Japan's consideration on the framework of scientific fishing trial for shark mitigation measure from the operational viewpoint

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Summary

This document clarifies the Japan's position that raises concern on the appropriateness of target species regulated by the new shark mitigation measure, wire-trace ban and framework of scientific fishing trial designated in RESOLUTION 25/08 from operational viewpoint. Blue shark should be managed as an exploitable resource and enhancement of monitoring and control of the stock should be prioritized rather than reducing mortality by wire-trace ban. In addition, Japan consider that large-scale fishing trials are necessary to evaluate the effectiveness of this measure in reducing the overall mortality of vulnerable fragile shark species (e.g., oceanic whitetip, shortfin mako, Alopiidae), considering the rare occurrence and various types of factors impact on the observation (e.g., environmental, operational, gear and species-specific factor), rather than fragmented trials currently supposed. Japan suggest the Commission reconsider the list of target species for mitigation measures and the process of evaluating mitigation effectiveness of wire-trace ban, taking into account the points raised in this document,

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1. Introduction

The IOTC Commission in 2025 adopted a new conservation measure for sharks, Resolution 25-08 "On the conservation of sharks caught in association with fisheries managed by the IOTC", combining and strengthening the existing measures relating to the shark conservation and their bycatch mitigation, i.e. Resolutions 18-02, 17-05, 13-05, 13-06 and 12-09 that are now superseded. For easy reference, the Resolution is attached in Attachment 1.

Resolution 25-08 contained several new elements, including one relating with a use of wire traces, described under paragraphs 15 through 21. There has been fundamental difference in views on the mitigation effectiveness of banning wire trace use in particular for vulnerable fragile sharks and neither the 20th Working Party of Ecosystem and Bycatch (WPEB20) nor the 27th Session of Scientific Committee (SC27) reached the consensus. Probably taking that into account, the Resolution defines the "scientific fishing trials" undertaken at least one CPC as a trigger to determine whether prohibition of "*using or carrying on board wire trace as leaders or branchlines in the IOTC area of competence North of 20 degrees South*" starting from January 1, 2028 (paras. 15 and 21) and requests the IOTC Scientific Committee at the annual Session in 2025 to develop and agree on the criteria and principles of such trials and its analysis (para. 15).

IOTC-2025-WPEB21(AS)-24 was tabled at the 21st Working Party of Ecosystem and Bycatch (WPEB21), as one proposal responding to the request in the paragraph 17 of Resolution 25-08. List of criteria was considered as technically not incorrect but some raised questions on its applicability to real situation and pointed the importance of further consideration on operational and logistic aspects, too. No further discussion was made at the WPEB21, leaving the judgement to the forthcoming Scientific Committee with all points raised to be taking into account and the recommendation was developed and agreed in a small drafting group. Somehow, the final text was modified from the agreed draft by removing all argument points and inserting full list of criteria proposed in IOTC-2025-WPEB21(AS)-24, which would give a wrong impression as the list to be the consensus at WPEB21. For reference, the full text of the relevant part of the WPEB21 Report is attached in Attachment 2..

Japan has strong concerns on whole process and arguments aiming for introduction of wire-trace ban as a vulnerable fragile shark bycatch mitigation measure, including the processes described in the Resolution 25-08. This document tries to clarify Japan's concerns and ask for re-consideration of target species list and evaluation process for wire-trace ban indicated in the Resolution 25-08.

2. Quick review of wire trace argument in the IOTC

This section made a quick review on historical arguments relating with wire-trace ban as vulnerable fragile shark conservation and mitigation measure, by mainly referring to the outcomes from various IOTC meetings. Main purpose is to show how in a rush the arguments toward introducing wire-trace and shark-line ban was made, without underlying information in the Indian Ocean, including knowledge on actual use of gears by the CPCs.

27th Session of IOTC Commission (2023):

> This is the first meeting report referring to the wire-trace ban as potential mitigation measures specially for vulnerable sharks, probably inspired by the introduction of wire-trace and shark-line ban in the Western and Central Pacific Fisheries Commission (WCPFC, Conservation and Management Measure 2022-04). The Commission suspended the consolidation of existing shark-related resolutions and requested the

relevant Working Party and Scientific Commission to provide specific advices on wire-trace and shark-line bans:

(para. 68) The proposal sought to combine several existing resolutions (18/02, 17/05, 13/06, 12/09 and 13/05) to cover all sharks species under a single management measure.

(para. 69) Despite revisions made, the proponents deferred the proposal.

(para. 70) The Commission NOTED the discussions on the issues of shark lines, wire leaders and fins naturally attached to reduce the impacts of IOTC fisheries on elasmobranchs, especially vulnerable species. The Commission also NOTED there is no clear advice from the IOTC Scientific Committee regarding the conservation and management of these elasmobranch populations in the IOTC area of competence.

(para. 71) The Commission REQUESTED the relevant Working Parties and IOTC Scientific Committee, at its 26th session, to review the latest science and best practices in other oceans and, in collaboration with the Compliance Committee as appropriate, provide advice to the Commission at S28 on technical and mitigation measures to strengthen the conservation of sharks. In particular advice on vulnerable species such as oceanic whitetip sharks, whale sharks and thresher sharks, and how to reduce the impact of tuna fisheries, including the following:

- *the use of wire trace as branch lines or leaders and the use of branch lines running directly off the longline floats or drop lines, known as shark lines; and*
- *the application of fins naturally attached requirements to improve monitoring of elasmobranchs, prevention of the practice of shark finning, full utilization of caught sharks and effective monitoring of compliance with existing conservation and management measures.*

19th Session of WPEB (2023):

Focus of shark-related discussion was on a definition of “Fins Naturally Attached”. The Secretariat reported the above-mentioned request from the Commission but no follow-up discussion occurred. Reference to wire-trace was as one of gear modification proposed to mitigate shark bycatch (Ziegler, I. 2023) and the meeting agreed to hold on-line workshop on positive and negative effects of gear modifications (para. 70). Para. 194 under the Agenda “Other Matters” indicated the agreement to broaden topics to be discussed at the time of data preparatory meeting in quite general way. Neither one was in the executive summary.

70. RECOGNIZING the need for a comprehensive analysis of the effectiveness of gear modifications (wire traces replaced by monofilament, hook type, bait type, etc.) to mitigate bycatch, the WPEB AGREED to hold an intersessional online workshop gathering experts to review the already-conducted meta analyses in order to clarify the beneficial and negative effects of gear modifications on the different species (including target species) and reach a consensus between experts.

194. The WPEB NOTED the customary data preparatory meeting which is usually held in the first half of the year. The WPEB NOTED that as there is likely to be little new to discuss with relation to data preparation for a stock assessment for shortfin mako shark, the group instead AGREED to use this scheduled meeting to cover aspects

of the agenda that required more time and/or expertise including: reviewing mitigation measures for sharks and other taxa and various gear types; reviewing indicators for mobulids; and developing management advice for cetaceans.

26th Session of the Scientific Committee (2023):

No reference on wire-trace but the intention to hold "bycatch mitigation workshop" using Data Preparatory meeting was noted, probably reflecting the way of report by the WPEB Chair.

59. The SC NOTED the intention of the WPEB to use the assigned Data Preparatory meeting both for data and stock assessment model preparation issues for shortfin mako which is due to be assessed in 2024, and also to hold a bycatch mitigation measure workshop with a range of experts on this topic. The SC further NOTED that there is unlikely to be a lot of new information and data for shortfin mako so there should be plenty of time during that meeting to look at mitigation measures. The SC NOTED the intention of the WPEB Chair and the Secretariat to reach out to experts both on mitigation measures and CPUE and stock assessments for this data preparatory meeting to make it as effective as possible.

28th Session of IOTC Commission (2024):

No reference to wire-trace or shark-line ban.

20th WPEB Data Preparatory meeting (2024):

"Longline bycatch mitigation workshop" was held as a part of this Data Preparatory meeting with a majority participation from the United States of America. Even though covering the other mitigation measures, the meeting focused its discussion on banning wire-leaders and shark lines and recommended the additional mitigation measures, referring to non-use of wire leaders and shark lines.

Japan did not recognize the intention of this workshop, failed to prepare for discussion on wire-leader use. Also, it questioned the capacity for Data Preparatory meeting to make a management recommendation.

(para. 46) *The WPEB RECOMMENDED that the collection of information on leader material type should be made mandatory under the Regional Observer Scheme Minimum Data Requirements and reported to the Secretariat. The WPEB also RECOMMENDED that these data collected under the ROS are strictly used for scientific purposes in research.*

(para. 47) *The WPEB RECOMMENDED that mitigation surveys should be developed by CPCs in the IOTC areas and with different gear types and configurations to assess mitigation measures such as the type of leaders and other factors to be tested and implemented. The WPEB NOTED that the increase of bite offs by the prohibition of wire leaders could lead to the decrease in the basic information necessary for stock assessment or monitoring abundance of shark species. ACKNOWLEDGING the importance of these data, the WPEB SUGGESTED that bite offs are recorded by observers to further inform bycatch estimates.*

(para. 74) *The WPEB NOTED on the basis of its review of global research that a prohibition on the use of wire leaders and shark lines by longline and other fisheries operating in the IOTC would likely result in a reduction in both the observed catch and the fishing mortality of shark species……. Based on these studies and on the basis of taking the precautionary approach, and consistent with existing SC advice*

on the need to reduce fishing mortality for shortfin mako, oceanic whitetip and silky shark, the WPEB RECOMMENDED that additional mitigation measures such as, but not limited to, the non-use of wire leaders and shark lines should be implemented. The WPEB AGREED to further discuss this issue at the WPEB Assessment meeting in September.

20th Session of WPEB (2024):

Responding to the request from the Data Preparatory meeting mentioned above, the Secretariat conducted a survey on the use of wire-trace and shark-line (IOTC Secretariat 2024). China, Indonesia, Japan, Mauritius, Seychelles and South Africa provided responses to the request. China and Mauritius indicated non-use of wire-trace and shark-line, while the remaining 3 CPCs indicated varied rate of wire-trace use in the order of Indonesia, Japan and South Africa from high to low. Only Indonesia used shark-lines. No ROS data available from the Seychelles at the time of survey. This is the first information available on the use of wire-trace and shark-line in the IOTC Region.

Semba et al. (2024) examined the data collected by Japanese observers in the Indian Ocean and showed that the majority of the fleet uses wire-trace only small part of branch lines in this area. Comparison of shark bycatch between leader-materials indicated higher catch rate with monofilament leader and no difference in haul-back mortality, though statistical credibility was questioned due to the analysis methodology used.

The meeting recognized a lack of clear guidance on roles and status of workshops as well as Data Preparatory meeting and agreed to seek a clarification from the Scientific Committee (para. 40). Recommendations from the Data Preparatory meeting (or mitigation workshop) were reviewed and generally accepted, except one on wire-trace and shark-line ban (paras. 42 and 43).

40. *ACKNOWLEDGING that the bycatch mitigation workshop was held as a part of the data preparatory meeting, the WPEB NOTED that the role and status of a "workshop" as well as a Working Party's data preparatory meeting is unclear as it is not explicitly defined in the IOTC rules of procedure. The WPEB NOTED that this caused a lot of confusion between participants, in particular regarding whether recommendations from a data preparatory meeting can be taken directly to the SC rather than being approved by the main Working Party meeting. The WPEB NOTED that while the recommendations from the April 2024 WPEB (data preparatory) meeting will be presented to the Scientific Committee as such for its consideration, the WPEB also RECOMMENDED that the SC provide clarification on the nature of data "workshops" and working party data preparatory meetings and their capacity to submit their recommendations independently and directly to the SC, to guide future WP recommendation processes.*

42. *The WPEB NOTED the recommendations arising from the WPEB Data Prep meeting (DP) which included a shark mitigation workshop and reviewed these again. [….]*

43. *The WPEB also NOTED the following recommendation from the data preparatory workshop, however, there were diverging views on this recommendation:* [para. 74 in Data Preparatory meeting report]

27th Session of the Scientific Committee (2024):

No consensus agreement on wire-trace and shark-line ban (paras. 82-84). It agreed the

need to develop clear guidance on role and status of “data preparatory meeting” and various workshops. However, when technical workshops will be needed, it recommended not to nest in the WP meetings and to develop Terms of Reference well ahead of time (paras. 171-174).

82. *The SC NOTED the Commission request to relevant working parties and the Scientific Committee to provide advice to the Commission on technical and mitigation measures to strengthen the conservation of sharks, in particular vulnerable species, including how to reduce the impact of tuna fisheries. In this regard, the Commission request included a specific request for advice regarding “the use of wire trace as branch lines or leaders and the use of branch lines running directly off the longline floats or drop lines, known as shark lines”.*

83. *The SC NOTED that the WPEB conducted a comprehensive research review pertaining to different potential shark mitigation options and produced a summary table listing the strengths and weaknesses of possible mitigation measures focused on longline gear, including limiting the use of wire trace as branch lines or leaders and shark lines (in Appendix VI of WPEB(DP) Report). The SC ACKNOWLEDGED that most of the existing research on this topic comes from the Pacific and Atlantic Oceans and that the information is currently scarce in the Indian Ocean. The SC REQUESTED that the WPEB and WPSE evaluate the potential impacts of limiting wire leader and shark lines on fleet operation and the potential social and economic impacts in the Indian Ocean. In addition, the SC ENCOURAGED CPCs to conduct region specific analyses on these mitigation methods. The SC RECOMMENDED that the Commission consider the research from the summary tables (Appendix VI of WPEB(DP) Report) should they wish to consider additional mitigation measures to strengthen the conservation of vulnerable sharks. The WPEB literature review highlighted that a prohibition on the use of wire leaders and shark lines by longline and other fisheries operating in the IOTC would likely result in a reduction in both the observed catch and the fishing mortality of shark species, particularly in situations where the use of wire leaders and shark lines are common. The SC also considered that further investigation on mitigation measures should be continued.*

84. *The SC NOTED that the summary table was produced during the Bycatch Mitigation Workshop held as a part of the WPEB data preparatory meeting for shortfin mako stock assessment. The SC NOTED that the WPEB data preparatory meeting recommended to the SC that additional mitigation measures such as, but not limited to, the non-use of wire leaders and shark lines be considered. The SC also NOTED that the WPEB reviewed this recommendation during the main meeting but could not reach an agreement. At present there are no clear guidelines from the SC on whether recommendations from a workshop or WP DP meeting (including a workshop) can go directly to the SC. This is a common issue shared by all WPs, not only to the WPEB, and as such the SC is presently developing its guidelines regarding such procedures.*

171. *The SC NOTED that the Data Preparatory (DP) meetings were established to facilitate the running of stock assessments. The inaugural DP meeting, held in 2019 for WPTmT, was subsequently followed by meetings for WPTT and WPEB.*

172. *The SC NOTED that since the DP meeting concept is relatively new and lacks specific rules of procedure, there is no clear guidance on their mandate and decision-making processes. In practice, the DP has operated independently and*

has sometimes provided direct recommendations to the SC, mainly concerning data issues, but in some other instances, concerning topics other than stock assessment inputs.

173. *The SC AGREED that it would be beneficial to clearly define the role of future Working Party intersessional meetings, including DP meetings, especially how they relate to the main WP meeting.*

174. *The SC NOTED the occasional need of technical workshops, corresponding to a request by the SC or Commission. The SC RECOMMENDED that:*

- *Technical workshops are not to be nested within Working Party meetings*
- *The terms of reference for such technical workshops should be established ahead of time to clarify their role and decision-making process, including whether they can make direct recommendations to the SC*

29th Session of IOTC Commission (2025):

Resolution 25-08 was adopted.

3. Concerns in technical aspects:

3.1 Shark species to mitigate through wire-trace ban:

Sharks are often caught in association with fisheries targeting on IOTC species. Blue sharks are often targeted by some semi-industrial and artisanal fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries and anecdotally in the purse seine fishery). However, in recent years longliners are occasionally targeting this species, due to an increase in its commercial value worldwide (IOTC 2024). Blue shark is dominated in nominal reported shark catch by the IOTC fisheries, followed by shortfin mako and silky sharks (IOTC Secretariat 2025) but in one order magnitude lower and the catch amount of other sharks even further down in order magnitude. Stock assessment conducted in 2025 indicated the status of blue sharks in healthy condition of not overfished and not subject to overfishing (IOTC 2025). Considering that some fleets even targeting this species, we considered blue shark as species for commercial exploitation subject to regular fisheries management aiming to balancing between stock conservation and best utilization, not a species only for conservation. The IUCN threat status also indicated as “Nearly threatened”, the status commonly seen for species under consistent but sustainable commercial exploitation. In that case, improved monitoring of catch and fishing operation, including enhanced monitoring of fins together with carcasses would become important, while the measure to reduce mortality such as retention ban would not be necessary.

Resolution 25-08 introduced blue shark as one of target species to mitigate through wire-trace ban in its paragraph 15, in addition to the vulnerable sharks (including oceanic whitetip shark, silky shark, shortfin mako and thresher sharks). This could cause confusion and distortion in developing fishing trial design as well as on evaluation of mitigation effectiveness of wire-trace ban.

Blue shark is known as one of toughest and most vigorous species in the world. Field experiment and observer data analysis consistently indicated 30 to 100% higher catch rate when using wire-trace comparing with monofilament branch-line (Afonso, *et al*. 2012, Santos *et al*. 2017, 2024, Scott *et al*. 2022; Appendix 1 in this document). It was considered that the difference of catch rate (lower catch rate in monofilament leader) was caused by

vigorous individuals escaping from monofilament lines through a bite-off. Accordingly, the haul-back mortality would become higher with monofilament lines and resulted in no difference between trace materials in overall mortality rate.

On the other hand, in the case of fragile sharks including silky sharks and shortfin mako, the chance of escapement through bite-off would be relatively low and resulted in similar catch rates with high haul-back mortality regardless leader materials. However, the results obtained in the past studies for sharks other than blue shark varied from no-difference to significantly high catch rate in wire trace, which may reflect the impact of gear configuration and/or operational styles, or less statistical credibility caused by low occurrence of events. It is noted that experiment using satellite tag indicates that switching from wire leader material to monofilament has a small improvement in survival rates while trailing gear length has a much larger impact on survivorship for oceanic whitetip shark (Hutchinson *et al*. 2022) and the differences in shark catch rates between monofilament and wire leaders was non-existent when bite-offs were counted (Afonso *et al*. 2012).

In the other words, the wire-trace use only increases an apparent catch rate but not changes overall bycatch mortality for blue sharks, and the results obtained on other sharks were confusing and not conclusive.

Emery et al. (2025) recommended to conduct power analysis as mandatory criteria for fishing trial under Resolution 25-08. Power analysis is a nice tool supporting the development of survey design under the situation with reasonable event occurrence expected and would work for blue shark. However, if applying to rare event, such as catch event of vulnerable or fragile sharks by species, analysis may require unrealistically high number of observations in order to obtain reasonable level of detection power. Other criteria listed as optional, to conduct trials in high concentrated time and area, would help to mitigate the problem but probably only in a limited extent. In that case, careful consideration would be also needed on possible impact of survey mortality to stock, in particular the case of vulnerable shark species.

All sharks listed as target in paragraph 15 distribute broadly throughout temporal and tropical areas of the IOTC conventional areas and high concentration may occur south of 20 degrees South in case of blue shark and shortfin mako for example. Paragraph 19 requires Scientific Committee to conduct further review on distribution of target sharks and longline efforts as well as that on utilization of leader materials, and to utilize them to explore spatial option of applying wire-trace ban at SC30 (para. 20).

3.2 Expected detecting power in fishing trials:

Resolution 25-08 identified fishing trial as only way to suspend wire-trace ban from entering into force on January 1, 2028 and to evaluate its effectiveness in reducing bycatch mortality of target sharks.

Experimental operations under controlled conditions are considered the most universally applicable and effective tool for verifying the efficiency of terminal fishing gear. However, this approach has notable limitations. Trial with a single vessel under well controlled condition may be the best for extracting a performance difference, e.g. in this case due to leader materials. However, if gear performance is subject to fishing season and location, operational styles, other marine environment conditions, and gear configuration (hook type, bait etc.), there is no guarantee that the results obtained from such singly focused trial can

be applied under the broader conditions, and in general, additional trials in different circumstances would become required.

On the other hand, when increasing number of vessels involved to cover wider range of factors, another challenge would arise in aligning operational conditions. For example, noises may arise from variations in fleet-specific operational habits, as well as differences in the marine and weather condition, vessel equipment, and crew skills, many of which are correlated and statistically difficult to eliminate. Developing a robust standardization protocol and establishing scientifically defensible criteria for determining equivalence across experimental conditions represents a significant challenge in fisheries research design.

Meta-analysis offers an alternative way reducing the impact of differing experimental setups and allowing broader comparisons. Experimental fishing trials and meta-analysis have their own advantage and drawbacks and mutually supplementary. However, these methods are only effective when there is a substantial difference in gear performance. If no clear difference in effectiveness exists, detecting power of both meta-analysis and fishing trials substantially declines.

The performance difference in catch rate due to leader materials seems only clear for blue shark but suggests no difference in overall mortality even for this species. Since Japan is in the position that this species should not be included in mitigation target and consider that the performance of changing the leader materials for other vulnerable and/or fragile sharks is uncertain. This may be because either that impacts of other factors including fishing time and location, operational styles, and gear configuration might be more substantial than the performance difference of leader material, or difficulty in accumulating adequate data due to low occurrence of vulnerable species in catch. In either case, the prospect for the fishing trials organized under Resolution 25-08 to provide a clear-cut outcome to resolve the issue seems quite low.

3.3 Handling of trial catch and effort data:

Fishing trials targeting on sharks would also catch tunas and tuna-like species of the IOTC mandate that are subject to regular stock assessment. Since the fishing operation in trials would substantially differ from normal commercial operations following under strictly designed procedure, it is necessary to store catch and effort data separately from the regular catch and effort data set, in order to avoid unnecessary confusion at the time of stock assessment.

Paragraph 2 of Resolution 25-08 indicates not applying the management measures to those operating for fishing trials as described in the Resolution. Similar arrangements would be needed for other species including those of the IOTC mandate prior to the initiation of any trial activity.

3.4 Mitigation measure through gear modification:

Japan tends to be reluctant in introducing mitigation measures through gear modifications including circle hook, weighted lines, and leader materials and will not accept unless it considers as absolutely necessary. This is partially for protecting fishers' maximum flexibility in exploring operational styles but more importantly because gear modifications often cause quite complex reactions according to species, like the case of impact of large circle hooks as a well-known example; modification may lead to reduction in mortality in some and

increase to the others.

For potential impact of wire-trace ban, higher catch of tunas with monofilament lines has repeatedly reported while Wu (2025) pointed significant adverse impacts in social and economic aspects of Taiwanese fisheries by decrease of catch caused by the increase of oil fish bite-off. In any case, it is important to gather further information on actual utilization of different gear materials and potential impacts of proposed gear modifications on various species from socio-economic viewpoint.

4. Concerns in operational aspects:

4.1. Role of the Secretariat:

We suspect Resolution 25-08 assuming that individual CPCs develop and conduct fishing trials independently following the guideline developed by the SC, and that the SC review and argue the outcomes in the regular way of reviewing documents submitted by CPCs. It should be noted that under the current situation, both SC and relevant WP (WPEB) are too busy for only quickly going through the agendas and submitted documents and that it is extremely hard to secure time to concentrate in depth discussion.

As pointed in the section 3.2, when multiple CPCs participate, standardization and harmonization of survey protocols, and ideally collaborative analysis of collected dataset would become extremely beneficial but challenging. Coordination among interested CPCs could only be achievable through the support of the IOTC Secretariat.

In addition, as indicated in the section 3.3, it is necessary to store catch and effort data of fishing trials separately from those of regular commercial operations. We need to rely on the Secretariat support on this, too.

4.2. Decisions on technical matters:

Commission and Scientific Committee have two separate roles and different expertise and should function as two wheels of a vehicle. In principle, the Commission makes a final decision in a form of adoption of Resolution, based on, but not necessarily limited to, management advice that the Scientific Committee develops based on technical knowledges and expertise, and also considering other aspects including social, economic and/or political factors. Therefore, it is not surprising for the Commission to make a decision diverting from, or contradicting to the Scientific Committee’s advice.

However, recently in several occasions, we found the adopted Resolutions containing contents of technical nature, without going through any argument at Scientific Committee. For example, in this case, the Scientific Committee did not provide a consensus view on effectiveness of wire-trace ban for shark mitigation, while the Commission adopted Resolution 25-08 containing a wire-trace ban, which is fine as long as over-riding decision was taken from reasons of non-technical nature. However, the Resolution further dictates the specific way to evaluate the effectiveness of wire-trace ban preventing the measure automatically entering into force in 2028. At least Japan does not believe the fishing trial as only and most effective way of evaluating mitigation performance of wire-trace ban, and neither agree the adequacy of one or two trials by few CPCs, nor prospect of bringing this to the conclusion. We still struggle to figure out the rationales on those choices.

As a member of SC participants, we feel much more comfortable if the Commission (or

Resolution) indicating its commitment to conclude the issue at the SC30 and allowing SC to make the best efforts to reach consensus advice. At least when Resolution containing technical components that was not reviewed at SC is discussed in the Commission meeting in the future, it would be appreciated if allowing SC to review technical aspects before making a final adoption.

5. Conclusion and Recommendation:

Japan is in the position that blue shark should be managed as an exploitable fisheries resource. Considering the current healthy stock condition and difficulty to interpret catch and effort data through various factors (e.g. reliability on release/discards data, bite-off, line-cutting before hauling, species identification), the management priority is enhancement of monitoring and control (e.g. ensuring link between fins and carcasses, improving data collection for stock assessment) rather than reducing mortality. In addition, the previous studies indicate the use of monofilament lines only increasing blue shark escapement through bite-off and not reducing the overall mortality (Afonso *et al*. 2012, Semba *et al*. 2024). Therefore, Japan considers that blue shark should not be included in the target list for mitigation through wire-trace ban.

Japan acknowledges the need to evaluate the effectiveness of wire-trace ban in reducing overall mortality of vulnerable fragile sharks in the IOTC convention areas prior to introducing the measure. Lack of consistency of conservation effects on these species in the results of previous study may suggest sampling difficulty due to rare event or dependency of gear performance on other factors including season, location, geography, environmental condition, operational style, and behaviors of individual shark species. Either case would require quite large-scale fishing trials to obtain data possibly enabling to provide a clear-cut solution, where the Secretariat's support in organizing and coordinating project activity including data management and analysis would become essential. Whilst the prospect for fishing trials in a scale and timeline indicated in the Resolution 25-08 to provide a clear-cut solution seems to be quite low.

In addition, currently, the retention of thresher sharks (Alopidae) and oceanic whitetip shark have been prohibited for more than ten years (Resolution 12/09 and 13/06). It is necessary to evaluate if this regulation (retention ban) is not enough for the stock recovery (if the stock is depleted) and wire-trace ban is an essential measure at least for these species. The adequacy and effectiveness of retention ban for thresher sharks (Alopidae) and oceanic whitetip shark for stock recovery should be evaluated at least in parallel to the evaluation of the effectiveness of wire-trace ban.

Japan suggests the Commission to reconsider the list of target species for mitigation measures and the process of evaluating mitigation effectiveness of wire-trace ban, taking into account the points raised in this document, which does not necessarily requires defer the timing of intended final decision, i.e. SC30.

Japan also would like to ask the Commission, whenever making a decision of technical nature without advice from the Scientific Committee in the future, to provide the Scientific Committee an opportunity of quick review on technical aspects prior to the adoption.

In the end, Japan would like to remind the request made at the 27th session of the Scientific Committee in 2024 to consider the status and way of operation of the Working Party of Ecosystem and Bycatch, if it intends to use for reviewing and drafting management advice on ecosystem and bycatch.

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Appendix 1.

(a) Summary information of existing knowledge on CPUE of shark species by leader type.

Author	Area	Period	Operation type	Depth of gear	Number of operation	Number of observed hooks	species	mono CPUE	wire CPUE	mono MPUE	wire MPUE	Notes
Santos et al. 2017	SW Indian Ocean	Nov. 2013 - Mar. 2014	Night and shallow LL	20–50 m	82	82,656	Blue shark	8	10.5	1.8	2.3	
							Shortfin mako	0.3	0.3	0	0	
							Bigeye thresher	0.2	0	0.1	0	
							oceanic whietip	0	0.2	0	0	
Semba *et al*. 2024	Tropical Indian Ocean	2016	Day and deep LL	65-400m	395	929,604	Blue shark	0.6	0.44	na	na	
							Shortfin mako	0.04	0.05	na	na	
Ward *et al*. 2008	off NE Australia (SW Pacific)	Sep. 2005–Dec. 2006	Both night and Day LL	Max. depth: 170m	177	75,101	Shortfin mako shark	0	0.08			
							Bigeye thresher shark	0.16	0.13			
							Pelagic thresher shark	0.03	0.35			
							Oceanic whitetip shark	0.08	0.29			
							Silky shark	0.32	0.53			
Afonso *et al*. 2012	SW equatorial Atlantic	Jan. 2011	Target: swordfish and tuna	Upper layer of water column	17	17,000	Blue shark	3.06 (J)	5.88 (J)	1.53	1.29	Bite-off events included, the difference between leader types disappeared.
							Oceanic whitetip shark	0.24 (J)	0.24 (J)	0.35	0.71	
							Silky shark	1.18 (J)	2.12 (J)	1.06	1.06	
Scott *et al*. 2022	Pacific (US)	Jan. - Jul. 2019	Deep-set LL (Target: BET), HPB:	27.2~330.9 m	50~80 (4 trips	194,244	Blue shark	0.976	1.501			
							Shortfin mako	0.224	0.618			
							Bigeye thresher shark	0.289	0.663			
Santos *et al*. 2024	NE Tropical and Equatorial Atlantic Ocean	Jun. 2013 - Oct. 2014	Night setting (HPB:5)	20–50 m	105 (3 trips)	92,225	Blue shark	25	39	5.8	8.9	Fish bait
							Shortfin mako	0.1	0.4	0.1	0.3	Fish bait
							Bigeye thresher shark	0.3	0.4	0.1	0.1	Fish bait
							Oceanic whitetip shark	1	0.9	0.4	0.4	Fish bait
							Silky shark	0.1	0.1	0.1	0.1	Fish bait
							Blue shark	22.1	29.4	6.5	8.4	Squid bait
							Shortfin mako	0	0.4	0	0.2	Squid bait
							Bigeye thresher shark	0.4	0.2	0.2	0.1	Squid bait
							Oceanic whitetip shark	0.9	0.9	0.5	0.7	Squid bait
							Silky shark	0.4	0.1	0.2	0.1	Squid bait

(b) Comparison of catch number of shark species by leader type from available information.

		Hooks	Blue shark	Oceanic whitetip	Silky shark	Shortfin mako	Threshers	Other sharks	% BSH
Santos et al. 2017	TOTAL (number)	82,656	767	8	na	26	10	7	93.8%
	Catch (nylon)	41,328	*330*	*1*	*0*	*11*	*7*	*2*	
	Catch (wire)	41,328	*436*	*7*	*0*	*15*	*3*	*5*	
	CPUE (nylon)		8.0	0	na	0.3	0.2	0	
	CPUE (wire)		10.5	0.2	na	0.3	0	0.1	
Afonso et al. 2012	TOTAL (number)	17,000	77	11	24	4	9	6	58.8%
	Catch (nylon)	8,500	*29*	*3*	*9*	*3*	*3*	*3*	
	Catch (wire)	8,500	*48*	*8*	*15*	*1*	*6*	*3*	
	CPUE (nylon)		*3.41*	*0.36*	*1.06*	*0.36*	*0.36*	*0.36*	
	CPUE (wire)		*5.65*	*0.95*	*1.77*	*0.12*	*0.71*	*0.36*	
Scott et al. 2022	TOTAL (number)	194,754	186	na	na	34	15	na	79.1%
	Catch (nylon)	*97,032*	73	0	0	9	5	0	
	Catch (wire)	97,212	113	0	0	25	10	0	
	CPUE (nylon)		*0.75*	*0.00*	*0.00*	*0.09*	*0.05*	*0.00*	
	CPUE (wire)		*1.16*	*0.00*	*0.00*	*0.26*	*0.10*	*0.00*	
Santos et al. 2024	TOTAL (number)	92,225	1904	65	13	17	21	2115	91.2%
	Catch (nylon)	46,290	744	33	9	3	12	850	
	Catch (wire)	45,935	1160	32	4	14	9	1265	
	CPUE (nylon)		*23.55*	*0.95*	*0.25*	*0.15*	*0.35*	*1.25*	
	CPUE (wire)		*34.20*	*0.90*	*0.10*	*0.35*	*0.30*	*1.00*	

Italic: estimated from available figuire in the document
blue: corresponding to Isurus spp

If catch number was not available, it was estimated by CPUE and effort. In case that detail figure was not included in the paper, we estimated the catch with original approach.

Attachment 1: Resolution 25-08

RESOLUTION 25/08
ON THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES MANAGED BY IOTC

Keywords: sharks, retention ban, full utilisation, naturally attached fins, thresher sharks, oceanic whitetip sharks, whale sharks, blue sharks, bycatch mitigation

The Indian Ocean Tuna Commission (IOTC),

RECOGNISING Resolution 12/01 *On the implementation of the precautionary approach* calls on IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs) to apply the precautionary approach in accordance with Article 5 of the United Nations Fish Stocks Agreement;

CONCERNED by the continued failure of IOTC CPCs to submit complete, accurate and timely catch records for sharks in accordance with existing IOTC Resolutions;

ACKNOWLEDGING the need to improve the collection of species-specific data on catch, discards and trade as a basis for improving the conservation and management of shark stocks and aware that identifying sharks by species is rarely possible when fins have been removed from the carcass;

RECALLING that the IOTC Working Party on Ecosystems and Bycatch agreed in its 2023 report that the precautionary approach would be one way to move forward to mitigate mortality on shark species because the stock assessment of shark species is hindered by data limitations;

RECALLING that United Nations General Assembly Resolution on Sustainable Fisheries, adopted annually by consensus, since 2007 (A/RES/62/177, 63/112, 64/72, 65/38, 66/68, 67/79, 68/71, 69/109, 70/75, 71/123, 72/72, 73/125, 74/18, 75/89, 76/71 and 77/118) calls upon States to take immediate and concerted action to improve the implementation of and compliance with existing regional fisheries management organisation (RFMO) or arrangement (RFMA) measures that regulate shark fisheries and incidental catch of sharks, in particular those measures which prohibit or restrict fisheries conducted solely for the purpose of harvesting shark fins, and, where necessary, to consider taking other measures, as appropriate, such as requiring that all sharks be landed with fins naturally attached;

FURTHER RECALLING that the FAO International Plan of Action for Sharks calls on States to encourage full use of dead sharks, to facilitate improved species-specific catch and landings data and monitoring of shark catches and the identification and reporting of species-specific biological and trade data;

AWARE that despite regional agreements on the prohibition of shark finning, shark fins continue to be removed on board and the rest of the shark carcass discarded into the sea;

EMPHASISING the recent recommendations of IOTC and WCPFC Scientific Committees that the use of fin-to-carcass weight ratios is not a verifiable means of ensuring the eradication of shark finning and that it has proven ineffective in terms of implementation, enforcement and monitoring;

FURTHER EMPHASISING that the IOTC Scientific Committee recommended in its 2023 report that the Commission consider extending measures to prevent finning of sharks such as fins naturally attached including partially attached and tethered for all fisheries or similar, alternative measures (for

example, fins artificially attached), providing they had been assessed and endorsed by the IOTC Scientific Committee and Compliance Committee as being equally or more likely to meet the conservation benefit (of a fins naturally attached measure) and are logistically feasible from a compliance monitoring perspective;

OBSERVING the adoption of NEAFC Recommendation 10:2015 *on Conservation of Sharks Caught in Association with Fisheries Managed by the North-East Atlantic Fisheries Commission*, Article 12 of the NAFO Conservation and Enforcement Measures, and GFCM Recommendation 42/2018/2 *on fisheries management measures for the conservation of sharks and rays in the GFCM area of application*, which establish the fins attached policy as the exclusive option for ensuring the shark finning ban in the NEAFC, NAFO and GFCM fisheries;

COGNISANT of the economic and cultural importance of sharks in the IOTC area of competence, the biological importance of sharks in the marine ecosystem as key predatory species, and the significant vulnerability of many shark species to overfishing due to their biology and to the significant overlap of their spatial distribution with fishing activities;

NOTING the advice of the IOTC Scientific Committee in 2021 that maintaining current catches of blue sharks is likely to result in decreasing biomass and the stock becoming overfished and subject to overfishing in the near future;

RECALLING that blue sharks account for more than 60% of global shark catches and that the Resolution 18/02 *On management measure for the Conservation of blue sharks caught in association with IOTC fisheries* required the Commission to consider, in 2021 the adoption of Conservation and Management Measures for blue sharks, such as catch limits for each CPC taking into account the most recent reported catch information or bycatch mitigation such as a ban on wire trace/shark line for blue shark as appropriate;

FURTHER RECALLING that Resolution 18/02 *On management measure for the Conservation of blue sharks caught in association with IOTC fisheries* has tasked the Scientific Committee to provide advice, if possible, on options for candidate limit, threshold and target reference points for the conservation and management of this species in the IOTC area of competence;

NOTING that the Commission, at its annual Session in 2024, requested the IOTC Scientific Committee to initiate management strategy evaluation (MSE) simulations for blue shark with the aim of developing a Management Procedure for this species;

FURTHER NOTING the advice of the IOTC Scientific Committee in 2021 that the Commission should take a cautious approach to the conservation of shortfin mako sharks and silky sharks by implementing management actions that reduce fishing mortality;

RECALLING the advice of the IOTC Scientific Committee in 2023 that mitigation measures should be taken to reduce at-vessel and post release mortality of oceanic whitetip shark and silky shark, including consideration of potential gear modifications in longline fleets targeting tuna and swordfish, noting that a recent study (Bigelow et al. 2021) concluded in WCPFC that banning both shark lines and wire leaders has the potential to reduce fishing mortality by 40.5% for oceanic whitetip shark and by 30.8% for silky shark;

FURTHER RECALLING that the Working Party on Ecosystems on Bycatch (WPEB) noted in 2024 on the basis of its review of global research that a prohibition on the use of wire leaders and shark

lines by longline and other fisheries operating in the IOTC would likely result in a reduction in both the observed catch and the fishing mortality of shark species, and that the WPEB recommended that additional mitigation measures such as, but not limited to, the non-use of wire leaders and shark lines should be implemented;

MINDFUL of the recommendation of the IOTC Scientific Committee in 2024 to consider the research from the 2024 WPEB report should the Commission wish to consider additional mitigation measures to strengthen the conservation of vulnerable sharks, noting that the WPEB literature review highlighted that a prohibition on the use of wire leaders and shark lines by longline and other fisheries operating in the IOTC would likely result in a reduction in both the observed catch and the fishing mortality of shark species;

DEEPLY CONCERNED that the majority of the species of the order of *Rhinopristiformes* are categorised as 'threatened' (meaning either vulnerable, endangered or critically endangered) by the IUCN Red List of Threatened Species, while the fins of these species are highly valued in the global shark fin trade, therefore requiring protection of the order of *Rhinopristiformes* from overexploitation for the fin trade in the same ways as the orders of *Selachimorpha*;

ADOPTS, in accordance with paragraph 1 of Article IX of the IOTC Agreement, the following:

Definitions

1. For the purpose of this Resolution:

    10. "CPCs" means Contracting Parties or Cooperating Non-Contracting Parties to the IOTC Agreement.

    11. "IOTC Species" means all species of fish listed in Annex B of the IOTC Agreement.

    12. "Sharks" means all species belonging to the 8 orders of *Selachimorpha* (*Carcharhiniformes, Lamniformes, Orectolobiformes, Heterodontiformes, Squaliformes, Squatiniformes, Hexanchiformes, and Pristiophoriformes*) and all species of the order of *Rhinopristiformes*.

    13. "Blue sharks" means the species *Prionace glauca*.

    14. "Hammerhead sharks" means all species of the family of *Sphyrnidae*.

    15. "Oceanic whitetip sharks" means the species *Carcharhinus longimanus*.

    16. "Mako sharks" means the species *Isurus oxyrinchus* and *Isurus paucus*.

    17. "Silky sharks" means the species *Carcharhinus falciformis*.

    18. "Thresher sharks" means all species of the family *Alopiidae*.

    19. "Whale sharks" means the species *Rhincodon typus*.

    20. "Full utilisation" means the retention by the vessel of all parts of the shark excepthead, guts and skin, to the point of first landing.

    21. "Shark finning" means removing and retaining all or some of a shark's fins and discarding its carcass at sea.

Application

2. This Resolution shall apply to all fishing vessels targeting and/or authorised to fish for IOTC Species in the IOTC area of competence and supply vessels[1] flying the flag of a CPC. This Resolution shall not apply to non-commercial vessels and conducting research on the efficacy of the management measures contained in this Resolution.

Shark Species whose Retention is Prohibited

3. Subject to paragraph 4, CPCs shall ensure that their flag vessels do not retain on board, transship, land and store any part or whole carcass of the following sharks:

   a) oceanic whitetip sharks;
   b) thresher sharks; and
   c) whale sharks

4. Without prejudice to paragraph 3, scientific observers shall be allowed to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs, skin samples, spiral valves, jaws, whole and skeletonised specimens for taxonomic works and museum collections) from sharks listed in paragraph 3, provided that they are dead at haulback and that samples are part of a research project approved by the IOTC Scientific Committee. Approval shall be granted pending the submission to the IOTC Scientific Committee of a detailed document outlining the purpose of the work, number and type of samples intended to be collected and the spatio-temporal distribution of the sampling work must be included in the proposal for the research project. The IOTC Scientific Committee shall review the research proposal and decide on whether or not to grant approval. Annual progress of the work and a final report on completion of the research project shall be presented to the IOTC Working Party on Ecosystems and Bycatch and the IOTC Scientific Committee.

Full Utilisation of Other Sharks

5. CPCs shall take the measures necessary to require that all sharks retained on board their vessels are fully utilised. CPCs shall ensure that the practice of shark finning is prohibited.

6. In order to implement the obligation in paragraph 5 for sharks landed fresh, CPCs shall require their vessels to land sharks with fins naturally attached to the carcass.

7. Without prejudice to paragraphs 5 and 6, in order to facilitate on-board storage, shark fins may be partially sliced through and folded against the shark carcass as specified in the diagram in **Annex II**, but shall not be removed from the carcass until the first point of landing.

8. In order to implement the obligation in paragraph 5 for sharks landed frozen in 2026, 2027 and 2028, CPCs shall ensure their fleets land or tranship sharks with fins naturally attached to the carcass or to use one and only one of the alternative measures listed below:

   a) Each individual shark carcass is bound to the corresponding fins using rope or wire;
      or

   b) Identical and uniquely numbered tags are attached to each shark carcass and its corresponding fins in a manner that inspectors can easily identify the matching of the carcass and fins at any time. Both the carcasses and fins shall be stored on board in the same hold.

9. If a CPC decides to authorise its vessels to use the alternatives in paragraph 8, it shall:

[1] The term supply vessels shall include support vessels.

a) notify the Secretariat by 1 September 2025;

b) implement enhanced monitoring efforts on any vessels authorised to implement the alternatives;

c) ensure that individual shark carcasses and their corresponding fins can be easily identified by inspectors on board the vessel at any time; and

d) ensure that these alternatives shall be applied before sharks are stored in fish holds as soon as possible.

10. The Secretariat shall circulate the information received from CPCs under paragraph 9 (a) to all CPCs immediately after the deadline.

11. Each year in their compliance questionnaire, the CPC shall report the information on the implementation of the alternatives in paragraph 8:

    a. any enforcement difficulties encountered from observer, electronic monitoring, aerial, boarding, and landing inspection reports;

    b. how monitoring of authorised vessels has been enhanced;

    c. how many vessels used the alternative measures in the previous year;

    d. how compliance is enforced at sea and in port, including how possible incidents of disproportionate fin counts, high grading and species substitution have been addressed;

    e. an explanation of why the fleet has adopted its fin-handling practice; and

    f. any other information Compliance Committee might deem necessary.

12. The Compliance Committee shall annually review and discuss the information submitted in accordance with paragraph 11 and, as appropriate, advise the Commission on the effectiveness of the alternatives in paragraph 8 to prevent finning, in particular in comparison to prohibition to remove fins specified in paragraph 5. The Commission shall decide by no later than the 32nd Session on shark finning and alternative measures, and whether any further modifications are required.

13. If in any year a CPC who used the alternative measures does not provide the information to the Compliance Committee in accordance with paragraph 11, then that CPC will no longer be able to use the alternative measures set out in paragraph 8.

Bycatch Mitigation Measures

14. From 1 January 2026, CPCs shall ensure that their flag long-line vessels do not use branch lines running directly off the longline floats or drop lines, known as shark lines. See **Annex I** for a schematic diagram of a shark line.

15. In order for any CPCs to continue to use wire trace north of 20S at least one CPCs will undertake scientific fishing trials to assess the effects of leader materials on the mortality of vulnerable shark species (including oceanic whitetip shark, silky shark, shortfin mako and thresher sharks) and blue sharks. Such trials must be conducted, concluded, presented to the IOTC Scientific Committee by SC30 subject to the possible extension in paragraph 18.

16. The trials objective will be to determine if, for the CPCs fleet, the use of wire leaders has a higher catch and mortality for the vulnerable and target shark species (both in total and by species) than does use of nylon monofilament leaders.

17. The trials will be conducted using an appropriate experimental design and analysed using appropriate statistical methods, the criteria and principles of which will be developed and agreed by the IOTC Scientific Committee at the annual Session in 2025.

18. The results of CPCs fishing trials must be presented in a detailed research paper (describing fully the methods and results and conclusions) to the IOTC Scientific Committee at its annual Session in 2027 for review and development of advice from the IOTC Scientific Committee to the Commission on the outcomes of the trial. A CPC may, with reasonable justification, request the Commission for an extension of 1 year to present the results of the fishing trials.

19. The IOTC Scientific Committee will also review available data and information by no later than SC29 pertaining to the spatial and temporal trends in:

    a) The relative distribution of vulnerable shark species and blue shark;

    b) The distribution of total longline fishing effort and by CPCs, by year over the past 10 years;

    c) The distribution and level of the use of wire leaders and monofilament leaders (and other leader types, if applicable) by CPC. For this point, all CPCs shall facilitate the provision of such information (best available) pertaining to their fleet to the IOTC Secretariat by 30 July 2026, to allow a summary of such spatial information to be provided to the SC.

20. In providing advice to the Commission on the outcomes of the fishing trials and their implications for the effectiveness of a prohibition on wire trace on vulnerable shark species in the IOTC area of competence, the SC30 subject to the possible extension in paragraph 18 will also provide advice based on the information in paragraph 19 above, regarding spatial options for the application of a prohibition on wire trace that take account of the distribution of each vulnerable and target shark species.

21. If no CPC has presented research in compliance with the above conditions to the SC in the timeline provided, then from January 1, 2028, unless subject to possible extension in paragraph 18, all CPC shall ensure that their flagged vessels are prohibited from using or carrying[2] on board wire trace as leaders or branchlines in the IOTC area of competence North of 20 degrees South.

22. CPCs shall ensure that their flag vessels:

    a) promptly release, to the extent practicable, sharks listed in paragraph 3 if recognised before bringing them on board the vessel or when brought alongside to ensure safe identification;

    b) release, in fisheries in which sharks are unwanted species, sharks (especially juveniles and pregnant sharks) alive that are caught incidentally and are not used on board for food and/or subsistence.

23. CPCs shall ensure that their flag recreational and sport fishing vessels:

    a) release alive all caught sharks listed in paragraph 3; and

    b) are equipped, if they are carrying out fishing with high probability of catching sharks listed in paragraph 3, with instruments suitable to release the animals alive.

24. With the aim to reduce post-release mortality, CPCs shall ensure that their flag vessels, when a shark is released, release the shark as soon as practically possible, taking into consideration the safety of the crew and observer, in accordance with the Minimum Standards for Safe Handling And Live Release Procedures set out in **Annex III**. The IOTC Scientific Committee shall review these Minimum Standards by 31 December 2025 and provide recommendations to the Commission on further improvements of the Minimum Standards for consideration and adoption at its annual Session in 2026.

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[2] CPCs that fish South of 20 degrees South with wire trace must ensure at all times that their vessels stow wire trace when they are North of 20 degrees South.

25. CPCs shall ensure that fishers are aware of and use available identification guides such as the IOTC Shark and Ray Identification in Indian Ocean Fisheries[3].

Specific Requirements for Blue Sharks

26. Based on the review and the results of the stock assessment to be conducted in 2025, updated reported catch information by each CPC and taking into account the IOTC Scientific Committee's advice, the Commission shall consider at its 2026 Session specific conservation and management measures for blue sharks, including a total allowable catch, catch limits for each CPC to be decided taking into account among other things, the most recent reported catch information.

27. The IOTC Scientific Committee shall continue the development of a management strategy evaluation framework for Indian Ocean blue shark, and present to the Commission potential harvest control rules, and associated candidate limit, target and threshold reference points.

Specific Requirements for Whale Sharks

28. CPCs shall ensure that their flag vessels do not intentionally set a purse seine net around a whale shark if it is sighted prior to the commencement of the set.

29. CPCs shall ensure that, if a whale shark is unintentionally encircled in a purse seine net, the master of the vessel takes all reasonable steps to ensure its safe release, while taking into consideration the safety of the crew. These steps shall follow the best practice guidelines for the safe release and handling of encircled whale sharks to be developed by the IOTC Scientific Committee by 31 December 2025 and subsequently submitted to the Commission for consideration and endorsement at its annual Session in 2026.

30. CPCs shall ensure that, if a flag purse seine vessel unintentionally encircles a whale shark in a purse seine net or fishing vessels using other gear types have an interaction with a whale shark in association with their fishing activity, the master of the vessel reports the incident to the relevant authority of the flag State, with the following information:

    a) the number of individuals;

    b) a short description of the interaction, including details of how and why the interaction occurred;

    c) the location of the interaction;

    d) the steps taken to ensure safe release; and

    e) an assessment of the life status of the animal on release, including whether the whale shark was released alive but subsequently died.

Reporting Requirements

31. CPCs shall ensure that all interactions with sharks related to paragraphs 3, 15, 22 and 28 are duly recorded through logbooks and, when an observer is on board, through observer reports in accordance with Resolutions 15/01 *On the recording of catch and effort data by fishing vessels in the IOTC area of competence* and 24/04 [superseded by Resolution 25/06] *On a Regional Observer Scheme*. CPCs shall submit this information to the IOTC Executive Secretary according to the timelines specified in Resolution 15/02 *Mandatory Statistical Reporting Requirements for IOTC Contracting Parties and Cooperating Non-contracting Parties (CPCs)* (or any superseding Resolution). CPCs shall additionally report any instances in which whale sharks have been encircled by the purse seine nets of their flagged vessels in their annual Implementation Report.

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[3] https://iotc.org/science/species-identification-cards.

32. CPCs shall report annual data for catches of all sharks in accordance with IOTC data reporting requirements and procedures in Resolution 15/02 *Mandatory statistical requirements for IOTC Members and Cooperating Non-Contracting Parties (CPC's)* (or any superseding Resolution), including estimates and status of discards (dead or alive) and size frequencies. CPCs shall additionally report all available historical data that has not yet been reported.

33. The Commission, on advice from the IOTC Scientific Committee, shall develop and consider for adoption at its annual Session in 2026 mechanisms to encourage CPCs to comply with their reporting requirements on sharks, notably on the most vulnerable shark species as identified by the IOTC Scientific Committee.

34. The Commission shall consider appropriate assistance to developing CPCs for the identification of sharks and the collection of data on their shark catches and assist in reporting of those.

35. CPCs shall include in their national Annual Reports to the IOTC Scientific Committee information on the actions they have taken domestically to monitor catches.

National Action Plans

36. CPCs should implement the FAO International Plan of Action for the Conservation and Management of Sharks (IPOA Sharks)[4].

37. CPCs should include their National Plans of Action under the IPOA Sharks in their annual Implementation Report.

Scientific Work and Recommendations

38. The IOTC Scientific Committee shall, through the IOTC Working Party on Ecosystems and Bycatch, continue its work on identifying and monitoring the status of sharks until such time as comprehensive assessments are possible for all relevant sharks, including those listed in paragraph 3, silky sharks, hammerhead sharks and mako sharks. The IOTC Scientific Committee shall establish terms of reference for a long term-project on sharks in the IOTC area of competence to be considered by the Commission at its annual Session in 2026, with the aim to ensure the collection of data required for performing reliable stock assessments for key shark species, including those listed in paragraph 3, silky sharks, hammerhead sharks and mako sharks. The project will include:

    a) the identification of data gaps for key shark species in IOTC;

    b) the collection of relevant data, including through direct contacts with CPC national administrations, research institutes and stakeholders;

    c) any other activity that could contribute to improving the collection of data required for performing stock assessments of key shark species in IOTC;

    d) the development and further improvement of shark identification guides for relevant shark species to provide a better overview on the compliance status of CPCs and thereby assist CPCs to comply with their reporting obligations. The IOTC Executive Secretary shall make these shark identification guides available on the IOTC website and distribute them among CPCs in regular intervals.

    CPCs are encouraged to contribute financially to the implementation of the project.

[4] https://www.fao.org/ipoa-sharks/tools/en/.

39. The IOTC Scientific Committee shall advise the Commission on the population status of relevant sharks, on their vulnerability to overfishing, and on whether precautionary management of these species, through the application of specific measures such as the measure in paragraph 3, is recommended.

40. CPCs with reported catches and landings of sharks shall endeavour to undertake research to:

    a) identify ways to make fishing gears more selective and reduce the mortality of incidentally caught sharks, in particular those listed in paragraph 3;

    b) improve knowledge on key biological/ecological parameters, life-history, behavioural traits, migration patterns, and post-release survival of key shark species, including those listed in paragraph 3 and silky sharks, hammerhead sharks and mako sharks;

    c) facilitate capacity building of CPCs in shark species identification to improve data reporting at species level;

    d) identify key shark mating, pupping and nursery areas, including those listed in paragraph 3 and silky sharks, hammerhead sharks and mako sharks; and

    e) improve handling practices for live sharks to maximise post-release survival.

    CPCs shall make the results of any such research available to the IOTC Scientific Committee and the IOTC Working Party on Ecosystems and Bycatch.

41. The IOTC Scientific Committee shall review annually the information reported by CPCs pursuant to this Resolution and the results of the research project pursuant to paragraph 38, on a gear-by-gear-basis. On this basis, the IOTC Scientific Committee shall, as appropriate and on an annual basis, provide recommendations to the Commission on ways to strengthen the conservation and management of sharks within IOTC, including:

    a) prohibition of utilisation of additional vulnerable shark species under paragraph 3 of this Resolution as appropriate;

    b) measures to improve the conservation of sharks whose utilisation is prohibited under paragraph 3, including mitigation measures to reduce the mortality of sharks, improving selectivity of fishing gears, spatial/temporal closures or minimum conservation sizes;

    c) measures to improve the conservation and management of sharks whose utilization is not prohibited,

    d) options for candidate limit, threshold and target reference points for the conservation and management of all sharks caught in association with IOTC fisheries, prioritising sharks caught for commercial purposes;

    e) total allowable catches for sharks caught in association with IOTC fisheries, prioritising sharks caught for commercial purposes;

    f) spatial/temporal closures or minimum conservation sizes;

    g) bycatch mitigation measures, including improvements of fishing gear selectivity and reduction of post release mortality via technical devices such as double conveyor belts for the release of incidentally caught shark in purse seine fisheries42. 43. to increase the probability of survival for released sharks;

    h) options to reduce post-release mortality sharks to be included in Resolution 15/01 *On the Recording of Catch and Effort Data by Fishing Vessels in the IOTC Area of Competence* (or any superseding Resolution) as species whose catch must be recorded.

42. In providing its recommendations pursuant to paragraph 26, the IOTC Scientific Committee shall take into account, *inter alia*, the following:

a) full stock assessments on sharks, stock assessments and, in the absence of more robust scientific information, Ecological Risk Assessments (ERAs) by fishing gears, using the best available scientific data/information;

b) trend of fishing effort by fishing gear on each shark species;

c) effectiveness of conservation and management measures for those fishing gears posing a high risk of incidental catches or other harmful impacts on sharks;

d) priority in sharks with high risk;

e) review of the practical implementation of the retention ban in paragraph 3;

f) feasibility of the implementation of the retention ban in paragraph 3, including identification of shark species;

g) impact and bias of conservation and management measures of sharks on fishing operations and shark data/information collected and reported by CPCs; and

h) Resolution 12/01 *On the Implementation of the Precautionary Approach*.

43. The IOTC Scientific Committee shall, at its annual Session in 2025, review existing data and information relating to the life history and conservation status of whale sharks, and confirm whether they meet the definition of being a taxon of the greatest biological vulnerability and conservation concern for which there are very few data. Should this be the case, the IOTC Scientific Committee shall advise the Commission on the appropriateness of applying precautionary management measures in IOTC fisheries, including a retention ban. The IOTC Scientific Committee may also identify options for future research and data collection, as well as advise on other mitigation measures for relevant IOTC fisheries.

Final Provisions

44. This Resolution shall enter into force on 1 January 2026.

45. Notwithstanding paragraph 44, paragraph 3(c) of this Resolution shall enter into force on 1 July 2026, and only if the IOTC Scientific Committee explicitly and unambiguously recommends, in accordance with paragraph 43 of this Resolution, a retention ban for whale sharks.

46. This Resolution supersedes the following Resolutions:

a) Resolution 18/02 *On Management Measures for the Conservation of Blue Shark Caught in Association with IOTC Fisheries*;

b) Resolution 17/05 *Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by the IOTC*;c) Resolution 13/05 *On the Conservation of Whale Sharks (Rhincodon typus)*;

c) Resolution 13/06 *On a Scientific and Management Framework on the Conservation of Shark Species Caught in Association with IOTC Managed Fisheries*; and

d) Resolution 12/09 *On the Conservation of Thresher Sharks (Family Alopiidae) Caught in Association with Fisheries in the IOTC Area of Competence*.

Attachment 2: Report of argument relating with the correspondence to paragraph 17 of the Resolution 25-08 (underlined by authors)

103. The WPEB REQUESTED that the SC consider and discuss how best to conduct trials to test leader effects on vulnerable species to take into account when they have differing distributions and core areas of abundance. With respect to paragraph 17 in particular, the WPEB discussed the recommended criteria and principles proposed by paper IOTC-2025-WPEB21(AS)-24. In general, the WPEB NOTED that the proposed criteria and principles were appropriate and based on well-established and tested scientific principles and practice for scientific experiments. WPEB NOTED the following points raised by participants during discussion:

- The conducting of scientific fishing trials can be logistically intensive and challenging (including to find appropriate survey design as well as candidate vessels and required funds), and the interpretation of results can be subject to limitations due to pragmatic difficulty of covering all key variables in particular time, area, and operational differences.
- Scientific fishing trials are the approach required under Resolution 25/08, however, some participants considered that careful consideration would be needed before determining that scientific fishing trials are the best way to evaluate the objective, from the practicality and feasibility aspects.
- Prior to scientific fishing trials being conducted, the Scientific Committee should discuss and agree on the handling of logistical matters, including who bears the cost, accessibility to obtained information, treatment of tunas and shark catch taken, review mechanism of results, and corresponding risks in management.
- If possible, those CPCs wishing to continue to use wire trace north of 20oS should collaborate to conduct such trials, as it may be more difficult for one CPC to cover different areas (if required) or collect sufficient data in the IOTC region. A collaboration approach was also proposed by the authors of paper IOTC-2025-WPEB21(AS)-22.
- The scientific fishing trials can be conducted either via scientific research vessels or on commercial fishing vessels (with scientific observers coordinating trial activities). Conducting trials on commercial vessels may ensure more authentic fishing conditions but can sometimes add additional constraints to survey design.
- Any trial should consider adding additional data collection fields to those mentioned under criteria #6 in the paper IOTC-2025-WPEB21(AS)-24 (for example time since hooking using hook-timers, mean fishing depth using temperature-depth recorders (TDRs), the length of the leader remaining in the bite-offs, estimated fish length) and should also consider if other variables (e.g. bait type) should be included in the trial design, if they are considered likely to interact with leader type effects, with at-haulback mortality risk or with the number of bite-offs.

104. The WPEB RECOMMENDED that the Scientific Committee take into account the criteria outlined in the IOTC-2025-WPEB21(AS)-24 (below) and points raised above when discussing the principles for conducting an experimental fishing trial(s) as requested per Resolution 25-08. For reference, the criteria outlined in IOTC-2025-WPEB21(AS)-24 are as follows:

- That the trial is conducted in areas and seasons with known high shark abundance (including of vulnerable shark species), using existing data from Indian Ocean Regional Observer Scheme (ROS) data or surveys to identify suitable hotspots.
- Before the trial, conduct a power analysis (following Watson et al. 2005) informed by historical bycatch data from the Indian Ocean to determine the number of sets required to detect a true effect (for each vulnerable species), thereby avoiding a Type II error.
- That the trial employs a "paired comparison" approach by alternating control (nylon monofilament) and experimental (wire) leaders along each longline section. Also, alternate the leader type on the first branch line for every subsequent fishing set to ensure a balanced design.
- That the trial standardises all gear and operational practices, including, inter alia, soak time, setting/hauling times, bait/hook types and branch line/leader lengths and other gear characteristics (e.g. use of lightsticks) to assist the trial in isolating the effect of leader material.
- Use at least one, and preferably two, independent observers or scientific researchers who are trained in longline operations and species identification to minimise human error and observational bias.
- Establish a standardised protocol for collecting data. Key metrics to record are species ID, leader material, fate (retained/discarded), condition at haulback, and the occurrence of bite-offs and the length of the leader remaining in the branchline of bite-offs.
- Ensure the trial vessel skipper and crew are briefed on the trial's objectives and design, and that they support the experimental protocols.
- Develop the statistical analysis plan in collaboration with biostatisticians. Appropriate statistical approaches may include hierarchical or mixed-effect models (e.g., GLMMs) to analyse key response variables, including: CPUE, bite-off rate, and haulback mortality rate.