
AN UPDATE FOR 2025-2026 ON THE PROGRESS OF IOTC BTH PRM PROJECT

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Discussions: The paper is to inform WPEB on the progress achieved to date in the implementation of IOTC bigeye thresher shark (*Alopias superciliosus*, BTH) post-release mortality study project (IOTC BTH PRM Project).

Feedback: The authors of the paper request the WPEB to review and comment on: project achievements and suggestion for final phase of the project.

Decisions: The paper seeks approval of the following decisions: 1) Extension of the project till 31 December 2028; 2) To ensure funding of ARGOS transmission from IOTC regular budget till the deployment of the last satellite tag.

IOTC Working Party on Ecosystems and Bycatch (WPEB) Saint-Pierre, La Réunion, France, 14-18 September 2026.

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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 21st 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) 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,China. On 16 September 2020 Taiwan,China has withdrawn from the project (please contact IOTC Secretariat for further details). For this reason, report for WPEB (IOTC-2020-WPEB16-INF1) was also withdrawn from the list of documents presented at WPEB 16 in 2020.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.

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 and 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.

No specific training of scientific observers was performed in 2025-2026.

State of partnership and field operations

From the start of the project a total of 7 countries/institutions have signed partnership agreement (letter of understanding): China (Shanghai Ocean University¹), Japan (National Research Institute of Far Seas Fisheries), France (Institut de Recherche pour le Développement), Portugal (Portuguese Institute for Ocean and Atmosphere), South Africa (Department of Agriculture, Forestry and Fisheries), and Taiwan, China (National Kaohsiung University). To date only Taiwan, China withdraw officially from the project. However, in 2025-2026 only France, Portugal and South Africa contribute actively to the Project implementation. Despite low number of partners, a considerable progress was observed (9 BTH tagged by sea-going observers) in 2025-2026.

Tags battery issues

In February 2020, the tags manufacturer, Wildlife 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. This notification admitted serious problem in tag performance related with batteries passivation. Wildlife Computers organised free return shipment and warranty replacement of all tags (both miniPATs and SPATs) touched by battery problem. The batterie issue involved numerous batches of tag used during the Project. The persistent problem resulted in regular tags exchange with Wildlife Computers every year since 2020. The issue is still persisted in 2025-2026: some tags made during 2024 showed signs of battery passivation (low transmitting voltage), while tags fabricated in 2023 shown poor overall performance (short period of data transmission) after 6-months of tag deployments likely due to batteries problems. One of these tags transmitted data for less than 2 hours after pop-up. In 2025 and 2026 three batches of tags were sent for warranty replacement to Wildlife Computers. All these operations were covered by Wildlife Computers warranty and do not needed 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. No batteries passivation was observed during storage of these tags. As to field performance, we didn't see improvement for tags fabricated in 2024 (Serie 24P) (3-7 days of data transmission but apparent drastic improvement of performance (not validated yet, one tag only) for tags made in 2025 (Serie 25P) – 120 days of transmission.

I would like to admit also that entry into service in July 2025 new 'Kinéis' satellite constellation highly improved data transmission efficiency by tags. In some case we have observed 300% increase in the volume of transmitted data.

Tagging efforts in 2025-2026

Since project start a total of 34 BTH and 2 PTH were tagged by five partners (see Table 1 for details). In 2025-2026 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.

¹ The names of all organisations are given as at the date of LoU signing.

Reunion Island, France

In 2025-2026 Reunion Island observer have tagged two BTH with miniPATs and two with sPATs (Figure 1). Three tags popped-up in a pre-programmed date (180 and 60 days for miniPATs and sPAT respectively). One of BTH tagged with sPATs does not survive. One of miniPATs have popped-up on 07.09.2026 and still transferring data.

South Africa

In 2025-2026 three BTH were tagged with sPATs (Figure 1). All sharks survived.

Portugal

In June 2025 two BTH were tagged with miniPATs. Both sharks survived, however one of them was attacked on a 27th day of tracking by a endothermic predator (presumably mako shark or great white shark) (Figure 5).

Preliminary results

A total of 36 tags (19 miniPATs and 17 sPATs) were attached to thresher sharks (Tables 1, 2). Detailed analysis of video data and/photographs showed that two specimens tagged with sPATs were pelagic thresher sharks, *Alopias pelagicus*. Thus, these data were excluded in further preliminary analysis. Estimated length (FL) of tagged sharks varied from 100 to 300 cm with a dominance of specimens from 160 to 200 cm (Figure 2).

Two of deployed tags never reported data that corresponds to 5.9% of total number of tags. This is good result considering usual acceptable non-reporting limit of 10%. However, for quite high percentage of tags, in particular those deployed for 180 days period, the transmission time was very short (few hours for some tags) that limited volume of transmitted data and highly complicated diagnostics. According to diagnostics of such cases performed by tag supplier (Wildlife Computers) some of them were related with state of batteries but in some case with unidentified external factors as transmission voltage was still high, when tag abruptly stopped transmission.

Diagnostics performed on data (see examples at Figures 3-5) (Table 3) suggests that 61.3% of released sharks survived (while two of them subjected to apparent lethal attacks by endothermic sharks, Figure 5). A total of 35.3% of release tags shows immediate or delayed (less than a week) mortality that could be directly associated with interaction with fishing gear/fishing operation.

A quick data screening suggest that lowest survival rate was observed in early years of field operations, likely caused by the practice to pull sharks on the deck: all specimens tagged on the deck not survived the operation but survival rate for in-water tagged sharks reached 74% (Tables 4, 5). In this context one of suggestion to potential best practice of bigeye thresher shark handling would be promoting of 'in-water' release of this species without taking it onboard.

Perspectives

In view of the delay in the project implementation, and the progress achieved in 2025-2026 I would re-iterate my last-year' 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 2027.

Right now, a total of 4 miniPATs and 9 sPATs are available for immediate tagging. 4 sPATs are in South Africa (two at sea), 3 sPATs and 4 miniPATs are in Reunion Island (2 sPATs and 2 miniPATs are at sea). Two sPATs are in USA (Wildlife Computers) for warranty replacement (battery issues) into new tag models. Expected shipment date – 17 November 2026.

The current credit balance as of February 2026 is 741€ (recent balance should be updated by the end of the current transmission by a tag). This is not sufficient to cover transmission of last 13 tags and would need additional funding from IOTC.

Acknowledgements

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Captains and the crew of F/V **Grand Morne**, F/V **Ocean Hercules**, F/V **Ocean Wanderer**, F/V **Shin Shuen Far**, F/V **Shin Shuen Far No16**, F/V **Timor**, FV **Valmitão**, F/V **Vetyver 6**, F/V **Wen Dar No666**.

Chloé Leroy (Sorbonne Université, France) performed preliminary analysis of tag data including graphical presentation of depth, temperature and light data.

References

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IOTC BTH PRM Project Team, 2018. A progress report on the implementation of the IOTC bigeye thresher shark post-release mortality study project (IOTC BTH PRM Project). IOTC Working Party on Ecosystems and Bycatch, Cape Town, South Africa, 10-14 September 2018. IOTC-2018-WPEB14-27, 21 p.

Table 1. Summary of PSATs deployment by partner

Fleet	Partner	Sharks tagged																		
		2018		2019		2020		2021	2022		2023		2024		2025		2026		Total	
		sPAT	mPAT	sPAT	mPAT	sPAT	mPAT		sPAT	mPAT	sPAT	mPAT	sPAT	mPAT	sPAT	mPAT	sPAT	mPAT	sPAT	mPAT
Japan	NRISF	N/A*		N/A		1	N/A		N/A		N/A		R	R	R	R	R	R	1	N/A
Taiwan,China	KNU			4	4	1	1	WD**	WD	WD	WD	WD	WD	WD	WD	WD	WD	WD	5	5
France	IRD***				1				1				2	1	1	1	1	1	2	5
Portugal	IPMA	1	2	5	2								R	R		2			6	7
South Africa	DAFF / DEFF** ***								2						2		1		3	2
China	ShOU										R	R	R	R	R	R	R	R	0	0
Total		1	2	9	7	2	1	0	0	3	0	0	0	2	3	3	2	1	17	19

*N/A – Not applicable

**WD – Withdrawn

***R – restrained

****Field operations are managed by CITEB. Field work realised by SciSea since 2023.

*****Field operations are managed and realised by CapMarine

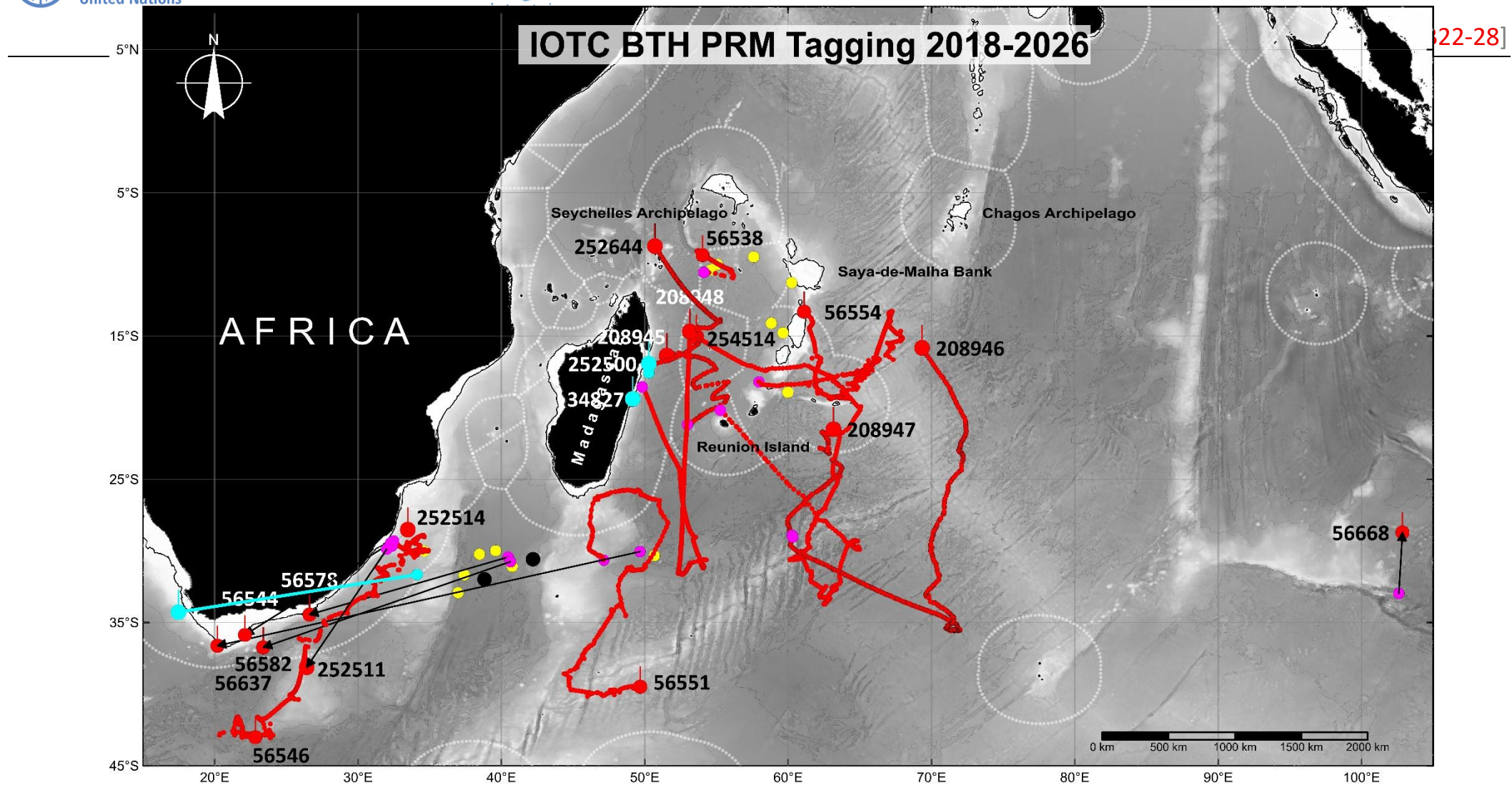


Figure 1. Positions of deployment, tags pop-up and most probable tracks (only for miniPATs) for bigeye thresher sharks tagged and released during IOTC BTH PRM Project during 2018-2025. Yellow circles represent mortalities; black circles are non-reported tags and circles in magenta are survivals. Red circles with antennas are pop-up locations. Symbols in cyan represent tagging 2014-2015. Symbols in cyan represent tagging 2025-2026. Numbers are PTT (Platform Transmitter Terminals) numbers, i.e. tag unique identifiers in the ARGOS system.

Table 2. Summary and diagnosis of PSATs deployments. Tags in '*bold italics*' are non-reporting, tags in 'bold underlined' (shaded lines) were attached to wrong species (pelagic thresher shark *Alopias pelagicus*)

Tag type		MiniPAT (180 days deployment) <i>n</i> =19													
Serial No	PTT	Species	FL, cm	Sex	Tagging conditions		Hook type	Hooking position	Terminal gear	Tagged by	Tagging date	Pop-up date	Tracking duration, days	Diagnosis	Predation
17P1264	56533	BTH	245	M	On	the	Circle	Mouth	Not reported	Taiwan, China	18/07/2019	19/07/2019	1	Mortality, too deep	
17P1265	56534	BTH	174	F	In	water	Circle	Mouth	Not reported	Taiwan, China	25/12/2019	25/12/2019	0	Mortality, too deep	
17P1266	56537	BTH	126	F	In	water	Circle	Tail	Not reported	Taiwan, China	20/08/2019	21/08/2019	1	Mortality, too deep	
17P1267	56538	BTH	165	M	In	water	Circle	Mouth	Not reported	Taiwan, China	13/01/2020	09/02/2020	27	Survival, premature detachment	
17P1268	56539	BTH	115	F	On	the	Circle	Mouth	Not reported	Taiwan, China	18/06/2019	N/A		Non reporting	
17P1274	56544	BTH	150	F	In	water	Circle	Mouth	Monofilament	South Africa	13/08/2022	10/02/2023	181	Presumed survival, poor data transmission (less than 1 hour)	

17P1276	56546	BTH	160	U	In water	Circle	Mouth	Monofilament	South Africa	14/08/2022	11/02/2023	179	Survival, poor data transmission (1day 18 hours)	
17P1277	56550	BTH	180	M	In water	J-hook	Mouth	Wire	Portugal	30/06/2019	N/A		Non reporting	
17P1278	56551	BTH	200	U	In water	J-hook	Mouth	Wire	Portugal	17/06/2019	21/09/2019	95	Survival, premature detachment (pin broke) poor data transmission (3 days 1 hour)	
17P1280	56554	BTH	200	U	In water	Teraci ma	Mouth	Monofilament	France	24/05/2019	21/11/2019	180	Survival	
17P0678*	49082	BTH	210	F	In water	Not reported	Not reported	Not reported	Portugal	11/05/2018	11/05/2018	0	Mortality, too deep	
17P0680*	49084	BTH	110	U	In water	Not reported	Not reported	Not reported	Portugal	18/05/2018	20/05/2018	2	Mortality, too deep	
20P2014	208945	BTH	160	U	In water	Circle	Mouth	Monofilament	France	03/06/2022	14/07/2022	41	Survival for 31 day	Predation by endothermic shark

															(mako or great white)
23P1266	208948	BTH	300	U	In water	Circle	Mouth	Monofilament	France	04/12/2024	03/06/2025	181	Survival, poor data transmission (14 hours)		
23P1328	252644	BTH	300	U	In water	Circle	Mouth	Monofilament	France	20/06/2025	15/09/2025	87	Mortality, too deep		
23P1909	254514	BTH	200	U	In water	Circle	Mouth	Monofilament	France	18/12/2024	17/06/2025	180	Survival		
23P2137	208947	BTH	250	U	Not reported	Not reported	Mouth	Not reported	Portugal	29/06/2025	21/08/2025	53	Survival for 27 days	Predation by endothermic shark (mako or great white)	
23P2170	208946	BTH	190	U	Not reported	Not reported	Mouth	Not reported	Portugal	30/06/2025	28/12/2025	180	Survival		
24P1545	34827	BTH	220	U	In water	Circle	Mouth	Monofilament	France	10/03/2026	07/09/2026	180	Survival	Tag transmitting data	

Tag type		sPAT (60 days deployment) n=17												
Serial No	PTT	Species	FL, cm	Sex	Tagging conditions	Hook type	Hooking position	Terminal gear	Tagged by	Tagging date	Pop-up date	Tracking duration, days	Diagnosis	Predation

17P0769*	46289	BTH	160	M	In water	Not reported	Not reported	Not reported	Portugal	01/05/2018	15/05/2018	14	Survival, premature detachment (pin intact) poor data transmission (1 day 19 hours)
17P0770*	46290	BTH	200	U	On deck	J-hook	Mouth	Not reported	Portugal	21/08/2019	21/08/2019	0	Mortality, too deep
17P1289	56578	BTH	170	U	In water	J-hook	Mouth	Wire	Portugal	08/06/2019	08/08/2019	61	Survival
17P1290	56581	BTH	240	F	On deck	J-hook	Mouth	Wire	Portugal	31/05/2019	14/06/2019	13	Mortality, too deep
17P1292	56582	BTH	180	U	In water	J-hook	Mouth	Wire	Portugal	06/06/2019	05/08/2019	60	Survival
17P1293	56637	BTH	200	U	In water	J-hook	Throat or stomach	Wire	Portugal	02/08/2019	02/10/2019	61	Survival
17P1451	56668	BTH	Not reported	M	In water	Not reported	Not reported	Not reported	Japan	08/06/2020	08/08/2020	61	Survival
<u>17P1463</u>	<u>56709</u>	<u>PTH</u>	<u>162</u>	<u>F</u>	<u>In water</u>	<u>Circle</u>	<u>Tail</u>	<u>Not reported</u>	<u>Taiwan, China</u>	<u>30/11/2019</u>	<u>30/11/2019</u>	<u>0</u>	<u>Mortality, too deep</u>
17P1465	56712	BTH	163	M	On the deck	Circle	Mouth	Not reported	Taiwan, China	15/08/2019	16/08/2019	24	Mortality, too deep

17P1467	56714	BTH	100	F	On deck	the	Circle	Mouth	Not reported	Taiwan, China	16/08/2019	16/08/2019	0	Mortality, too deep
17P1470	56720	BTH	187	M	On deck	the	Circle	Mouth	Not reported	Taiwan, China	12/07/2019	12/07/2019	0	Mortality, too deep
<u>17P1495</u>	<u>56724</u>	<u>PTH</u>	<u>148</u>	<u>F</u>	<u>In water</u>		<u>Circle</u>	<u>Mouth</u>	<u>Not reported</u>	<u>Taiwan, China</u>	<u>11/01/2020</u>	<u>11/01/2020</u>	<u>0</u>	<u>Mortality, too deep</u>
23P1325	252511	BTH	180	U	In water		Circle	Mouth	Monofilament	South Africa	12/03/2025	08/04/2025	27	Lost during tagging (floated at the surface then attacked by a predator)
23P1337	252514	BTH	195	U	In water		Circle	Mouth	Monofilament	South Africa	18/02/2025	20/04/2025	61	Survival
24P0986	252500	BTH	180	U	In water		Circle	Mouth	Monofilament	France	22/06/2025	22/08/2025	61	Survival
24P0989	252513	BTH	120	U	In water		J-hook	Mouth	Monofilament	France	29/04/2026	07/05/2026	8	Mortality, too deep
25P1395	34859	BTH	150	U	In water		Circle	Mouth	Monofilament	South Africa	03/02/2026	05/04/2026	60	Survival

*Tags borrowed from IRD POREMO Project

Table 3. Summary of tag diagnostic by tag type (bigeye thresher shark only, pelagic thresher shark not included)

Tag type	Survival				Not reported	Lost	Total
	Full deployment	Premature detachment	Predation	Mortality			
miniPAT	7	2	2	6	2		19
sPAT	7	1	-	6	-	1	15
Total	14	3	2	12	2	1	34
%*	45.2	9.7	6.4	35.3	5.9	2.9	100
%*		61.3					

*For correctly deployed reported tags

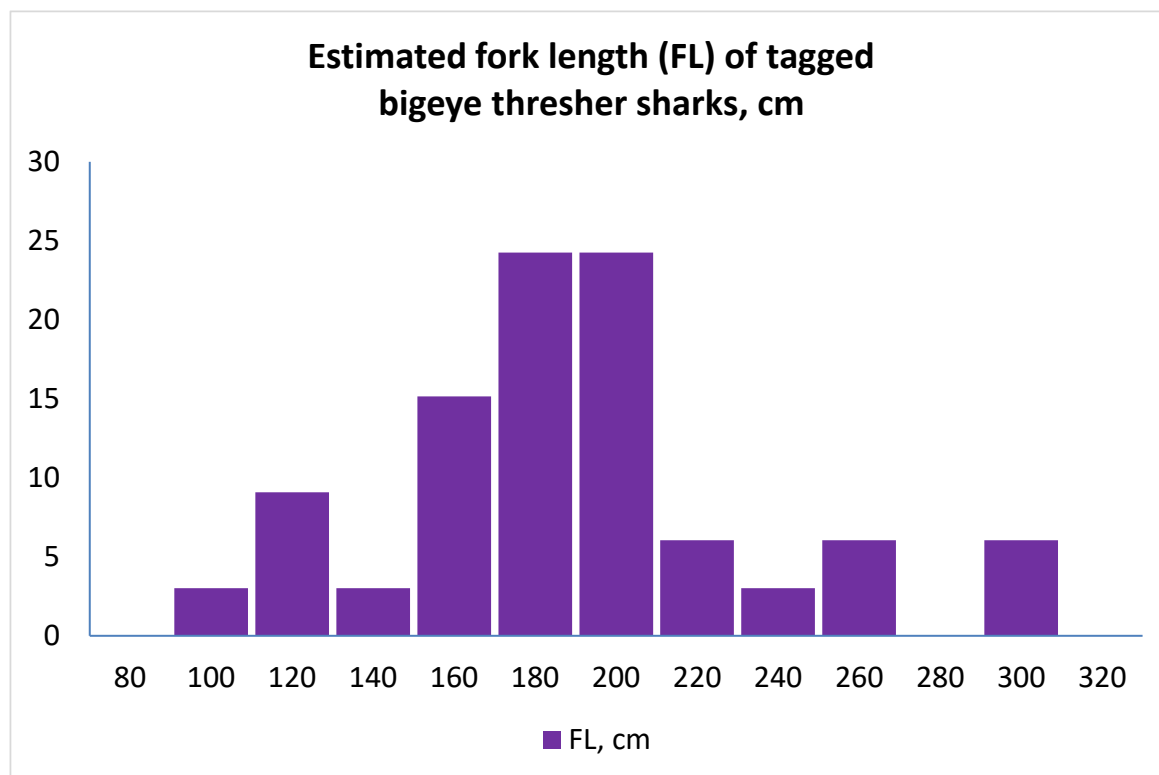


Figure 2. Length frequency distribution of bigeye thresher sharks (estimated FL, cm) tagged during IOTC BTH PRM Project

Table 4. Summary of survival by year of deployment (bigeye thresher sharks only, pelagic thresher sharks not included)

Diagnostics	Year									Total
	2018	2019	2020	2021	2022	2023	2024	2025	2026	
Survival	1	5	2		3		2	4	2	19
Mortality	2	8						1	1	12
Total deployed and reported	3	13	2		3		2	5	3	31
Survival rate, %	33.3	38.4	100		100		100	80.0	66.7	61.3



Table 5. Summary of survival by tagging conditions (bigeye thresher sharks only, pelagic thresher sharks not included)

Diagnostics	Tagging conditions		
	In water	On the deck	Total
Survival	17	0	17
Mortality	6	6	12
Total deployed and reported	23	6	29
Survival rate, %	73.9	0	

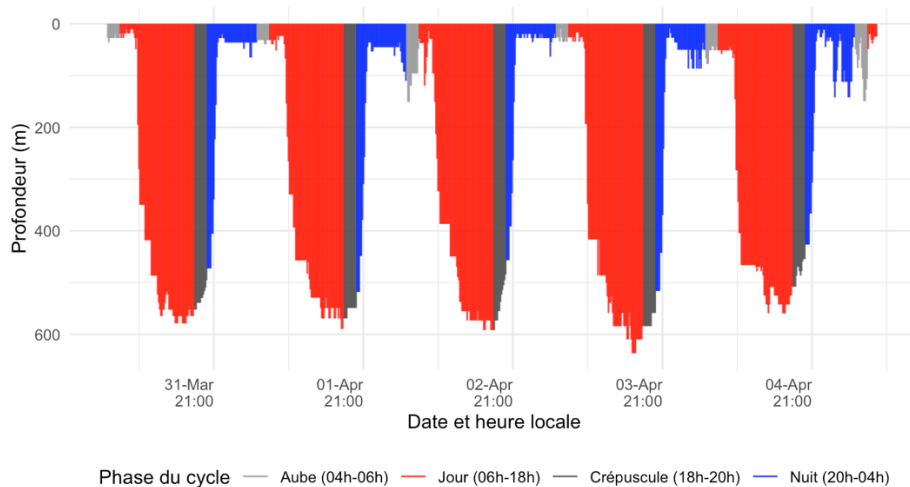


Figure 3. Example of BTH survival track based on sPAT data

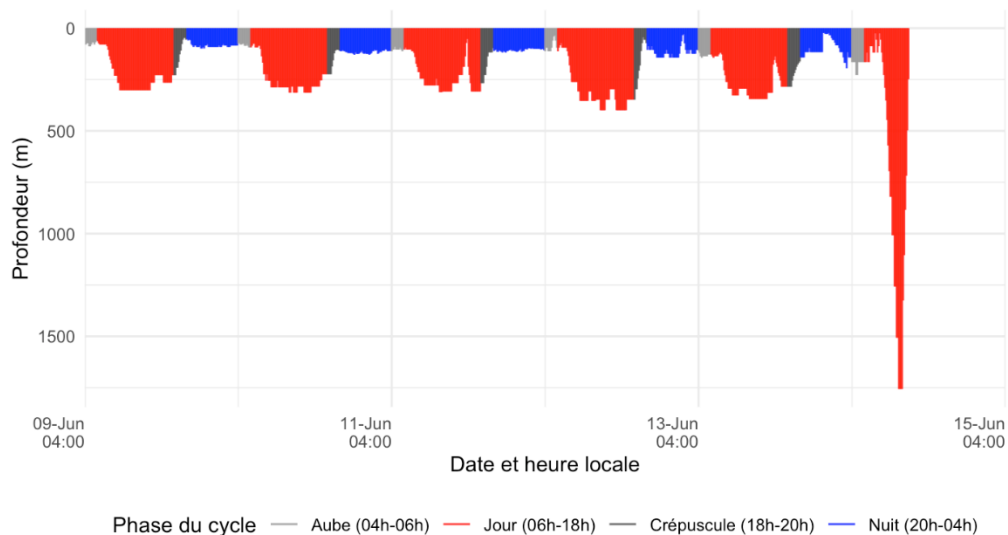


Figure 4. Example of BTH mortality track based on sPAT data.

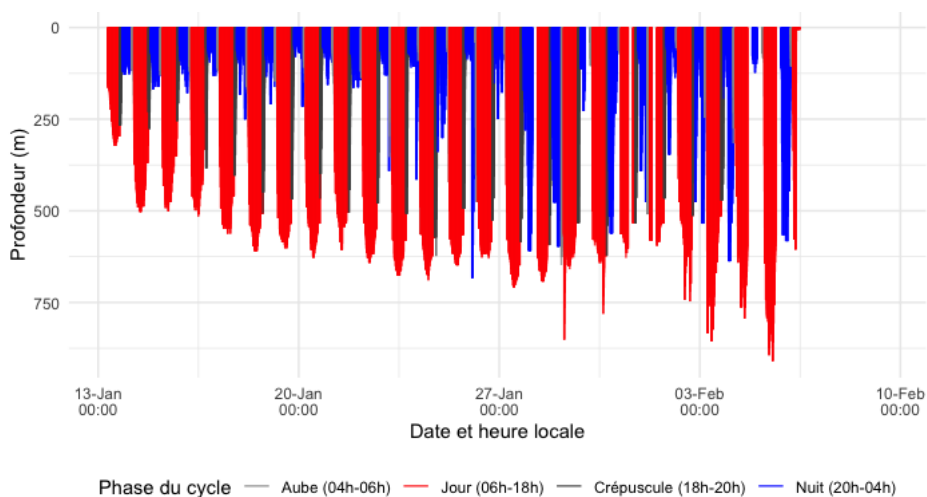


Figure 5. Example of BTH survival track based on miniPAT data (premature detachment).

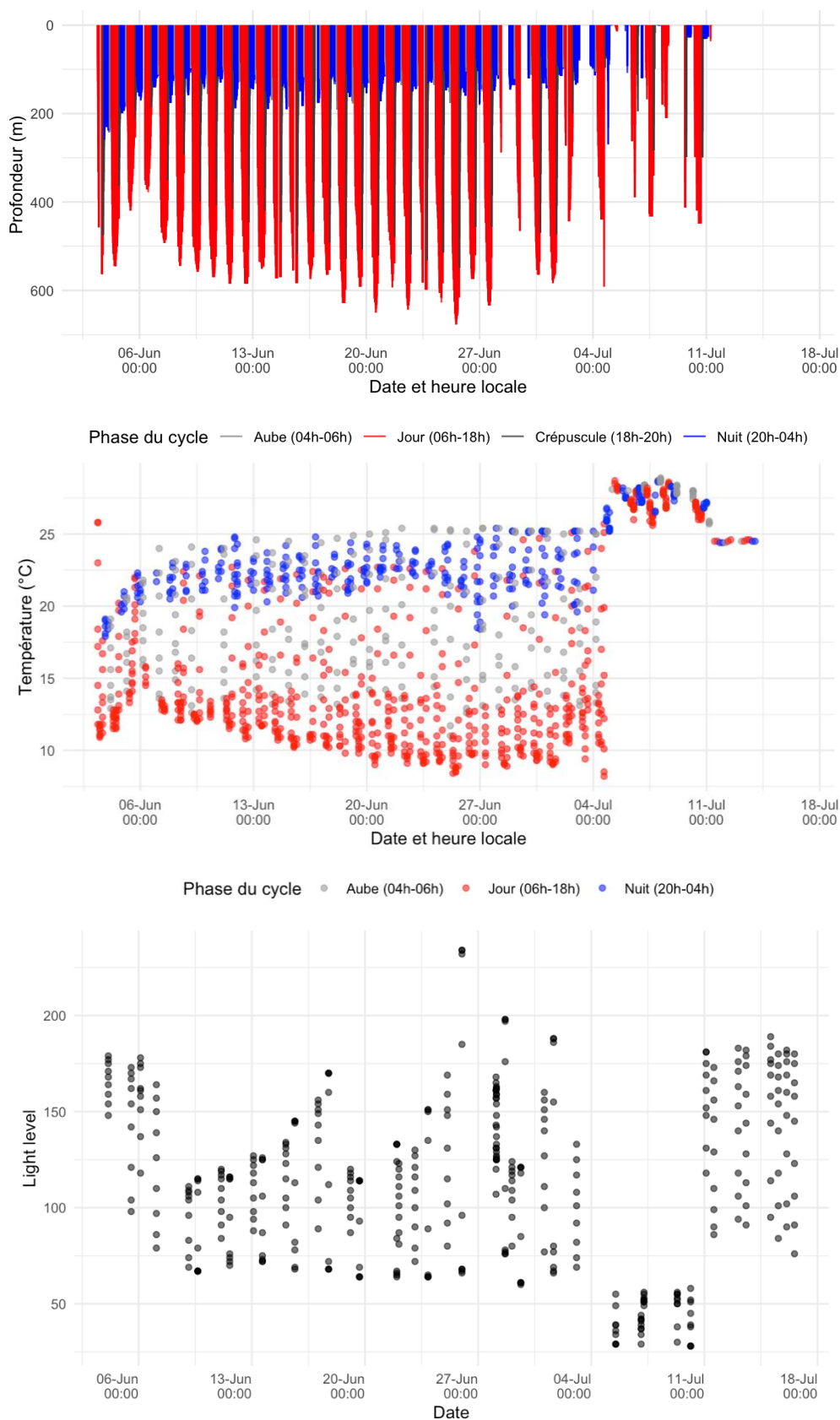


Figure 5. Example of BTH survival track, followed by an attack of endothermic predator (mako or great white shark) based on miniPAT data.