UN environment CMS

MEMORANDUM OF UNDERSTANDING ON THE CONSERVATION AND MANAGEMENT OF MARINE TURTLES AND THEIR HABITATS OF THE INDIAN OCEAN AND SOUTH-EAST ASIA

CMS/IOSEA/MOS8/Inf.9.1.c
10 September 2019
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8TH MEETING OF THE SIGNATORY STATES
Da Nang, Viet Nam, 21-25 October 2019
Agenda Item 9.1

UPDATES ON THE STATUS OF IOSEA NETWORK SITES

iSIMANGALISO WETLAND PARK

(Prepared by South Africa)

Update on the Status of the IOSEA Network Site
(Version: 21 August 2019)

iSimangaliso Wetland Park World Heritage Site

A. Date of submission (DD/MM/YYYY):
The date on which the questionnaire was completed.

10/09/2019

B. Name and address of compiler(s), if not the IOSEA Focal Point
Name and contact information (including affiliation) for the individual(s) who prepared this information.

Name:	Santosh Bachoo	
Functional Title:	Senior Ecologist (Marine)	
Organization:	Ezemvelo KZN Wildlife	
Address:	**Physical Address:** 1 Peter Brown Drive Montrose Pietermaritzburg 3202 KwaZulu-Natal Republic of South Africa	**Postal Address:** Ezemvelo KZN Wildlife Private Bag X3 Congella Durban 4000 KwaZulu-Natal Republic of South Africa
Email:	Santosh.Bachoo@kznwildlife.com	

Name:	Sizo Sibiya	
Functional Title:	Executive Manager: Biodiversity Conservation	
Organization:	iSimangaliso Wetland Park Authority	
Address:	**Physical Address:** The Dredger Harbour St Lucia 3636 KwaZulu-Natal Republic of South Africa	**Postal Address:** The Dredger Harbour Private Bag X05 St Lucia 3936 KwaZulu-Natal Republic of South Africa
Email:	sizo@isimangaliso.com	

C. Country: *The name of the country in which the site is located.*

Republic of South Africa

D. Name of site: *The name of the site (alternative names should be given in brackets).*

iSimangaliso Marine Protected Area, iSimangaliso Wetland Park World Heritage Site. Figure 1 gives spatial context to the site in and provides the names and locatities of points referenced in the rest of this document. This map illustrates the original extent of the MPA within the park that has since been expanded. This will be discussed further down in the document.

Figure 1: *iSimangaliso Wetland Park*

1. Have there been changes in the management authority? No

Name, address and contact details of the body responsible for the direct local conservation and management of the site, if different than in original proposal.

Site Management Authority
iSimangaliso Wetland Park Authority
Private Bag X5
St Lucia
3536
KwaZulu-Natal
Republic of South Africa

Direct Mandated Local Conservation Management (under a management agreement with iSimangaliso Wetland Park Authority)
Ezemvelo KZN Wildlife
Private Bag X3
Congella
Durban
4000
KwaZulu-Natal
Republic of South Africa

2. What are the current population numbers and trends for the marine turtle species present at the site?

Please insert population numbers for each species present and the year when the population was estimated, as well as the population **trend** *(e.g. stable, increasing, decreasing, unknown)*

2.1. CURRENT POPULATION NUMBERS

Five species of turtles have been documented in the coastal waters of South Africa. These are the Green turtle (*Chelonia mydas*), the hawksbill (*Eretmochelys imbricate*), the olive Ridley (*Lepidochelys olivacea*) the leatherback (*Dermochelys coriacea*) and the loggerhead (*Caretta caretta*) turtle. The Green, hawksbill and the olive ridley are data deficient in terms of population numbers for South Africa and are unavailable. For the leatherback and loggerhead turtles, long-term data (approx. 55 years) are only available for the nesting female component of these populations. Annual monitoring for these species starts on 15 October and terminates 5 months later on 15 March of the following year. Table 1 details the nesting parameters for nesting leatherback and loggerhead turtles for the 85 km stretch of beach from the South African/Mozambican border south to Sodwana Bay during the 2018/2019 season.

2.1.1. Current Population Numbers (Table 1) – Nesting Leatherback Turtles (*Dermochelys coriacea*)

The results of the 2018/2019 season was indicative of a depressed nesting season for this species. There were 402 leatherback emergences recorded, the lowest for the past 5 seasons. There were 100 tagged animals encountered, of which 73 were identified as distinct individuals. Of these, 40 were identified as being encountered for the first time on our beaches, and 33 having being encountered in previous seasons. Of the 399 emergences, 393 had resulted in successful nesting events – this represents a nesting success of 98% which is typical for this species. The mean curved carapace length of 1614mm is also within the range for the South African leatherback subpopulation. The overall population size does remain worryingly small though, with 73 individuals recorded during this season.

2.1.2. Current Population Numbers (Table 1) – Nesting Loggerhead Turtles (*Caretta caretta*)

This season realised a slight increase in turtle nesting activity with 5749 emergences recorded as compared to the previous seasons. There were 1219 tagged loggerheads recorded (highest for the past 8 seasons) of which 843 were identified as distinct individuals. The number of distinct individuals is the highest when compared to the previous 7 seasons. For loggerheads, 511 individuals were identified as having nested for the first time, while 332 are experienced nesters that have visited our beaches before. In terms of nesting, 3352 emergences resulted in successful nests which represents a nesting success of 58% which is typical for this species.

Table 1 : Latest nesting parameters for leatherback and loggerhead turtles (2018/2019 nesting season only)

TURTLE NESTING PARAMETERS – 2018/2019 SEASON	LEATHERBACK TURTLES	LOGGERHEAD TURTLES
NUMBER OF TRACKS[1]	402	5749
NUMBER OF TAGS[2]	100	1217
NUMBER OF DISTINCT INDIVIDUALS[3]	73	843
NUMBER OF NEW INDIVIDUALS[4]	40	511
NUMBER OF REMIGRANTS[5]	33	332
NUMBER NESTED[6]	393	3352
NUMBER NOT NESTED[7]	9	2366
NUMBER OF NESTS NOT SPECIFIED[8]	0	31
NUMBER OF CALLOUSES[9]	16	113
CCL Mean Length (mm) ± STDEV	1614±62.78	909.25*±37.41

2.2. CURRENT POPULATION TRENDS

Consistent effort has been applied to the area from the Bhanga Nek research station (16 km south of the Mozambique border) to the Kosi estuary mouth (3.2 km south of the border). Dedicated patrolling of this area has taken place every nesting season since 1965 and it is for this reason that this area is termed the "Index Area" (Nel and Bachoo 2011[10]). Therefore, nest and track (emergence) counts from this area are used as an index of abundance of the nesting population trend due to the application of consistent effort in this area. Track counts are particularly favoured as a metric/proxy of population size as this is least dependent on effort, equipment and interpretation and therefore gives a more reliable indicator of population trends (Nel 2014[11]). Population trends based on track counts for nesting leatherbacks and loggerheads are presented in Figures 2 and 3 respectively.

2.2.1. Current Population Trends – Nesting Leatherback Turtles

The population trend for leatherbacks (Fig. 2) in terms of track counts reveals great inter-annual variation in nesting numbers for the duration of the programme. Despite the variation, the population did go through a phase of rapid recovery in the first decade of protection, followed by a period of prolonged stability. The period between 2014 and 2016 did seem very positive, with the past 2 seasons (2017/2018 and 2018/2019) revealing successive declines. This was likely a response to large-scale beach erosion events experienced on the nesting beaches, making the beaches unsuitable for nesting. The high variation between each season does make it difficult to conclusively state that the leatherback nesting population is on the rise. As it stands, the overall nesting population is therefore considered to be stable but dangerously low.

[1] **Number of tracks**: number of recorded emergences irrespective of nesting or turning around without nesting.
[2] **Number of tags**: number of turtles identified by their tags including repeated nesting/emergences.
[3] **Number of distinct individuals**: number of individuals identified through-out the season.
[4] **Number of new individuals**: individuals that were untagged and were tagged for the first time in this season.
[5] **Number of remigrants**: individuals that were tagged in previous seasons and were still carrying their tags.
[6] **Number nested**: number of emergences that resulted in a turtle nesting.
[7] **Number not nested**: number of emergences where turtles returned prematurely to the sea before nesting.
[8] **Number of nests not specified**: number of tracks reported without specifying if the animal nested or not.
[9] **Number of callouses**: number of previous tag scars reported.

[10] *Nel, R. and Bachoo, S. 2011. Season Report: Turtle Monitoring 2010-2011. Internal Report for Ezemvelo KZN Wildlife and iSimangaliso Wetland Park.*
[11] *Nel, R. 2014. 50 Years of Turtle Conservation, Monitoring and Research: A State-of-Knowledge Report for Ezemvelo KZN Wildlife.*

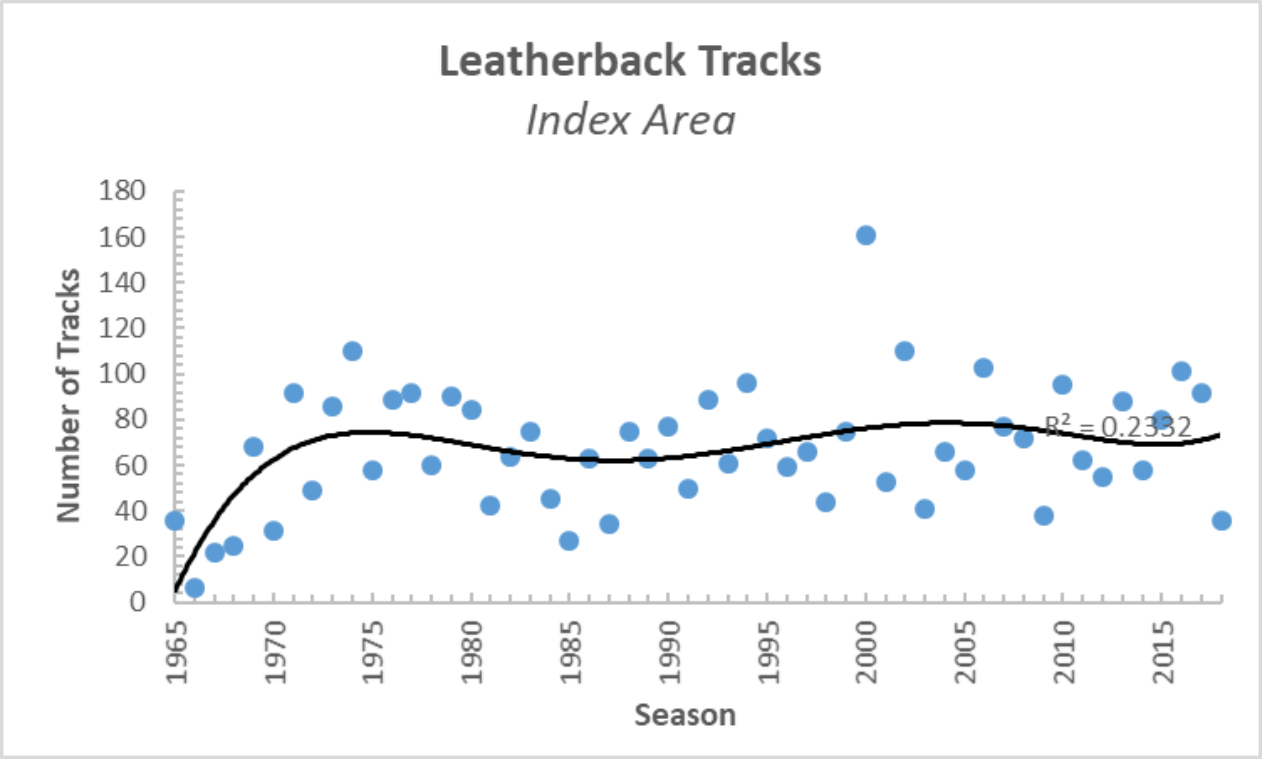

Figure 2 : Leatherback emergences in the Index Area for the duration of the programme

2.2.2. Current Population Trends – Nesting Loggerhead Turtles

The long-term nesting loggerhead population trend in terms of tracks overall is considered to be increasing. The long-term trend has undergone distinct phases (Fig. 3) since the implementation of the protection programme in 1963:

- Initial rapid increase – this was during the first 5-10 years of monitoring, quite likely an immediate positive response to protection;
- Prolonged stability – following the initial rapid increase, a prolonged period of stability spanning approximately 30 years;
- Rapid increase – during the early 2000's to around 2011/2012, where there was a dramatic (almost exponential) increase in the population. Nel (2014) attributed this to the consistent long-term protection afforded to hatchlings which are now coming back to nest. Other contributions noted by Nel (2014) was the increased protection in Mozambique since 1996 as well as the collapse of the prawn trawl industry off the east coast of KZN.
- Peak – the population, reported as having stabilised between the 2011/2012 -2013/2014 (Nel 2014), seems to have now peaked with no further increase.
- Population decline – the population is showing the first signs of a sudden decline since the start of the programme 55 years ago. There were 3 seasons of successive decline from the 2013/2014 season to the 2016/2017 season. The cause of the decline is unknown.
- The past 3 seasons does offer a glimmer of hope in terms of an increasing trend and we do remain guardedly optimistic. This does however highlight the need for continual conservation and monitoring.

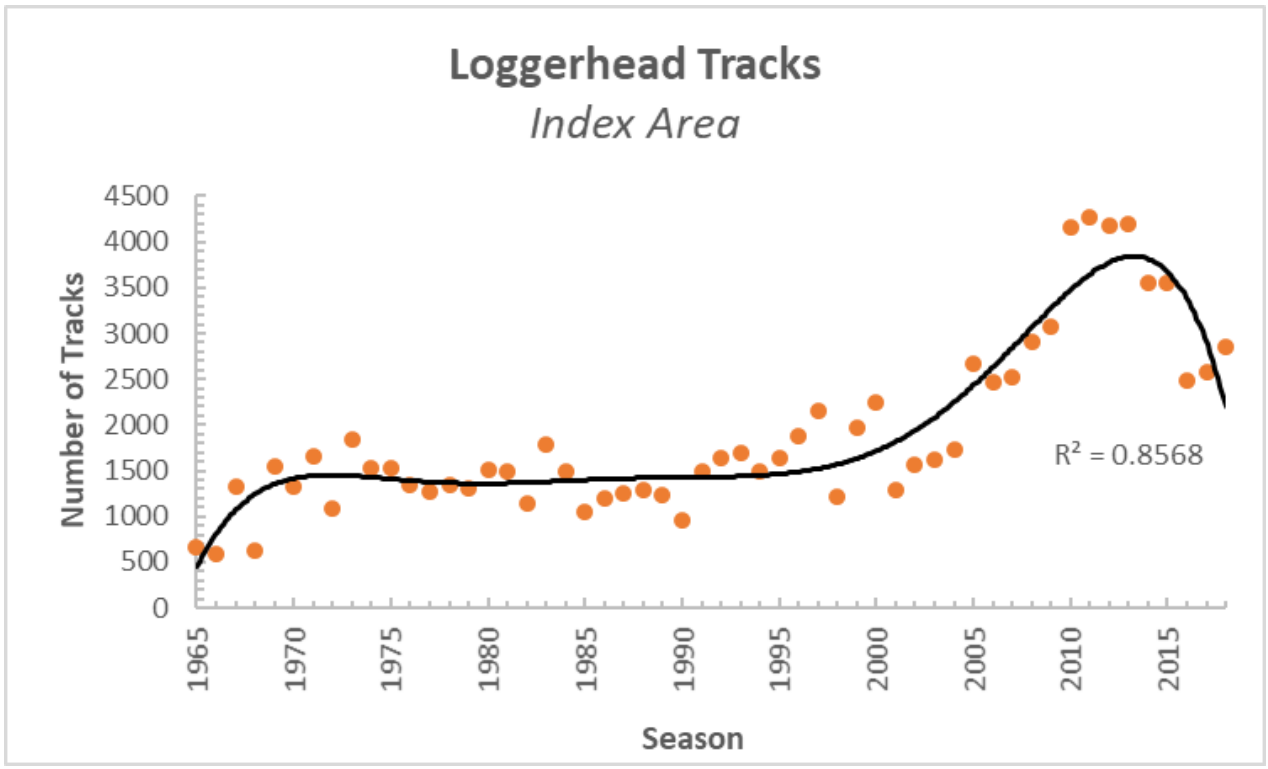

Figure 3 : Loggerhead emergences in the Index Area for the duration of the programme

2.2.3. Current Population Trend – Green Turtles (*Chelonia mydas*)

No data available

2.2.4. Current Population Trend – Hawksbill Turtles

No data available

2.2.5. Current Population Trend – Olive Ridley Turtles

No data available

3. Have there been any changes in land/sea ownership, protected status, legislation and/or governance framework, which affect the site?

Describe any changes to legislation / regulations relevant to the protection / conservation of marine turtles and their habitats at this site, and comment on their effectiveness.

Mention any changes in nationally relevant protected area status, international conservation designations and, in the case of transboundary sites, bilateral or multilateral conservation measures which pertain to all or part of the site since 2014. If a protected area or reserve has been established (at a national/regional level), give the date of its establishment and size. If only a part of the site is included within a protected area, the area of marine turtle habitat that is protected should be noted.

New International designations since 2014 may include sites listed under the UNESCO/World Heritage Convention, Man and Biosphere Reserve Network, Ramsar Convention, other site conservation networks, etc. Where appropriate, list the IUCN (1994) protected areas management category(ies) that apply to the site.

Marine Protected Area Expansion

In October 2018, the South African government approved a network of 20 new and extended Marine Protected Areas (MPAs) in the Exclusive Economic Zone (EEZ) of South Africa that are representative of the countries rich coastal and ocean biodiversity. This was gazetted on 23 May 2019 and resulted in increased protection of the coastal and ocean environments around South Africa from 0.4% to 5%. In the case of the iSimangaliso site, the size of the existing MPA increased significantly from 886 km^2 (see Fig 1) to 10700 km^2 (see Fig 4). One of the stated purposes for the expansion of the MPA is for the protection of

inter-nesting and foraging turtles in the area, and this bodes very well for turtle conservation and protection at this site.

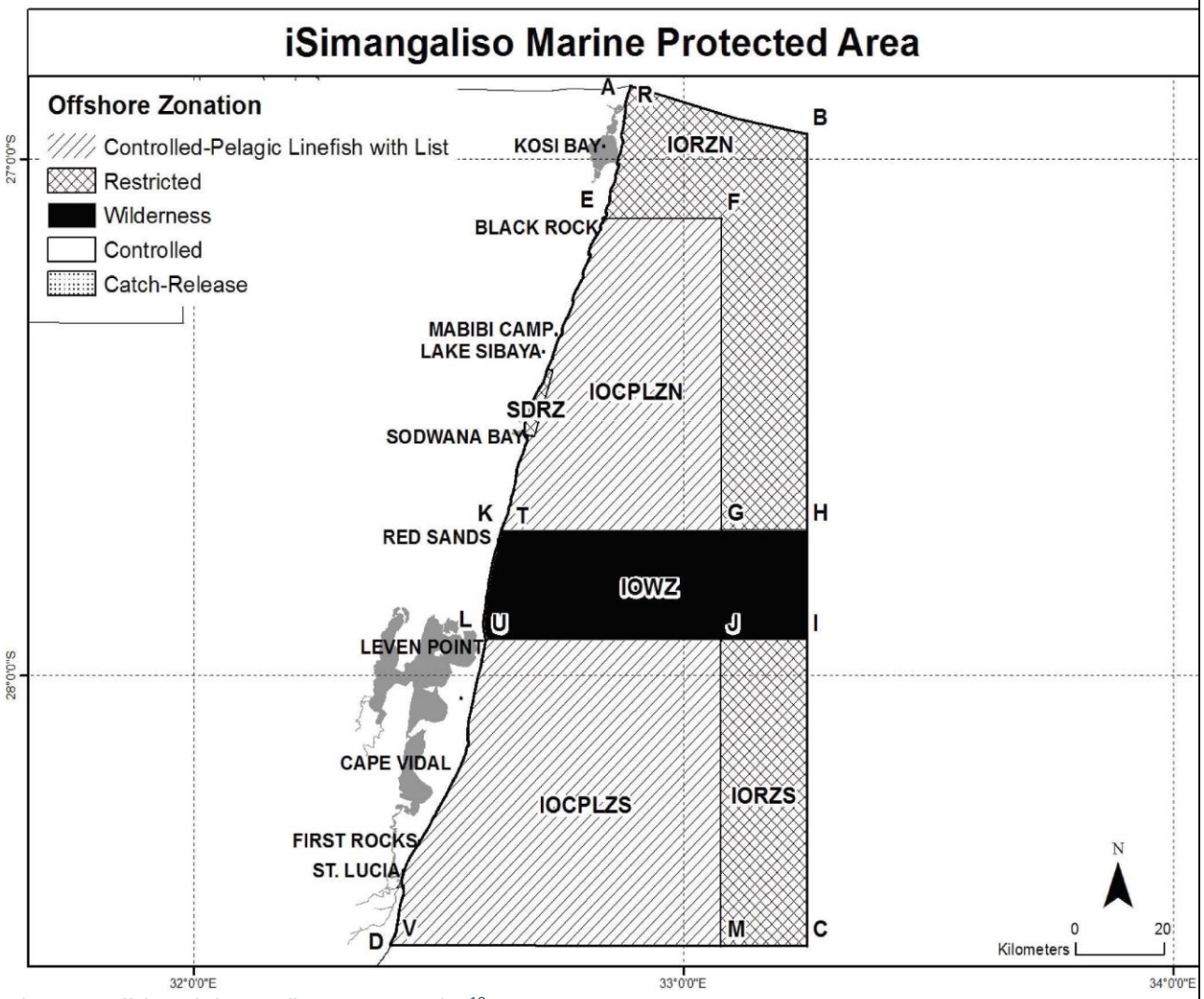

Figure 4: Offshore iSimangaliso MPA Zonation[12]

4. What are currently the most important threats to marine turtles and their habitat at the site?

Describe the human and natural factors negatively affecting the ecological character of the site, both within and in the vicinity of the site. These may include new or changing activities/uses, major development projects etc., which have had, are having, or may have a detrimental effect on the natural ecological character of the site. For example, describe in terms of the percentage of coastline (or other area) modified/affected by a particular threat; for egg collection, describe in terms of number of nests, per species, per year. Mention also data-deficient threats, where a threat is known to be present but is not quantified. Collectively, this information should provide a basis for monitoring of ecological character of the site.

Poaching

- Very low level of poaching at this site – typically 1-2 incidences every 2-3 times a year. This includes poaching of nesting turtles as well as nest raiding for eggs.
- Dedicated patrols (day and night) ensures that the levels remain suppressed.

Pollution

- Plastic pollution remains the main issue at this site.
- Regular beach clean-ups at this do assist with mitigating this threat, but microplastics remain an unquantified threat to the site.

[12] *National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003): Regulations for the Management of the iSimangaliso Marine Protected Area. Government Gazette No. 42479, 23 May 2019*

Natural Hazards

- Mainly predation on nests by other fauna in at the site – these include mongoose and honey badgers.

Illegal fishing in the area: coral damage and bycatch

- The site is a declared marine protected area within a World Heritage Site. Fishing is highly regulated and is mainly recreational only – there is no commercial fishing permitted.

Habitat destruction/modification

- There have been instances of extensive beach erosion over the past few seasons, where nesting beaches have been washed away by storm surges. The storm surges, quite likely driven by climate change, has been responsible for affecting both nesting adults as well as nests.
- Beach erosion typically produces steep wave-cut platforms (cliffs). Nesting turtles experience great difficulty in scrambling over these cliffs, resulting in them either turning back or nesting at the base of the sand cliff where the nests become inundated with water at high tide. Tragically, during the 2016/2017 season, a leatherback was smothered to death by a collapsing sand bank while trying to scramble over a beach cliff (see Fig 5). This happened again the following season to another leatherback under a similar scenario. Prior to this, incidences of this nature was unprecedented for the 55 year history of the programme.

Figure 5: Leatherback smothered to death by falling sand from a collapsed wave-cut platform it was trying to scale (Picture supplied by Linda Harris). Note the height of the bank.

- Beach erosion has also affects hatching success. A stark example of this was in February 2019, where the high-density loggerhead nesting beaches north of Bhanga Nek were washed away together with the nests.

Socio economic factors

- The general lack of socio-economic opportunities in the area can be viewed as a threat to nesting turtles. However, this unique phenomenon is considered an important source of income for communities in the area. There remain few socio-economic activities at this site that are incompatible with either nesting or foraging turtles. There is very limited development on this 200 km stretch of beach within the WHS, which remains restricted to seven low-intensity tourist nodes/conservation management sites that are located at Maphelane/St Lucia, Cape Vidal, Sodwana Bay, Mabibi, Manzengwenya, Bhanga Nek and Kosi Bay. Apart from these, the primarily undisturbed beaches at iSimangaliso Wetland Park are considered to possess a high degree of resistance or resilience to anthropogenic disturbances.
- It must be highlighted that the long-term turtle monitoring programme is critically important as it has effectively protected these marginal turtle subpopulations for 55 years while simultaneously changing the value of turtles from a short-term food source to a long-term sustainable source of tourism and employment (close to 40 individuals are employed annually) for locals residing in the area. It demonstrates great synergy between conservation and the creation of economic opportunities – two goals that are otherwise generally incompatible.

5. New conservation and management interventions taken since 2014 and measures planned for near future

Describe conservation and management interventions taken at the site to address threats since 2014. Any application of coastal and marine spatial planning, or integrated coastal/marine zone management planning, involving or affecting the site should be noted.

Describe any other new conservation measures taken at the site, such as restrictions on development, management practices beneficial to wildlife, closures of fishing, etc. (Note that information on any monitoring schemes and survey methods should be given under point 19, below.)

Where applicable, describe public outreach and communication activities. In addition, if applicable, describe any new developments in the involvement of local communities and indigenous people in the participatory management of the site, including co-management activities, surveillance and enforcement, and performance evaluation since 2014.

The interventions to aid turtle conservation and management that were proposed for this site in the 2013 IOSEA Marine Turtle Site Network submission are listed below together with the progress:

1. *Marine Protected Area (MPA) Expansion* – the initial plans for expansion were to extend the then MPA south to the St. Lucia lighthouse (south of Maphelane), and to extend this 3 nautical miles out to sea. This area has been surpassed, with the current gazetted expansion going out to a depth 2000m offshore and now encompassing an area of 10700 km^2.The details of this expansion has been discussed in Section 3.
2. *Extend the current monitoring area south from Mabibi to Sodwana Bay* – prior to 2014, this area was suspected as a nesting leatherback hotspot, based on the tagging (flipper and satellite tagging) as well as on-the-ground observations. Expanded monitoring was initiated in the 2014/2015 nesting season and added an approximately 25 km stretch of beach to the 60 km that is being monitored. An additional 13 community members were employed to achieve this. It was found that this area supported close to 42% of the nesting activity over the entire monitoring area.
3. *The Threatened or Protected Marine Species Regulations and Species List* - were gazetted in May 2017 in accordance with S56 National Environmental Management: Biodiversity Act (No.10 of 2004). The Regulations protects all five sea turtles species occurring in South Africa's coastal waters and further categorise each species a conservation status as well as regulate prohibitions and exemptions to restricted activities involving specimens of listed threatened or protected marine species. In addition to this, the TOPMS Regulations provide for the regulations of marine species while in captive institutions.
4. *Turtle Biodiversity Management Plan Update* - Biodiversity Management Plans (BMP's) are provided for in Section 43 of the National Environmental Management: Biodiversity Act (NEMBA). It is a legislative tool that can be used in addition/or in isolation to the TOPS List (under 3) to aid in a conservation of a species. Currently, the Republic of South Africa has two MoU's on Sea Turtles that are unfortunately not being implemented adequately. The Department of Environmental Affairs has decided to effectively implement the two MoU's, and if there is a shortage to the protection of sea turtles, a BMP for Sea Turtles can then be developed to address where current National legislation and Regional obligations fall short. Sea turtles are well protected in the country, and we need to ensure that the current level of protection aids the species. As such, the development of a BMP is not going to continue.

6. Current / proposed scientific research and monitoring since 2014

Name current and/or proposed scientific research projects and their start and end dates, relating to marine turtles and their habitats. Please describe monitoring activities (e.g., tagging, satellite tracking, genetic sampling, nesting and foraging ground surveys, ongoing beach monitoring, etc.). Cite relevant published papers in support of the submission.

- The Nesting Leatherback and Loggerhead Turtle Monitoring Programme - Core conservation monitoring programme in initiated in 1963 and is ongoing
- Nolte, C. 2019 The distribution of South African sea turtles as indicated by epibionts and stable isotopes. Unpublished MSc Thesis, Nelson Mandela University. 140 pages

- Pretorius, D 2019. Zoning the Western Indian Ocean to mitigate conflict between ocean-based hydrocarbon exploration and production on sea turtles. Unpublished MSc Thesis, Nelson Mandela University, 148 pages.

- de Vos D, Nel R, Schoeman DS, Harris LR, du Preez, D (2019) Effect of introduced *Casuarina* trees on the vulnerability of sea turtle nesting beaches to erosion. *Estuarine Coastal and Shelf Science* 223:147-158.

- du Preez M, Nel R, Bouwman H (2018) First report of metallic elements in loggerhead and leatherback turtle eggs from the Indian Ocean. *Chemosphere* 197:716-728

- Harris, L., Nel, R., Oosthuizen, H., Meÿer, M., Kotze, D., Anders, D., McCue, S., Bachoo, S., 2018. Managing conflicts between economic activities and threatened migratory marine species towards creating a multi-objective blue economy. *Conservation Biology*,32(2): 411-423.

- Le Gouvello D, Nel R, Harris LR, Bezuidenhout K, Woodbourne S (2017) Identifying potential pathways for turtle-derived nutrients cycling through beach ecosystems. *Marine Ecology Progress Series,* 583:49-62.

- Robinson, NJ, Moreale, SJ, Nel, R, Paladino, FV (2017) Movements and diving behaviour of inter-nesting leatherback turtles in on oceanographically dynamic habitat in South Africa. *Marine Ecology Progress Series* 571: 221-232.

- Le Gouvello D, Nel R, Harris LR, Bezuidenhout K (2017) The response of sandy beach meiofauna to nutrients from sea turtle eggs. *Journal of Experimental Marine Biology and Ecology* 487:94-105.

- Robinson NJ, Stewart KR, Dutton PH, Nel R, Paladino FV, Santidrián Tomillo P (2017) Standardising curved carapace length measurements for leatherback turtles, *Dermochelys coriacea*, to investigate global patterns in body size. *Herpetological Journal* 26: 133–136.

- Robinson NJ, Morreale SJ, Nel R, Paladino FV (2016) Coastal leatherback turtles reveal conservation hotspot. *Scientific Reports* 6:37851.

- Robinson NJ, Majewska R, Lazo-Wasem E, Nel R, Paladino FV, Rojas L, Zardus JD, Pinou T (2016) Epibiotic diatoms are universally present on all sea turtle species. PLoS ONE 11(6): e0157011.

- Ryan PG, Cole G, Spiby K, Nel R, Osborse A, Perold V (2016) Impacts of plastic ingestion on post-hatchling loggerhead turtles off South Africa. *Marine Pollution Bulletin* 107: 155-166.

- Santidrián Tomillo P, Saba VS, Lombard C, Paladino F, Spotila J, Fernández C, López Rivas M, Tuček J, Nel R, Oro D (2015) Global analyses of the effects of local climate on the hatchling output of leatherback turtles. *Scientific Reports* 5: 16789

- Harris LR, Nel R, Oosthuizen H, Meÿer M, Kotze D, Anders D, McCue S, Bachoo S (2015) Paper-efficient multi-species conservation and management are not always field-effective: The status and future of Western Indian Ocean leatherbacks. *Conservation Biology* 191: 383-390.

7. Briefly describe current financial as well as capacity-building needs

Identify fundraising and capacity building needs for the site (e.g. in relation to monitoring, management interventions, surveillance and enforcement, and performance evaluation).

Sources of Funding – Core Monitoring Programme

- Ezemvelo KZN Wildlife
- iSimangaliso Wetland Park Authority
- Wildlands Conservation Trust (via WildOceans)
- Blue Action Fund (via WildOceans)
- United States Fish and Wildlife Services (awaiting outcomes of application)
- A Pew Marine Fellowship (by one of the advisors to the site, Dr Ronel Nel) made some provision for an update and development of new of training materials on sea turtles to be used in the Park. Most of the experts involved from a number of organizations (including uShaka and Ezemvelo KZN Wildlife) are being donated. However, there is a financial need for the printing of booklets and posters being produced.

8. References since 2014

List any new references relevant to marine turtle records and to the site, including management plans, major scientific reports, scientific articles and bibliographies. When a large body of published material on the site is available, only the most important references need be cited, with priority being given to recent literature containing extensive bibliographies. Reprints or copies of the most important literature should be appended whenever possible. Provide website addresses of references where available.

- Nolte, C. 2019 The distribution of South African sea turtles as indicated by epibionts and stable isotopes. Unpublished MSc Thesis, Nelson Mandela University. 140 pages

- Pretorius, D 2019. Zoning the Western Indian Ocean to mitigate conflict between ocean-based hydrocarbon exploration and production on sea turtles. Unpublished MSc Thesis, Nelson Mandela University, 148 pages.

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- Harris, L., Nel, R., Oosthuizen, H., Meÿer, M., Kotze, D., Anders, D., McCue, S., Bachoo, S., 2018. Managing conflicts between economic activities and threatened migratory marine species towards creating a multi-objective blue economy. *Conservation Biology*,32(2): 411-423.

- Le Gouvello D, Nel R, Harris LR, Bezuidenhout K, Woodbourne S (2017) Identifying potential pathways for turtle-derived nutrients cycling through beach ecosystems. *Marine Ecology Progress Series,* 583:49-62*.*

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- Le Gouvello D, Nel R, Harris LR, Bezuidenhout K (2017) The response of sandy beach meiofauna to nutrients from sea turtle eggs. *Journal of Experimental Marine Biology and Ecology* 487:94-105.

- Bachoo, S. 2017. Sea Turtle Conservation and Monitoring in KwaZulu-Natal – A report on activities during 2016/2017. Edited by Dr Scotty Kyle. Ezemvelo KZN Wildlife Internal Report – 35pp

- Robinson NJ, Stewart KR, Dutton PH, Nel R, Paladino FV, Santidrián Tomillo P (2017) Standardising curved carapace length measurements for leatherback turtles, *Dermochelys coriacea*, to investigate global patterns in body size. *Herpetological Journal* 26: 133–136.

- Robinson NJ, Morreale SJ, Nel R, Paladino FV (2016) Coastal leatherback turtles reveal conservation hotspot. *Scientific Reports* 6:37851.

- Robinson NJ, Majewska R, Lazo-Wasem E, Nel R, Paladino FV, Rojas L, Zardus JD, Pinou T (2016) Epibiotic diatoms are universally present on all sea turtle species. PLoS ONE 11(6): e0157011.

- Ryan PG, Cole G, Spiby K, Nel R, Osborse A, Perold V (2016) Impacts of plastic ingestion on post-hatchling loggerhead turtles off South Africa. *Marine Pollution Bulletin* 107: 155-166.

- Nel, R. 2016. Turtle Monitoring and Research Report: 2013/14 and 2014/15 seasons. Report for Ezemvelo KZN Wildlife and iSimangaliso Wetland Park Authority. 32pp

- Santidrián Tomillo P, Saba VS, Lombard C, Paladino F, Spotila J, Fernández C, López Rivas M, Tuček J, Nel R, Oro D (2015) Global analyses of the effects of local climate on the hatchling output of leatherback turtles. *Scientific Reports* 5: 16789

- Harris LR, Nel R, Oosthuizen H, Meÿer M, Kotze D, Anders D, McCue S, Bachoo S (2015) Paper-efficient multi-species conservation and management are not always field-effective: The status and future of Western Indian Ocean leatherbacks. *Conservation Biology* 191: 383-390.

- Nel, R. 2014. 50 Years of Turtle Conservation, Monitoring and Research: A State-of-Knowledge Report for Ezemvelo KZN Wildlife.