets are reported as targeting tuna, sharks are also intentionally retained as part of the catch. The WPEB further **NOTED** that the use of wire leaders on these vessels is specifically intended to increase shark catches. The WPEB further **NOTED** that wire leaders reduce the likelihood of sharks biting through the gear, thereby increasing hook retention and overall shark retention to the point of haulback.
28. The WPEB **NOTED** that information on bite-off rates is being collected and will be presented at the next WPEB meeting.
29. The WPEB **NOTED** that these longline vessels range from 40 to 80 t in gross tonnage.
30. The WPEB **NOTED** paper IOTC-2026-WPEB22(DP)-INF02 on Considerations on tissue sampling for future close kin mark recapture studies in Indian Ocean sharks, including the following abstract provided by the authors:

*“Most assessments of shark species conducted within RFMOs globally are notoriously uncertain. Catch data are typically unreliable and the species are generally not the subject of major sampling programs reserved for high-value target species. To address this major uncertainty, we discuss the potential for close-kin mark recapture (CKMR) to be applied to shark species of concern in the IOTC area and how sampling programs, if carried out at the appropriate scale, could support robust estimation of the spawning stock abundance of sharks. A brief conceptual overview of CKMR is provided, and a summary of a recent design study on scalloped hammerheads in*

*the Australian-Southeast Asian region is provided. This information paper argues that sampling programs and associated logistics required to underpin CKMR estimates of sharks should be initiated. This will require coordination between contracting parties and cooperation on international requirements for sample transportation such as CITES. Sampling is recommended to start as soon as possible, along with coordination of an Indian Ocean tissue bank, for both target and bycatch species of interest.”*

31. The WPEB **NOTED** that the paper included a feasibility study on scalloped hammerhead sharks in the Australia and southeast Asia region (ASIAN region) to evaluate the sample sizes required for a close-kin mark–recapture (CKMR) program. The study follows a similar approach to the CKMR design study for the Indian Ocean shortfin mako shark conducted by CSIRO and presented to the WPEB in 2025.
32. The WPEB **NOTED** that the study used an individual-based population model (fishSim – an R package developed at CSIRO) to simulate populations with demographics like scalloped hammerhead sharks. The model incorporated uncertainty in spatial structure through alternative scenarios of stock connectivity for scalloped hammerhead shark.
33. The WPEB **NOTED** that key uncertainties, including stock structure and connectivity, life-history parameters, and the catch history, are likely to have a large impact on estimates of target sample size and on the precision of the CKMR study.
34. The WPEB **NOTED** that, while some understanding of population structure and biology is helpful to inform sampling design for such studies and **ACKNOWLEDGING** the challenges posed by uncertainty in stock structure and the need for robust stock assessments to provide abundance information, it is more important to plan and begin sampling as soon as possible. Samples can be archived and subsequently used to improve biological information. Sampling in the fishery can also provide information on kinship “hit rates” (number of kin per number of individuals compared), which can help inform population size and stock structure. The WPEB further **NOTED** that CKMR can be particularly useful for identifying spatial structure/degree of connectivity, compared to some standard genetic population studies. Sampling can also help resolve connectivity at the ocean-basin scale, an issue relevant to all stock assessments, reinforcing the need to begin sample collection as early as possible.
35. The WPEB **NOTED** that CITES listings for some vulnerable shark species pose challenges for sampling and the transport of samples to where they will be analysed. The WPEB **NOTED** that, in coastal waters, CPCs may be able to negotiate directly with their CITES Management Authorities regarding sampling requirements, whereas this is more difficult on the high seas. The WPEB **NOTED** the suggestion that engagement with CITES should occur at the RFMO level, which could coordinate negotiations to obtain sampling permits but further **NOTED** that previous efforts to streamline permitting processes at the RFMO level were not successful. The WPEB also **NOTED** that CITES has been developing mechanisms to collaborate with countries and to support this type of research and **ENCOURAGED** WPEB scientists to get in touch with the CITES Secretariat to try to overcome some of these challenges. The WPEB further **RECOMMENDED** that the SC **ENCOURAGE** the Commission to consider engaging directly with the CITES Secretariat to explore options for addressing these challenges at a broader institutional level.
36. The WPEB **NOTED** that for endangered shark species, CKMR may be one of the few viable approaches to obtain reasonably accurate population size estimates. The WPEB **NOTED** its overall support for the CKMR approach, which has been shown to work well for pelagic sharks, particularly in cases where traditional assessment methods are likely to fail due to insufficient data. The WPEB **RECOMMENDED** that the Scientific Committee give serious consideration to applying CKMR approaches to shark species, and emphasized the importance of initiating sampling sooner rather than later.
37. The WPEB **NOTED** that two EU-funded projects, implemented by the IOTC Secretariat, will be starting in 2026. One is a pilot project to develop a sampling network and collaboration with CPCs, including the development of

standardized sampling protocols for IOTC species. The second project aims to build capacity for sample storage and management, similar to the WCPFC tissue bank program. The collected samples would support future studies, including epigenetic ageing and CKMR. The overall aim is to establish a regional sampling program that can be sustained over time. The WPEB **REQUESTED** that pelagic sharks be explicitly included in the proposed sampling programme from its inception.

38. The WPEB **NOTED** that previous work by organisations such as CSIRO and IRD has highlighted gaps in sampling coverage across parts of the Indian Ocean. The WPEB further **NOTED** that observer programmes, including those coordinated by AZTI, may provide opportunities to expand sample collection, particularly in longline fisheries. However, constraints remain for shark species that are subject to retention bans, requiring at-sea sampling when individuals are dead.

## 5 Review of new information on indicators for oceanic whitetip, scalloped hammerhead and silky shark

### 5.1 Review of indicators

39. The WPEB **NOTED** paper IOTC-2026-WPEB22(DP)-04 on Sharks and rays basic indicators from the French purse seine and longline fisheries in the western Indian Ocean, including the following abstract provided by the author:

*“Sharks and rays, including several endangered species, are common bycatch in most IOTC fisheries but remain largely data-poor. Available information on these taxa is generally derived from onboard observer programs. French observer programs for purse seine and longline fisheries were initiated in 2005 and 2007, respectively, with coverage steadily increasing to the present. Here, we provide an overview of the available data and present basic abundance indicators for sharks and rays caught by French purse seine and longline fleets operating in the western Indian Ocean. For purse seine fisheries, indicators include the number of individuals per set and the proportion of sets with zero catch. For longline fisheries, indicators are expressed as the number of individuals per 1,000 hooks and the proportion of sets with zero catch. A total of 26 and 34 elasmobranch species have been recorded as bycatch in French purse seine and longline fisheries, respectively. In purse seine fisheries, the most frequently encountered species are silky shark (*Carcharhinus falciformis*; FAL), oceanic whitetip shark (*Carcharhinus longimanus*; OCS), pelagic stingray (*Pteroplatytrygon violacea*; PLS), and devil rays (*Mobula mobular*; RMM). In longline fisheries targeting swordfish, the most common elasmobranchs are blue shark (*Prionace glauca*; BSH), pelagic stingray (PLS), silky shark (FAL), and oceanic whitetip shark (OCS), while other species occur at much lower frequencies. To date, standardized catch-per-unit-effort (CPUE) indices have only been developed for blue shark (BSH) and oceanic whitetip shark (OCS) using French longline observer data, and silky shark (FAL) using purse seine observer data.”*

40. The WPEB **NOTED** that:

- Blue shark showed low zero-catch rates (3–26%) and a decreasing trend in both nominal and standardised CPUE;
- Pelagic stingray in purse seine fisheries showed a decreasing CPUE trend (zero-catch range 20–43%);
- Silky shark in purse seine fisheries showed high zero-catch rates (56–96%) and increasing nominal CPUE, potentially influenced by spatial fishing patterns;
- Many species were rarely encountered and so were unsuitable for CPUE standardisation.

41. The WPEB **NOTED** that only a limited number of species are currently suitable for CPUE standardisation, including blue shark and oceanic whitetip shark (longline), and silky shark (purse seine), with some additional potential for cross-gear comparisons.

42. The WPEB **NOTED** the high quality of the dataset presented, particularly for bycatch monitoring.

43. The WPEB **DISCUSSED** the interpretation of CPUE-based indicators. The WPEB **NOTED** concerns regarding the use of CPUE as an index of abundance, particularly in purse seine fisheries where aggregation behaviour around FADs may lead to hyperstability. The WPEB **NOTED** that increased shark abundance around FADs may not necessarily reflect population-level abundance.
44. The WPEB **NOTED** that trends in CPUE may be influenced by fishing practices (e.g. fishing mode, spatial distribution, and quota constraints) rather than underlying population changes. The WPEB **DISCUSSED** the importance of separating CPUE analyses by fishing mode (FAD vs free-school sets) and considering interactions between target catch (e.g. tuna) and bycatch.
45. The WPEB **NOTED** uncertainty regarding recent declines in CPUE for silky shark and recommended further investigation into potential drivers, including spatial shifts in fishing effort (e.g. Mozambique Channel) and changes in fishing practices. The WPEB **NOTED** that spatial shifts of the longline industry to the Mozambique Channel have been accompanied by higher catches of certain shark species.
46. The WPEB **NOTED** that the dataset presented represents a limited geographic extent and may not be fully representative at the basin scale, particularly with regards to the longline fisheries.
47. The WPEB **DISCUSSED** the influence of environmental variability, including eddy activity and regional productivity (e.g. Mozambique Channel and Somali upwelling), on species distribution and CPUE trends.
48. The WPEB **AGREED** that key uncertainties remain regarding bycatch estimation, abundance indicators, and the effects of fishing mode, spatial effort, and environmental drivers, and **ENCOURAGED** further analytical work to address these issues, including improved modelling approaches and cross-validation of different indices.

## 5.2 *How these indicators can be used*

49. The WPEB **NOTED** paper IOTC-2026-WPEB22(DP)-08 on Quantitative risk assessment methods with potential application to shark bycatch in the Indian Ocean.
50. The WPEB **NOTED** several methodological approaches, including:
- Productivity Susceptibility Analysis (PSA), which provides qualitative risk scores;
  - SEFRA (scale-based approaches using mortality thresholds);
  - SAFE (rate-based approach using exploitation rate relative to a threshold).
51. The WPEB **NOTED** that the SAFE framework estimates exploitation rate as the ratio of total mortality to total population size, incorporating spatial variation in catchability and species density.
52. The WPEB **DISCUSSED** the applicability and assumptions of different assessment approaches. The WPEB **NOTED** that methods such as SAFE provide a potentially useful framework for estimating exploitation rates using catch-effort data, but rely on strong assumptions regarding catchability, spatial limits, and environmental drivers.
53. The WPEB **NOTED** that structural assumptions and priors (e.g. catchability coefficients) can strongly influence results, necessitating sensitivity analyses.
54. The WPEB **DISCUSSED** challenges associated with:
- Data quality (observer vs logbook data);
  - Species lumping;
  - Reporting rates and potential biases;
  - The assumption of linear relationships between catch and effort;
  - The ability of environmental variables to accurately predict species distributions.

55. The WPEB **NOTED** that species misidentification and aggregated data may affect model performance, and that species-specific approaches are preferable where possible, although aggregated approaches may be considered in some cases.
56. The WPEB **NOTED** concerns that some approaches rely on combining qualitative metrics into quantitative outputs, which may limit their ability to provide robust estimates of exploitation rates, and may be more appropriate for relative ranking of species vulnerability.
57. The WPEB **DISCUSSED** the transferability of catchability between fleets and the implications for multi-fleet fisheries such as those in the Indian Ocean.
58. The WPEB **NOTED** that while environmental modelling approaches show promise, their reliability depends on the strength of relationships between environmental variables and species density.
59. The WPEB **NOTED** examples of model application, including basking shark and blue shark case studies. The WPEB **NOTED** that environmental covariates (e.g. SST gradients) can provide reasonable predictions of species density and CPUE in some cases.
60. The WPEB **DISCUSSED** strengths, weaknesses, and future applications of these approaches. The WPEB **NOTED** that strengths include the ability to estimate exploitation rates using relatively limited data and to incorporate spatial, temporal, and fishery-specific variation. The WPEB **NOTED** weaknesses related to sensitivity to assumptions, particularly regarding spatial limits, catchability, and unobserved (cryptic) portions of the population.
61. The WPEB **NOTED** that these methods are still under development and would benefit from further application across species and regions to better understand their properties.
62. The WPEB **NOTED** paper IOTC-2026-WPEB22(DP)-09 on Initial Feasibility Matrix of Data-Limited Assessment Approaches for Key Shark Species in the IOTC Region: A Starting Point for Discussion at the Data Preparatory Meeting, including the following abstract provided by the author:

*“This document provides a brief review of quantitative ecological risk assessment methods with potential application to shark bycatch in fisheries managed by the Indian Ocean Tuna Commission (IOTC), focusing on the inputs required by different assessment approaches and the data currently available within the IOTC context. Methods considered include Productivity–Susceptibility Analysis (PSA), SAFE, EASI-Fish, SEFRA, and other spatially explicit, rate-based frameworks. Rather than a comprehensive comparison of methods, the document outlines key data requirements related to fishing effort, species distributions, catchability, post-discard survival, and productivity reference points, and evaluates their implications for feasibility. A phased action plan is proposed to audit IOTC-held data, assess species- and method-specific readiness, and pilot quantitative assessments with active engagement of Contracting Parties. The proposed approach is intended as a quantitative escalation tier that complements existing ERA and PSA processes, while acknowledging limitations arising from data coverage, uncertainty, and parameter identifiability.”*

63. The WPEB **NOTED** that additional work is required to:
- Evaluate feasibility across species (e.g. oceanic whitetip shark, silky shark);
  - Incorporate discard and post-release mortality data;
  - Assess data requirements (e.g. life history and size composition data);
  - Compare and prioritise methods based on available data and timelines for implementation.
64. The matrix was discussed at length with some initial modification being made – the matrix can be seen in [Appendix V](#).

65. The WPEB **AGREED** on carrying out further intersessional work, including dedicated workshops, to refine methodological approaches, clarify data requirements, and assess the feasibility of applying different assessment methods across elasmobranch species, with a view to completing risk assessments in the future.

## 6 Other business

### 6.1 Shark research plan

66. The WPEB **NOTED** that the shark research plan workshop is planned for July to be held in person, involving participants from the original workshop as well as selected experts from a range of different CPCs. The WPEB **NOTED** that the outputs of this workshop will be presented to the WPEB meeting in September.

### 6.2 Seabird workplan

67. The WPEB **NOTED** that no papers were submitted under this agenda item, so **ENCOURAGED** the presentation of relevant papers for discussion at the September meeting.

68. The WPEB **NOTED** constraints related to publication rules under the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), whereby only older reports can be made publicly available and meeting reports are released only after the Commission meeting in October. The WPEB **NOTED** that this means that the full details of what CCSBT have been discussing on this topic cannot be shared with the WPEB but a summary of their work can be provided by scientists who attend both meetings.

### 6.3 Handling guidelines compilation work

69. The WPEB **NOTED** paper IOTC-2026-WPEB22(DP)-INF04 on Compilation of best-practice handling and release guidelines.

70. The WPEB **RECALLED** that in 2025 the WPEB recommended that the Commission consider adopting a master document of handling guidelines for all taxa. The WPEB **NOTED** that this paper brings together guidelines that have already been endorsed by the WPEB and SC (sharks, mobulids and cetaceans) as well as those that require further work (turtles and seabirds) and further **NOTED** that this document still needs to be finalised.

71. The WPEB **NOTED** that the Western and Central Pacific Fisheries Commission (WCPFC) is currently developing handling and release guidelines for marine turtles. The WPEB **NOTED** that many fishing nations, particularly those operating across multiple RFMOs have expressed a preference for harmonised guidance across RFMOs. The WPEB **ENCOURAGED** continued collaboration with WCPFC and other RFMOs, with updates to be reported back to the WPEB.

72. The WPEB **NOTED** that differences in gear types and fishing operations across ocean regions need to be taken into account when developing such guidelines. The WPEB also **NOTED** that significant work is already underway on handling and release practices, and that IOTC should actively share its progress with other organisations rather than waiting for alignment to occur elsewhere.

## 7 Review of the draft, and adoption of the Report of the 22<sup>nd</sup> Session of the WPEB(DP)

73. The report of the 22<sup>nd</sup> Session of the Working Party on Ecosystems and Bycatch Data Preparatory meeting (IOTC–2026–WPEB22(DP)–R) was **ADOPTED** by correspondence.

**APPENDIX I**  
**LIST OF PARTICIPANTS**

<b>Chairpersons</b>					
<b>Title</b>	<b>First name</b>	<b>Last name</b>	<b>Affiliation</b>	<b>Email</b>	<b>CPC</b>
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Dr.	Jiang-Feng	Zhu			

**APPENDIX II**  
**AGENDA FOR THE 22<sup>ND</sup> WORKING PARTY ON ECOSYSTEMS AND BYCATCH DATA**  
**PREPARATORY MEETING**

**Date:** 15-17 April 2026

**Location:** Online

**Time:** 12:00 – 16:00 (Seychelles time, GMT+4)

**Chair:** Dr Charlene da Silva (South Africa)

**Vice-Chair:** Dr Philippe Sabarros (EU, France) and Dr Yanan Li (China)

- 1. OPENING OF THE MEETING (Chair)**
- 2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION (Chair)**
- 3. REVIEW OF THE DATA AVAILABLE AT THE SECRETARIAT FOR BYCATCH SPECIES AND BYCATCH DATA ESTIMATION APPROACHES (All)**
- 4. REVIEW INFORMATION ON BIOLOGY, ECOLOGY, FISHERIES AND ENVIRONMENTAL DATA RELATING TO SHARKs (all)**
  - 4.1. Review new information on the biology, stock structure, their fisheries and associated environmental data for sharks
    - Catch and effort
    - Observer data
    - Catch at size
    - Catch at age
    - Biological indicators, including age-growth curves and age-length keys
- 5. REVIEW OF NEW INFORMATION ON INDICATORS FOR OCEANIC WHITETIP, SCALLOPED HAMMERHEAD AND SILKY SHARK (all)**
  - 5.1. Review of indicators (all)
  - 5.2. Discussion on how these indicators can be used (all)
- 6. OTHER BUSINESS**
  - 6.1. Shark research plan
  - 6.2. Seabird workplan
  - 6.3. Handling guidelines compilation work
- 7. REVIEW OF THE DRAFT, AND ADOPTION OF THE REPORT OF THE 22<sup>ND</sup> SESSION OF THE WORKING PARTY ON ECOSYSTEMS AND BYCATCH (DATA PREPARATORY) (Chair)**

### APPENDIX III

#### LIST OF DOCUMENTS FOR THE 22<sup>ND</sup> WORKING PARTY ON ECOSYSTEMS AND BYCATCH

Document	Title
IOTC-2026-WPEB22(DP)-01a	Agenda of the 22 <sup>nd</sup> Working Party on Ecosystems and Bycatch Data Preparatory Meeting
IOTC-2026-WPEB22(DP)-01b	Annotated agenda of the 22 <sup>nd</sup> Working Party on Ecosystems and Bycatch Data Preparatory Meeting
IOTC-2026-WPEB22(DP)-02	List of documents of the 22 <sup>nd</sup> Working Party on Ecosystems and Bycatch Data Preparatory Meeting
IOTC-2026-WPEB22(DP)-03	Review of the statistical data and fishery trends (IOTC Secretariat)
IOTC-2026-WPEB22(DP)-04	Sharks and rays basic indicators from the French purse seine and longline fisheries in the western Indian Ocean (P. Sabarros and C. Tellier).
IOTC-2026-WPEB22(DP)-06	Preliminary study of standardised catch per unit efforts (CPUE) of blue shark ( <i>Prionace glauca</i> ) in the Eastern Indian Ocean (I. Jatmiko, L. Sadiyah, F. Satria, S. A. Raup, D. R. Slamet and A. S. Januar)
IOTC-2026-WPEB22(DP)-07	Estimation of the Indonesian shark production (I. Jatmiko)
IOTC-2026-WPEB22(DP)-08	Quantitative risk assessment methods with potential application to shark bycatch in the Indian Ocean (C. Edwards)
IOTC-2026-WPEB22(DP)-09	Initial Feasibility Matrix of Data-Limited Assessment Approaches for Key Shark Species in the IOTC Region: A Starting Point for Discussion at the Data Preparatory Meeting (C. da Silva and M. Tolotti)
<b>Information papers:</b>	
IOTC-2026-WPEB22(DP)-INF01	Update of wire-leader used on longline fishery in Indonesia. (I. Jatmiko)
IOTC-2026-WPEB22(DP)-INF02	Considerations on tissue sampling for future close kin mark recapture studies in Indian Ocean sharks. (T. A. Patterson, J. P. Eveson)
IOTC-2026-WPEB22(DP)-INF03	Species composition, commercial landings, distribution and some aspects of biology of shark (class pisces) of Pakistan: pelagic sharks (M. Moazzam and H. B. Osmany)
IOTC-2026-WPEB22(DP)-INF04	Compilation of best-practice handling and release guidelines (Secretariat)
IOTC-2026-WPEB22(DP)-INF05	Interactions between coastal fisheries and Critically Endangered scalloped hammerhead sharks in the Western Indian Ocean (D. van Beuningen, R. Bennett, N. Sidat, J. Siteo, S. Fernando, E. Nyale and P. Musembi)

## APPENDIX IV

### THE STANDING OF A RANGE OF INFORMATION RECEIVED BY THE IOTC SECRETARIAT FOR SHARKS

Extract from IOTC-2026-WPEB22(DP)-03.

(Appendix references in this Appendix, refer only to those contained in this appendix)

#### Overall bycatch levels & trends of silky shark

Retained catches of silky sharks caught by Indian Ocean fisheries have been recorded since 1985. Until the mid-2000s, the catch was entirely comprised of artisanal fisheries' catches, increasing over time to reach a peak of 25,000 t in 1999. This was followed by a sudden decrease in the mid-2000s. Since then, with the addition of catches reported by industrial fisheries, the average catch has remained at around 2,800 t, with contributions of 70% and 30% from artisanal and industrial fisheries, respectively. The industrial fisheries component is mostly made up of offshore gillnet catches (53%), followed by deep-frozen longline (24%) and fresh longline (7%). (Figure A 1).

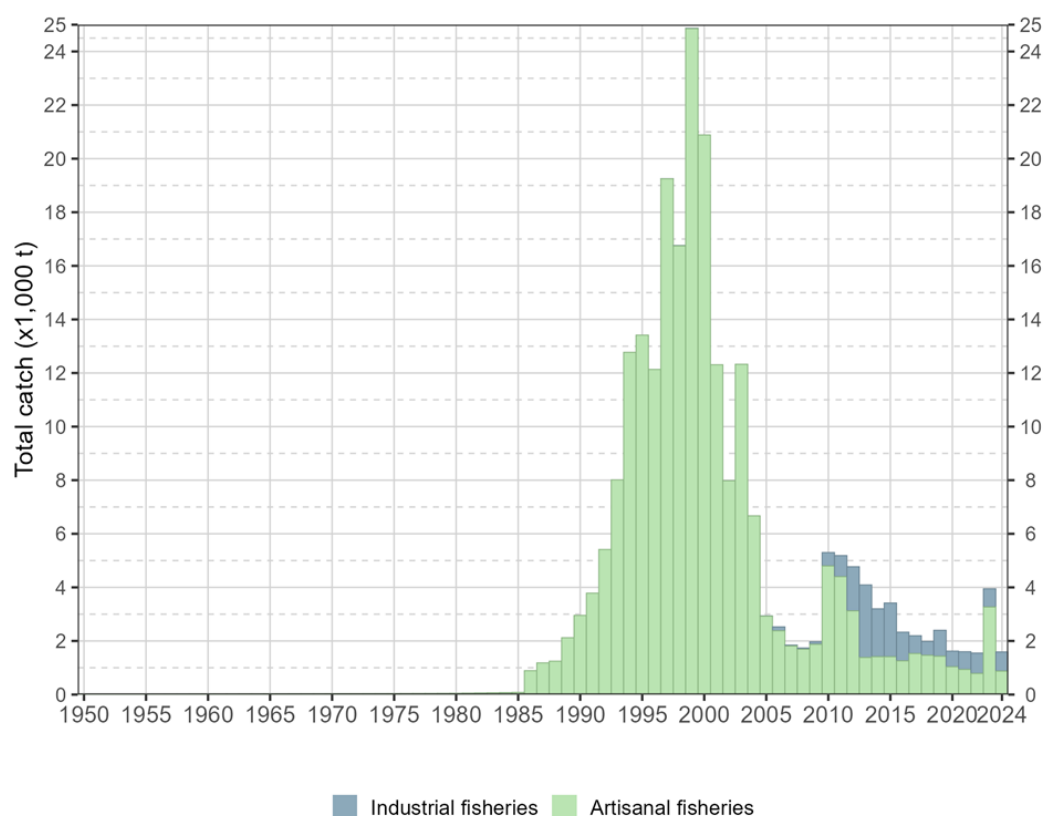


Figure A 1: Annual cumulative time series of retained catches (metric tonnes; t) of silky shark by fishery type for the period 1950-2024

Although catches in the early period are based almost exclusively on data from the Sri Lankan longline-gillnet fishery, the gillnet fishery was the dominant source of silky shark catches in the Indian Ocean throughout the entire time series, accounting for the largest proportion of reported catches during the historical peak in the late 1990s. At its maximum, it contributed approximately 14,000 t, and it remains the primary component in the most recent years of the series. Collectively, the longline fisheries represent the second most important source of catches. The 'Longline | Other' subcategory makes a substantial contribution during the 1995–2001 peak period (Sri Lankan longline-gillnet fisheries), adding up to 10,000 t above the gillnet baseline in some years. The 'Longline | Fresh' and 'Longline | Deep-freezing' subcategories provide smaller, yet consistent, contributions and have become relatively more visible since 2010 as overall catch levels have declined. Catches from the "Purse Seine | Other" subcategory are exclusively from Indonesia's small purse fishery, representing a marginal contribution of around 1,000 t over the entire time series, but accounting for 50% of the total reported catches in 2023 (Figure A 2).

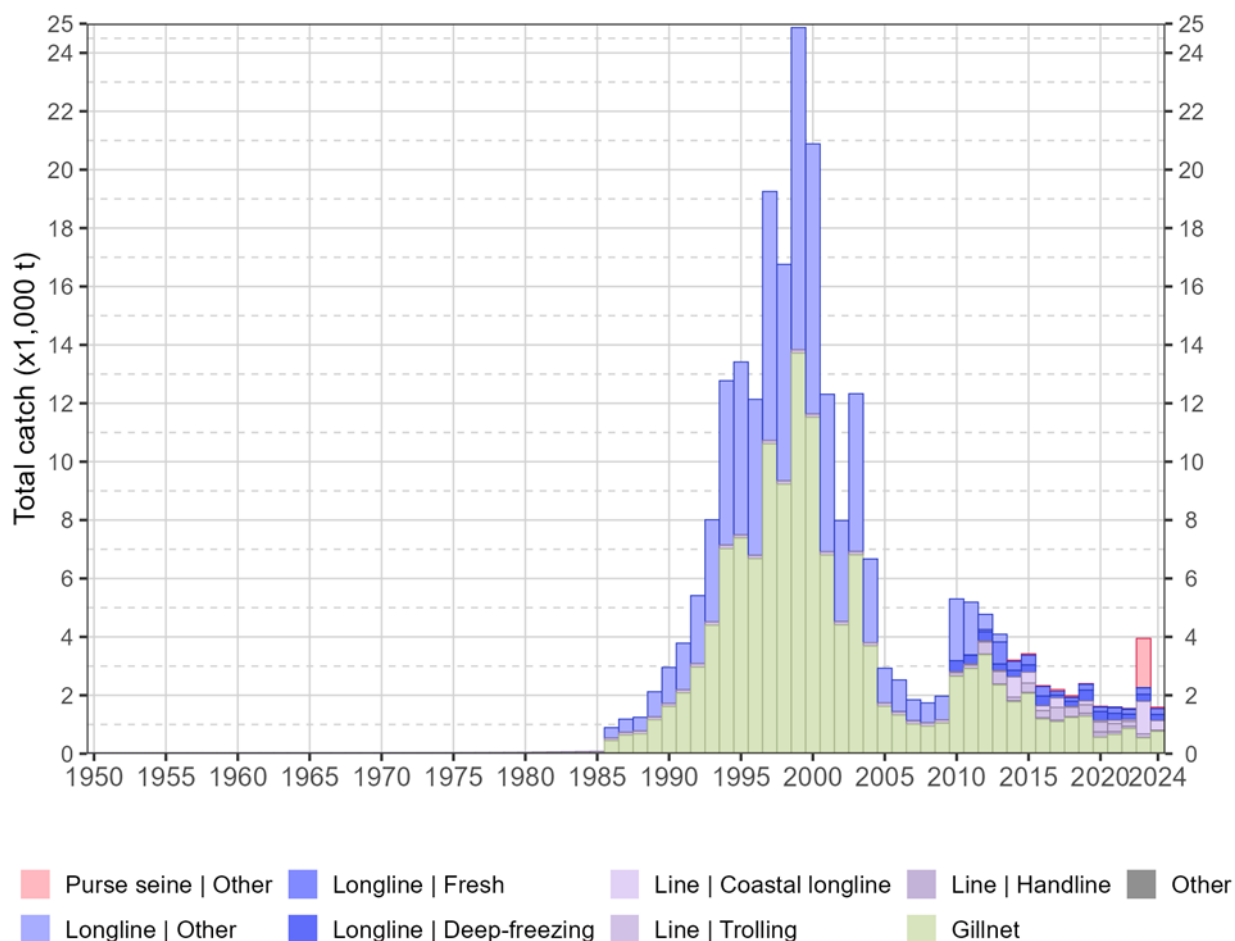


Figure A 2: Annual cumulative absolute time series of retained catches (metric tonnes; t) of silky shark by fishery for the period 1986-2024

In recent years (2020–2024) the contribution of the catches has remained stable for the longline fisheries, with some variability in the gillnet fisheries. There was a marked peak in the line and purse seine fisheries in 2023. On average, catches are dominated by the coastal longline and purse seine fisheries of Indonesia, followed by the coastal fisheries of Sri Lanka and the industrial fresh and deep-freezing longline fisheries of Taiwan, province of China (**Figure A 2**).

### Overall bycatch levels & trends of oceanic whitetip shark

Since 1985, most reported catches of oceanic whitetip sharks in the Indian Ocean have been from artisanal fisheries, reaching 1,000 t in 1999. This was followed by an 80% decrease in catches compared to previous years between 2005 and 2010. Catches reported by industrial fisheries fluctuated between 20% and 70% year on year. Between 2017 and 2022, catches averaged 44 t, presumably following the adoption of a retention ban in accordance with the Resolution 13/06. The last two years have seen a peak in catches never recorded before, with 1,680 and 900 t reported for 2023 and 2024, respectively (**Figure A 3**).

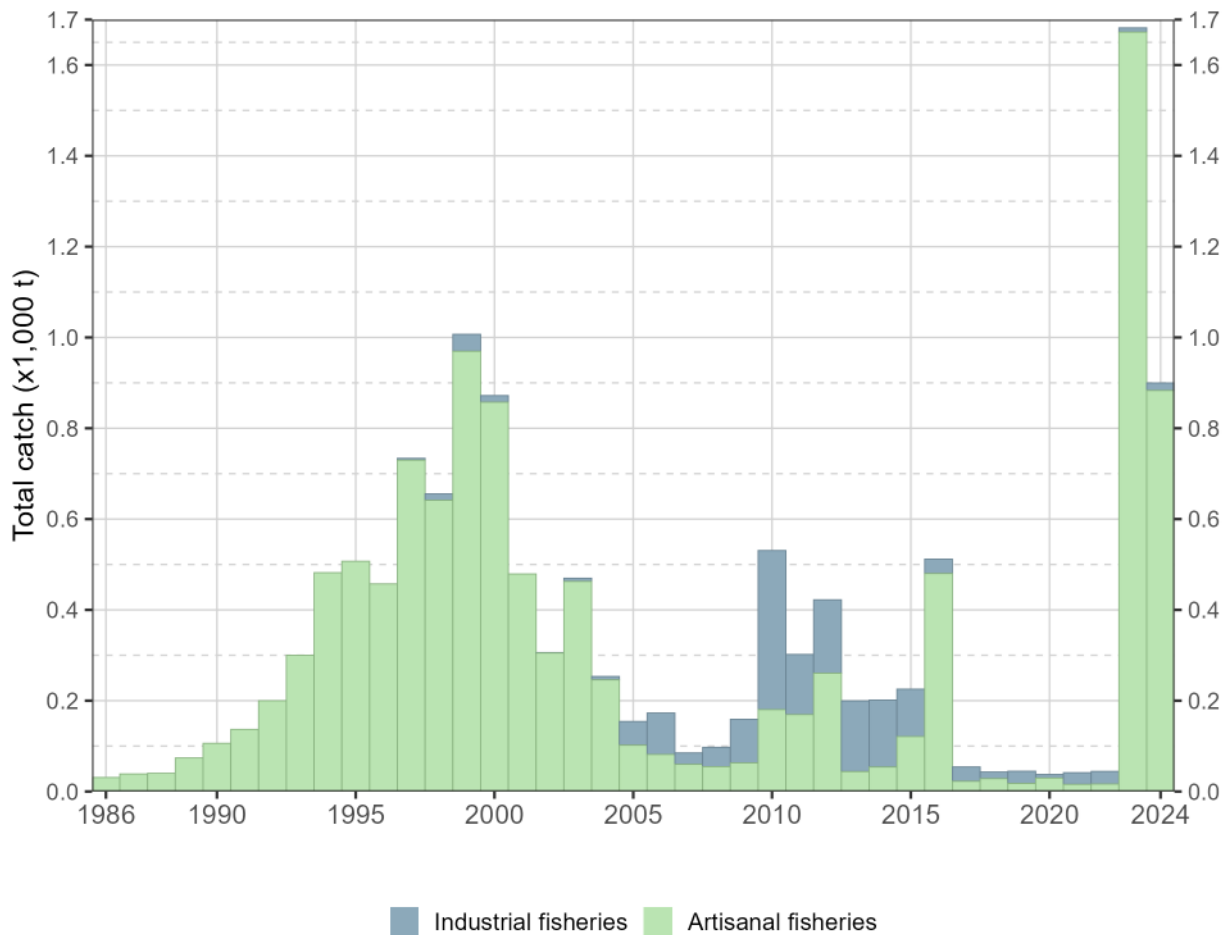
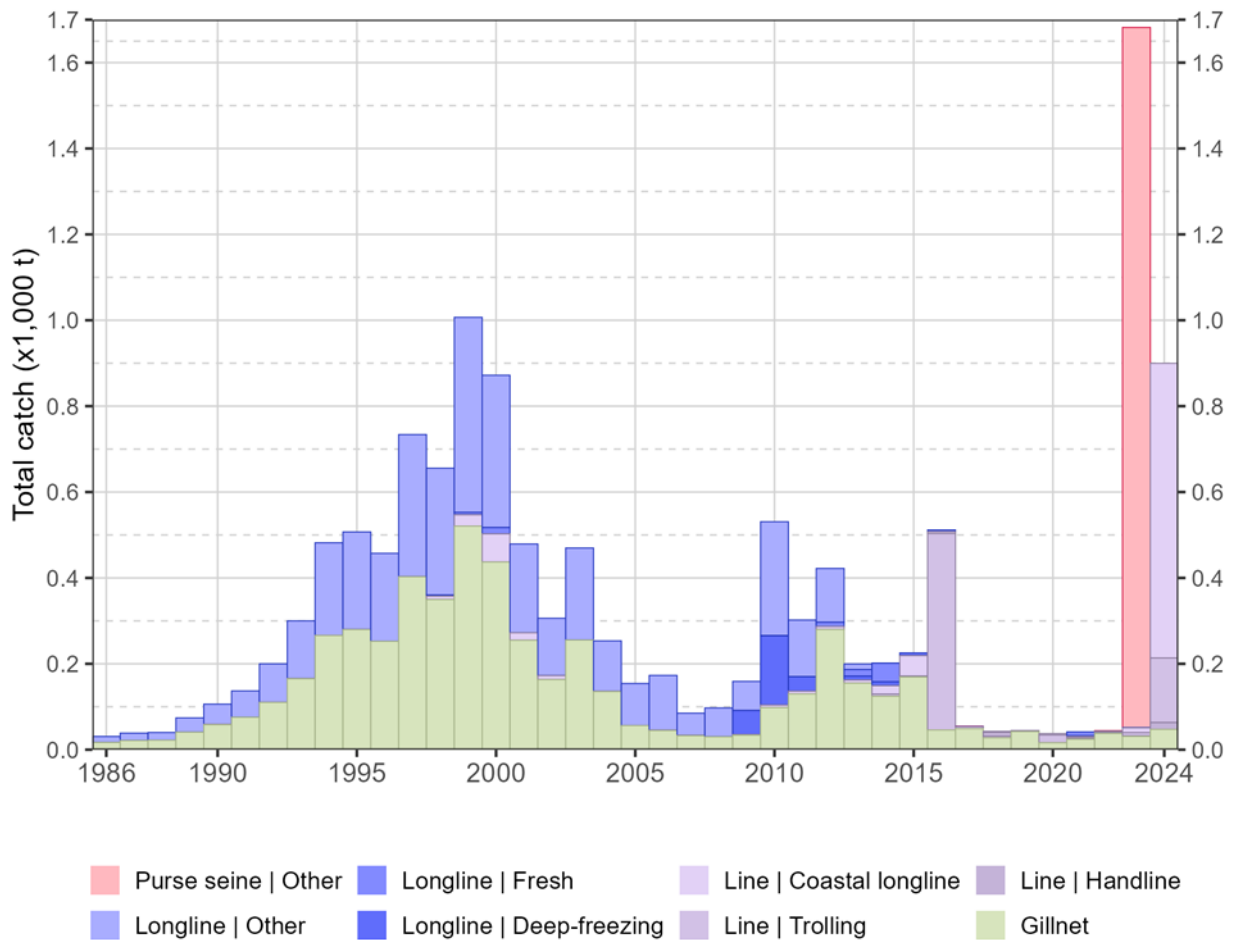


Figure A 3: Annual cumulative absolute time series of retained catches (metric tonnes; t) of oceanic whitetip shark by fishery type for the period 1986-2024

Similarly to the previously described trends for the silky shark, the first period was mostly comprised of the Sri Lankan longline-gillnet fishery. Between 2005 and 2015, the contribution of industrial fisheries varied from year to year, representing 30% to 78% of the total reported catches, primarily due to the contributions of offshore gillnet fisheries and longline fisheries targeting swordfish. Unusual catch levels were reported from small purse seine fisheries in Indonesia in 2023 (1,630 t), and in 2024 from coastal longline fisheries of Mozambique (677 t) and line and trolling fisheries from Madagascar (140 t) (Figure A 4)



**Figure A 4:** Annual cumulative absolute time series of retained catches (metric tonnes; t) of oceanic whitetip shark by fishery for the period 1986-2024

#### Overall bycatch levels and trends - Hammerheads sharks

Most of the hammerhead sharks reported were aggregated species, accounting for 84% of the total catch series. Catches at species level have been reported since 1986, with smooth hammerhead and scalloped hammerhead sharks dominating and making a similar contribution to the total over the entire period, although there has been high variability within years (**Figure A 5**).

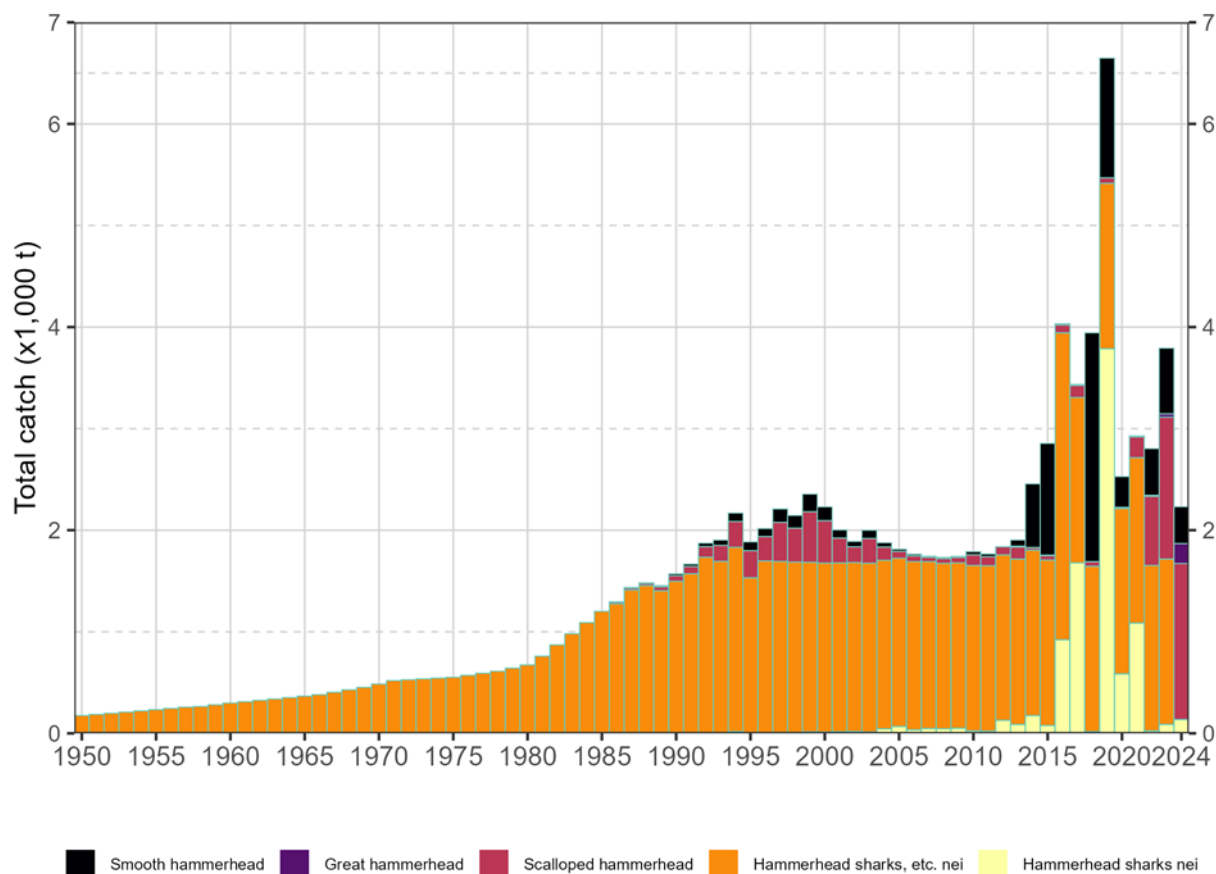


Figure A 5: Annual cumulative absolute time series of retained catches (metric tonnes; t) of hammerhead shark by species or species groups for the period 1950-2024.

Retained catches of scalloped hammerhead shark caught by Indian Ocean fisheries have been reported since 1986, mostly comprising artisanal fisheries' catches. Since 2003, industrial fisheries have also reported catches of scalloped hammerhead shark, representing 17% of the full catch series, but with high variability within years, ranging from 1% to 52% of the total retained catches reported.

Catches of the scalloped hammerhead shark reached a peak of 498 t in 1999, followed by a sudden decrease to an average of 65 t per year from the mid-2000s until 2020. However, since 2021, catches have sharply risen, reaching a maximum reported value of 1,537 t in 2024. The first period, characterized by the Sri Lankan longline-gillnet fishery catches, was followed for an increase of reporting fisheries and fleets, although with lower catch levels. The final period (2021-2024) is dominated for the gillnet fisheries (54%), followed by beach seine (16%), handline (14%) and coastal longline fisheries (12%). Mozambique and Kenya gillnet fisheries are responsible for the 74% and 16% of the reported catches of scalloped hammerhead shark with catches reported for 2023-2024, and 2022, respectively (**Figure A 6**).

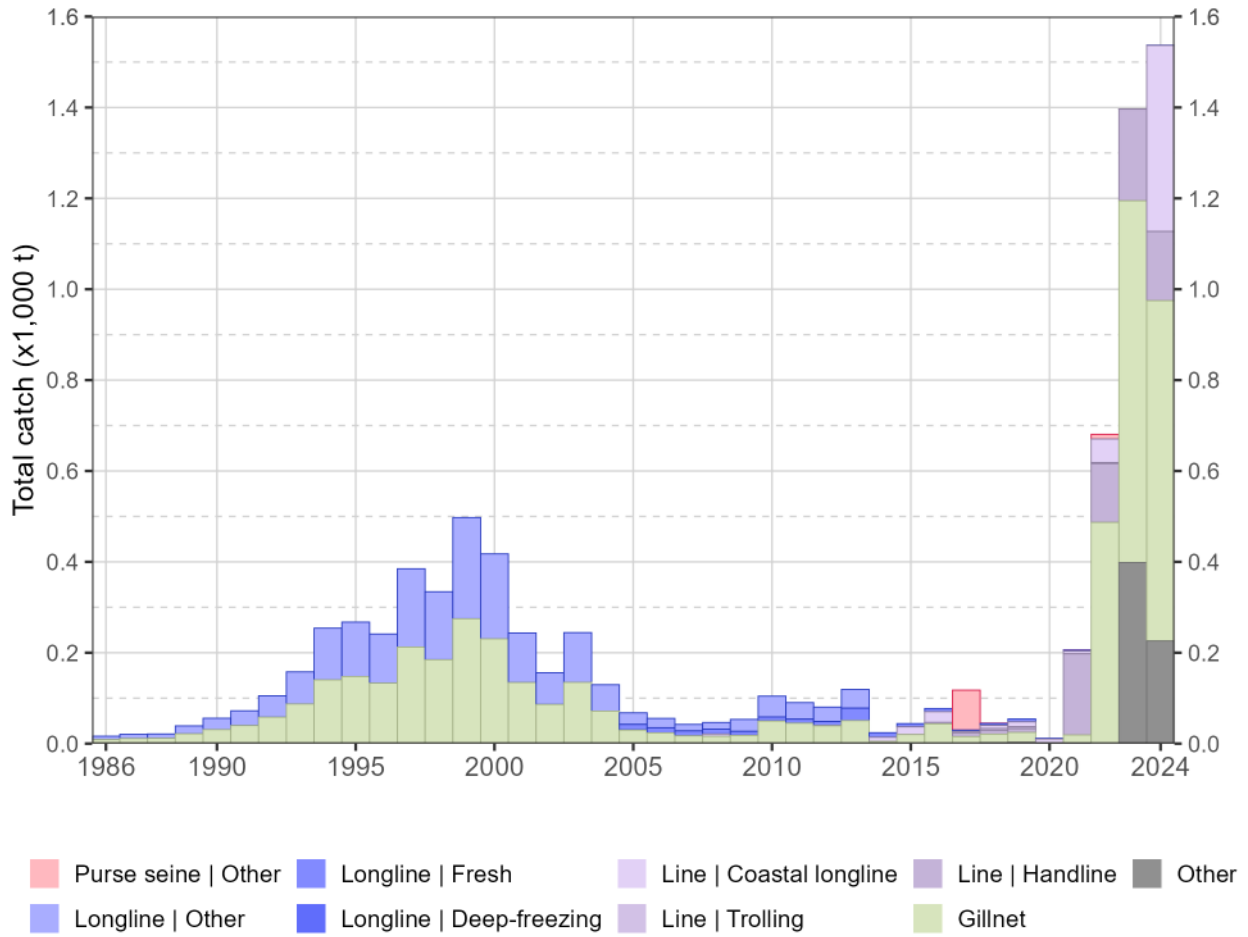


Figure A 6: Annual cumulative absolute time series of retained catches (metric tonnes; t) of scalloped hammerhead shark by fishery for the period 1986-2024

**APPENDIX V**  
**RISK ASSESSMENT FEASIBILITY MATRIX**

Species	Input	Data & Quality	Comments & refs	RA	IA	ERA	EASY-FISH	SEFRA	YPR/SPR
<b>Oceanic Whitetip</b>	Life history (growth, maturity, longevity)	3	Bass 1973, Mejuto et al. 2005, White 2007, Romanov & Romanov 2009, Coelho 2009, Filmater et al 2012 (some IOTC reference in there)	X	X	X	X	X	X
	Species-specific catch data	2?	PS (1)(%), LL (2) , L (?) and GN (?)	X	X	X	X	X	—
	Effort data	1	PS (1), LL (2) , L (?) and GN (?)	X	X	X	XX	X	—
	Standardised CPUE time series	2	Available for PS (1) and LL (1) for selected fleets	—	X	—	—	X	—
	Nominal CPUE / presence-absence	2	PS (1), LL (2) , L (?) and GN (?)	X	X	—	XX	X	—
	Length-frequency data	2	PS (1), LL (2) , L (?) and GN (?)	—	XX	—	X	—	X
	Maturity information (L50 etc.)	3		X	X	X	X	X	X
	Gear interaction / selectivity	1	Vertical information is required. PSAT (gear depth).	X	X	X	X	X	X
	Spatial overlap (species × fishery)	2	Vertical distribution information is available. (REF)	X	X	X	X	X	—
	Post-release mortality estimates	2	Bach <i>et al</i> 2018. Sabarros et al. 2023 (PS), Sabarros et al. 2025 (LL)	—	—	X	X	X	—

	Observer data (set-level detail). *a	2	PS (1), LL (2) , L (?) and GN (?)	X	X	X	X	X	—
	Species distribution	2	Lopetegu-Eguren et al. 2022	—	—	—	—	X	—
	Expert judgement	1		X	X	X	X	X	—
<b>Summary</b>				<b>TBD</b>	<b>Not Feasible</b>	<b>Feasible**</b>	<b>TBD</b>	<b>?</b>	<b>?</b>
<b>Scalloped Hammerhead</b>	Life history (growth, maturity, longevity)	?	Stevens & Lyle 1989, De Bruyn et al. 2005, White et al 2008, Jorgenson et al. 2009, Kembaren et al. 2013	X	X	X	X	X	X
	Species-specific catch data	-----	Species lumped into Sphyrna spp.	X	X	X	X	X	—
	Effort data	-----	Gear specific	X	X	X	XX	X	—
	Standardised CPUE time series	—		—	X	—	—	X	—
	Nominal CPUE / presence-absence	2	GN (?), L(?) ,LL (2), OTH	X	X	—	XX	X	—
	Length-frequency data	2	GN (?), L(?) ,LL (2), OTH	—	XX	—	X	—	X
	Maturity information (L50 etc.)	2		X	X	X	X	X	X
	Gear interaction / selectivity	2	GN (?), L(?) ,LL (2), OTH. Vertical information	X	X	X	X	X	X
	Spatial overlap (species × fishery)	2	GN (?), L(?) ,LL (2), OTH	X	X	X	X	X	—
	Post-release mortality estimates	3?	GN (?), L(?) ,LL (?), OTH	—	—	X	X	X	—
Observer data (set-level detail)	2	GN (?), L(?) ,LL (?), OTH (?)	X	X	X	X	X	—	

	Species distribution*	2	Course distributional maps (i.e. IUCN)	—	—	—	—	X	—
	Expert judgement	1		X	X	X	X	X	—
	<b>Summary</b>			<b>TBD</b>	<b>Not Feasible</b>	<b>Feasible**</b>	<b>TBD</b>	<b>TBD</b>	<b>?</b>
<b>Silky Shark</b>	Life history (growth, maturity, longevity)	2	Strassburg, 1958, Bass et al 1973, Stevens 1984, Anderson & Ahmed 1993, Compagno & Niem 1998, Smith et al. 1998, Mejuto et al 2005, Matsunaga 2007, Romanov & Romanov 2009, Hall et al 2012	X	X	X	X	X	X
	Species-specific catch data	2	GN (?), LL (2), L(?), PS (1)	X	X	X	X	X	—
	Effort data	1	GN (?), LL (2), L(?), PS (1)	X	X	X	XX	X	—
	Standardised CPUE time series	2	Available for PN and LL for selected fleets	—	X	—	—	X	—
	Nominal CPUE / presence-absence	1	GN (2), LL (2), L(2), PS (1)	X	X	—	XX	X	—
	Length-frequency data	1?	GN (2), LL (2), L(2), PS (1)	—	XX	—	X	—	X
	Maturity information (L50 etc.)	1		X	X	X	X	X	X
	Gear interaction / selectivity	1	GN (?), LL (2), L(?), PS (1)	X	X	X	X	X	X
	Spatial overlap (species × fishery)	2	Consider vertical overlap	X	X	X	X	X	—
	Post-release mortality estimates	1	2 papers to be presented in Sept (EU). Gear Specific.	—	—	X	X	X	—

Observer data (set-level detail)	2	GN (?), LL (2), L(?), PS (1)	X	X	X	X	X	—
Species distribution	1	Mannocci et al. 2020.	—	—	—		X	—
Discard								—
Expert judgement	1		X	X	X	X	X	?
<b>Summary</b>			<b>Feasible</b>	<b>Not Feasible</b>	<b>Feasible**</b>	<b>TBD</b>	<b>TBD</b>	<b>Feasible</b>

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## **APPENDIX VI**

### **CONSOLIDATED RECOMMENDATIONS OF THE 22<sup>ND</sup> SESSION OF THE WORKING PARTY ON ECOSYSTEMS AND BYCATCH**

WPEB22(DP).01 (para. 35) The WPEB **NOTED** that CITES listings for some vulnerable shark species pose challenges for sampling and the transport of samples to where they will be analysed. The WPEB **NOTED** that, in coastal waters, CPCs may be able to negotiate directly with their CITES Management Authorities regarding sampling requirements, whereas this is more difficult on the high seas. The WPEB **NOTED** the suggestion that engagement with CITES should occur at the RFMO level, which could coordinate negotiations to obtain sampling permits but further **NOTED** that previous efforts to streamline permitting processes at the RFMO level were not successful. The WPEB also **NOTED** that CITES has been developing mechanisms to collaborate with countries and to support this type of research and **ENCOURAGED** WPEB scientists to get in touch with the CITES Secretariat to try to overcome some of these challenges. The WPEB further **RECOMMENDED** that the SC **ENCOURAGE** the Commission to consider engaging directly with the CITES Secretariat to explore options for addressing these challenges at a broader institutional level.

WPEB22(DP).02 (para. 36) The WPEB **NOTED** that for endangered shark species, close-kin mark–recapture (CKMR) may be one of the few viable approaches to obtain reasonably accurate population size estimates. The WPEB **NOTED** its overall support for the CKMR approach, which has been shown to work well for pelagic sharks, particularly in cases where traditional assessment methods are likely to fail due to insufficient data. The WPEB **RECOMMENDED** that the Scientific Committee give serious consideration to applying CKMR approaches to shark species, and emphasized the importance of initiating sampling sooner rather than later.