SITE INFORMATION SHEET

in support of a formal proposal to nominate a site for inclusion in the IOSEA Marine Turtle Site Network

1. Date of submission (DD/MM/YYYY):
The date on which the Site Information Sheet was completed.

02 / 09 / 2014

2. 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 sheet, for formal submission through the national IOSEA Focal Point.

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

Republic of South Africa

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

iSimangaliso Wetland Park World Heritage Site (St. Lucia Marine Protected Area and the Maputaland Marine Protected Area)

5. Geographical coordinates

*The geographical coordinates (latitude and longitude) of the **approximate centre** of the site, expressed in 'decimal degrees'. For example, the location of the IOSEA Secretariat in Bangkok is 13.763483°, 100.508157°. If the site consists of two or more discrete units, the coordinates of the centres of each of these units should be given. (Add any additional coordinates in a separate annex.)*

Decimal Degrees

-27.465724°	,	32.692693°

6. General Location

Describe the general location of the site. This should include the site's distance (in a straight line) and compass bearing from the nearest significant administrative centre, town or city. The human population of the listed centre and its administrative region should also be stated. (See also the information requested under point 24: Site Map)

General Location of the Site

South Africa's turtle nesting beaches, approximately 200 km in length, are located exclusively within the iSimangaliso Wetland Park World Heritage Site (iSimangaliso). iSimangaliso is located on the north-eastern aspect of KwaZulu-Natal, South Africa, and is the most easterly portion of the uMkhanyakude District Municipality (DC27). The uMkhanyakude District Municipality is also comprised of five local municipalities that surround the park. These local municipalities are uMhlabuyalingana, Jozini, The Big Five False Bay, Hlabisa and Mtubatuba. The results of the 2011 census for the uMkhanyakude District Municipality place the population there at 625,846 individuals[1].

In the remainder of this document, the codes that appear in square brackets alongside each of the titles below refer to sections of a separate document describing the evaluation criteria, which will be informed by the proponents' submission. ***Proponents are encouraged to consult the Evaluation Criteria document [2] for more explanation of the rationale behind each criterion and of the detailed information to be used for evaluation purposes.***

7. Area [N3]

The approximate surface area of the site to be included in the network (in hectares or square kilometers). If the site is an island, indicate also the total surface area of the coastline directly relevant to turtle conservation. Area should correspond to the map provided under point 24.)

The marine and coastal components of the iSimangaliso Wetland Park World Heritage Site are of direct relevance to turtle conservation. The entire nesting area for leatherback (*Dermochelys coriacea*) and loggerhead (*Caretta caretta*) turtles in South Africa is the approximately 200 km stretch of beach that runs from the SA-Mozambican border to the Cape St. Lucia lighthouse south of Maphelane and extends out from the high water mark to a distance of three nautical miles (approximately six km) offshore. This area of about 1,200 km^2 is completely within the World Heritage Site and therefore under complete formal protection.

The coral reef complexes contained within the boundaries of the marine protected areas of iSimangaliso also provide important foraging habitats for loggerhead, hawksbill, green and the very occasional olive ridley turtles.

[1] http://census2011.adrianfrith.com/place/527

[2] Criteria for the Evaluation of Nominations to the Network of Sites of Importance for Marine Turtles in the Indian Ocean – South-East Asia Region, IOSEA Marine Turtle MoU Secretariat. http://ioseaturtles.org/sitenetwork-evaluation.php

8. Physical features of the site [EB1- 4, S5, S6, N1]

Describe the principal physical characteristics of the site, including the marine turtle habitat types occurring at the site. List the ecosystem types included in the site (nesting beach, foraging habitat, reproductive habitat, migratory habitat) and the approximate area in hectares (or km^2) of each habitat type included. Indicate whether the site's physical attributes are shared by other sites in the country, or are exceptional/unique.

Nesting Beach

The approximately 200 km coastline of the iSimangaliso Wetland Park World Heritage Site contain the beaches that represent the main nesting sites for leatherback and loggerhead turtles in the south-west Indian Ocean (Nel 2012 and Hamman *et al* 2013) and is the only place in South Africa where this phenomenon occurs.

The mainly silica and calcium carbonate beaches have profiles that range from flat to steeply sloped with medium to coarse-grain sand. The slopes of the sandy beaches can be interrupted by wave-cut platforms in the low intertidal following heavy wave action. The beaches are backed by vegetated or unvegetated primary dunes (except in the vicinity of the estuary mouths) which extend into the high, stable vegetated secondary dunes (Hughes 1996).

Species or Management Unit Richness

In addition to the nesting leatherback and loggerhead turtles, this site also supports juvenile through adult stage green turtles (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and quite possibly even the olive ridley (*Lepidochelys olivacea*).

Presence of Rare Marine Turtle Species

From a regional perspective, the turtle nesting beaches of iSimangaliso are of critical importance as they host populations of leatherback and loggerhead turtles that are genetically distinct from those in other rookeries of the same species in the Western Indian Ocean (Dutton *et al* 1999). The leatherbacks have been grouped with the Atlantic nesting group (Vargas *et al* 2008) meaning that in the IOSEA region, this population is genetically distinct. Given the modest population sizes of these genetically distinct species that this site supports, the overall importance of iSimangaliso's beaches must be elevated.

Resistance and Resilience

There is very limited development on this 200 km stretch of beach. Development nodes are laid out in the Integrated Management Plan for the Park, and current tourism facilities with direct beach access is limited to eight low-intensity tourist nodes/conservation management sites that are located at Maphelane/St Lucia, Cape Vidal, Sodwana Bay, Mabibi, Island Rock (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. This is achieved via two mechanisms – strong enforcement of legislation and natural capital. Strong enforcement is achieved by the presence of five stations along this stretch of coast. These stations are manned by a total of five compliance managers, five principal field rangers, two senior field rangers and 31 field rangers. Patrols are undertaken daily, nightly and reactively when required. The beaches are fully protected by national legislation and inclusion as an UNESCO World Heritage Site and Ramsar site.

This has been critical in ensuring that the nesting habitat and the vulnerable life history stages of turtles i.e. both the nesting and the hatchling emergence stages of the leatherback and loggerhead turtles, remain protected as was the case for the past 50 years. In addition to the formal beach protection, it is important to note that these beaches, by virtue of their vast natural sand reserves in the dune systems and undeveloped coastline, have the greatest natural capacity to respond to human-induced sea-level rise. Even with coastal retreat, the mobilization of sand from these dunes will continue to provide a functional beach (Harris 2008) that can sustain the nesting turtle species that use this beach to nest.

Foraging Habitat

The coastal waters of iSimangaliso are moderately important foraging areas for five species of turtles. In addition to the leatherbacks and loggerheads, there are also the green (*Chelonia mydas*) which is relatively common, the hawksbill (*Eretmochelys imbricata*) which is not common and the olive ridley (*Lepidochelys olivacea*) which is very rarely encountered in SA waters (Hughes 1996). Although olive ridley's have not been directly observed in the coastal waters of iSimangaliso, the discovery of an olive ridley nest hatching out at Warner Beach (Durban) in 1971 (Hughes 1972) and their entanglement in bather-protection nets outside of the park certainly indicates that they at least transit through the coastal waters of iSimangaliso.

The relative number of turtles foraging in the coastal waters of iSimangaliso Wetland Park is unknown. In terms of the criterion EB1b, the following indicators are applicable for this site:

- Foraging turtles are regularly but intermittently observed from boat or by divers; and/or
- Turtles occasionally strand on these beaches. Green and hawksbill turtles occasionally strand on these beaches

National Significance

The national significance of turtles to South Africa was recognized as far back as the late 1950s, starting with the Coastal Fishing Ordinance (No. 19 of 1958, Section 4) which specifically made provision for the protection of turtles by stating that "No person shall capture any turtle or take or destroy the eggs of any turtle". This was rigorously enforced by the then Natal Parks Board (Hughes 1973). Natal Parks Board is now called Ezemvelo KZN Wildlife.

Further protection was given to the beaches in February 1979, via Proclamation 35/1979 under the Natal Ordinance No 15/1974, wherein strict controls on fishing and a ban on commercial fishing were placed on the area.

In 2000, iSimangaliso was proclaimed a World Heritage Site in terms of the World Heritage Convention Act, 1999 (Act 49 of 1999), an Act that adopts the World Heritage Convention into South African legislation. The significance of this site was thus elevated, bringing the entire coastline under formal protection, and incorporating the Maputaland and St. Lucia Marine Protected Areas (about 180 km from SA/Mozambican border to Cape Vidal) which were declared in December 2000 in terms of the Marine Living Resources Act (18 of 1998).

Achievement of World Heritage Site status is of tremendous significance both nationally and globally. It is recognized internationally as a place of "outstanding universal value", having achieved World Heritage listing in possessing three of the ten criteria

- Criterion vii: To contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.
- Criterion ix: To be an outstanding example representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.
- Criterion x: To contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

Overall, this site is of exceptional uniqueness to South Africa and is the only place in the country where sea turtle nesting occurs. The establishment of the Ponta do Ouro-Kosi Bay Marine Transfrontier Conservation Area enhances protection of turtles nesting on either side of the South African/Mozambican border.

In addition, the site is one of four Ramsar sites in the iSimangaliso Wetland Park, namely, *Turtle Beaches/Coral Reefs of Tongaland*: Location. The site was designated on 2 October 1986 (Ramsar Site # 344).

Perceived Ancillary Benefits as a Consequence of the Site's Inclusion in the Network

There are substantial ancillary conservation benefits anticipated through the inclusion of this site into the IOSEA Network of Sites of Importance for Marine Turtles. It is accepted that marine turtle conservation cannot work in isolation, given that leatherbacks make extensive migrations outside of the MPA during the nesting period (Vogt 2011). Post nesting migrations of leatherbacks and loggerheads, as revealed by both flipper tag returns (Hamman *et al* 2013) and satellite tagging (Lambardi *et al* 2008), revealed that virtually the entire western-Indian ocean, the southern ocean (Hughes *et al* 1998) and the Atlantic ocean are utilized. Protection of these genetically unique populations will be enhanced.

This site is currently of high biodiversity value and contains other species and habitat of conservation concern that would directly benefit from inclusion e.g. the discovery of South Africa's only coelacanth population at iSimangaliso (Venter *et al* 2000). The soft coral communities that provide for foraging habitat for non-nesting turtle species in iSimangaliso are at their southernmost limits of their African distribution (Schleyer and Tomalin 2000) with little formal protection in neighbouring Mozambique. Other habitats include a dune cordon whose height can exceed 100 m replete with climax forests. As a result of coastal development outside of the park, these habitat types are virtually non-existent elsewhere.

9. Ecological resources [EB1- 4, S5, S6, N1]

Describe the ecological resources at the site, including marine turtles and other noteworthy biodiversity. Describe the marine turtle species / management units occurring at the site, if they are known. Where possible, provide an abundance estimate for each marine turtle species/management unit (e.g. in terms of average number of turtles nesting annually or foraging). **Evaluation Criteria EB1a and EB1b** *offer guidance on how to describe the relative importance of a site frequented by one or more marine turtle species. Indicate whether the site's ecological resources are shared by other sites in the country or are exceptional/unique.*

Nesting Turtle Abundance at Nesting Site – Leatherback and Loggerhead Turtles

Background

Of the 200 km stretch of beach under formal protection, it is the 60 km of beach which extends from the SA/Mozambican border south to Mabibi that is the subject of an intensive turtle monitoring programme that is implemented annually by Ezemvelo KZN Wildlife in partnership with iSimangaliso Authority and the Nelson Mandela Metropolitan University. Having started in 1963, this is one of the longest-running programmes of its kind in the world. This site contains the only marine turtle nesting habitat in the country and is therefore unique in the South African context.

Nesting Turtle Abundance

For the past five seasons, there were on average approximately 300 leatherback nesting events recorded per season. The average number of leatherbacks per season that contributed to this nesting effort is approximately 70 individuals. For the loggerheads, the average number of nests per season over the past five seasons is approximately 3,600. The annual average for loggerhead turtles over this period that contributed to this nesting effort is approximately 700 per season. These averages are for the entire monitoring area i.e. Mabibi to the SA/Mozambican border (approx 60 km). Table 1 gives the results of the nesting turtle survey in this area for the 2013/2014 season.

2013/2014 Nesting Season	Leatherback	Loggerhead
NUMBER OF TRACKS[3]	378	6261
NUMBER OF TAGS[4]	98	961
NUMBER OF DISTINCT INDIVIDUALS[5]	70	672
NUMBER NESTED[6]	353	3827
NUMBER NOT NESTED[7]	19	2390
NUMBER OF NESTS NOT SPECIFIED[8]	2	37
NUMBER OF CALLUSES[9]	6	108
NUMBER OF PIT TAG ENCOUNTERS[10] **(REPEATS)**	9(2)	211
NUMBER OF NOTCHES[11] **(actual codes reported)**	N/A	26 (21)
Mean Length (mm)±STDEV	1615.27 ±143.5	838.3±44

Table 1: Latest nesting statistics for leatherback and loggerhead turtles (2013/2014 season).

Long-Term Nesting Trends at the Nesting Site for Leatherback and Loggerhead Turtles

The proxy used to determine the leatherback and loggerhead nesting trend *for the duration of the programme* are the numbers of tracks on the index beach within the nesting site. The index beach is a 13 km stretch of beach that extends from Bhanga Nek to Kosi Bay. The consistency of effort applied in monitoring this area for the duration of the programme make it ideal to use parameters recorded here to analyze the nesting population trend. The nesting parameter used for analyzing the long-term population trend are the number of tracks reported in the index area as it is the least reliant on effort and interpretation (Nel 2014).

The long-term nesting trend for nesting leatherback and loggerhead turtles in the index beaches at iSimangaliso are available and are illustrated in Figures 1 and 2 respectively.

[3] **Number of tracks**: number of recorded emergences irrespective of nesting or turning around without nesting.
[4] **Number of tags**: number of turtles identified by their tags including repeated nesting/emergences.
[5] **Number of distinct individuals**: number of individuals identified through-out the season.
[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 calluses**: number of previous tag scars reported.
[10] **Number of PIT tags encounters (repeats)**: number of PIT tags reported for the season with the number of tags reported more than once in brackets.
[11] **Number of notches**: number of individuals reported with a/pair of marginal scutes (shell plates) missing possibly due to notching.

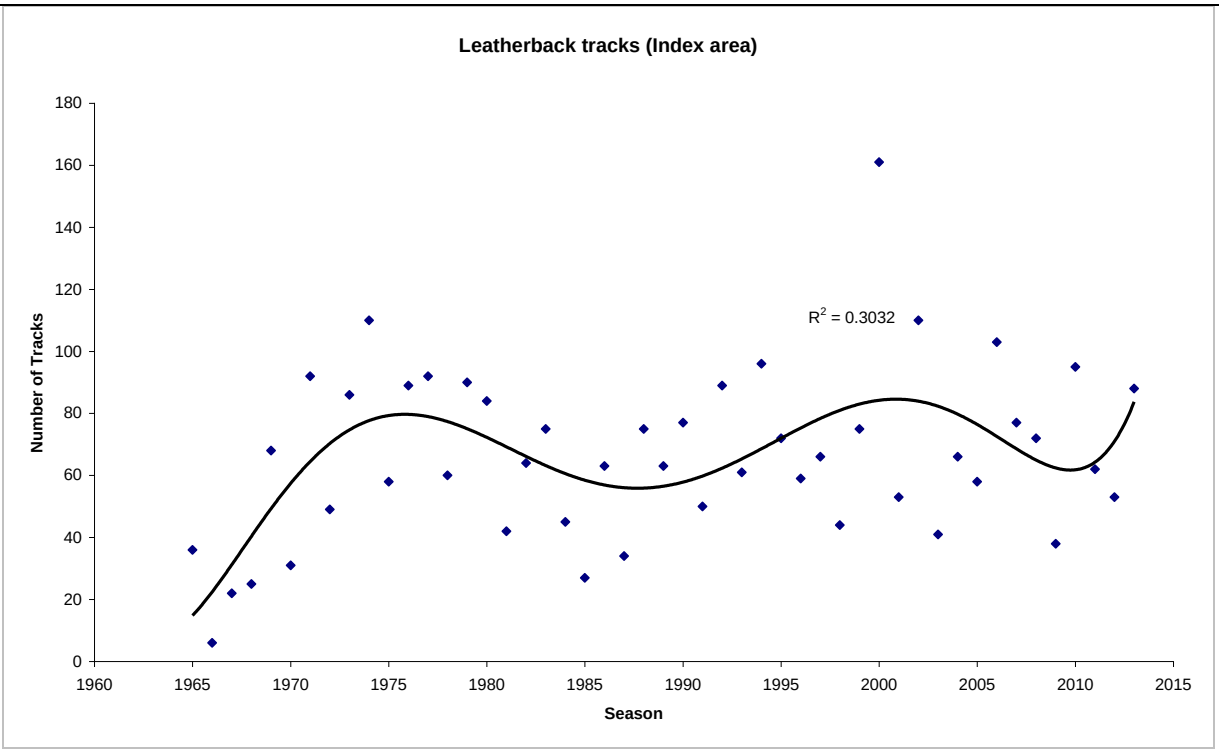

Figure 1: Nesting trend for leatherback turtles in the index area (13 km) from the 1965/1966 nesting season to the 2013/2014 nesting season.

The nesting leatherback population is characterized by large variations in track numbers between seasons with an overall stable population size. This trend however is based on a small subsample of the population as it only uses data from the 13 km index beach. The consistency of effort in this area still makes this the most reliable population trend for leatherbacks for now (Nel 2014).

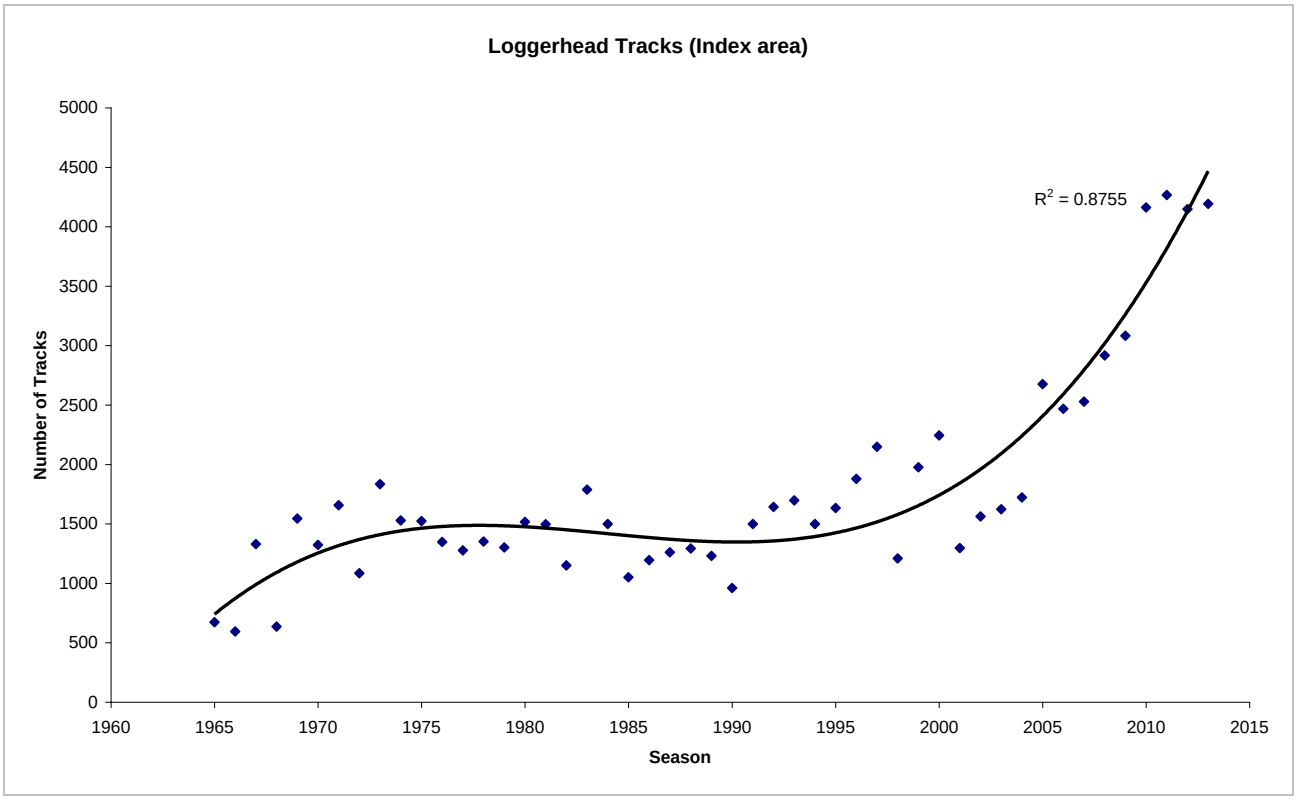

Figure 2: Nesting trend for loggerhead turtles in the index area (13 km) from the 1965/1966 nesting season to the 2013/2014 nesting season.

The loggerhead nesting trend (Fig 2) in the index area shows an initial increase in the first decade of the implementation of the monitoring programme, followed by a plateau that spans approximately 30 years and then a spectacular increase in the last decade (Nel 2014). This clearly indicates a current steady population growth in the nesting loggerhead population in South Africa. It has been stated that the most obvious reasons seem to be the consistent, long-term protection where hatchlings reared under the programme are returning to nest about 30 years later (Nel 2014). In addition, external factors most probably contributing to the recovery of this population include the increased protection in the neighbouring Mozambique (especially since 1996), and the collapse of prawn trawling fishery that operated on the Tugela Banks off the east coast of South Africa over the course of the last decade (Nel 2014).

Foraging Turtle Abundances at the Site

The coastal waters of iSimangaliso are moderately important foraging areas for five species of turtles. In addition to the leatherbacks and loggerheads, there are also the green (*Chelonia mydas*) which is relatively common, the hawksbill (*Eretmochelys imbricata*) which is not common and the olive ridley (*Lepidochelys olivacea*) which is very rarely encountered in SA waters (Hughes 1996).

10. Cultural importance [S1]

Describe the cultural / religious / spiritual importance of the site (e.g. in terms of historical associations, spiritual traditions, religious significance etc.), as well as non-consumptive traditional beliefs/practices, in relation to marine turtles. If possible, provide references to published/unpublished historical or other accounts, which may give an indication of relative importance in a national context.

There are communities who have been living in the area (site) for more than two hundred years and they were practising traditional methods of conserving turtle species. Dead turtles found at the site beaches in the early 1960's were at the time believed to be a recent phenomenon and not an ancient traditional practice on the Maputaland coast (George Hughes *pers comm*).

The local amaThonga used to feed turtle eggs to their chickens in the belief that it will enhance the egg-laying in chickens. In the late nineties, suggestions that eating sea-turtle eggs will cure HIV/Aids was propagated. It was through the cooperation of the local Thonga *amaKhosi* and Ezemvelo KZN Wildlife that this was dispelled (Hughes 2012).

11. Jurisdiction [G1]

The name of the government authority with: (a) territorial jurisdiction over the site, e.g. state/province, region or municipality etc.; and the name/description of the authority with (b) functional jurisdiction for conservation purposes, e.g., Department of Environment, Department of Fisheries, traditional owners, etc.

iSimangaliso Wetland Park Authority

12. Management authority [G1]

Name, address and contact details of the body responsible for the direct <u>local</u> conservation and management of the site.

iSimangaliso Wetland Park Authority

Dredger Harbour

St. Lucia,

Contact person:

Andrew Zaloumis-Chief Executive Officer

Tel: 0355901633 email: Andrew@iSimangaliso.com

13. Current protected status and governance framework [G1, S4]

Describe any applicable legislation / regulations (or traditional laws / norms) relevant to the protection / conservation of marine turtles and their habitats at this site, and comment on their effectiveness. Include details of how any incompatible human activities and/or uses of land and sea at the site are prohibited or mitigated.

Mention any 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. 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.

International designations 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.

All of the Acts listed below have relevance to the iSimangaliso Wetland Park WHS (iSimangaliso IMP) and protects sea turtles and their habitats in South Africa.

1. <u>World Heritage Convention Act, 1999 (Act 49 of 1999)</u>

Objectives:

To provide for:

- The incorporation of the World Heritage Convention into South African law
- The enforcement and implementation of the World Heritage Convention in South Africa
- The establishment of Authorities and the granting of additional powers to existing organs of state
- Integrated management plans over World Heritage sites
- Financial, auditing and reporting controls over the Authorities

Notices and Regulations:

- GN. R. 1193 of 24 November 2000: Regulations in Connection with the Greater St Lucia Wetland Park
- GN No. 4477 of 24 November 2000: Establishment of the Greater St Lucia Wetland Park and Authority

Relevance to turtle conservation:

Provides formal protection

2. <u>National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA):</u>

Objectives:

- To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state

Relevance to turtle conservation:

- Although it is framework legislation for environmental protection in South Africa in general, the Act and its Regulations also have application in the iSimangaliso Wetland Park where turtle nesting habitat is protected, mainly via the following **Notices and Regulations:**
  - The Control of Vehicles in the Coastal Zone Regulations (GN No. 1399 of 21 December 2001) on the nesting beaches at iSimangaliso;
  - Environmental Impact Assessment Regulations, 2010 (GN No. 543, 544, 545 and 546 of 18 June 2010) - regulates developments within the park that may have adverse environmental

effects to the nesting turtle beaches

3. <u>National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003)</u>

Objectives:

To provide for:

- The protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes
- The establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards
- Intergovernmental co-operation and public consultation in matters concerning protected areas

Relevance to turtle conservation:

- Provides formal protection for protected species including turtles by providing a listing of prohibited activities relating to species within a protected area where:
    - Chapter 3 (Part 1) lists prohibitions (Section 6) where no person shall, in a special nature reserve, national park or world heritage site, without the prior written consent of the management authority:
        - Engage in any **restricted** activity – "*Restricted activity*" as defined in this act in relation to a specimen of a protected species, means:
            - hunting, catching, capturing or killing any living specimen of a listed threatened or protected species by any means, method or device whatsoever, including searching, pursuing, driving, lying in wait, luring, alluring, discharging a missile or injuring with intent to hunt, catch, capture or kill any such specimen;
            - gathering, collecting or plucking any specimen of a listed threatened or protected species;
            - exporting from the Republic, including re-exporting from the Republic, any specimen of a listed threatened or protected species;
            - conveying, moving or otherwise translocating any specimen of a listed threatened or protected species;
            - selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen of a listed. threatened or protected species; or
            - any other prescribed activity which involves a specimen of a listed threatened or protected species.
        - wilfully disturb any species or specimen;
        - wilfully cause pollution, harm or death to any individual or population of any fauna or flora species.

4. <u>National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)</u>

Objectives:

To provide for:

- The management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998
- The protection of species and ecosystems that warrant national protection - includes turtles
- The sustainable use of indigenous biological resources; the fair and equitable sharing of benefits

arising from bioprospecting involving indigenous biological resources

- The establishment and functions of a South African National Biodiversity Institute

Relevance to turtle conservation:

- Provides classifications and processes for the sustainable management of biodiversity
- Provides regulations relating to the protection of threatened ecosystems and species in South Africa, as well as any trade that relates to listed threatened or protected species.

Notices and Regulations:

- GN. R. 151 of 23 February 2007: List of critically endangered, endangered, vulnerable and protected species
- GN No. 152 of 23 February 2007: Threatened or Protected Species Regulations

5. <u>Marine Living Resources Act, 1998 (Act 18 of 1998)</u>

Objectives:

To provide for:

- The conservation of the marine ecosystem
- The long-term sustainable utilization of marine living resources
- The orderly access to exploitation, utilisation and protection of certain marine living resources
- The exercise of control over marine living resources in a fair and equitable manner to the benefit of all the citizens of South Africa

Relevance to turtle conservation:

- Conservation of the marine ecosystem and sustainable utilization of the resources
- Protection of every species of sea animal (excluding seals or birds) through prohibition on catching, disturbance or possession; specific measures related to turtles
- Regulation 58(7) of the MLRA (1998) exercise control over turtles as a marine living resource providing full protection of turtles and their products in South Africa namely; specifying that: *No person shall, except on the authority of a permit, engage in fishing, collecting, killing, attempting to kill, disturbing, harassing, keeping or controlling of, or be in possession of, any turtle or any part or product thereof at any time.*

Notices and Regulations:

- Declaration of Areas as Marine Protected Areas (GN No. R 1429 of 29 December 2000) the St Lucia and Maputaland MPAs
- Coelacanths Government Gazette No. 21948 (29 December 2000, No. R 1428)

6. <u>National Environmental Management: Integrated Coastal Management Act, 2008 (Act 24 of 2008)</u>

Objectives:

- To determine the coastal zone of the Republic of South Africa
- To provide for the co-ordinated and integrated management of the coastal zone by all spheres of government in accordance with the principles of co-operative governance
- To preserve, protect, extend and enhance the status of coastal public property as being held in trust by the State on behalf of all South Africans, including future generations;
- To secure equitable access to the opportunities and benefits of coastal public property

- To give effect to the Republic's obligations in terms of international law regarding coastal management and the marine environment

Relevance to turtle conservation:

1. Laws related to developments in the Coastal Zone - especially important for protection of nesting sites.

14. Land/sea tenure/ownership [G1]

Provide details of ownership of the site and ownership of immediate surrounding areas (e.g., state, provincial, private, etc.) which may have a bearing on the conservation of the site. Describe any local or customary law relevant to the land / sea tenure, and explain any terms that have a special meaning in the country or region concerned.

Ownership of Immediate Surrounding Areas

The area immediately adjacent to the nesting beaches and ocean is a proclaimed protected area. At Kosi Bay people live inside the Park but, with relatively few households (less than 60). There is a vested interest in turtle conservation as local monitors and turtle tours guides are employed from the local communities.

The predominant current land uses in the areas adjacent to the Park include the following:

Agriculture and commercial timber plantations

Agricultural potential is relatively poor due to a combination of nutrient poor soils, land tenure insecurity, unfavourable rainfall and lack of sufficient water supplies and irrigation systems, high temperatures and humidity, lack of finances amongst previously disadvantaged farmers, poor knowledge of economic farming practices, poor support services, and marketing and processing constraints. Commercial agricultural activities comprise mainly sugar cane, cotton, citrus and silviculture (commercial plantations) with some stock and game ranching in the south. Subsistence-based agriculture comprises mainly vegetable and stock production. However, most households do not produce enough food to meet their requirements. Commercial timber plantations have been a dominant land use in the region since the 1940s.

Conservation/eco-tourism

Land under conservation, whether private or State-owned, constitutes a large land use in the region. On private land, game farming and nature-based tourism have gained momentum over the past 15 years. Several farmers in the area are also supplementing their agricultural income through tourism, by providing small-scale accommodation. Tourism activities are concentrated predominantly along the coast, and inland, in and surrounding uMkhuze Game Reserve and the Hluhluwe-iMfolozi Park. Several community-based tourism ventures have been established, with several more in the process of development, mostly in partnership with the private sector. According to the regional and sub-regional plans produced for the area, the tourism sector is considered an important potential generator of economic growth in the region, due to its rich natural resources and cultural heritage.

Settlement

There are many settlements in the region and this can be considered a significant land use. The settlement densities of the areas around the main towns are increasing, together with some key infrastructure. Many people move to the centres seeking employment and/or better access to services, while still maintaining their ties to land and homesteads in the rural areas.

15. Socio-economic values and land/ocean uses and activities within the vicinity of the site [EB4, G5, S2, S5, S6]

Describe, in general terms, the principal social and economic values of the site, including human activities and land uses (past, current and planned) within the vicinity of the site (e.g., agriculture, fishing, resource extraction, grazing, water supply, urban/industrial development, tourism, outdoor recreation, education and scientific research), irrespective of whether or not they are considered to directly impact the conservation of marine turtles. Some indication of the relative importance of each form of land use should be given, whenever possible.

Socio- Economic Values

There are very few, if any, social-economic activities that are occurring at this site that are incompatible with either nesting or foraging turtles. This site remains the only site of its type in South Africa, where turtles emerge form the sea to nest. There is very limited development on this 200 km stretch of beach. Development with direct beach access is limited to seven low-intensity tourist nodes/conservation management sites that are located at Maphelane/St Lucia, Cape Vidal, Sodwana Bay, Mabibi, Manzengwenya and Bhanga Nek. 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.

In addition 22 members of the local KwaDapha community are employed annually for five months of the year as turtle monitors whose job it is to collect the nesting data that is used in the population trend analysis. Their mere presence on the beach serves as deterrence to any potential poaching. This remains one of the very few examples in the region where protecting turtles can definitely provide a sustainable alternative livelihood from their use.

1. Tourism and Outdoor Recreation

The tourism facilities that service local and international clientele are all low impact facilities that benefit positively by (a) being able to take guests for turtle tours at nesting sea turtles, or (b) go diving where turtles can be observed foraging amongst the reef complexes there. Approximately four concession licenses are available each year to allow for turtle tours, of which one is reserved for the kwaDhapa community. This provides direct income to the community from turtle-related tourism.

2. Resource Extraction

- *Agriculture*

The Coastal Forest Reserve, immediately adjacent to the nesting beaches, have less than 60 households (see Section 14) that practice subsistence farming in the protected area. It is practiced at a low level, with monitoring in place to minimize expansion.

- *Grazing*

The rural nature of the areas surrounding the site means that cattle farming is a major activity. The Coastal Forest Reserve comes under pressure for grazing and this is allowed via an informal agreement.

- *Fishing*

Fishing is a major activity at iSimangaliso and encompasses subsistence and sport/recreational fishing activities. Fishing competitions are held at designated areas and are on a catch-and-release basis only. Boat-based fishing is also permitted and takes place from four launch sites. These are at Sodwana Bay, Maphelane, St Lucia and Cape Vidal. Shore-based angling also takes place at these sites. iSimangaliso has three sanctuaries where fishing is prohibited, and there are rules in place that govern fishermen's use of lights at night during the turtle nesting season. No commercial fishing is allowed within the MPA.

- *Water Supply*

The provision of water to communities/facilities in close proximity to the facilities at the nesting site is via borehole, rainwater collection and from the main lake at Kosi Bay.

The inclusion of this site in the network of *Sites of Importance for Marine Turtles in the Indian Ocean – South East Asian Region* will elevate the benefits that conservation of turtles has in the region.

16. Factors adversely affecting the site's overall ecological character, as well as threats to marine turtles and their habitat at the site [EB4, S2]

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 existing, 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 all adverse and change factors reported, supply measurable/quantifiable information (if such data exist), as well as information on the scale, extent and trend of the change factor and its impact. 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.

Human Factors

Unauthorized Developments

Recently, unauthorized developments on the frontal dune system of the nesting beaches in the Coastal Forest reserve section of the iSimangaliso Wetland park threatened to undermine the World Heritage Values. This was dealt with swiftly by iSimangaliso and Ezemvelo, where high court orders were obtained to demolish the structures. The sites are being rehabilitated (http://isimangalisonews.wordpress.com/). The prospect of unauthorized developments still remains, but there is ongoing compliance monitoring in place to address this threat should the need arise.

Direct Harvesting

Direct harvesting of nesting turtles and/or their products within the iSimangaliso Wetland Park is at a very low level and is not considered to be a major threat to the population. The Ezemvelo Incidents Database reveals that for the past five seasons, five adult loggerheads were "harassed", of which three resulted in deaths. Two were found upside-down and released. These incidents occurred at the South African/Mozambican border, Bhanga Nek and at Castle Rock.

During this period (~10 years), 23 loggerhead nests were raided by humans. These incidents occurred at Castle Rock, Bhanga Nek and Kosi Bay. For leatherbacks, no adult has been killed, and only one nest was raided in the past five seasons in the vicinity of Rocktail Bay.

Offshore Threats

The current beach protection programme at iSimangaliso has been extremely effective for the recovery of the nesting turtle population at this site, especially for the loggerheads (Nel and Bachoo 2011). The major threats to leatherbacks and loggerheads are offshore and outside of the iSimangaliso WHS and these include the bather protection nets in KZN and the longline fisheries which pose the greatest quantified threat.

17. Conservation and management interventions taken [G2, G3]

Describe conservation and management interventions already taken at the site to address threats. Note that some of this information may have been recorded in abbreviated form in the IOSEA Site Data Sheets, available online (www.ioseaturtles.org/reporting). Any application of coastal and marine spatial planning, or integrated coastal/marine zone management planning, involving or affecting the site should be noted.

Describe the management planning process for the site, including the state of implementation of any management plan that has been developed and approved for the site. Describe any other conservation measures taken at the site, such as restrictions on development, management practices beneficial to wildlife, closures of hunting, etc. (Note that information on any monitoring schemes and survey methods should be given under point 19, below.)

Where applicable, describe 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.

The combination of the site as a tourist destination and the high levels of poverty in the area has resulted in increased pressure to accommodate more tourists in unauthorized developments. These developments do have an impact on the ecological character of the site and are therefore swiftly dealt with.

All of the unauthorized developments have been halted and removed from the Coastal Forest Reserve. The iSimangaliso Authority has the power and capacity to deal with these cases and has effectively used the justice system to prevent further developments. All buildings have been knocked down and the sites rehabilitated.

Ongoing management by the iSimangaliso Wetland Park Authority and its contracted conservation partner will serve to enforce the law. Continued employment of local people in the turtle monitoring and tourism sector assist to build support for tourism conservation.

iSimangaliso is one of the only Protected Areas in South Africa that has local communities on its board. Representatives from the traditional authority, land claimants and local government sit on the board. In addition, where land claims have been settled co-management agreements have been put in place between the iSimangaliso Wetland Park and the land claimant group. These co-management agreements set up the benefits to flow to the land claimants from the Protected Areas, as well as define the involvement and participation of the claimants.

The use and impact of the marine environment in the Maputaland and St Lucia Marine Reserves within the iSimangaliso Wetland Park needs to be controlled and limited to ensure that the key objectives of the MPAs are achieved. Zonation is an effective management intervention which allows different levels and types of use and impact.

This site currently has four sanctuary zones:

- Kosi mouth (excluded) to the South African/Mozambican border
- N13 Point (included) to N31 rock ledge (excluded)
- Dog Point (included) to Botelier Point (included)
- Red Sands to Leven Point (included)

18. Conservation interventions proposed, but not yet implemented [G2, G3]

Provide details of any concrete conservation measures that have been proposed, or are in preparation, for the site, including any proposals for legislation, protection and management. Summarize the history of any longstanding proposals that have not yet been implemented, and differentiate between those proposals that have already been officially submitted to the appropriate government authorities and those which have not as yet received formal endorsement, e.g., recommendations in published reports and resolutions from specialist meetings. Also mention any management plan that is in preparation but has not yet been completed, approved or implemented.

Conservation interventions proposed for this site that aid turtle conservation include the following:

1. Marine Protected Area (MPA) Expansion – plans are well underway to extend the existing St. Lucia MPA from Cape Vidal south to the St. Lucia lighthouse south of Maphelane, and to extend this 3 nautical miles out to sea (Fig. 5). This will bring in approximately 220 km^2 under formal protection.
2. A long-standing proposal was to extend the current monitoring area south from Mabibi to Sodwana Bay, particularly as that site is emerging as a nesting leatherback hotspot. This expanded monitoring programme is anticipated to start in the 2014/2015 nesting season and will add another 25 km stretch of beach to the approximately 60 km that is being monitored. It will also see an additional 13 community members being trained and employed in nesting turtle data collection.
3. A Biodiversity Management Plan (BMP) for Turtles is currently being developed. An action plan will form part of the BMP. The Action Plan will also incorporate actions from both the IOSEA and Atlantic Turtle MOUs. Once the draft BMP for Turtles is finalized, it will follow the gazetting process which includes the Public Participation Process. The first draft is expected to be gazetted for public participation process in early 2015.

19. Current / proposed scientific research and monitoring [G4]

Describe any current and/or proposed scientific research on marine turtles and their habitats, as well as information on any special facilities for research. In particular, describe past and current marine turtle monitoring activities at the site (e.g., tagging, satellite tracking, genetic sampling, nesting and foraging ground surveys, ongoing beach monitoring, etc.). Describe the survey methodology in sufficient detail to allow for an assessment of its efficacy. Indicate the number of years of continuous monitoring, and whether data have been used to estimate trends in the size of the management unit. Cite relevant published papers in support of the submission.

Special Facilities for Research

At the site, a combination of research, conservation management and resort facilities exist and can be used as platforms for conducting research. The most practical site is the turtle research station located at Bhanga Nek (see Fig 3 in Section 24) which sleeps six individuals. It has direct beach access to the high-density turtle nesting beaches at Bhanga Nek. Bhanga Nek also has a field ranger outpost with a dedicated vehicle for conducting patrols and servicing the turtle monitor camps during the nesting season. Water is sourced from borehole, Kosi lake and from rainwater harvesting. Electricity is provided for by generator only and is available daily from 5pm to 10pm.

Manzengwenya (see Fig 3 in Section 24) is another research facility available for conducting research. This is approximately 20 km south of Bhanga Nek and is approximately 300 m from the beach. This facility sleeps 10 individuals and has 24-hour electricity. Field ranger staff here do not conduct beach patrols as this function is done by the staff at Bhanga Nek.

Resort facilities available if required include Rocktail Bay (located at Manzengwenya), Thonga Lodge located at Mabibi and Sodwana Bay.

Marine Turtle Monitoring

- **Tagging, Nesting and Beach Monitoring**

  The complete provincial species monitoring plan for leatherbacks and loggerheads has been completed by Nel and Lawrence (2007) and is available on the IOSEA website at

http://www.ioseaturtles.org/bibliography_search_detail.php?id=14. In summary, monitoring starts from mid-October and proceeds to mid-March of the following year. Turtles/tracks are identified to species and counted, and the species and size are recorded from each turtle encountered. Straight carapace length (SCL in mm) was measured for loggerheads and curved carapace length (CCL in mm) for leatherbacks. Each turtle encountered was tagged with a flipper tag; for loggerheads the tag was placed at the proximal end of the front flippers, while the back flippers were used for leatherbacks. The areas between the Mozambique border and Kosi Lake as well as Kosi Lake to Black Rock were monitored by community monitors, appointed and managed by Ezemvelo. The monitoring between Black Rock and Hulley Point (Mabibi) was monitored by Rocktail Bay, appointed by the iSimangaliso Park Authority (Nel and Bachoo 2011). All involved in data collection are trained by Ezemvelo to do so. The monitoring programme started in 1963 and has just surpassed 50 years of implementation. As the first two years of data collection (1963/1964 & 1964/1965) were mainly exploratory with inconsistent effort (Nel and Bachoo 2011), these years have been excluded from population size estimates and trend analyses. The rest of the data has been used to estimate trends in the size of the management unit. The latest trends are shown in Section 9 (Table 1; Fig. 1 and Fig. 2).

- **Satellite Tracking**

  Work with satellite telemetry and turtles in South Africa began in 1996 to 2003, where a total of 19 female turtles comprising 8 loggerheads and 11 leatherbacks were equipped with satellite transmitters in the Maputaland Marine Area (Luschi *et al* 2006). Satellite-tracking turtles is currently done as a collaborative effort between the Department of Environmental Affairs (Oceans and Coasts), the Nelson Mandela Metropolitan University and Ezemvelo KZN Wildlife. This was started in 2006 and is still ongoing. Under this collaboration, 17 leatherback turtles and 24 loggerhead turtles were fitted with satellite tags. The use of this technology is planned to continue for as long as there is funding available to do so. The results of these are currently being written up for publication (Harris et al *in prep*).

- **Genetic Sampling**

  Genetic studies have been conducted on leatherback turtles in South Africa and have been published by Dutton *et al*. (1999). More recently, scientists from University of Washington and the Nelson Mandela Metropolitan University have embarked on a project using a molecular-based kinship analysis of hatchlings to determine the number of males contributing to a leatherback and a loggerhead turtle population. Sampling is ongoing.

- **Foraging Ground Surveys**

  No survey of the foraging turtles at the iSimangaliso site have been conducted and this remains a key gap.

20. Current / proposed communication, education, and public awareness activities [S3]

Give details of any existing and/or planned site-based programmes, activities and facilities for communication, education and public awareness, including training. Comment on potential opportunities for future educational and outreach activities at the site.

The iSimangaliso Authority undertakes and coordinates the following public awareness and outreach activities that relate to sea-turtle conservation:

1. iSimangaliso has school groups visiting the Park and the education programme has a component on turtle conservation.
2. Newsflashes providing information on the Park, including information on turtles, are distributed to 14,000 email recipients.
3. Media junkets, where media are taken on turtle tours, take place annually in order to build awareness of turtles and the importance of conservation of turtles.
4. iSimangaliso Park staff conduct workshops and sessions with school children at their schools.
5. Environmental awareness training and capacity-building is conducted with the leadership and youth from communities living in and adjacent to the Park.
6. Environmental monitors are trained in turtle conservation and monitoring activities.

In addition to the work done by iSimangaliso, various educational and outreach activities related to turtles, management and their conservation are undertaken by the Ezemvelo Senior Community Conservation Officer (SCCO) based at Sodwana Bay. This comprises the following annual targets:

- Undertaking 21 school visits to deliver talks on turtles using presentations and preserved materials in the classroom. Thereafter, educational tours are done on the nesting beaches within iSimangaliso. Topics covered include turtle biology, ecology, conservation, turtle monitoring and tourism.
- Group presentations – an annual target of approximately 25 presentations on turtles is set. These are also done on the beach and the groups include tourists, special interest groups, staff etc.
- An annual target of three information sessions is set for information sessions to tourists if a turtle nests on the beach at Sodwana and if the SCCO is made aware of the emergence.
- An annual target of six turtle tours is set. Information sessions are held before the trip and during a turtle nesting event.
- Turtle monitor training – x2 two-day workshops are held annually in preparation for the turtle monitoring season. The turtle monitors (both walk-on and drive-on concessions) are trained in various aspects of turtle biology but mainly on nesting data collection. This is done immediately prior to the onset of the turtle nesting season.
- Turtle concession training (three walk-on and seven drive-on) is also done annually – all turtle tour operators authorised by the iSimangaliso Authority are trained with a code of conduct that governs their activity around a nesting turtle.
- Ezemvelo Kids Club. Turtle presentations and 2x turtle drives are done annually for members of the Ezemvelo Kids Club.
- Awareness material for children are produced and distributed as well. These include turtle posters, turtle colouring-in books, and turtle information brochures, all of which are designed by Ezemvelo's Design Studio.

Major Events Showcasing the Turtle Monitoring Programme

- In 2012, Ezemvelo, in conjunction with the iSimangaliso Authority, hosted a gala event to celebrate 50 years of turtle conservation at the uShaka Marine World in Durban, South Africa. This was done to commemorate the hard work of those that have served the programme and to celebrate its continued success.
- Following on from the gala event, VIP's and members of the media were treated to a turtle tour on the beaches at Sodwana Bay. The tour was broadcast on South African national news (SABC3) and is available on YouTube. The address is https://www.youtube.com/watch?v= -P9dlvaHLA
- Dr George Hughes book, "Between the Tides – in Search of Sea Turtles" was officially launched at the gala. Dr Hughes also presented his book at other events around the country.
- The Royal Show – a major event in 2013 where the Turtle Monitoring Programme was showcased to the public. The display, which specifically focused on "50 Years of Sea Turtle Conservation" won the Gold Medal at the event for having the best display.
- An article detailing the 50 years of turtle conservation in South Africa was done for a major tourism magazine in KZN. The article is available at http://southcoaststyle.co.za/monitoring-leatherback-and-loggerhead-sea-turtles-in-kzn
- The Chief Operations Officer of Ezemvelo KZN Wildlife, Dr Bandile Mkhize, authored an article on the turtle monitoring programme for a major newspaper in KZN in 2014, hailing it as one of the most successful conservation programmes in the country. The article is available at http://www.iol.co.za/dailynews/opinion/our-success-stories-1.1656387#.U7PZS6Lb7fs

Recent Presentations on the Turtle Monitoring Programme

1. Bachoo, S, Nel, R and Olbers, J. 2012. Fifty Years of Turtle Conservation. Symposium of Contemporary Conservation Practice, Fern Hill Hotel, PMB.
2. Anders, D. and Bachoo, S. 2012. South Africa Country Report to the Regional Workshop and Fourth Meeting of the Western Indian Ocean - Marine Turtle Task Force, Port Elizabeth, South Africa, 4-7 December 2012
3. Bachoo, S. and Nel, R. 2011. Long-Term Nesting Trends for the South African Nesting Species. Sea-Turtle Research and Management Workshop, St Lucia, South Africa
4. Nel, R., Bachoo, S., and Hughes, G.R. 2011. Sea Turtle Nesting in Northern KwaZulu-Natal. 14th South African Marine Science Symposium (SAMSS)/ 46th Estuarine and Coastal Sciences Association (ECSA) International conference.
5. Bachoo, S., Nel, R and Hughes, G. 2010. Country Overview: South Africa. Second Workshop on the Conservation of Sea Turtles in Mozambique. Mozambique.
6. Bachoo, S, Nel, R. and Hughes, G.R. 2010. Sea Turtle Knowledge, Monitoring and Fisheries Interaction within South African Waters. South West Indian Ocean (SWIO) Fisheries Project Proposal: Component 5: Activities Related to Sea Turtles. Sea turtle population assessment in the SWIO: population status, regional migratory patterns, interaction with open sea fisheries and their related management issues, and capacity building). Ifremer, Reunion Island.
7. Nel. R., Bachoo, S. and Olbers, J.M. 2009. Sea Turtles of KwaZulu-Natal – Results of the 2008/2009 Nesting Season. Proceedings of the KZN Marine and Coastal Management Research Group, uShaka Marine World.

21. Financial resources available for management of the site and other activities [G5]

Identify human and financial resources (including in-kind contributions) available to support immediate and near-term activities, as well as resources available to sustain site-based activities in the longer-term (e.g. in relation to monitoring, management interventions, surveillance and enforcement, and performance evaluation).

Financial Resources

Financial resources that sustain long-term monitoring are derived from various sources. These include the following government departments:

- The Department of Environmental Affairs (Branch: Oceans and Coasts)
- The Expanded Public Works Programme via the Department of Agriculture, Forestry and Fisheries
- iSimangaliso Wetland Park
- Ezemvelo KZN Wildlife

In-kind donations

In-kind donations and support have been/are derived on an ad-hoc basis from the following institutions:

- World Wildlife Fund
- Wildlife and Environmental Society of South Africa
- Identipet (Pty) Ltd.
- Research institutions, such as Nelson Mandela Metropolitan University, collect their own funds for research activities conducted on the site.

22. Additional resource needs at the site [G5]

Where specific needs are identified (e.g. skilled personnel, specialized training, facilities, field equipment etc.) indicate how marine turtle conservation activities are presently impaired on account of their unavailability (e.g. inability to carry out regular surveys, to conduct certain types of research, to monitor certain parts of the range etc.) This information may be useful for compiling a general picture of deficiencies and resource needs that could be presented to potential programme sponsors.

The current 60 km turtle survey is extremely resource intensive, with personnel and equipment costs for the programme approaching R450000-00 per annum. An additional 25 km stretch of beach will be added this season (2014/2015) to the programme. This addition will require the employment of an additional 13 monitors. This will add approximately R250000-00 to the annual cost of the programme, bringing the total to about R700000-00 per annum.

With these costs, it becomes difficult to explore the application of newer technologies in the turtle monitoring programme and in turtle conservation in general. These include the following:

- Use of Cybertracker for data collection. These are robust units that allow for instantaneous data collection and its automatic upload to the turtle database. Ezemvelo have used these with great success in other programmes that involved specially protected species. We will be able to determine exact nest locations and check if monitors are on patrol.
- Cybertrackers however require daily recharging. The unreliable power supply will necessitate the acquisition of portable generators at some of the stations to ensure stable power supply.
- Turtle poaching incidents, including nest raiding, have taken place in the cover of darkness. Given that the current vehicle on station is best suited to drive at low tide only on the beach, a smaller lighter 4x4 (Honda Rhino) will be best suited to perform more beach patrols.
- Night-vision goggles for compliance management is a key requirement for anti-poaching efforts that will further aid turtle conservation at the site.

- Further expansion of the environmental education activities to include more children from more schools.
- Further expansion of the community based awareness programmes with communities living adjacent to the site.

23. References [e.g. S1, G2, G4]

List key references relevant to marine turtle records and to the site, including management plans, major scientific reports, 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.

The management plan and scientific reports relevant to the South African turtle programme at iSimangaliso beaches are available on the IOSEA Turtles website in the Bibliography Resource section (http://www.ioseaturtles.org/bibliography_search.php).

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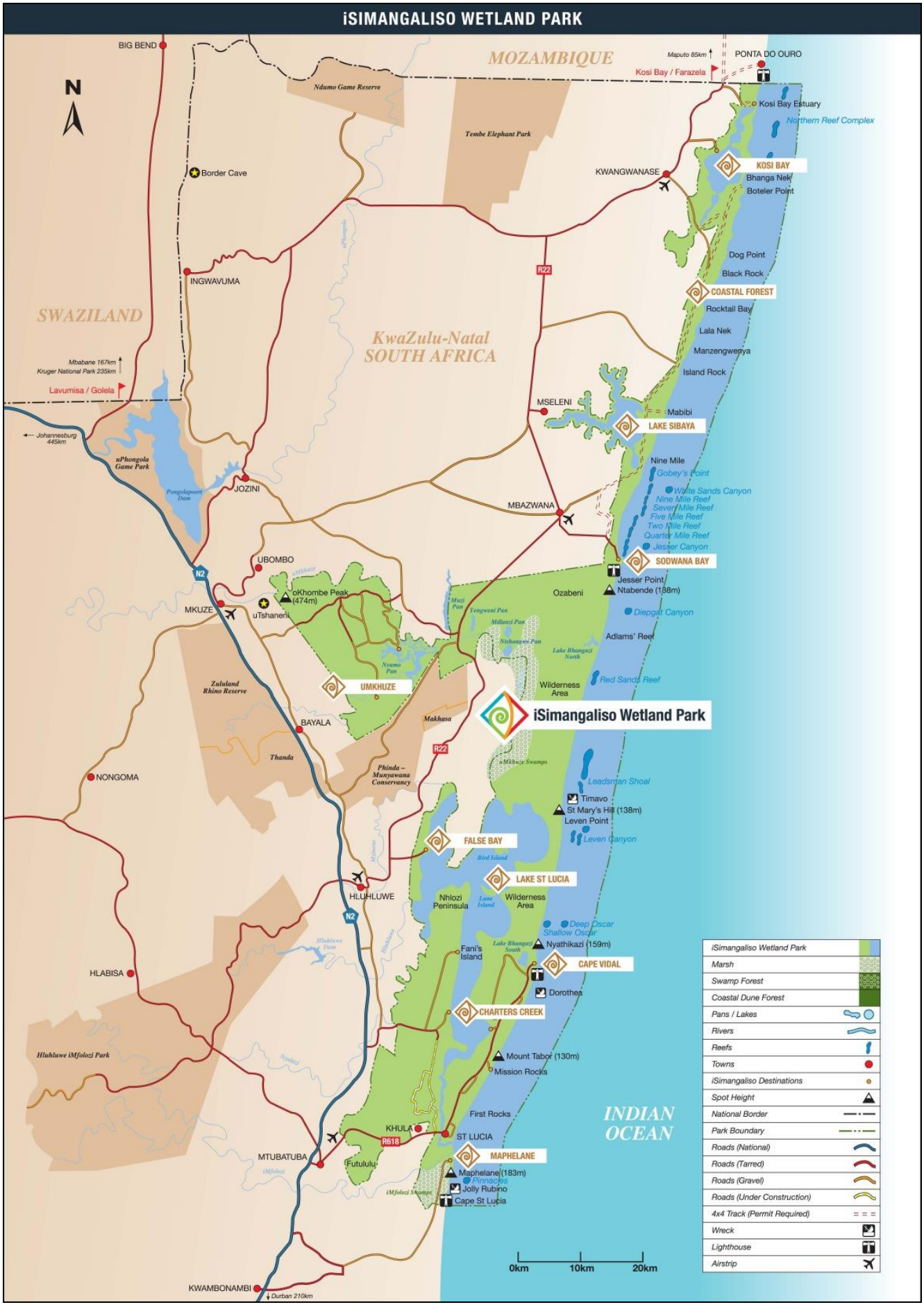
24. Site map [N2, N3]

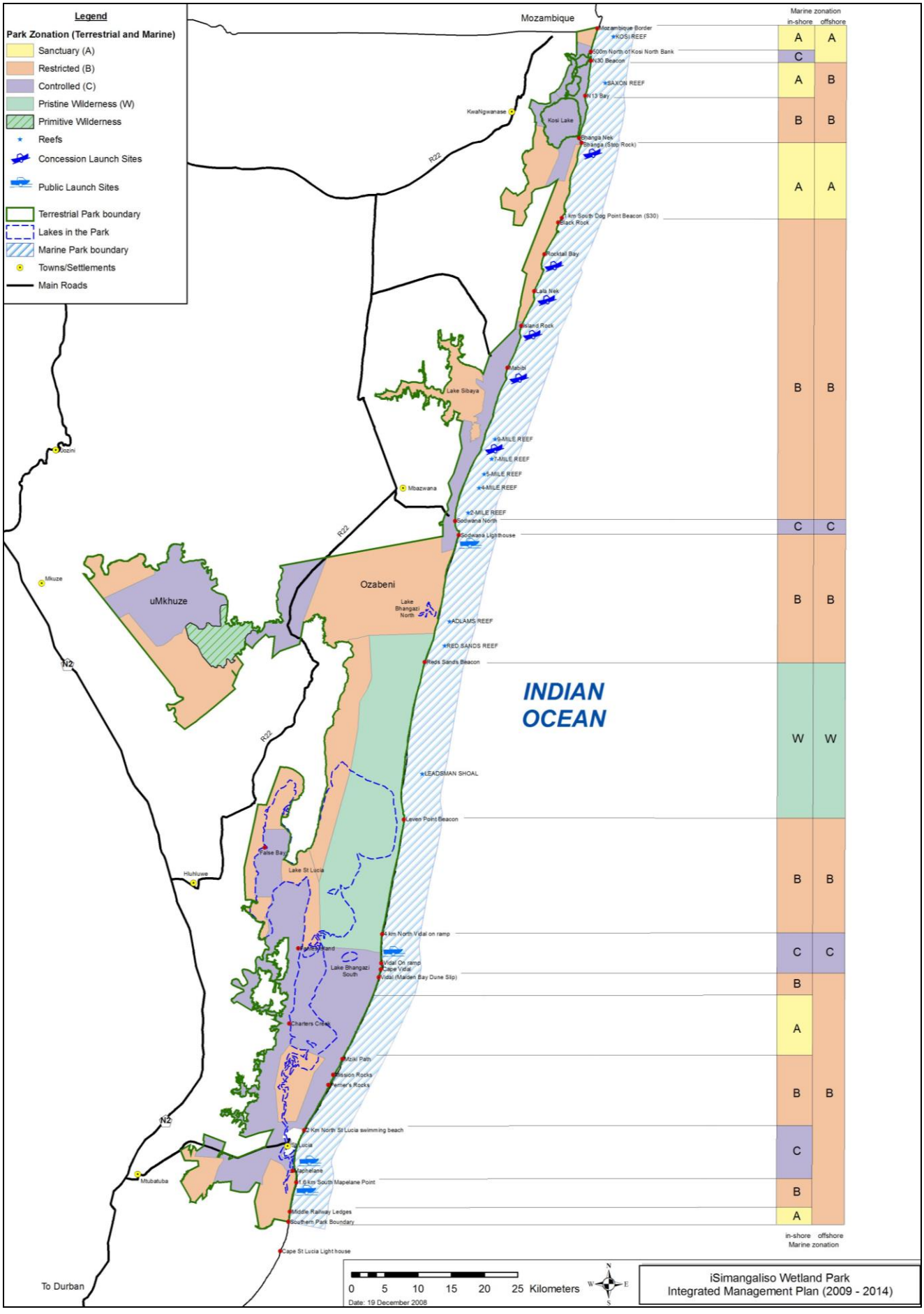
The most detailed and up-to-date map of the site available should be appended to the Site Information Sheet in digital and/or hardcopy format. The ideal site map will clearly show the area boundaries of the site, scale, latitude, longitude and compass bearing, administrative boundaries (e.g., province, district, etc.), and display basic topographical information, the distribution of the main site habitat types and notable hydrological features. It will also show major landmarks (towns, roads, etc.). Indications of land use activities are especially useful.

If applicable (and available), provide a zoning scheme to indicate areas where certain activities that might be incompatible with turtle conservation are permitted, buffer zones, and areas where such activities are not permitted (i.e. sanctuary areas).

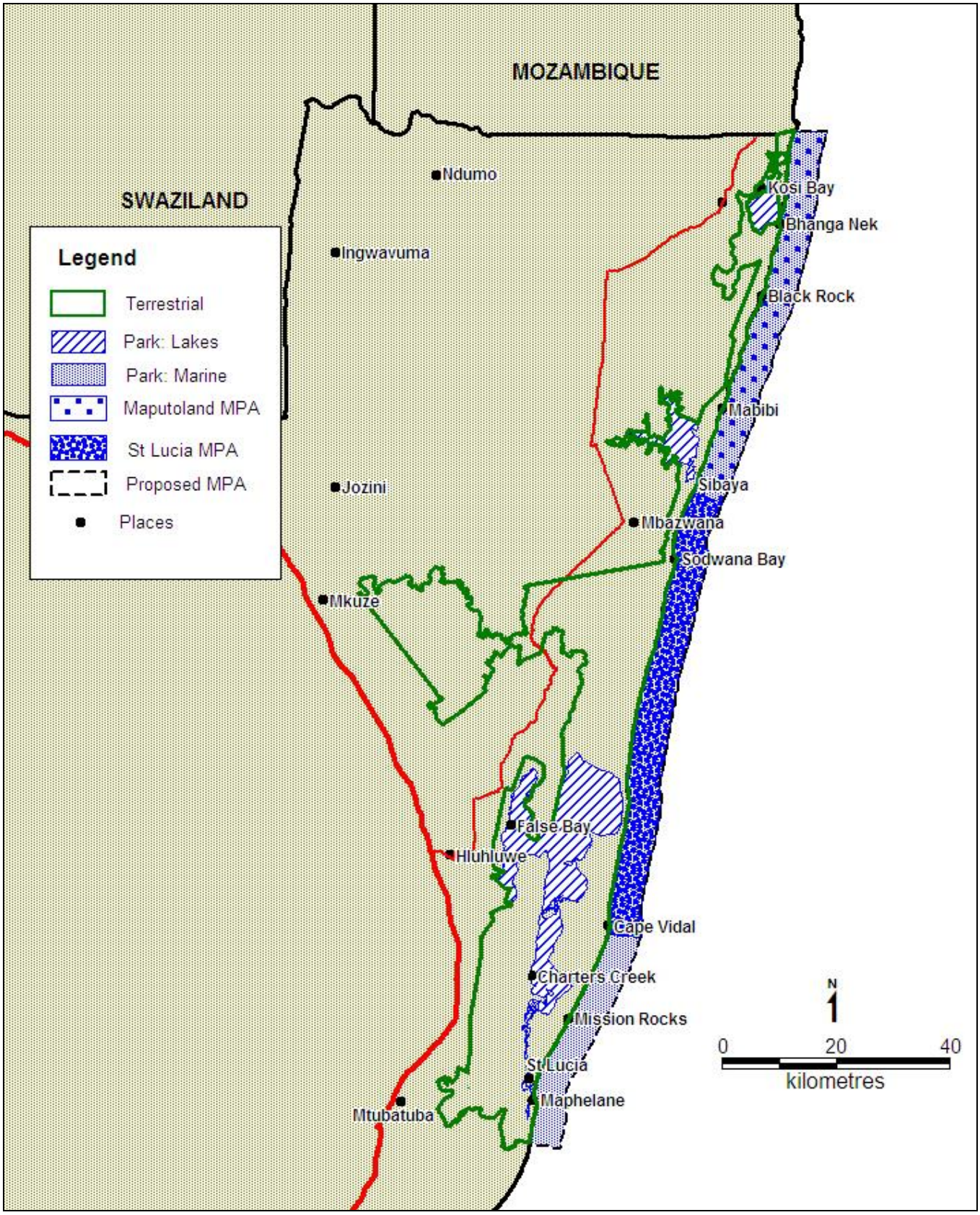
The optimum scale for a map depends on the actual area of the site depicted. Generally the map should have a 1:25,000 or 1:50,000 scale for areas up to 10,000 ha; 1:100,000 scale for larger areas up to 100,000 ha; 1:250,000 for areas exceeding 100,000 ha. In simplest terms, the site should be depicted in some detail. For moderate to larger sites, it is often difficult to show detail on an A4 sheet at the desired scale, so generally a sheet larger than this is more appropriate. While an original map is not absolutely necessary, a very clear image is desirable. A map exhibiting the above attributes will be more suitable for scanning.



Map 1. iSimangaliso Wetland Park (provided by the Site proponent).



Map 2. iSimangaliso Wetland Park Zonation – Terrestrial and Marine (provided by the Site proponent).



Map 3. Current marine protected areas and proposed extension to the marine protected area to align to the terrestrial boundary of the iSimangaliso Wetland Park (provided by the Site proponent).

Map 4. Google Earth map of the iSimangaliso Wetland Park (provided by the IOSEA Secretariat).