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An update for 2024-2025 on the development of IOTC BTH PRM Project

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ABSTRACT

This note provides recent updates on IOTC bigeye thresher shark (*Alopias superciliosus*, BTH) post-release mortality study project (IOTC BTH PRM Project). The objective of the study is to evaluate the efficiency of the IOTC Conservation and Management Measure on non-retention of thresher sharks of the genus *Alopias* (Resolution 12/09). The summary of collective efforts since the 13th, 14th, 15th, 16th, 17th, 18th, 19th, and 20th IOTC WPEB are presented.

Introduction

The primary objective of this study is to assess the post-release mortality of bigeye thresher sharks caught and released (in accordance with IOTC CMMs[1]) by major commercial longline fleets fishing in the IOTC Area of Competence. For details of project development and experimental design please see IOTC-2018-WPEB14-27 and IOTC-2019-WPEB15-16.

The project started in 2017 have represented collaborative efforts of IOTC Secretariat and several research institutions working with following fishing fleets (in alphabetic order): China, France, Japan, Portugal, South Africa, and Taiwan. On 16 September 2020 Taiwan has withdrawn from the project (please contact IOTC Secretariat for further details). For this reason, report for WPEB (IOTC-2020-WPEB16-INF1) was also withdrawn from the list of documents presented at WPEB 16 in 2020.

Currently the IOTC BTH PRM Project active collaborators are limited by three fleets: France (Reunion), Portugal, and South Africa, see details in the 'COVID-19 Effect and its effect on the Project partnership in post-COVID period' section.

Experimental design

The complete experimental design document was presented during the 14th WPEB and is available as an appendix to working paper IOTC-2018-WPEB14-27.

Training material

No progress since 2020. The latest version of the manual is the IOTC manual for tagging bigeye thresher shark (BTH) with pop-up satellite archival tags (PSAT) to evaluate post-release mortality (PRM) 2019 V2-1.

Training

Training of scientific observers, scientists and students in tagging of sharks with pop-up satellite archival tags in Reunion Island has been performed routinely along 2023-2025.

[1] Indian Ocean Tuna Commission Conservation and Management Measure: Resolution 12/09 *On the conservation of thresher sharks (Family Alopiidae) caught in association with fisheries in the IOTC Area of Competence. http://www.iotc.org/cmm/resolution-1209-conservation-thresher-sharks-family-alopiidae-caught-association-fisheries-iotc*

COVID-19 Effect and its effect on the Project partnership in post-COVID period

The COVID-19 pandemic has heavily affected the project. Placing observers onboard fishing vessels was suspended starting from 2020 for variable periods in China, Japan, France, Portugal and South Africa. However, in 2020 Japan arranged the tagging through direct contract with the industry: a person initially trained as observer was recruited by the industry and voluntary proposed collaborated with NRIFSF to carry out deployment within the IOTC BTH PRM Project.

The post-COVID period shows gradual decline in the project participation with restrained approach by China, Japan, and Portugal (the latter due to fishermen demand for gratification of tagging operations even for species banned for retention). In 2023, during the WPEB 19, Spanish Institute of Oceanography (IOE) have expressed interest to participate in the project, however IOE not joined the project due to administrative restructuration and other internal issues. During the WPEB 20 Portugal (IPMA) agreed to re-start tagging in smaller scale compare to pre-COVID era. Despite low number of partners a considerable progress was observed in 2024-2025 thanks to successful field operations of France, South Africa and Portugal.

MiniPAT battery issues

In February 2020, the tags manufacturer, Wildife Computers, released a notification: “Increased variability in total transmissions from MiniPATs shipped from mid-2018 through 2019” that concerns reliability of miniPATs fabricated between 2017 and 2019. The notification announced a recall for certain series of non-deployed tags shipped from mid-2018 to late 2019. The first batch IOTC BTH PRM tags were received in April 2018 and were not covered by the recall directly. However, weak performance of certain miniPATs observed for deployed tags followed by an analysis of miniPATs transmissions performed by Wildlife Computers engineers indicated the presence of battery problems.

The batterie issue still persist in 2024-2025: at least tag made during 2023 still have poor batteries performance after 6-months of tag deployments. One of these tags transmitted data for less than 24 hours after pop-up. In 2024 and 2025 four batches of tags were sent for warranty replacement to Wildlife Computers. All these operations were covered by Wildlife Computers warranty and do no need any funding from IOTC or partners. Late 2024 the Wildlife Computers have informed about development of new sPAT (sPAT-407C) and minPAT (MiniPAT-430) that are apparently free from batteries issues. First replacement tags from new series were received in August 2025. They have not yet been used in tagging operations yet.

Right now, a total of 4 miniPATs and 18 sPATs are available for immediate tagging. 1 s PAT is in South Africa, 5 sPATs in Reunion Island and 12 sPATs and 4 miniPATs are in the meeting place, Sète.

1 miniPAT is in the process of replacement by WC into new tag models. Expected shipment – late November 2025.

Tagging efforts in 2024-2025

Since project start BTH were tagged by five partners (see Table for details). Following to tag recall procedure, no tags were deployed since last WPEB in 2022-2023. In 2024-2025 only France, Portugal and South Africa possessed tags and tagged BTH. None of the other partners expressed interest to obtain tags and continue tagging operations.

Reunion Island, France

Since early 2024 Reunion Island observers kept tags onboard during local fishing operations and during longer trips to Mozambique Channel. However, till December no BTH were tagged due to low encounter rate, compare with other species (e.g. during single trip of 27 sets a total of 2 oceanic whitetip sharks, *Carcharhinus longimanus* and 4 shortfin mako, *Isurus oxyrinchus* were tagged but none of bigeye thresher shark).

In December 2024 Reunion Island observer have tagged two BTH with miniPATs (one off east Madagascar coast and another one north from Reunion)(Figure). Both tags popped-up in preprogrammed date, sharks survived. Another one BTH shark were tagged by miniPAT and one with sPAT in June 2025 (Figure). MiniPAT tag is still in water, expected pop-up date 17.12.2025 and sPAT popped-up in preprogrammed date, shark survived.

South Africa

In February and March 2025 two BTH were tagged with sPATs. Both sharks survived.

Portugal

In June 2025 two BTH were tagged with miniPATs. One tag popped-up prematurely after 53 days in water (shark survived) and another tag is still in water, expected pop-up date 27.12.2025 (apparent survival).

Table. Summary of PSATs deployment by partner

Fleet	Partner	Number of tags distributed		Year of distribution	Sharks tagged																	
		sPAT	mini-PAT		2018		2019		2020		2021	2022		2023		2024		2025		Total	
					sPAT	mPAT	sPAT	mPAT	sPAT	mPAT		sPAT	mPAT	sPAT	mPAT	sPAT	mPAT	sPAT	mPAT	sPAT	mPAT
Japan	NRIFSF	4	0	2019		N/A*		N/A	1	N/A			N/A		N/A	R	R	R	R	1	N/A
Taiwan	KNU	8	5	2019			4	4	1	1	WD**	WD	WD	WD	WD	WD	WD	WD	WD	5	5
France	IRD	8	4	2018				1					1				2	1	1	1	5
Portugal	IPMA	6	4	2018	1	2	4	3								R	R		2	5	7
South Africa	DAFF	4	2	2018									2					2		2	2
China	ShOU	4	5	2019										R	R	R	R	R	R	0	0
Total		**34**	**20**		**1**	**2**	**8**	**8**	**2**	**1**	**0**	**0**	**3**	**0**	**0**	**0**	**0**			**14**	**19**

* N/A – Not applicable

** WD – Withdrawn

***R - restrained

Preliminary results

A preliminary estimation of post-release survival rate for bigeye thresher shark caught and released by pelagic longline fleet in the Indian Ocean is 64.3% (18 out of 28 individuals considered in the analysis). However, this estimate should not be used in the evaluation of conservation measures efficiency since operations are still ongoing and several participating fleets are poorly covered or not represented at all. Compliance of each tagging operation to experimental design and protocols are also not evaluated yet. In particular survivorship for tagging operations of 2024-25 was equal to 100% while tagging at the start of the programs shows lower survival rate. Apparently fleet and shark handling practice variables plays important role in BTH survivorship. These variables still have to be analysed.

Perspectives

In view of the delay in the project implementation, and the progress achieved in 2024-2025 I would advise to extend project till the end 2028. Projecting from current tagging pace we can expect to finish all field operation by the end of 2026 – early 2027.

A total of 23 tags are still available for tagging. As agreed with IOTC Secretariat additional funds to cover ARGOS transmission will be covered by IOTC regular budget.

Acknowledgements

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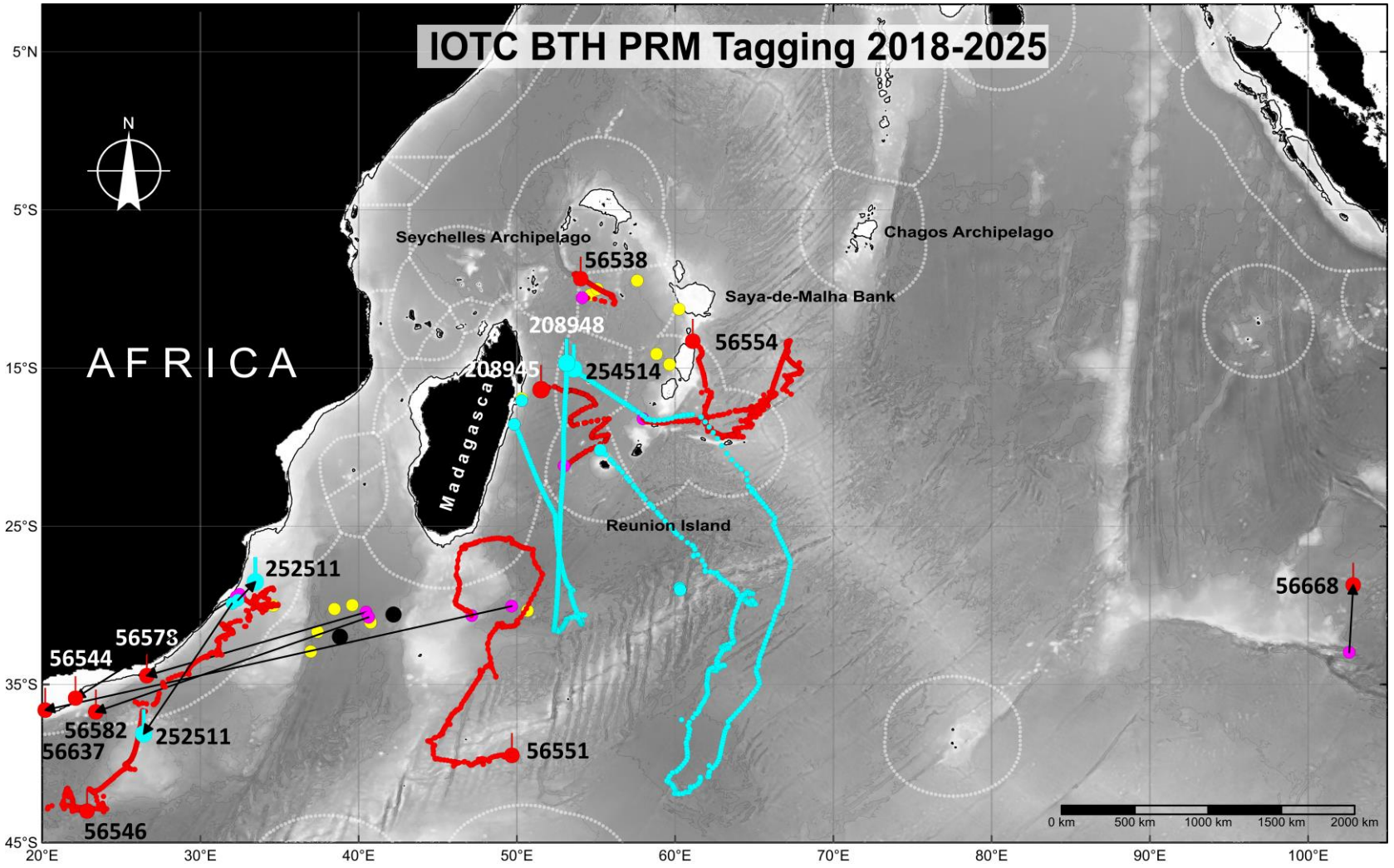

Figure. Positions of deployment, tags pop-up and most probable tracks (only for miniPATs) for bigeye thresher sharks tagged and released during IOTC BTH PRM Project during 2018-2025. Yellow circles represent mortalities, black circles are non-reported tags and circles in magenta are survivals over 60 days (full deployments of sPATs). Red circles with antennas are pop-up locations. Symbols in cyan represent tagging 2014-2015. Numbers are PTT (Platform Transmitter Terminals) numbers, i.e. tag unique identifiers in the ARGOS system.