

MONITORING, TAGGING AND CONSERVATION OF MARINE TURTLES IN MOZAMBIQUE: ANNUAL REPORT 2017/18

Compiled and edited by:

Raquel S. Fernandes, Jessica L. Williams, Sara Gonzalez-Valladolid,

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Maputo, November 2018

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1 – Loggerhead (*Caretta caretta*) hatchling at POPMR (Photo: Miguel Gonçalves).

2 – Loggerhead (*C. caretta*) carapaces and bones found at QNP (Photo: Lara Muaves).

3 – Green turtle (*Chelonia mydas*) rescued near Barreira Vermelha (Photo courtesy of POPMR).

4 – Leatherback turtle (*Dermochelys coriacea*) nesting at POPMR (Photo: Miguel Gonçalves).

The opinions, positions and points of view expressed in this document, reflect only those of the authors and do not necessarily reflect those of governmental institutions, private sector or civil society which contributed to the elaboration of this report.

Maputo, November 2018

SUMMARY

The eleventh annual report on monitoring, tagging and conservation of marine turtles in Mozambique presents the results of the 2017/18 season. These results are based on the compilation of data on nesting females, tracks, nests and hatchlings, strandings and mortalities, including sporadic sightings, from different monitoring and conservation programs, occurring within and outside marine protected areas (MPA) along the coastline. The report also highlights current research and published studies, training and awareness talks, as well as priorities for monitoring and research.

The 2017/18 monitoring season took place from June 2017 to May 2018 in the northern section of the country, from Vamizi island (Quirimbas archipelago), and from September 2017 to March 2018 in the southern section, from the Bazaruto Archipelago National Park (BANP) towards the Ponta do Ouro Marine Partial Reserve (POPMPR). Tracks and nests of loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) turtles were recorded along the stretch of coastline between Cabo de São Sebastião Total Protection Zone (CSSTPZ, also known as the Vilanculos Wildlife Sanctuary) and the POPMPR; green turtles (*Chelonia mydas*) were reported at Vamizi, Bazaruto and Benguérua Islands and a few hawksbills in Bazaruto Island.

In total, 2 133 tracks and 976 nests were recorded. The most abundant species were loggerheads (1 935 tracks; 823 nests) and greens (120 tracks; 93 nests), followed by leatherback turtles (66 tracks; 47 nests), hawksbill turtles (4 tracks; 4 nests) and non - identified species (8 tracks; 3 nests). No olive ridley turtles were reported.

The POPMPR continues to be an important nesting area for both loggerhead (98.6% and 99.7% of all loggerhead tracks and nests reported, respectively) and leatherback turtles (94.3% and 95.6% of all leatherback tracks and nests reported, respectively). Approximately half of the tracks were recorded in December for both species. Tracks and nests were most abundant from Ponta Malongane to Ponta Dobela (68.9% of total tracks and 76.8% of total nests from the POPMPR). The latter section is also the area where most tagging occurs (79.0% of 167 tagged turtles in POPMPR).

Currently, the POPMPR and the Vamizi Island programmes are the only ones where continuous tagging of marine turtles is taking place. At the BANP, tagging occurs sporadically and is mostly on done on foraging green marine turtles, which are accidentally caught on fishing nets. At the POPMPR, 248

individual loggerheads and 13 leatherbacks were handled. Tagged turtles (both new and recaptured) represented only 17.7% and 30.0% (loggerheads and leatherbacks, respectively) of the total tracks recorded. These results, show a decrease in tagged marine turtles when compared to 2016/17 season (308 loggerheads and 19 leatherbacks) and more than what was recorded for 2015/16 season (229 loggerheads and 12 leatherbacks). At Vamizi Island, a total of 27 green turtles were tagged and eight green turtles recaptured from January to May. Only one green turtle was tagged in BANP.

At the Quirimbas National Park (QNP), 125 sightings of live marine turtles and 25 mortalities were reported from June 2017 to May 2018 in Ibo, Matemo and Quirimba Islands. The majority of the turtles identified were loggerheads and greens. A “marine turtle slaughter site” was found in Mefunvo Island, in the central section of the QNP. At provincial and district level, the Attorney General, with the support of the World Wildlife Fund (WWF), has been pursuing and promoting specific environmental education programs in this area in collaboration with several stakeholders.

A total of 86 marine turtles mortalities were reported along the coastline of Mozambique. Of these, 81.4% derived from anthropogenic causes, 15.1% from non-identified causes and 3.5% are potentially from natural causes. It is important to highlight that this number does not reflect the current level of marine turtle mortality in the country. Although marine turtles are a protected species in Mozambique since 1965, these results show that these marine migratory species are facing great pressures and urgent measures are required to protect individuals, their habitats and migratory corridors. These measures, amongst others, should continue to cater for strict enforcement and penalties, as well as promotion of sustainable practices, especially in the fisheries sector.

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INTRODUCTION

Since the late 1980s, marine turtle monitoring programs have been gradually established along the Mozambican coastline (Videira *et al.*, 2008). The first and oldest programme was established at Inhaca Island in 1988, followed by programs in the Bazaruto National Park (now Bazaruto Archipelago National Park - BANP) and between Ponta Dobela and Ponta Malongane (now part of the Ponta do Ouro Partial Marine Reserve - POPMR) in 1994. In 2004, with the onset of the now extinct Mozambique Marine Turtle Working Group (MMTWG) and with the interest of several private sector initiatives, several monitoring and tagging programmes were established. For example, in 2005, the Cabo de São Sebastião and Vamizi Island programmes were initiated and are still running (Videira *et al.*, 2008). Prior to 2007/08 season a few more monitoring programs were established but due to a lack of resources and because these were not considered priority areas for marine turtle nesting (low numbers reported), these, unfortunately, were terminated (Louro & Fernandes, 2012).

Currently, there are eight marine turtle monitoring programmes in operation (Table 1). However, monitoring effort has not been consistent and there are data gaps throughout the seasons (Table 1). Another important aspect to consider, is that some programmes, such as Inhaca Island, are ongoing, but because of the need to establish a collaboration agreement, the data collected are not shared for the annual reports (Fernandes *et al.*, 2017; 2016; 2015a,b; 2014; Louro & Fernandes, 2013; Louro & Fernandes, 2012).

In terms of species composition, marine turtles nesting females show a dominance of green turtles (*Chelonia mydas*) in the northern region (e.g. Vamizi Island and Quirimbas National Park - QNP). In the south, loggerheads (*Caretta caretta*) and leatherbacks (*Dermochelys coriacea*) turtles are dominant (e.g. Ponta do Ouro Partial Marine Reserve - POPMR) (Anastácio, 2014; Fernandes *et al.*, 2014; 2015a,b; 2016; Fernandes, 2015; Louro *et al.*, 2012; Louro & Fernandes, 2013; Pereira *et al.*, 2009; Trindade, 2012; Videira *et al.*, 2008; 2010; 2011). Cabo de São Sebastião Total Protection Zone (CSS ZPT) and Bazaruto Archipelago National Park (BANP) are two areas considered of high species richness, with potential nesting of the five species known

to occur in Mozambique waters. However, in the last few years, hawksbill (*Eretmochelys imbricata*) and olive ridley turtles (*Lepidochelys olivacea*) nesting reports are very scarce (Fernandes *et al.*, 2014; 2015; 2016; Fernandes, 2015; Louro *et al.*, 2012; Louro & Fernandes, 2013; Pereira *et al.*, 2009; Trindade, 2012; Videira *et al.*, 2008; 2010; 2011).

Table 1. Historical data contribution of marine turtles monitoring programmes (Green – established program with published data on the annual reports; Blue - established program with data possibly published on other sources; Yellow – occasional patrols with published data on the annual reports; White – no program). BANP–Bazaruto Archipelago National Park; NP–National Park; POPMR–Ponta do Ouro Partial Marine Reserve; TPZ–Total Protection Zone. * = Julien *et al.* (2017)

Monitoring Programme	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/98	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Vamizi Island																														
Quirimbas NP																														
Primeiras and Segundas Islands																														
BANP																														
Pomene NR																														
Cabo de São Sebastião TPZ																														
Tofo																														
Závora																														
Zavala																														
Xai-Xai																														
Bilene																														
Manhiça																														
Macaneta																														
Inhaca Island, POPMR																														
P. Mucombo - P. Santa Maria, POPMR																														
P. Dobela – P. Mucombo, POPMR																														
P. Malongane - P. Dobela, POPMR																														
P.Ouro - P. Malongane, POPMR																														

OBJECTIVES

The general objective of the *Mozambique marine turtle monitoring, tagging and conservation annual report* is to compile relevant data collected from the various marine turtle monitoring and conservation programmes in Mozambique, as well as casual occurrences reported outside these programmes, from June 2017 to May 2018. More specifically, the report's objectives are to:

- (1) Determine the nesting females species composition;
- (2) Determine the number of tracks with and without nests per species and per area;
- (3) Determine the number of nests, eggs and hatchlings per species and per area;
- (4) Determine the number of sightings in feeding areas or/and migration corridors; and
- (5) Determine the number of mortality and stranding cases per species per area.

METHODOLOGY

In the present report, seven marine turtle monitoring areas were considered, namely: (1) Vamizi Island; (2) Quirimbas National Park (QNP); (3) Bazaruto Archipelago National Park (BANP); (4) Cabo de São Sebastião Total Protection Zone (CSSTPZ); (5) Pomene National Reserve (PNR); (6) Inhambane Province (Massinga, Tofo – Painsane and Závora - Praia Manhame); and (7) Ponta do Ouro Partial Marine Reserve (POPMR).

During the 2017/18 season, the total length of the beaches patrolled at the seven monitoring areas was approximately 288 km (~10.4% of the country's coastline; Table 1 and Figure 3). The monitoring period varied between monitoring sections. At the southern section, the nesting season run from the 1 October 2017 to 31 March 2018 and in the northern section from 1 June 2017 to 31 May 2018.

The monitoring effort is summarized in Table 2, which also details the methodology used (ie. type of patrols, number of community monitors and rangers, as well as the monitoring period).

It is recognized that the data compiled, is based on data extracted from information made available by the different monitoring programmes, and might contain gaps and errors beyond

the authors' control. Thus, readers are advised to proceed with caution on performing further analyses based on these data. The analysis on number of tracks and nests per day are only made for POPMR and Vamizi Island because the monitoring effort in these areas is consistent and the dataset is more robust.

Table 2. Monitoring effort per monitoring area during the 2017/18 season. (P - Patrols on foot; PB - Patrols by bicycle and PC – Patrols by car). NP=National Park; NR=National Reserve; PMR=Partial Marine Reserve; TPZ=Total Protection Zone. * = Occasional patrols; ** =Total number of days with beach patrols not recorded (numbers presented are mathematically inferred through the relation of beach patrol distance and total km reported).

Monitoring Areas	Type of patrol	Nr of monitors & rangers	Distance per section (km)	Total distance patrolled (km)	Period	Nr of days patrolled
1. Vamizi Island	PF	4	12	≈4380	01Jun17 – 31May18	365
2. Quirimbas NP						
Matemo Island	PB	4	≈24	≈2823	01Jun17 – 31May18	**118
Ibo Island	PB	14	≈17	≈5940	01Jun17 – 31May18	**349
Quirimba Island	PB	4	≈16	≈3042	01Jun17 – 31May18	**190
3. Bazaruto Archipelago NP						
Bazaruto Island	PF	37	≈40	≈1400	01Oct17 – 31Oct18	35
Benguêrua Island	PF		≈10	≈100		10
4. Cabo São Sebastião TPZ	PF	9	25	-	01Sep17 – 31Mar18	120
5. Pomene NR	PF	13	10-30	≈1146	01Oct17 – 30Mar17	52
6. Inhambane						
Massinga Beach	PF	1	*	-	01Feb18 – 30 June 18	*
Tofo –Paindane	PF	1	*	-	01Oct17 – 30 Apr 18	*
Závora (Manhame Beach)	PF	1	10*	-	01Oct17– 30 Apr 18	*
7. Ponta do Ouro PMR						
P. Mucombo - Santa Maria	PF	20	≈20	≈3640	01Oct17 – 31Mar18	182
P. Chemucane - Mucombo	PF	3	≈11	≈2002	01Oct17 – 31Mar18	182
P. Milibangalala - Chemucane	PF	3	≈12	≈2184	01Oct17 – 31Mar18	182
P Dobela - Milibangalala	PF	3	≈7	≈1274	01Oct17 – 31Mar18	182
Monte Mutondo – P. Dobela	PF	3	≈10	≈1820	01Oct17 – 31Mar18	182
P. Techobanine – Mutondo	PF	3	≈10	≈1820	01Oct17 – 31Mar18	182
P. Maderjanine - Techobanine	PF	3	≈6	≈1092	01Oct17 – 31Mar18	182
P. Malongane - Maderjanine	PF	3	≈6	≈1092	01Oct17 – 31Mar18	182
P. Malongane – Mutondo	PC	1	32	1248	01Dez17 – 08Jan18	39
P. Ouro – Malongane	PF	3	≈8	≈1456	01Oct17 – 31Mar18	182

Monitoring Areas

1. Vamizi Island

Patrols are conducted daily and early in the morning to record new nesting activities, mark new nests and check the older nests (Table 2; Figure 1). Nest excavation is conducted after the maximum period for incubation has been surpassed, to collect data on the number of eggs (hatched and unhatched) and number of hatchlings (alive and dead).

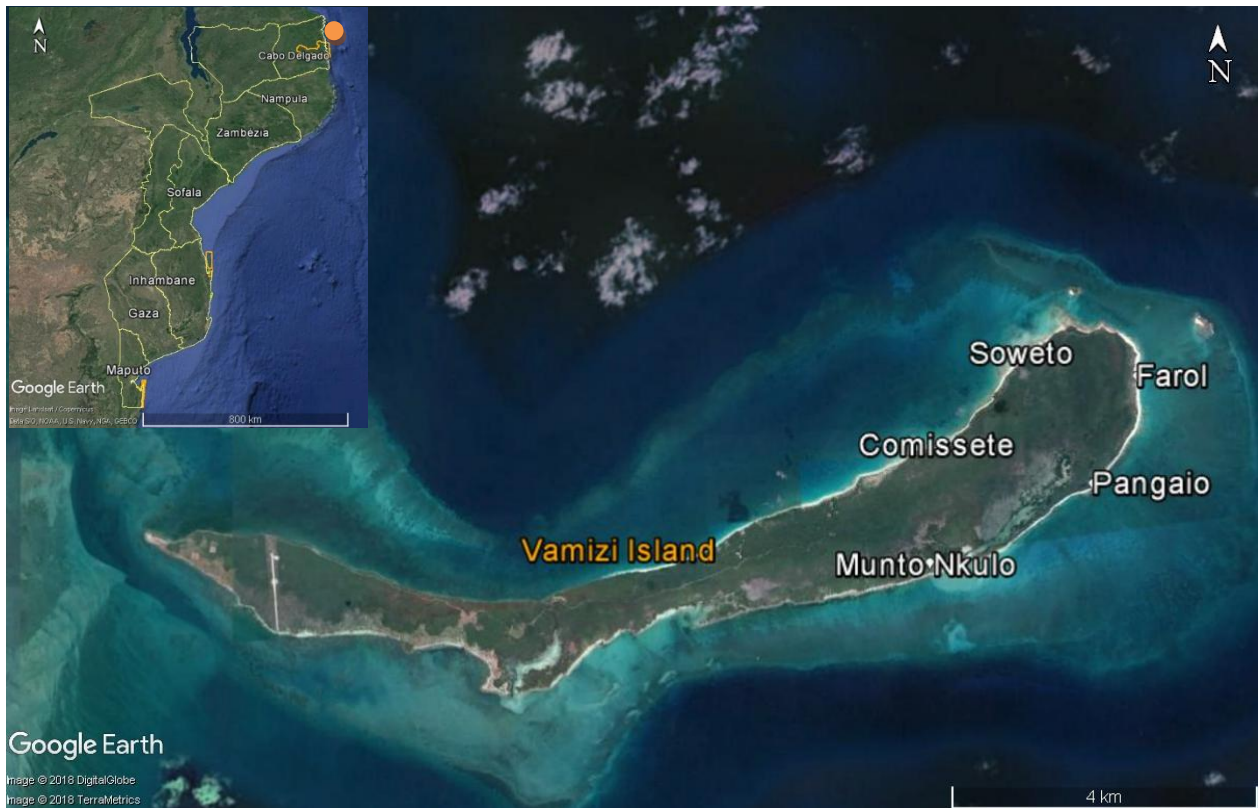


Figure 1. Vamizi Island and main beach reference sites for marine turtle monitoring (Adapted from Google Earth).

2. Quirimbas National Park (QNP)

The QNP, proclaimed in June 2002 (Decree 14/2002 of 6 June), has a total area of 9 130 km², of which 1 185 km² encompasses the marine environment (Pereira, *in press*). Monitoring patrols at the QNP are conducted daily by the 22 Management Oriented Monitoring System (MOMS) community monitors at three islands: Matemo, Ibo and Quirimba (Table 2; Figure 2). The marine turtle monitoring module is integrated within the MOMS program established by the World Wide Fund for Nature (WWF). Monitoring consists of identifying tracks and/or nests, report sightings at sea and mortality incidents. Unfortunately, the monitors are not implementing the marine turtle protocol for the data collection, applied by other programmes, and therefore neglect, for example, monitoring effort and biometric data.

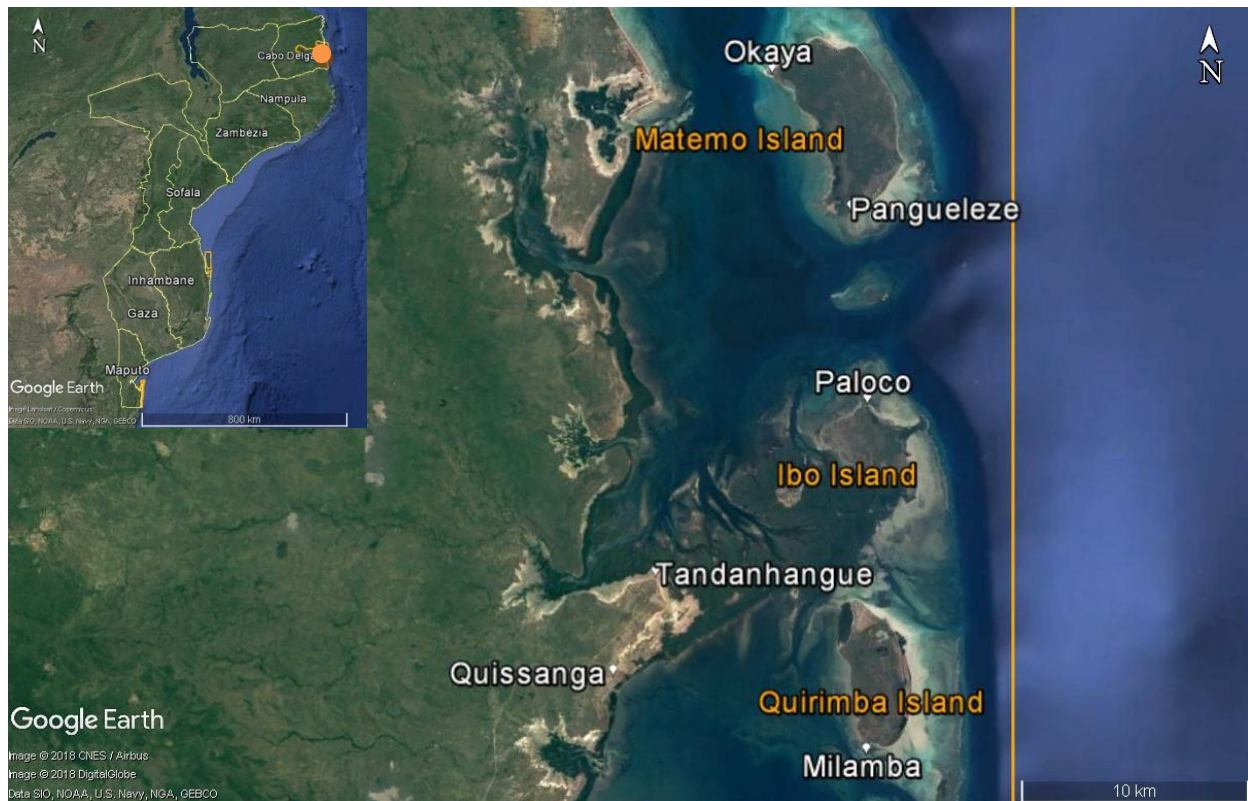


Figure 2. Quirimbas National Park (Matemo, Ibo and Quirimba islands) with main sites where marine turtle monitoring takes place (Adapted from Google Earth).

3. Bazaruto Archipelago National Park (BANP)

The BNAP was established in 1971, but the current limits were extended and approved in 2001 (Decree 39/2001, of 21 November), to an area of approximately 1 430 km², of which 1 295 km² encompass the marine environment. Two groups of rangers and community marine turtle monitors conduct daily patrols. One group patrols at night and the other group patrols in the morning. Monitoring effort spreadsheets were not fully available with only a total of 35 and 10 days records at Bazaruto Island and Benguérua Island, respectively (Table 2; Figure 3). However, with the establishment of MOMS, rangers have been collecting data using the MOMS datasheets, which are organized in three modules, daily sheets, monthly and annual summary books. At the end of the nesting season, the data from the MOMS daily patrols sheets are transferred to the marine turtle monitoring datasheets.

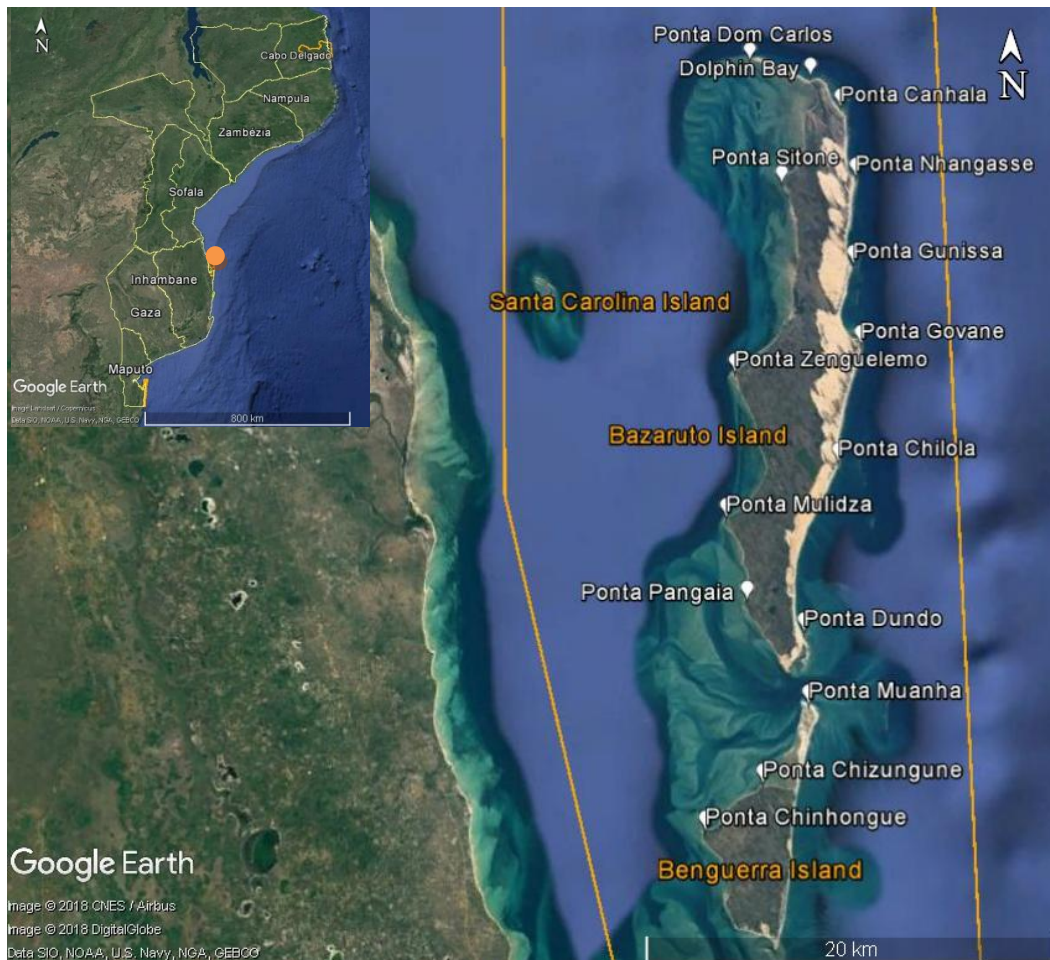


Figure 3. Bazaruto Archipelago National Park and reference sites for marine turtle monitoring (Adapted from Google Earth).

4. Cabo de São Sebastião Total Protection Zone (CSSTPZ)

Adjacent to the BANP, the CSSTPZ was established in 2003 (Decree 18/2003, 29 April) and encompasses an area of approximately 439.3 km², of which 230 km² are classified as marine environment. The community marine turtle monitors conduct early morning and nightly monitoring patrols to identify and record all nesting females or tracks (Table 2; Figure 4). The programme is currently applying the national monitoring protocol.

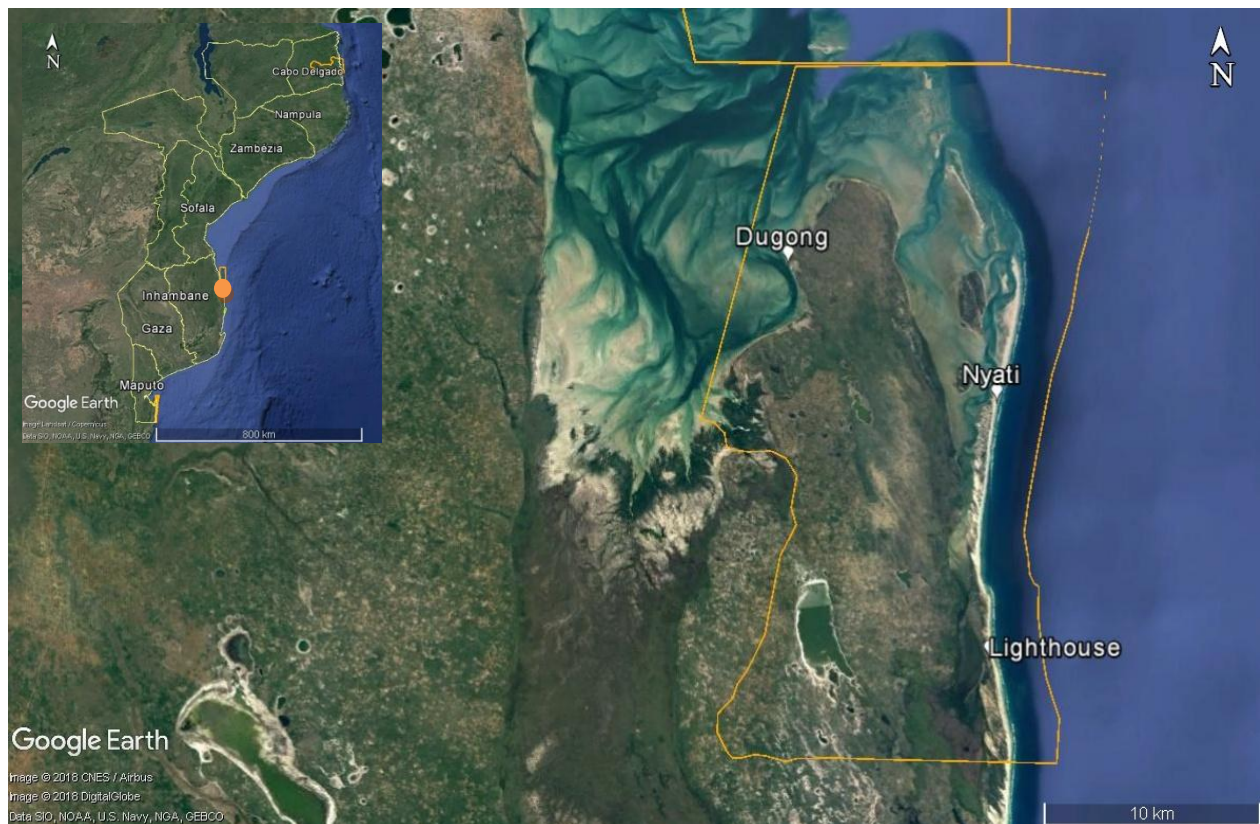


Figure 4. Cabo de São Sebastião Total Protection Zone and main reference sites for marine turtle monitoring (Adapted from Google Earth).

5. Pomene National Reserve (PNR)

The PNR was established in 1972 through Decree 109/72 of 16 November and covers an area of 50 km². A new proposal for extending its limits to include coastal and marine ecosystems is currently being discussed. At the PNR patrols started in 1 October 2017 and ended in March 2018, with a total of 52 patrols covering different distances per patrol and effort per month (Table 2; Figure 5). The programme is currently applying the national monitoring protocol.

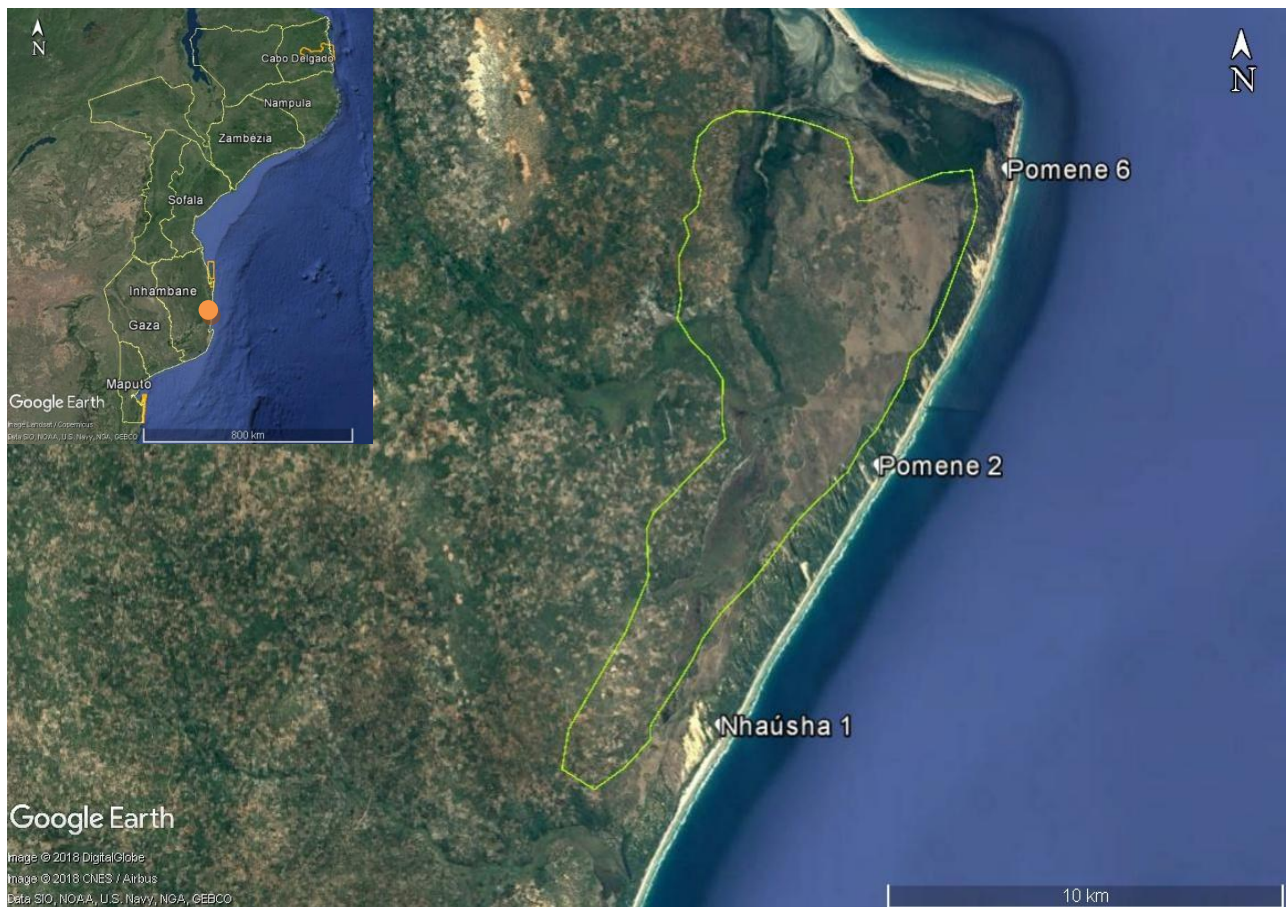


Figure 5. Pomene National Reserve with main reference sites for marine turtle monitoring (Adapted from Google Earth).

6. Ponta do Ouro Partial Marine Reserve (POPMR)

POPMR was proclaimed in August 2009 (Decree 42/2009 of 21 August) and has an extension of 678 km². The POPMR community marine turtle monitors (44) were subdivided into nine sections between Ponta do Ouro and Santa Maria (Table 2; Figure 5). However, to maintain consistency within the database, data were organized according to their geographical coordinates in the following sections: 1) Ponta do Ouro to Ponta Malongane; 2) Ponta Malongane to Ponta Dobela; 3) Ponta Dobela to Ponta Mucombo and 4) Ponta Mucombo to Santa Maria. The programme is currently applying the national monitoring protocol.

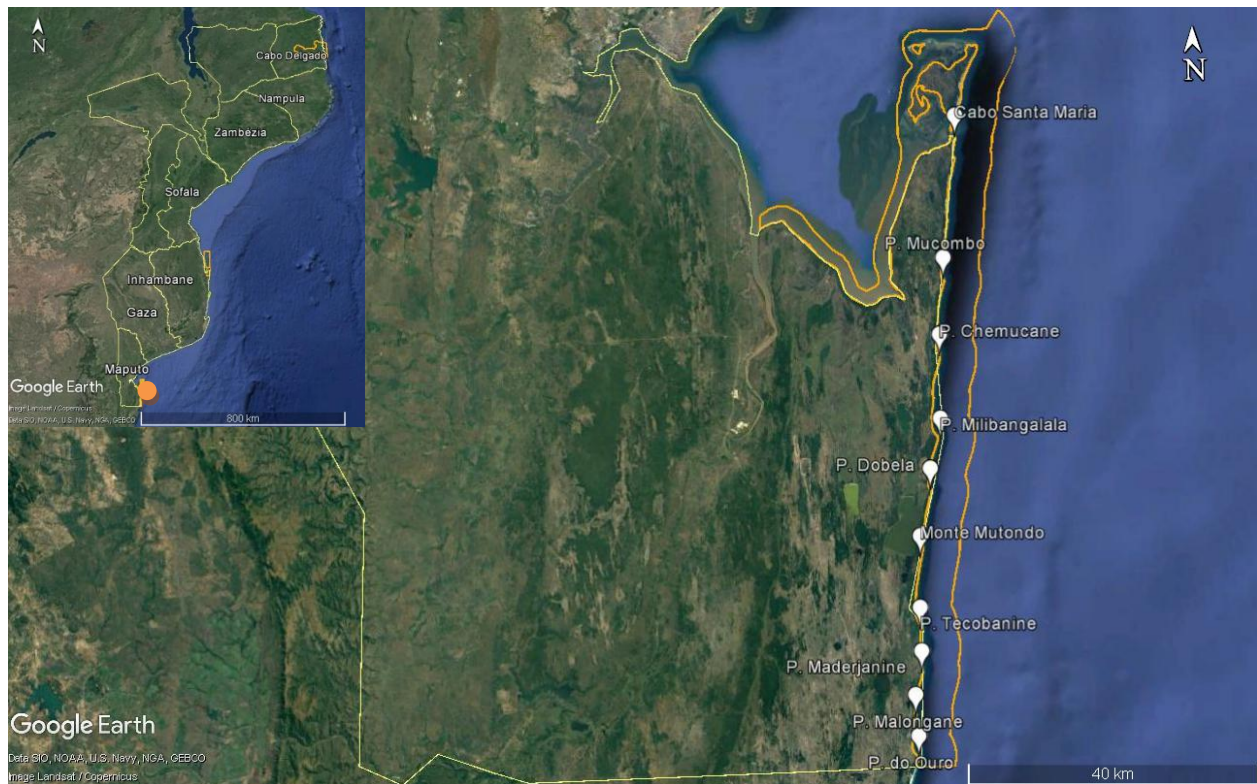


Figure 6. Ponta do Ouro Partial Marine Reserve with main reference sites for marine turtle monitoring (Adapted from Google Earth).

7. Sites with Casual Reports

Casual marine turtle patrols occur at Inhambane Province, outside marine protected areas, more specifically at Massinga beach, Tofo – Paindane and Závora (Manhame Beach). These

patrols are not made daily, being opportunistic field visits to validate nesting events, tracks, illegal take, stranding or entanglements.

A field visit to Nampula Province took place from 16 to 19 October 2017 and included interviews with three small-scale traders from Wamualo market, a waiter from Hotel Napela (Nacala-Velha), as well as five fishermen from Nachiropa and Nantaca beaches (Memba). The data collected in Nacala-Velha and Memba was only related to marine turtle mortality.

MONITORING RESULTS

Female tracks

During the 2017/18 nesting season, a total of 2 133 tracks were recorded (Table 3). The tracks were recorded at Vamizi Island (5.4%), BANP (1.3%), CSSTPZ (0.9%), Tofo-Paindane (<0.5%), Závora (Manhame beach) (<0.5%) and the POPMR (92.4%). At the QNP, no tracks were reported. However, 125 sightings of live turtles at sea were recorded in QNP, mostly loggerheads, greens and turtles not identified to species level.

At the POPMR, a total of 1 969 tracks were reported, of which 1 909 were from loggerheads (97.0%) and 60 from leatherbacks (3.0%; Table 3). Loggerhead tracks were first sighted on 19 September 2017 and the last track on 2 March 2018, with a peak nesting activity (978 tracks, 51.2%) in December (Figures 7 and 8). Nesting activity was also high in January (468 tracks, 24.5%), which constitutes a different pattern from what was observed in the 2016/17 season, whereas the nesting activity was highest in November and December. Leatherback tracks in POPMR were first sighted on 29 October 2017 and the last track on 27 February. The highest activity was observed in December (31 tracks, 52.5%) and the second peak in November (15 tracks, 25.4%; Figures 7 and 9).

At Vamizi Island, a total of 116 female green turtle tracks were reported, showing higher activity between May and July (Figure 7).

Table 3. Marine turtle tracks per species and per area (Cc–*Caretta caretta*; Cm–*Chelonia mydas*; Dc–*Dermochelys coriacea*; Ei–*Eretmochelys imbricata* and Lo–*Lepidochelys olivacea*, NI–Not identified; BANP–Bazaruto Archipelago National Park; TPZ- Total Protection Zone, PNR – Pomene National Reserve, POPMR–Ponta do Ouro Partial Marine Reserve), during the 2017/18 season. * = occasional patrols.

Monitoring area	Cc	Cm	Dc	Ei	Lo	NI	Total
1. Vamizi Island	116						116
2. Quirimbas National Park	0						0
3. BANP	11	4		4		8	27
Bazaruto Island	9	3		4		2	18
Benguérua Island	2	1				6	9
4. Cabo de São Sebastião TPZ	14		5				19
5. PNR	0						0
6. Inhambane Casual Sites	1		1				2
Massinga							0
Tofo-Paindane*	1		1				2
Závora–Praia Manhame*	0						0
7. POPMR	1909		60				1969
Ponta Mucombo – Santa Maria	186		4				190
Ponta Dobela – Ponta Mucombo	362		8				370
Ponta Malongane - Ponta Dobela	1316		41				1357
Ponta do Ouro – Ponta Malongane	45		7				52
Total	1935	120	66	4	0	8	2133

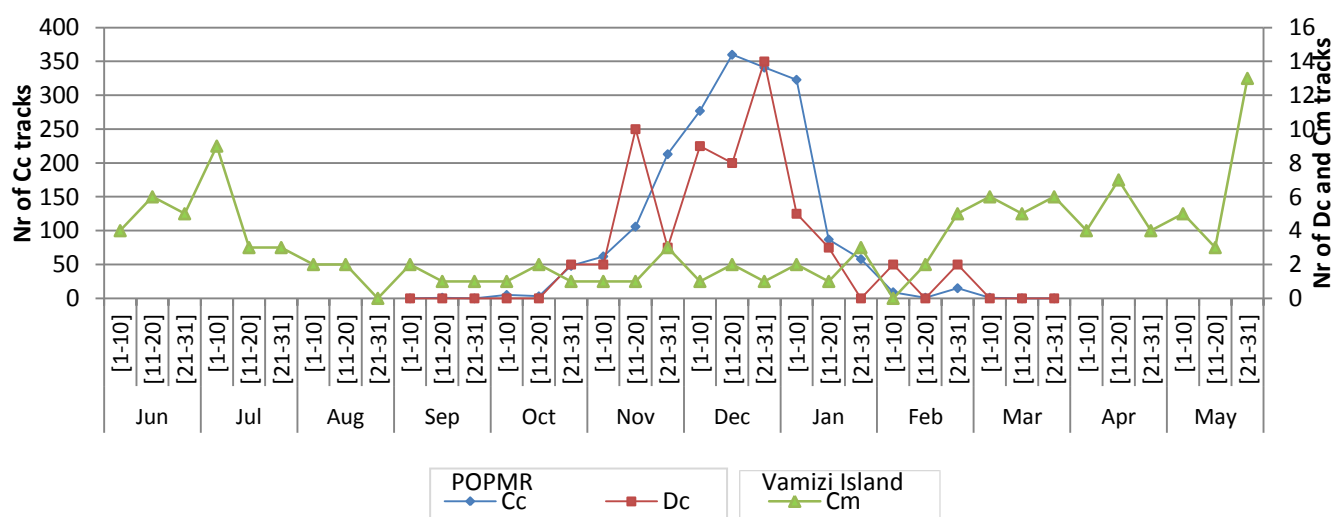


Figure 7. Total number of tracks per species binned into 10-day groups across the 2017/18 season at Ponta do Ouro Partial Marine Reserve and Vamizi Island (Cc – *Caretta caretta* – left axis; Dc – *Dermochelys coriacea* and Cm – *Chelonia mydas* – right axis).

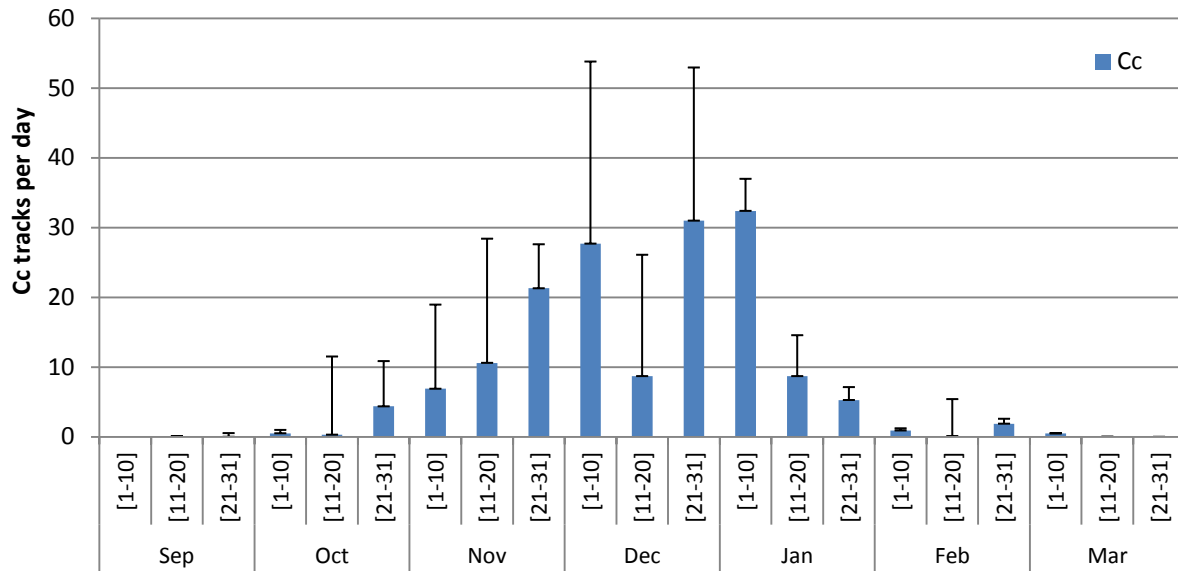


Figure 8. Average number of tracks per day for loggerhead turtles (*Caretta caretta*) nesting at the Ponta do Ouro Partial Marine Reserve binned into 10-day groups across the 2017/18 season. Bars = SD.

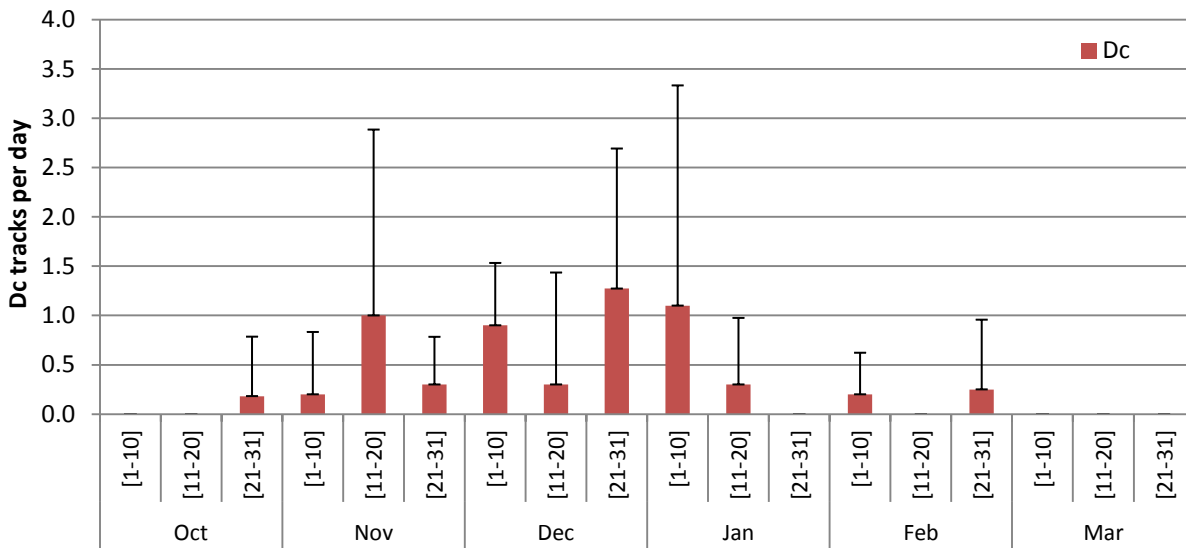


Figure 9. Average number of tracks per day for leatherback turtles (*Dermochelys coriacea*) nesting at the Ponta do Ouro Partial Marine Reserve binned into 10-day groups across the 2017/18 season. Bars = SD.

Nests

Within the recorded tracks (Table 3), 976 tracks were associated with a confirmed nest (Table 4), 15 were non-nesting emergences and 1 138 resulted in unconfirmed nests (Table 5). Most nests were recorded at the POPMR (87.7%), followed by Vamizi island (9.2%), BANP (2.2%), CSSTPZ (0.9%) and fewer from Tofo-Paindane (<0.5%), Závora–Praia Manhame (<0.5%; Table 4).

Table 4. Number of confirmed nests laid per species and per area (Cc–*Caretta caretta*, Cm–*Chelonia mydas*, Dc–*Dermochelys coriacea*, Ei–*Eretmochelys imbricata*, Lo–*Lepidochelys olivacea*; NI–not identified; BANP–Bazaruto Archipelago National Park; POPMR–Ponta do Ouro Partial Marine Reserve; TPZ–Total Protection Zone) during the 2017/18 season. * = Occasional patrols.

Monitoring area	Cc	Cm	Dc	Ei	Lo	NI	Total
1. Vamizi island		89					89
2. Quirimbas National Park							0
3. BANP	11	4		4		3	22
Bazaruto Island, BANP	9	3		4		2	17
Benguérua Island, BANP	2	1				1	5
4. Cabo de São Sebastião TPZ	9		5				14
5. PNR							0
6. Inhambane Casual Sites	1						1
Massinga							0
Tofo–Paindane*	1						1
Závora–Praia Manhame*	0						0
7. POPMR	803	0	47	0	0	0	850
P. Mucombo–Santa Maria	86		3				89
P. Dobela–P. Mucombo	94		5				99
P. Malongane–P. Dobela	616		36				652
P. do Ouro–P. Malongane	7		3				10
Total	824	93	52	4	0	3	976

Table 5. Number of non-nesting emergences (NNE) and unconfirmed nests (UN) laid per species and area, during the 2017/18 season. Cc–*Caretta caretta*, Cm–*Chelonia mydas*, Dc–*Dermochelys coriacea*, Ei–*Eretmochelys imbricata*, Lo–*Lepidochelys olivacea* and NI–not identified; TPZ–Total Protection Zone; POPMR–Ponta do Ouro Partial Marine Reserve. * = Occasional patrols.

Monitoring area	Cc		Cm		Dc		Ei		Lo		NI		Total
	NNE	UN	NNE	UN	NNE	UN	NNE	UN	NNE	UN	NNE	UN	
1. Vamizi island				27									27
2. Quirimbas National Park													
3. BANP													
Benguérua Island												5	5
6. Inhambane Casual Sites					1	1							2
Massinga													0
Tofo–Paindane*					1	1							2
Zavora (Manhae beach)													0
7. POPMR	13	1093	0	0	1	12	0	0	0	0	0	0	1119
P. do Ouro – P. Malongane	1	37				4							42
P. Malongane - P. Dobela	10	690			1	4							705
P. Dobela – P. Mucombo		268				3							271
P. Mucombo – Santa Maria	2	98				1							101
Total	13	1093	0	27	2	13	0	0	0	0	0	5	1153

Loggerhead nests at the POPMR were first sighted on 11 October 2017 and the last confirmed nest on 30 January 2018 with highest nesting activity in December (419 confirmed nests, 52.2% of total nest; Table 6). Nesting activity was also high in January (228 confirmed nests, 28.4%). At the BANP, all of the 11 loggerhead nests were exhumed, and from an estimated 1 789 eggs laid, 942 did not hatch (Table 7). An abnormal loggerhead hatchling carapace with six scutes was recorded in Bazaruto Island (Figure 10) and was first thought to be an olive ridley turtle. Confirmation was later obtained from Dr. Colin Limpus from the University of Queensland, Brisbane, Australia.

Table 6. Loggerhead turtle (*Caretta caretta*): number of confirmed nests laid per area and month, during the 2017/18 season. TPZ–Total Protection Zone; POPMR – Ponta do Ouro Partial Marine Reserve. * = Occasional patrols.

Monitoring area	Sep	Oct	Nov	Dec	Jan	Feb	Mar
3. BANP			4	3	4		
Bazaruto Island, BANP			2	3	4		
Benguérua Island, BANP			2				
4. Cabo de São Sebastião TPZ		1	4	2	1	1	
6. Inhambane Casual Sites							
Tofo-Paíndane*							
Závora–Praia Manhame*							
7. POPMR		9	147	419	228		
Ponta Mucombo – Santa Maria			26	28	32		
Ponta Dobela – Ponta Mucombo		1	17	9	37		
Ponta Malongane - Ponta Dobela		8	101	349	158		
Ponta do Ouro – Ponta Malongane			3	3	1		
Total	0	10	155	424	233	1	0

Table 7. Loggerhead turtles (*Caretta caretta*): number of hatchlings and eggs per area, during the 2017/18 season. HS=estimated hatching success. Note that fully destroyed nests were not included in the table. * = Nests with information on number of eggs laid and unhatched eggs; ** = Nests with information on live and dead hatchlings.

Area \ Number	Nests*	Eggs Laid	Unhatched Eggs	HS (%)	Nests**	Alive Hatchlings	Dead Hatchlings
3. BANP							
Bazaruto Island	9	1331	729	45.2%	9	586	45
Benguérua Island	2	458	213	53.5%	2	212	1



Figure 10. Loggerhead hatchling with an abnormal number of scales (Photo: Tomás Manasse).

Green turtles nest throughout the year in northern Mozambique, with a nesting peak from March to June in Vamizi Island, whereas in the southern part of the country nesting follows the seasonal trend of other species (ie. October to February). Nests from green turtles were not abundant in Inhambane region, with only four nests reported at the BANP in December and January (Table 8). All the reported green turtle nests were exhumed at Vamizi island (89 nests) and BANP (4 nests; Table 9). The results show a higher hatchling success at Vamizi Island, which warrants further investigation.

Table 8. Green turtle (*Chelonia mydas*): number of confirmed nests laid per area and month, during the 2017/18 season. BANP–Bazaruto Archipelago National Park.

Monitoring Area	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
1. Vamizi Island	12	13	3	3	3	3	2	2	5	14	12	17
3. BANP							3	3				
Bazaruto Island							2	1				
Benguérua Island							1					
Total	12	13	3	3	3	3	5	3	5	14	12	17

Table 9. Green turtle (*Chelonia mydas*): number of hatchlings and eggs per area, during the 2017/18 season. HS=estimated hatching success. Note that fully destroyed nests were included in the table.

Area	Number Nests*	Eggs Laid	Unhatched Eggs	HS (%)	Nests**	Alive Hatchlings	Dead Hatchlings
1. Vamizi Island	89	6581	348	94.7	89	6233	NI
3. BANP							
Bazaruto Island	3	574	274	52.3	3	294	45
Benguérua Island	1	223	108	51.6	1	106	2

*Nests with information on number of eggs laid and unhatched eggs

** Nests with information on alive and dead hatchlings

Leatherback nests in POPMR were first sighted on 6 November 2017 and the last nest on 27 February. Highest activity was observed in December (26 confirmed nests, 56.5%) and November (13 confirmed nests, 28.3%; Table 10).

Table 10. Leatherback turtle (*Dermochelys coriacea*): number of confirmed nests laid per area and month, during the 2017/18 season. POPMR–Ponta do Ouro Partial Marine Reserve; TPZ–Total Protection Zone. * = Occasional patrols.

Monitoring area	Oct	Nov	Dec	Jan	Feb	Mar
4. Cabo de São Sebastião TPZ		3	2			
7. POPMR	0	13	26	8	0	0
Ponta Mucombo – Santa Maria		2		1		
Ponta Dobela – Ponta Mucombo		3		2		
Ponta Malongane - Ponta Dobela		7	26	3		
Ponta do Ouro – Ponta Malongane		1		2		
Total	0	16	28	8	0	0

Hawksbill turtle nests were scarce (4 nests) and only reported at Bazaruto island, BANP (Table 11), indicating good hatching success (Table 12).

Table 11. Hawksbill turtles (*Eretmochelys imbricata*): number of confirmed nests laid per area and month, during the 2017/18 season.

Monitoring area	Sep	Oct	Nov	Dec	Jan	Feb	Mar
3. BANP							
Bazaruto Island		2	1		1		
Total		2	1		1		

Table 12. Hawksbill (*Eretmochelys imbricata*): number of hatchlings and eggs per area, during the 2017/18 season. HS=estimated hatching success. Note that fully destroyed nests were included in the table. * =Nests with information on number of eggs layed and unhatched eggs; ** = Nests with information on alive and dead hatchlings.

Number Area	Nests*	Eggs Laid	Unhatched Eggs	HS (%)	Nests**	Alive Hatchlings	Dead Hatchlings
3. BANP							
Bazaruto Island	4	467	99	78.2%	4	352	16

Table 13 shows the number of nests destroyed by natural and anthropogenic causes at the POPMR and Vamizi island. Nests raided by bush pigs (and probably other animals as dogs) at POPMR seems to be increasing and should be consider a management priority as the number of nests destroyed represents 16.4% of the reported confirmed nests.

Table 13. Number of nests destroyed by natural and anthropogenic causes per area, during the 2017/18 season. Cc–*Caretta caretta*, Cm–*Chelonia mydas*, Dc–*Dermochelys coriacea*, Ei–*Eretmochelys imbricata*, Lo–*Lepidochelys olivacea*; NI–not identified; POPMR–Ponta do Ouro Partial Marine Reserve.


Area	Species	Natural causes	Anthropogenic causes	Total
1. Vamizi Island	Cm	1 nest flooded		1
7. POPMR				
Ponta Mamoli- Ponta Dobela	Ni	Nests raided		139 (16.4% of confirmed nests)


Mortalities, Strandings and Entanglement



A total of 86 marine turtle mortalities were reported. The majority of these mortalities (81.4%) are due to anthropogenic causes such as captures of females nesting or fisheries-associated, 15.1% from unidentified causes and 3.5 % potentially from natural causes (Table 14). The only entanglement case reported was of a green turtle entangled in a bottom gillnet fishing net close to the Barreira Vermelha coral reef, at Inhaca Island, which was then successful released (Table 15).




Table 14. Reported marine turtle threats by natural (NC), anthropogenic (AC) or not identified (NI) causes that have led to the turtle mortality, per area and species (Cc–*Caretta caretta*, Cm–*Chelonia mydas*, Dc–*Dermochelys coriacea*, Ei–*Eretmochelys imbricata*, Lo–*Lepidochelys olivacea* and NI–not identified; CCL–curved carapace length).




Monitoring area	Description	Photo evidence	NC	AC	NI
Afungi Peninsula to Farol, Palma District, Cabo Delgado Province	30 separate mortality events (carapace bones, skulls and plastrons) were reported during a census conducted along 40 km of coast.	Witnessed by Jessica L. Williams		30	





Monitoring area	Description	Photo evidence	NC	AC	NI
Pemba, Cabo Delgado Province	Carapace bones (Ni) found on Wimbi beach (30/08/2018)				1
		Photo: Jessica L. Williams			
Ibo Island, QNP, Cabo Delgado Province	Cc found dead without injuries found in <i>Careca Sand dune</i> (March, 2018)	Witnessed by Lara Muaves & Momade (MOMS Agent)		2	
	Cm carapaces and visceral tissues found in <i>Careca Sand dune</i> (January, 2018) (July, 2018)	Witnessed by Lara Muaves & Momade (MOMS Agent)		2	
	NI carapaces and visceral tissues (June, July, August and September, 2017 and January, 2018)	Witnessed by Lara Muaves & Momade (MOMS Agent)		4	3
Matemo Island, QNP, Cabo Delgado Province	Cc found dead in front of Matemo Lodge (December, 2017 and January, 2018)	Witnessed by Lara Muaves & Momade (MOMS Agent)			2
	Cm found dead in front of Matemo Lodge	Witnessed by Lara Muaves & Momade (MOMS Agent)			2
	Carapaces and visceral tissues . Two dead turtles entangled in a fishing net	Witnessed by Lara Muaves & Momade (MOMS Agent)		5	2

Monitoring area	Description	Photo evidence	NC	AC	NI
Quirimba Island, QNP, Cabo Delgado Province	Cm found dead (23 October and August, 2017)	 <p>Photos: Lara Muaves & Momade (MOMS Agent)</p>		2	
	Carapace (January, 2018)	<p>Witnessed by Lara Muaves & Momade (MOMS Agent)</p>			1
Nacala-Velha, Nampula Province	Cm carapaces in the possession of locals at the Wamualo Market (CCL = 39 cm).				
	Cm meat is sold openly at the price of 100.00 to 150.00 Meticais per kilogram (USD 1.67–2.5; Fernandes <i>et al.</i> , 2018).	<p>Witnessed by Carlos Litulo</p>		3	

Monitoring area	Description	Photo evidence	NC	AC	NI
	Cm carapace within a household at Bairro 25 de Setembro (CCL = 41 cm) (19 October, 2017)	 Photo: Carlos Litulo		1	
Memba, Nampula Province	Cm carapace found in the mangroves at Nachiropa beach (CCL = 44 cm) (19 October, 2017). According to a representative of Memba Fishing Community Council, artisanal spear fishers are catching turtle, and people are also killing nesting females and collecting and eggs at night between Mukombo and Nantaca beaches	 Photo: Carlos Litulo		1	
São Sebastião, Inhambane Province	Dead turtles strandings. The animals had no signs of injuries and the most likely cause of death was associated with some form of fishing outside Cabo de São	Witnessed by Cabo de São Sebastião Total Protection Zone rangers		4	

Monitoring area	Description	Photo evidence	NC	AC	NI
	Sebastião Total Protection Zone waters				
Pomene, Inhambane Province	Carapace bones found in Pomene beach (S 22°54.455' and E 35°34.359'). (27 October, 2017)	 <p>Photo: Marcos A. M. Pereira</p>			1
	Stranding of a Cm with rope dangled through his orbital holes. (June 2018)	 <p>Photo: courtesy of Mareika B. Krugel</p>		1	
Backdoor Beach, Tofinho, Inhambane Province	Plastron freshly burnt of a mature adult turtle (17 April, 2017)	 <p>Photo: Jessica L. Williams</p>		1	

Monitoring area	Description	Photo evidence	NC	AC	NI
Tofo, Inhambane Province	Juvenile Ei found dead in Tofo Bay. (8 October 2017).	 <p>Photo: Jessica L. Williams</p>			1
Linga Linga, Inhambane Province	Dc female slaughtered by local community prior to nesting at Guinjata. It's not clear if she was caught in nearshore waters or as she was emerging to lay (29/10/2017)	  <p>Photos: courtesy of Love the Oceans Witnessed by Vicente Matsimbe</p>		1	
POPMR, Maputo Province	Cm found dead between Ponta Mucombo and Santa Maria CCL= 98 cm (3/07/2017)		1		

Monitoring area	Description	Photo evidence	NC	AC	NI
	Cm found dead between Ponta Dobela to Ponta Mucombo CCL=82 cm (28/07/2017)	 <p>Photo: courtesy of Filimone Javane</p>	1		
	Cc found dead between the section Ponta Mucombo and Santa Maria CCL= 104 cm (29/07/2017)	 <p>Photo: courtesy of Vicente Matsimbe</p>	1		
	<p>Carapaces and bones were found near an artisanal fishing camp close to the Marine Biological Station:</p> <ul style="list-style-type: none"> - 11 Cm (average CCL = 35.5 cm \pm 8.4) -2 loggerheads (average CCL = 77.5 cm \pm 4.9). <p>The main culprit was identified and fined 72,000.00 Meticals (~1,200 USD) according to the Conservation Law (Law 5/2017 of 11 May;</p>	 		13	



Monitoring area	Description	Photo evidence	NC	AC	NI
	Miguel Gonçalves POPMR Park Warden, pers. comm.).	 <p>Photos: courtesy of the POPMR</p>			
Total			3	70	13

Table 15. Reported marine turtle entanglements and standings by natural (NC), anthropogenic (AC) or not identified causes (NI) per area and species (Cc – *Caretta caretta*, Cm – *Chelonia mydas*, Dc – *Dermochelys coriacea*, Ei – *Eretmochelys imbricate* and Lo – *Lepidochelys olivacea*; CCL curved carapace length).

Monitoring Area	Description	Photo evidence	NC	AC	NI
POPMP, Maputo Province	POPMP rangers found one juvenile green turtle entangled in a bottom gillnet near the Barreira Vermelha Sanctuary. The marine turtle was successfully released alive (15/11/2017)	 <p>Photos: courtesy of the POPMP</p>		1	
Total				1	

Tagging and recaptures

A total of 168 tags from the series MZ2187 to MZ2362 were applied at POPMR and 27 tags from the series MZ0295 to MZ898 at Vamizi Island, and one tag at BANP (MZ2009; Table 16). Numbers of first time recaptured turtles per monitoring area which were tagged in previous seasons or in other areas are shown in Table 17.

At POPMR, the application of new tags was mainly done in loggerhead turtles (95.8%) and in smaller numbers in leatherback turtles (4.2%). Tagged loggerhead turtles tracks (248 turtles; 339 tracks) represent only 17.7% of the total recorded tracks for this species. While the tracks of tagged leatherbacks turtles (13 turtles; 18 tracks) represent 30.0% of the total tracks of this species.

At Vamizi Island a total of 35 green turtles were identified, including seven recaptures from turtles tagged in previous nesting seasons (2008/09 and 2009/10).

Table 16. Number of marine turtles tagged for the first time during the 2017/2018 season at Vamizi Island, Bazaruto Archipelago National Park and Ponta do Ouro Partial Marine Reserve (POPMR), per species. Note that the application of new tags to replace old tags was not counted.

Monitoring Area	<i>C. caretta</i>	<i>D. coriacea</i>	<i>C. mydas</i>
1. Vamizi Island			27
3. BANP			1
7. POPMR	161	7	
P. Mucombo - Santa Maria	9	0	
P. Dobela – P. Mucombo	19	2	
P. Malongane – P. Dobela	128	4	
P. Ouro – P. Malongane	5	1	
Total	161	7	28

Table 17. Numbers of marine turtles recaptured in 2017/2018 season at the Vamizi Island and Ponta do Ouro Partial Marine Reserve (POPMPR), per species. Note that this table includes only the tags that were first applied on other nesting seasons or from other areas outside the monitoring area. * =The total of individuals recaptured at POPMPR is not the sum of the numbers reported per each section, as an individual (same tag number) can be seen in different beach sections. The POPMPR total refers to the number of individuals recaptured with tags that were applied in previous nesting seasons or different areas, for example from South Africa.

Monitoring Area	<i>C. caretta</i>	<i>D. coriacea</i>	<i>C. mydas</i>
1. Vamizi Island			7
7. POPMPR*	87*	6*	
P. Mucombo – Santa Maria	1	0	
P. Dobela – P. Mucombo	23	2	
P. Malongane – P. Dobela	72	6	
P. do Ouro – P. Malongane	6	0	

RESEARCH UPDATE

Recent publications relevant to Mozambique (published from August 2017 to June 2018)

- Fernandes, R. S., C. Litulo, M. A. M. Pereira & C. M. M. Louro (2018). Artisanal fisheries still represent a significant threat to marine turtles in Mozambique. *African Sea Turtle Newsletter*, 9: 11-15.
- Harris, L. R., R. Nel, H. Oosthuizen, M. Meyer, D. Kotze, D. Anders, S. McCue & S. Bachoo (2017). Managing conflicts between economic activities and threatened migratory marine species toward creating a multiobjective blue economy. *Conservation Biology*, 32 (2): 411-423.
- Louro, C. M. M., M. A. M Pereira, R. S. Fernandes, C. Litulo, G. Aparício & M. Carrilho (2018). Investigação e monitoria de espécies e ecossistemas nas áreas de conservação marinhas em Moçambique: Parque Nacional do Arquipélago do Bazaruto 2017, 31 pp. Maputo, Centro Terra Viva.
- Louro, C. M. M., M. A. M Pereira, C. Litulo, R. S. Fernandes & T. I. F. C. Pereira (2018). Investigação e monitoria de espécies e ecossistemas nas áreas de

conservação marinhas em Moçambique: Parque Nacional das Quirimbas 2017, 38 pp. Maputo, Centro Terra Viva.

- Louro, C. M. M., M. A. M. Pereira, C. Litulo, M.H. Schleyer, R. S. Fernandes & T. I. F. C. Pereira (2018). Investigação e monitoria de espécies e ecossistemas nas áreas de conservação marinhas em Moçambique: Reserva Nacional do Pomene, 29 pp. Maputo, Centro Terra Viva.

Conference presentations

- Williams, J. L., S. J. Pierce, M. M. B. P. Fuentes & M. Hamann (2018). Bycatch or illegal take? Understanding artisanal fisheries and their impacts on sea turtles in Mozambique. Oral Presentation at 38th International sea turtle symposium, Kobe, Japan 18th-23rd February.

On-going studies

- Pilcher N.J. & J. Williams (in prep.). Assessment of the status, scope and trends of the legal and illegal international trade in marine turtles, its conservation impacts, management options and mitigation priorities in Mozambique. Report to the CITES Secretariat Project S-527. SSFA/2018/DKA.

Priority future research and conservation management actions needed

- Analysis of female emergences at POPMR (from Ponta do Ouro to Santa Maria) from 1994 to the current nesting season. This analysis will include extrapolation of tracks based on historic data from the index site (Ponta Malongane) for the period between 1994/95 and 2007/08 nesting season. This priority was identified in the 2016/17 report but without any progress due to the need to re-examine all raw data.
- The identification and quantification of the extent of anthropogenic impacts (e.g. fisheries-related mortality, oil and gas prospecting and a deep water port building and operation at POPMR) to marine turtles and its habitats in Mozambique and the region. With regards to marine turtle mortality related fisheries, along the coastline different

stakeholders (e.g. tourism operators and civil society) are reporting marine turtles mortality cases but not following a specific protocol to quantify artisanal bycatch and intentional captures. Semi-industrial and industrial fisheries bycatch data is also not being reported on a regular basis. Efforts should be made to collaborate with fisheries institutions in those matters, including the implementation of turtle excluder devices (TEDs).

- Improve marine turtles populations sizes estimates.

TRAINING RANGERS AND COMMUNITY MONITORS AND OTHER ACTIVITIES

Centro Terra Viva, within the aims of the Memorandum of Understanding with ANAC, Mozbio and FNDS (signed in July 2017), is developing activities related with result dissemination in marine conservation areas, namely QNP, BANP, RNP and POPMR.

The activities include talks with stakeholders (e.g. monitors, rangers, administrators, tourism operators) in the conservation areas, namely Ibo Island and Biaque – QNP (4 and 9 October 2017, respectively), Pomene - PNR (30 October 2017), Bazaruto Island - BANP (16 November 2017) and in Ponta do Ouro - POPMR (31 May 2018). A workshop entitled *“Resultados de investigação, monitoria e aspectos operativos nas áreas de conservação marinhas em Moçambique”* was held in Maputo City (4-5 September 2018). One of the main objectives of the workshop was to strengthen synergies and exchange experiences, between marine conservation areas and community management areas, based on research and monitoring protocols and results. One of the topics addressed was about marine turtles, specifically monitoring protocols, areas requiring monitoring (e.g. Primeiras e Segundas), data sharing and databases, including tagging data. With regards to this last issue, tag sequence was discussed because currently there is one tag number sequence (MZ 001 – MZ 3150) for the all country. The problem arises from the fact that the POPMR, one of the monitoring areas with the main tagging programme in the country, requires a continuous tag sequence. The solution is still under debate.

ENVIRONMENTAL EDUCATION AND AWARENESS

Quirimbas National Park

- In the QNP, environment education sessions for marine turtle conservation, have been conducted around Ibo, Matemo, Quirimba, Mefunvo islands as well as in Quissanga village, with local communities specially fishers. About 15 awareness sessions were jointly conducted by the Attorney General (including prosecutors of Ibo, Quissanga and Pemba districts), local NGOs (OIKOS, Ibo Foundation and WWF), and local government and Park authorities.
- The MOMS agents have also played an important role on the environmental education and awareness activities around Ibo, Matemo and Quirimba islands. In addition to record number of alive and dead marine turtle sightings and to report the illegal activities to the Park authorities, MOMS agents also conduct “door to door” campaigns, sensitizing the fisheries communities about the ecological importance of marine turtles and the Mozambican Laws against intentional turtle killing and other illegal activities. Announced by the prosecutor of Ibo District, Fátima Karina, the number of illegal processes reduced from ten (10) to two (2) during the period of January 2017 to June 2018, from the ten reports, seven (7) were related to intentionally captures of marine turtle in Matemo and Ibo island.
- Furthermore, some specific activities on “waste management” were recently implemented by OIKOS, and it has been discussed the integration of the cleaning of “marine turtle cemetery” and collection of all bones and remains of marine turtles. During the workshop about MOMS results’ dissemination and discussion, held last June 2018 with disparate stakeholders, the Permanent Secretary and the prosecutor of Quissanga District, announced that the “marine turtle cemetery” of Quissanga village was already cleaned and all the bones taken out, as a result of intensive awareness campaigns raised throughout the year and being led by the local government.

Inhambane Province

- CTV made a presentation about marine turtles in the Biofund event “*Biodiversity of Mozambique - The Culture of Conservation and Sustainable Development: Harmonizing Economic Development and Biodiversity Conservation*” for approximately 50 children from different schools held in August 2018.

CHALLENGES & RECOMMENDATIONS

Overall, and based on past and present recommendations, the following recommendations should be considered (see Table 18 to correspond recommendations per area):

1. Improve monitoring effort. If a monitoring programme does not have the capacity to do beach patrols daily during the nesting season, it should apply its greater monitoring effort, during the nesting activity peaks.
2. Improve the recording of monitoring effort. More specifically, record the distance and duration of all patrols made. The monitoring effort spreadsheets per monitoring area (digital or hardcopy) should be shared with CTV to avoid the error of considering false zero observation days.
3. Adopt the current monitoring protocol to collect all data related to females emergences (e.g. tracks, nests and biometrics);
4. Adopt the current monitoring protocol to collect all data related to nests (e.g. number of eggs, and live and dead hatchlings);
5. Review the current monitoring protocol for counting the numbers of hatched eggs. Where possible, the number of eggs laid and the number of eggs unhatched shall be counted. It should be clear when only the "broken" shells are counted, given the high associated error that may lead to unrealistic inference of the potential number of live

offspring that can reach the sea (instead of using the subtraction of eggs laid by the number of eggs unhatched). Additional count of "false eggs" must be made;

6. Carry out a specific study on nest density and main threats during the incubation phase (related to the number of non-hatched eggs) and emergence success of the hatchlings to support the decision on nest translocation in the future or other actions related to raided nests or anthropogenic threats.
7. Establish a MoU for the collaboration with the fisheries sector to collect data related to mortality of marine turtles.
8. Care should be made when categorizing the variables related to tags. A new tag should only be considered "new" when it is applied on a marine turtle with no tags. A second emergence of the mentioned tagged turtle, or turtles tagged during previous nesting seasons, should be considered as recaptures.
9. Challenges were found as a result of the existence of replicates on the data collected during the 2017/18 nesting season at POPMR: a total of 372 replicates were found. This may be a result of duplicate insertion of data due to the separate source of tables, one for tracks and the other for tagged and sighted turtles from the current system used on the monitoring reports for Ponta Malongane to Ponta Dobela section, but also due to human error during the data insertion.
10. Continue to promote the training and refreshment of monitors with regard to the methodology of data collection, in particular the recording of monitoring effort, species identification and measurement of carapaces. This is a major priority for the QNP monitors, as verified by the cross-check through the use of photos and raw data, which allowed the detection of several species identification failures, mainly between loggerhead and green turtles, lack of information on carapace size in all datasheets and in some cases, no accurate geographic location.
11. Improve the tag database, including the standardization of the tag nomenclature and add references whenever possible to "lost tag", "future tag" (data entrances related to

turtles that were retagged) and “foreign tag”. Each individual turtle must have a unique identification code.

12. Improve and continuously update the marine turtle databases. Raw data from POPMR, BANP and QNP are currently hosted by CTV. Whereas Vamizi island and CSSTPZ programs maintain their own databases.
13. Make efforts to prepare an MoU with the Biology Station on Inhaca Island and formalize collaboration with other ongoing programs to ensure the standardization of protocols for monitoring, training and accommodation of all information regarding monitoring, tagging and conservation of marine turtles in Mozambique.

Table 18. Priority recommendations per monitoring area. QNP–Quirimbas National Park; BANP–Bazaruto Archipelago National Park; CSSTPZ–Cabo de São Sebastião Total Protection Zone; PNR–Pomene National Reserve; POPMR–Ponta do Ouro Partial Marine Reserve.

Monitoring Area	Recommendations										
	1	2	3	4	5	6	7	8	10	11	
Vamizi island	X	X					X		X	X	
QNP	X	X	X				X		X	X	
BANP	X	X		X	X	X	X	X	X	X	
CSSTPZ	X	X					X	X	X	X	
PNR	X	X					X				
Tofo–Paindane*	X	X					X				
Závora–Praia Manhame*	X	X					X				
POPMR		X		X		X	X		X	X	

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