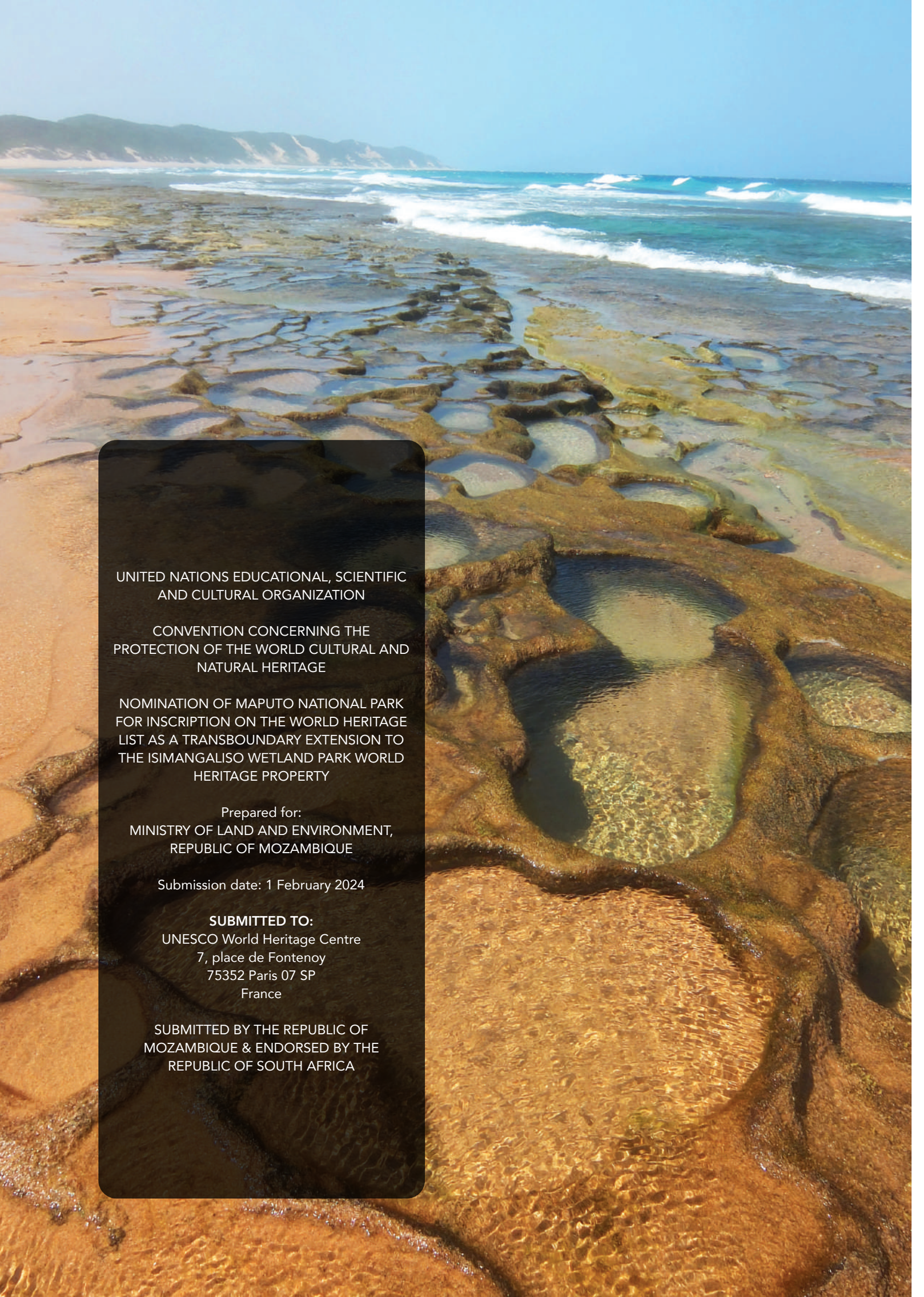
PARQUE NACIONAL
DE MAPUTO

# CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE

REPÚBLICA DE MOÇAMBIQUE
MINISTÉRIO DA TERRA E AMBIENTE

ANAC
ADMINISTRAÇÃO NACIONAL DAS ÁREAS DE CONSERVAÇÃO

iSimangaliso
Wetland Park



UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE

# NOMINATION OF MAPUTO NATIONAL PARK FOR INSCRIPTION ON THE WORLD HERITAGE LIST AS A TRANSBOUNDARY EXTENSION TO THE ISIMANGALISO WETLAND PARK WORLD HERITAGE PROPERTY

Prepared for:
MINISTRY OF LAND AND ENVIRONMENT,
REPUBLIC OF MOZAMBIQUE

Submission date: 1 February 2024

**SUBMITTED TO:**
UNESCO World Heritage Centre
7, place de Fontenoy
75352 Paris 07 SP
France

SUBMITTED BY THE REPUBLIC OF MOZAMBIQUE & ENDORSED BY THE REPUBLIC OF SOUTH AFRICA

# ACKNOWLEDGMENTS

The Government of the Republic of Mozambique is pleased to formally submit this dossier to UNESCO under the Convention Concerning the Protection of the World Cultural and Natural Heritage. Our submission nominates Mozambique's Maputo National Park (MNAP) to be inscribed on The World Heritage List as a transboundary extension to South Africa's iSimangaliso Wetland Park World Heritage Property. The two properties, across both their marine and terrestrial components, adjoin each other along the Mozambique-South Africa border, a transboundary area of global conservation significance. This adjacency, and the proximity of many other Protected Areas, illuminates the provenance of this submission, which recalls a rich history of joint action between the Republics of Mozambique and South Africa, and the Kingdom of eSwatini, as they have sought to conserve and develop the region by creating Transfrontier Conservation Areas (TFCAs).

Importantly, these strategies are attended by formal agreements. Indeed, the trilateral Lubombo Spatial Development Initiative of 1999, for which the newly-inscribed iSimangaliso Wetland Park World Heritage Property was South Africa's anchor project, formalised the intention to extend South Africa's World Heritage property into Mozambique and introduced legal mechanisms for transboundary management. Later, the Lubombo Transfrontier Conservation and Resource Area Protocol was signed between the three countries in June 2000, and has yielded regional benefits such as improved border crossings and roads, the formalisation of TFCAs, tourism development, research, and joint Park and Task Group operations. The iSimangaliso Wetland Park-Maputo National Park area falls within one of the TFCAs established by South Africa, Mozambique and eSwatini under the Lubombo SDI and TFCA protocols.

The Government of Mozambique thanks the South African Government for this long-standing partnership, and for their support for transboundary cooperation, conservation and development. We further thank the South African Government for its support of the iSimangaliso Wetland Park, and for the Park authority's readiness to extend iSimangaliso's World Heritage protection into Mozambique as expressed in its 2022–2030 Management Plan. Against this backdrop, the Government of Mozambique also thanks the Administração Nacional das Áreas de Conservação (ANAC), the Maputo National Park, and Peace Parks Foundation (PPF) for their work to improve the conservation management of MNAP. Their efforts have led to increasingly promising opportunities for conservation and tourism management across a globally significant transboundary property with strong prospects for long-term protection. For preparing the dossier, thanks are also due to Peace Parks Foundation, Centro Terra Viva, Wild Equity, People Nature Connect, the Mozbio programme, the Prince Albert II of Monaco Foundation, and UNESCO for generous technical guidance.

Regionally and internationally, it is clear that the inscription of the MNAP as a transboundary extension of the iSimangaliso Wetland Park World Heritage Property will be a fitting, logical and mutually beneficial addition to the long history of conservation in this area. This dossier merits our support for reasons that bear on ecology, conservation management, tourism development, and the potential of the region to support and sustain its people in both South Africa and Mozambique while protecting a natural area of Outstanding Universal Value.

As the Government of Mozambique, we fully endorse this nomination, and are grateful for our shared history of regional willingness to advance new models of conservation-beyond-boundaries in the service of sustainable development. To these efforts, we look forward to adding the many benefits and advantages of World Heritage inscription as an emerging rationale and support for our shared aspirations.

*Photo courtesy of Jenny Stromvoll*

# FOREWORD

In its 23rd session of the World Heritage Committee held in Marrakesh, Morocco (29 November–4 December 1999) at which the iSimangaliso Wetland Park was inscribed on the World Heritage List, the World Heritage Committee praised the launch of the trilateral Lubombo Spatial Development Initiative between South Africa, eSwatini and Mozambique; and it noted its support for an extension of the new iSimangaliso Wetland Park World Heritage Property into a future transboundary property with Mozambique as part of a move between these three countries to conserve and develop the region by creating Transfrontier Conservation Areas (TFCAs). Similarly, the IUCN's 1999 technical evaluation of the newly-inscribed iSimangaliso Wetland Park World Heritage Property noted that such an extension, for terrestrial and marine components, would be "commendable and would benefit conservation of the area." In pursuit of this ideal, the Lubombo Transfrontier Conservation and Resource Area Protocol was signed between the three countries in June 2000, and the Ponta do Ouro-Kosi Bay Marine and Coastal TFCA between Mozambique and SA came into effect as Africa's first marine TFCA. The Protocol also included the Usuthu-Tembe-Fúti TFCA which further linked South Africa and Mozambique.

In 2002, at a World Heritage Centre Marine Biodiversity Workshop, the area from Maputo Bay/Inhaca was ranked 4th as a Western Indian Ocean priority for World Heritage Property nomination (Hillary *et al.*, 2003); the Ponta do Ouro Partial Marine Reserve (PPMR) was established by the Mozambique Government in 2009, and in its 2012 assessment of Marine World Heritage[1], the IUCN noted the submission of the iSimangaliso Wetland Park-Mozambique property on the World Heritage Tentative List. The conservation potential of the PPMR was enhanced in 2019 when the Maputo Environmental Protection Area (MEPA) was gazetted as the Park's buffer zone; and in 2021 the Maputo National Park (MNAP) was established, consolidating the PPMR and the Maputo Special Reserve (MSR[2]).

In recent years, interest from donors and international conservation agencies, and the Peace Parks Foundation (PPF) in South Africa has led to improved conservation management of the MNAP, and increasingly realistic prospects of joint management. Indeed, the iSimangaliso Wetland Park Integrated Management Plan 2022–2030 notes the desirability of extending iSimangaliso's World Heritage protection into Mozambique and confirms iSimangaliso's support of the Ponta do Ouro–Kosi Bay TFCA. The mutual enthusiasms of the State Parties in this regard are endorsed in UNESCO's Operational Guidelines for the Implementation of the World Heritage Convention, which state in paragraph 135 that "Wherever possible, nomination dossiers of transboundary sites should be prepared"; and they further bear on the IUCN's Compendium of Standards to inscribe Natural Properties on the World Heritage List, which flag the importance of joint management between countries of transboundary properties. The advantages of such collaboration are compelling, and offer prospects to align management, conservation strategies, compliance, tourism, marketing and education, and it is expected that the proposed transboundary property may offer an instructive model in this regard.

The MNAP will enhance the values of the iSimangaliso Wetland Park, help to maintain ecological connectivity between ecosystems and species, and increase the ranges and resilience of protected and vulnerable plants and animals, including mega-fauna. Specifically, the MNAP has unique attributes which enhance the system as a whole - the barrier islands of Maputo Bay, with its extensive seagrass beds, tidal flats, mangroves and the shallow-water Barreira Vermelha and Ponta Torres coral reefs.

Regionally, the addition of the MNAP as a transboundary extension to the iSimangaliso Wetland Park will strengthen conservation efforts made by neighbouring South Africa, including listing of the iSimangaliso Wetland Park as a World Heritage Property in 1999, and promulgating the iSimangaliso Marine Protected Area. Even as a stand-alone site, the iSimangaliso Wetland Park qualifies as a property of "Outstanding Universal Value," to which the proposed transboundary extension adds extensive areas with comparable attributes and many novel features. Thus, the iSimangaliso Wetland Park is a superlative anchor property to which the proposed transboundary extension forms a natural, meaningful, and mutually beneficial extension in a transboundary area of acknowledged global conservation significance.

World Heritage Properties are recognised as the world's most significant protected areas; their international visibility offers protection from many jeopardies, and they can leverage their status to generate benefits which grow local support for conservation and promote conservation-compatible development. Regionally and internationally, the inscription of the MNAP as a transboundary extension of the iSimangaliso Wetland Park World Heritage Property would be a fitting culmination of the long history of conservation in the region, and the joint aspirations of the Mozambican and South African Governments to develop and conserve their countries wisely.

1 Obura, D.O., Church, J.E. and Gabrié, C. (2012). *Assessing Marine World Heritage from an Ecosystem Perspective: The Western Indian Ocean*. World Heritage Centre, United Nations Educational, Scientific and Cultural Organization (UNESCO). 124 pp.

2 Established in 1932

# ACRONYMS

| | |
|---|---|
| **ADNAP*** | National Fisheries Administration (*Administração Nacional das Pescas)* |
| **AMSL** | Above mean sea level |
| **ANAC*** | National Administration of the Conservation Areas *(Administração Nacional das Áreas de Conservação)* |
| **ANE*** | National Roads Administration *(Administração Nacional de Estradas)* |
| **APIT*** | Priority Area for Tourism Investment *(Área Prioritária para o Investimento no Turismo)* |
| **ASCLME** | Agulhas and Somali Current Large Marine Ecosystems |
| **Aw** | Tropical savanna, wet |
| **Bsh** | Hot semi-arid (steppe) climate) |
| **CBNRM** | Community Based Natural Resource Management |
| **CBO** | Community-based Organisation |
| **CCLM*** | Lourenço Marques Province Hunting Commission *(Comissão de Caça da Província de Lourenço Marques)* |
| **CCM*** | Mozambique Colony Hunting Commission *(Comissão de Caça da Colónia de Moçambique)* |
| **CCP** | Community Fishing Council *(Conselho Comunitário de Pesca)* |
| **CITES** | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| **CMS** | Convention on Migratory Species |
| **COP13** | Thirteenth Session of the Conference of the Parties |
| **COTS** | crown of thorns star fish |
| **CR** | Critically Endangered |
| **CTA*** | Confederation of Economic Associations (Confederação das Associações Económicas de Moçambique) |
| **CTV*** | Centro Terra Viva |
| **CUA** | Controlled Use Area |
| **CUA-m** | Marine Controlled Use Area |
| **CUA-t** | Terrestrial Controlled Use Area |
| **Cwa** | Monsoon-influenced humid subtropical climate |
| **SDSMAS** | District Directorate for Health, Women and Social Action *(Serviço Distrital de Saúde, Mulher e Acção Social)* |
| **DG** | Director General |
| **DMC*** | Climate Change Directorate (Direcção *Nacional das Mudanças Climáticas)* |
| **DNA*** | National Directorate of Water *(Direcção Nacional de Águas)* |
| **DNAB*** | National Directorate of the Environment *(Direcção Nacional do Ambiente)* |
| **DNAC*** | National Directorate for Civil Aviation *(Direcção Nacional de Aviação Civil)* |
| **DUAT*** | Right of use and exploitation of land *(Direito de Uso e Aproveitamento da terra)* |
| **EAME** | Eastern African Marine Ecoregion |
| **EBA** | Endemic Bird Area |
| **EBMI*** | Inhaca Marine Biology Research Station (*Estação de Biologia Marítima da Ilha de KaNyaka)* |
| **EIA** | Environmental Impact Assessment |
| **EN** | Endangered |
| **EPA** | Environmental Protection Area |
| **EX** | Extinct |
| **FOSCAM*** | Civil Society Organisations Forum for the Marine and Coastal Area *(Fórum das Organizações da Sociedade Civil para a Área Marinha e Costeira)* |
| **GEF** | Global Environment Facility |
| **GOM** | Government of Mozambique |
| **ha** | hectares |
| **HIV/AIDS** | Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome |
| **HQ** | Headquarters |
| **HWC** | Human Wildlife Conflict |
| **IDEPA** | National Institute of Fisheries and Aquaculture (*Instituto de Desenvolvimento de Pesca e Aquacultura*) |
| **IDP** | Individual Development Plan |
| **IIAM*** | Mozambique Agricultural Research Institute *(Instituto de Investigação Agrária de Moçambique)* |
| **IIP*** | National Institute of Fisheries Research (*Instituto Nacional de Investigação Pesqueira)* |
| **IMP*** | Integrated Management Plan |
| **INAHINA*** | National Institute of Hydrography and Navigation (*Instituto Nacional de Hidrografia e Navegação)* |
| **INAM*** | National Meteorological Institute (*Instituto Nacional de Meteorologia)* |
| **INAMAR*** | National Maritime Institute *(Instituto Nacional da Marinha)* |

| | |
|---|---|
| **INGD** | National Institute for Disaster Management and Risk Reduction *(Instituto Nacional de Gestão e Redução do Risco de Desastres)* |
| **IOSEA** | Indian Ocean and South-East Asia |
| **IPS** | Invasive Plant Species |
| **IUCN** | International Union for Conservation of Nature |
| **km** | Kilometers |
| **KZN** | Kwazulu-Natal |
| **KZNNCS** | KwaZulu-Natal Nature Conservation Service |
| **LC** | Least Concern |
| **LCG-UTF TFCA** | Lubombo Conservancy-Goba and Usuthu-Tembe-Fúti TFCA |
| **MCCS** | Mesoscale Convective Complexes |
| **M&E** | Monitoring and Evaluation |
| **MEPA** | Maputo Environmental Protection Area |
| **METT** | Management Effectiveness Tracking Tool |
| **MICOA*** | Ministry for the Coordination of Environmental Affairs (*Ministério para a Coordenação da Acção Ambiental)* |
| **MIMAIP*** | Ministry of the Sea, Inland Waters and Fisheries *(Ministério do Mar, Águas Interiores e Pescas)* |
| **MIREME** | Ministry of Mineral Resources and Energy (*Ministério de Recursos Minerais e Energia*) |
| **MITUR** | Ministry of Tourism (*Ministério do Turismo)* |
| **mm** | millimetre |
| **MNAP** | Maputo National Park |
| **MoU** | Memorandum of Understanding |
| **Mp** | Maputo Bay |
| **MPA** | Marine Protected Area |
| **MNH** | Museum of Natural History |
| **MSR** | Maputo Special Reserve |
| **MTA*** | Ministry of Land and Environment *(Ministério da Terra e Ambiente)* |
| **NAPA** | National Adaption Plan of Action to Climate Change |
| **NGO** | Non-Governmental Organization |
| **NNE** | North-Northeast |
| **NNE-SSW** | North-Northeast-South-Southeast |
| **NRMC** | Natural Resource Management Committee |
| **NT** | Near-Threatened |
| **NW** | North West |
| **OUV** | Outstanding Universal Value |
| **pa** | per annum |
| **PEDTM*** | Strategic Plan for the Development of Tourism in Mozambique *(Plano Estratégico para o Desenvolvimento do Turismo em Moçambique)* |
| **PEOT** | Special Plan for Territorial Planning |
| **PPF** | Peace Parks Foundation |
| **PR** | Public Relations |
| **REDD+** | Reducing emissions from deforestation and forest degradation+ |
| **RH** | Relative humidity |
| **S** | South |
| **SA** | South Africa |
| **SABAP2** | South African Bird Atlas Programme |
| **SADC** | Southern African Development Community |
| **SAWC** | Southern African Wildlife College |
| **SAPA** | Social Assessment of Protected Areas |
| **SDAE*** | District Services of Economic Activities *(Serviço Distrital de Actividades Económicas)* |
| **SDPI** | Infrastructure and Planning District Services *(Serviço Distrital de Planeamento e Infra-estruturas)* |
| **SE** | Southeast |
| **SST** | Sea Surface Temperatures |
| **SW** | South West |
| **TFCA** | Transfrontier Conservation Area |
| **TPA** | Total Protection Area |
| **UEM*** | Universidade Eduardo Mondlane |
| **UNEP** | United Nations Environment Program |
| **UNESCO** | United Nations Education, Science and Cultural Organization |
| **VSLA** | Village Savings and Loans Groups |
| **VU** | Vulnerable |
| **WCS** | Wildlife Conservation Society |
| **WHC** | World Heritage Committee |
| **WIO** | Western Indian Ocean |
| **WIOMSA** | Western Indian Ocean Marine Science Association |
| **WWF** | World Wildlife Fund for Nature |

** Throughout this document Portuguese Acronyms are used when referring to institutions or legal rights*

# TABLE OF CONTENTS

# LISTS

## LIST OF FIGURES



## LIST OF TABLES

# LIST OF MAPS

# EXECUTIVE SUMMARY

## STATE PARTIES

Republic of Mozambique

## STATE, PROVINCE OR REGION

Maputo Province, Mozambique

## NAME OF THE NOMINATED PROPERTY

Maputo National Park – the proposed transboundary extension to the iSimangaliso Wetland Park World Heritage Property (Dossier 914)

## GEOGRAPHICAL COORDINATES TO THE NEAREST SECOND

| NAME | REGION(S) / DISTRICT(S) | COORDINATES OF THE CENTRAL POINT | AREA | AREA OF BUFFER ZONE (HA) |
|---|---|---|---|---|
| Proposed transboundary extension, Maputo National Park (MNAP) | Mozambique, Maputo Province, Matutuíne District | S 26° 26′ 11″<br>E 32° 52′ 14″ | 153,992 ha | 469,363 ha |
| Inscribed property, iSimangaliso Wetland Park World Heritage Property | South Africa, KwaZulu-Natal | S 27° 50′ 20″<br>E 32° 33′ 00″ | 243,479 ha | 322,905 ha |
| Total area | | | **397,471 ha** | **792,268 ha** |

## TEXTUAL DESCRIPTION OF THE BOUNDARIES OF THE NOMINATED PROPERTY

The proposed transboundary extension, the Maputo National Park (MNAP) is located on the south-eastern coast of Maputo Province in the Matutuíne District, southern Mozambique. The MNAP extends from Ponta do Ouro in the south, where it borders on the iSimangaliso Wetland Park World Heritage Property in South Africa, around the northern tip of Ilha de KaNyaka to the Maputo River mouth in Maputo Bay. The park extends from the high-water mark to three nautical miles into the Indian Ocean and one nautical mile into the interior of Maputo Bay, including the surrounding waters of Inhaca and Portuguese Islands (DNAC, 2011). The terrestrial component of the park (formerly the Maputo Special Reserve) is bordered by Maputo Bay in the north, the Indian Ocean in the east, the Maputo River, the Fúti River and a line two kilometres east of the Salamanga–Ponta do Ouro road in the west, and the southern tips of Lake Xinguti and Lake Piti (DNAC, 2009).

The Maputo Environmental Protection Area (MEPA), gazetted in 2019, is the MNAP's buffer zone. It serves this purpose as contemplated in paragraph 104 of the 'Operational Guidelines for the Implementation of the World Heritage Convention,' and safeguards the MNAP and mitigates environmental impacts.

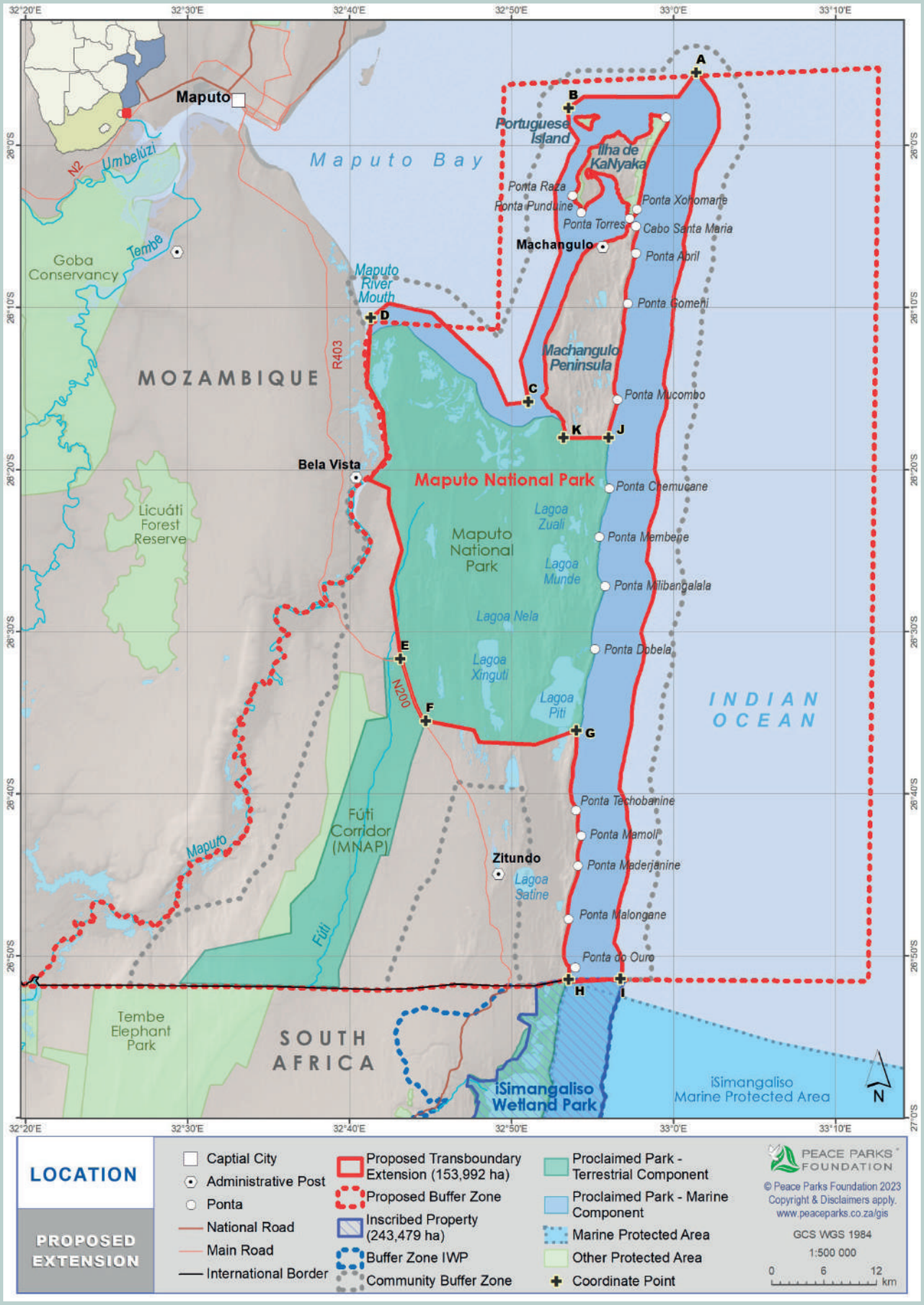
The buffer zone covers 469,363 ha and includes Ilha de KaNyaka, part of the Administrative Posts of Bela Vista and Zitundo, the Administrative Post of Machangulo in its entirety, and the Municipal District of KaNyaka.

In the northwest the Park boundary and buffer zone both follow the course of the Maputo River, and it is not feasible to extend the buffer zone west of the river along this part of the boundary. Also, the town of Bela Vista is situated along the western bank of the Maputo River, making the westward extension of the buffer zone in this area additionally impractical.

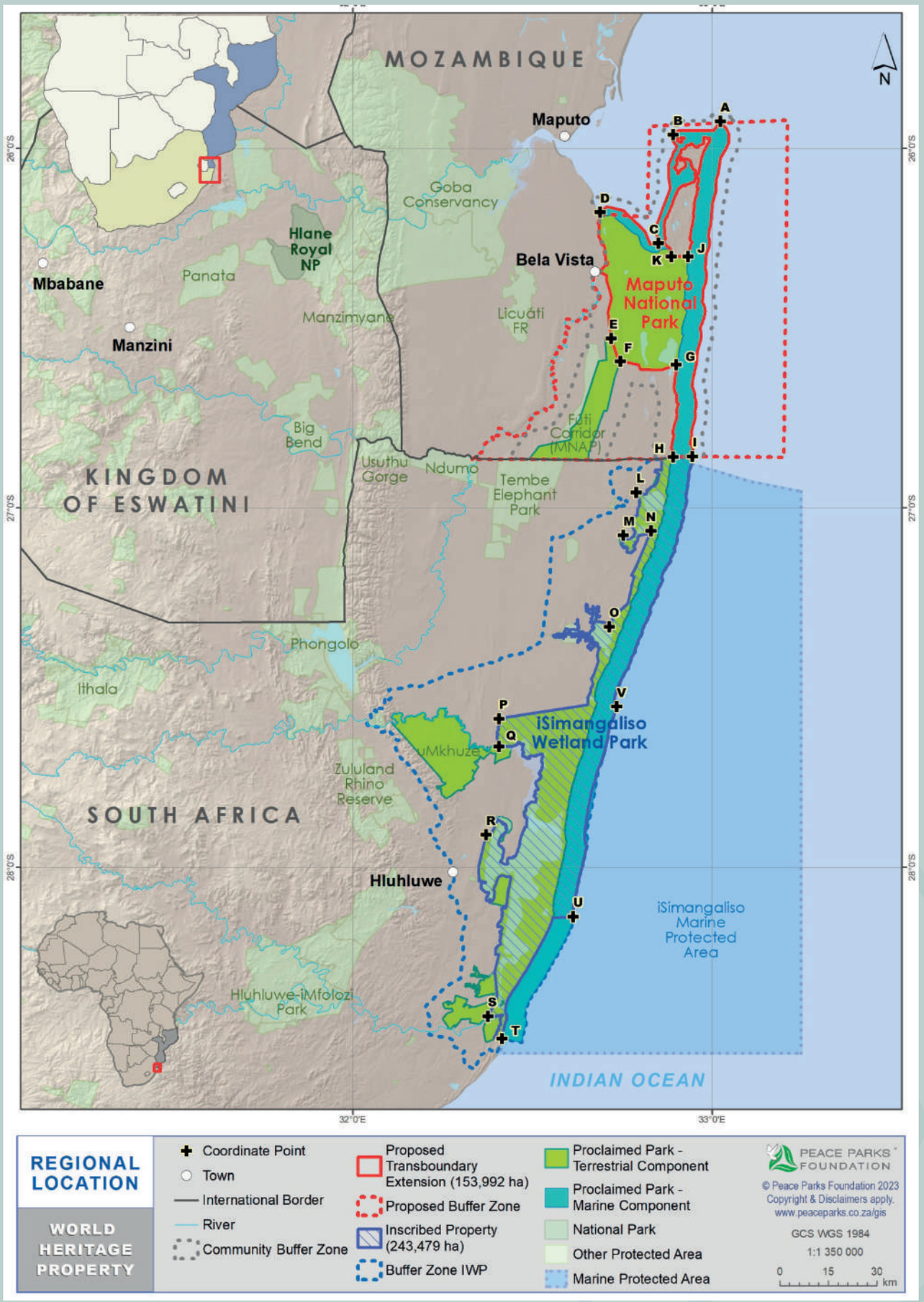
In addition, there is a proclaimed community buffer zone of 120,194 ha which falls within the MEPA. It is set at 5 km from the MNAP boundary, and surrounds both its terrestrial and marine components. The purpose of the community buffer zone is to define communities who benefit from the MNAP, specifically, those who qualify for a 20% share in the MNAP's revenue. While the word 'buffer' is used in the MNAP proclamation, the purpose of the community buffer zone should not be confused with the buffer zone or MEPA as described above, and in the Foreword and in Section 1.

The Fúti Corridor is part of the proclaimed Maputo National Park but is not included in the proposed transboundary extension as it does not meet the World Heritage criteria for which the proposed transboundary extension is being nominated.

***Map 1.*** *The Proposed Transboundary Extension - The Maputo National Park (MNAP)*



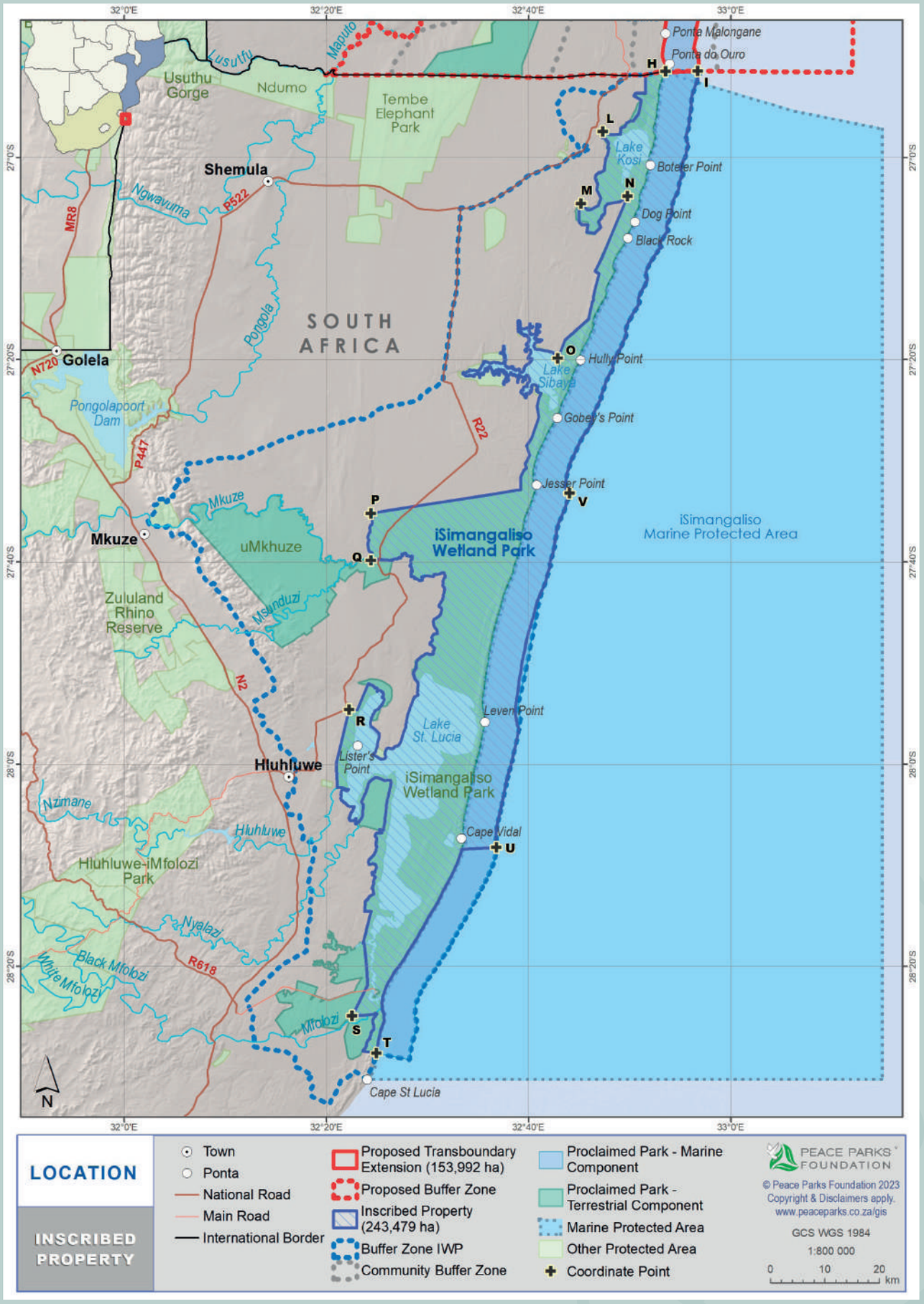
***Map 2.*** *Regional Location of the iSimangaliso Wetland Park World Heritage Property and the Proposed Transboundary Extension, the Maputo National Park (MNAP)*



# TEXTUAL DESCRIPTION OF THE BOUNDARIES OF THE INSCRIBED PROPERTY

The iSimangaliso Wetland Park World Heritage Property is located along the north-eastern coast of KwaZulu-Natal Province in South Africa. It is a single protected area covering approximately 241 574 ha of terrestrial land, and extending approximately 201 km along the KwaZulu-Natal coastline from the South African-Mozambique border north of Kosi Bay, to 500 m south of the Cape St Lucia lighthouse at Maphelane, covering approximately one third of KwaZulu-Natal's coastline (see Map 3). In the east, the Park is bordered by the Indian Ocean. The Marine Protected Area extends approximately 38 km out to sea in the north to 84.4 km in the south. The western boundary ranges from between 1 to 55 km inland from the coast, incorporating the Lubombo Mountains in the extreme west, but with a narrower coastal strip north of Sodwana Bay. The Dukuduku/Futululu forests, parts of Lake St. Lucia's Western Shores, and the uMkhuze Game Reserve are part of the iSimangaliso Wetland Park but fall outside of the World Heritage Property (see Map 3).

***Map 3.*** *The Inscribed Property - The iSimangaliso Wetland Park World Heritage Property*



# CRITERIA UNDER WHICH PROPERTY IS NOMINATED

Natural criteria: (vii),(ix) & (x)[33].

# CULTURAL LANDSCAPE

No.

# DRAFT STATEMENT OF OUTSTANDING UNIVERSAL VALUE

## a) BRIEF SYNTHESIS

The proposed transboundary extension, the Maputo National Park (MNAP), is located on the south-eastern coast of southern Mozambique, and the inscribed World Heritage Property, the iSimangaliso Wetland Park, lies adjacently along the north-eastern coast of South Africa. Together – these properties cover a unique wetland, marine/coastal and terrestrial area at the southern limit of the east African coastal plain recognised for its global conservation significance. The MNAP is nominated as a transboundary extension of both the marine and terrestrial portions of the iSimangaliso Wetland Park to create World Heritage Property which will straddle the border between Mozambique and South Africa.

Together, the proposed transboundary extension and inscribed property fall within the Maputaland Centre of Plant Endemism and the Maputaland-Pondoland-Albany Hotspot, one of only 36 such regions of botanical conservation significance globally. They contain a largely pristine and uninhabited continuum of marine, coastal, wetland, estuarine and terrestrial ecosystems in which diverse, interlinked habitats support an intact flora and fauna of exceptional species diversity and endemism. 6 500 plant and animal species are recorded for the iSimangaliso Wetland Park and 4 935 for the MNAP. The two properties' marine components uniquely represent a number of biogeographic provinces and form one of eight key biodiversity seascapes of global importance within the Eastern African Marine Ecoregion.

## b) JUSTIFICATION FOR CRITERIA

The iSimangaliso World Heritage Property was inscribed for the same criteria (vii, ix, x) upon which the proposed transboundary extension submission is argued, suggesting the equivalence and complementarity of their attributes. These criteria, as set out below, are described here for this proposed, consolidated site.

### Criterion (vii): Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

Together, the iSimangaliso Wetland Park and the Maputo National Park offer terrestrial, coastal and marine land and seascapes of exceptional beauty. The clear, sparkling waters of the Indian Ocean, punctuated by coral reefs, break on wide sandy beaches and rocky shores, and a forested cordon of five dune forms abut an expansive mosaic of wetlands, grasslands, estuarine systems, lakes, savannah, swamp- and sand-forests to offer rich landscape texture, remote wilderness and sweeping vistas. Tidal mangroves and seagrass meadows in Maputo Bay add to this moving spectacle. Outstanding natural phenomena are large numbers of nesting Leatherback and Loggerhead turtles on the beaches, dolphins and migrating whales and whale sharks, dugongs, the largest aggregation of giant trevally in the world, large numbers of waterfowl, large breeding colonies of pelicans, storks, herons and terns, and the southerly flyway for migratory birds of the east coast of Africa make this area one of the most important bird refuges on the southern African subcontinent. In the iSimangaliso Wetland Park, naturally shifting salinity states in Lake St. Lucia are linked to wet and dry climatic cycles, with the lake responding accordingly with shifts from low to high-saline states.

### Criterion (ix): Be outstanding examples 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.

The iSimangaliso Wetland Park and the Maputo National Park are located at the narrow southern limit of the East African coastal plain on which early Pleistocene fluvial, marine and aeolian forces, together with climate, geology, oceanography and soils, have produced a richly textured mosaic of terrestrial, wetland, estuarine, coastal, and marine elements. Climatic stability in the Pleistocene has enabled species to persist, leading to high levels of endemism.

3 These are the same criteria under which the iSimangaliso Wetland Park was nominated as a World Heritage Property in 1999

The area's transitional location between sub-tropical and tropical biotas, and its coastal setting also support exceptional species diversity. Past speciation in the Maputaland Centre of Endemism is ongoing against a backdrop of undisturbed landscape-level and geological unfolding. In the marine environment, sediments transported by the Agulhas current are trapped by submarine canyons on the continental shelf, allowing for clear waters and coral reefs.

### Criterion (x): 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.

The range of habitats (terrestrial, wetland, coastal and aquatic) in the iSimangaliso Wetland Park and the Maputo National Park support a conservation-significant diversity of African biota, including many threatened and/or endemic species. Of over 6,500 plant and animal (including 521 bird) species recorded from the iSimangaliso Wetland Park, those of conservation importance include 11 species endemic to the Park, 108 species endemic to South Africa, and 467 species listed as threatened in South Africa. Of 4,935 species recorded in the MNAP, 104 are of international conservation significance, and 184 are endemic or near endemic to Mozambique (5), southern Africa (95) and the WIO (135).

Specifically, the iSimangaliso Wetland Park and the Maputo National Park share natural habitats for in-situ conservation of threatened species of outstanding universal value for science and conservation.

Leatherback and Loggerhead turtles, listed as 'Near Threatened' on the IUCN Red List, use the coastal dunes and sandy beaches of both Parks as critical inter-nesting, mating, and nesting grounds. In terms of population size, these habitats support the second most important nesting population in the Indian Ocean.

In the Maputo National Park, the waters of the western shores of Ilha de KaNyaka shelter the last remnant individuals of the Dugong population of Maputo Bay. Also on the western shores of Ilha de KaNyaka, the reefs of Barreira Vermelha and Ponta Torres occur under extreme environmental conditions. These reefs are isolated from others along the East African coastline and are unique within the Western Indian Ocean region. Adding to these features, Ilha de KaNyaka has the largest coverage of seagrass (Zostera capensis) in the world, a species categorised as Vulnerable on the IUCN Red List because of its decline in Maputo Bay.

## c) STATEMENT OF INTEGRITY

According to the IUCN's 1999 Technical Evaluation of the iSimangaliso Wetland Park's World Heritage Property application, even as a stand-alone property, iSimangaliso "is of sufficient size and retains most of the key elements that are essential for long-term functioning of the ecosystem." The addition of the proposed transboundary extension will add 153 992 ha to the iSimangaliso World Heritage Property's 243 479 ha, and expand the WHS area contained within the Maputaland Centre of Endemism by approximately 60% to create a single, new, 397 471 $^{ha}$ extended World Heritage Property[4]. This area will reap the protective advantages of its larger size, and is additionally protected by buffer zones in both properties (iSimangaliso WHS: 322,905 ha; MNAP: 469,363 ha. It will also profit from the species-area relationship, a more advantageous edge-to-area ratio and greater biogeographic coverage. Its flora and fauna may have larger ranges, and more viable population sizes and migratory possibilities. The area's situation within the larger Lubombo Transfrontier Conservation and Resource Area (TFCA), with its many Parks and Protected Areas (Map 13), is also notable, and bears testimony to the history of conservation and co-operation in the region. The proposed transboundary extension consolidates the integrity of the overall property, exhibiting many of the habitats, landscapes, and processes of the iSimangaliso Wetland Park, and adding novel features and species. Together, the two properties deliver a generous arena in which terrestrial and marine ecosystems and natural processes remain functional and intact, with strong prospects for long-term conservation.

## d) REQUIREMENTS FOR PROTECTION AND MANAGEMENT

The iSimangaliso Wetland Park is managed by the iSimangaliso Wetland Park Authority according to national legislation which affords it legal protection; it is surrounded by a buffer zone, and managed as a single, largely fenced and uninhabited protected area according to its Integrated Management Plan (IMP), which defines zonation of terrestrial and marine areas and permissible/non-permissible use according to zone. Funding for conservation management comes from National and Provincial Government, donors, and private sector and commercial revenue. Threats to the iSimangaliso Wetland Park include degradation of the upper Mfolozi Swamps by agriculture; droughts, which affect the salinity and water levels in Lake St. Lucia; unsustainable fishing and alien invasive plants, the state of catchments outside the Park and land claims.

4 This excludes the iSimangaliso Marine Protected Area of 1 070 203 ha

Conservation management of the MNAP is well advanced due to prior work by the Mozambique Government to establish formally protected areas in southern Mozambique, and interest in recent years from donors, international conservation agencies and the Peace Parks Foundation (PPF). The MNAP is managed by the National Administration of Conservation Areas (ANAC) through a Management Unit with a Park Administrator (appointed by ANAC) and an Operational Manager appointed by PPF via a co-financing agreement between the two entities.

The protection and management of MNAP is subject to the legal framework of the Government of Mozambique. The Maputo Environmental Protection Area (MEPA) was gazetted in 2019 as a buffer zone for the MNAP, which was proclaimed in 2021. The MNAP's Management Plan was approved by the Government of Mozambique on the 25th November 2022. The Management Plan will address Policy Frameworks, Strategies, Heritage, Social Management, Livelihood and Commercial Development. The Park's Specific Regulation, which includes the zonation plan, park rules, and tourism concession activity limits governs many potentially harmful activities. Park-specific Tourism, Business and Elephant Management Plans have also been approved.

The co-management agreement with PPF spans 15 years, and its injection of skilled staff, capital and operational funds is laying a firm foundation for progressive conservation management. The rewilding of the Park has been largely completed, Eucalyptus plantations have been removed and protection services improved, and the Park is now attractive to tourists and has moved into a tourism development phase. Stakeholders, including communities living in the Park and the buffer zone, Government, NGOs, transfrontier conservation structures and research institutions are consulted regularly and represented on management forums and committees.

Despite this level of organisation and consolidation, the Park still faces a number of development-, environment-, and tourism-related challenges. Chief among these are the socio-economic conditions in which the MNAP finds itself - the state of regional development, the poverty of those who live in and around the Park, and the reliance of these inhabitants on marine and terrestrial natural resources, livestock and farming.

The MNAP also faces specific challenges - climate change will affect it, as may pollution in the marine environment in the case of marine disasters, or artisanal and semi-commercial over-fishing. Charcoal and firewood production, invasive species, and the growth of tourism are notable, as are expanding road networks, the proximity of Maputo port, the potential construction of a deep-water port at Techobanine and interests in mining, oil and gas exploration.

However, the Mozambique Government's strategic development plans for the region seek specifically to safeguard the environment, and with its attendant legal framework and management system, the MNAP enjoys a high degree of protection.

## NAME AND CONTACT INFORMATION OF OFFICIAL LOCAL INSTITUTION/ AGENCY/ORGANISATION


**Ministry of Land and Environment**
National Administration of the Conservation Areas / ANAC

**Telephone**
+258 (21) 30 23 62
+258 874 036 889 (Cell. phone)
+258 822 682 459 (Cell. phone)

**Fax**
+258 (21) 30 23 73

**Contact people**
Mr. Cornélio Coelho Miguel / Head of the Department of Cooperation and Studies

**Email**
cornelio.miguel@anac.gov.mz

**Website**
www.anac.gov.mz

**Mailing address**
Rua da Resistência n° 1746/47
8° Andar, Maputo, Mozambique

# 1. IDENTIFICATION OF THE NOMINATED PROPERTY

The proposed transboundary extension, the Maputo National Park (MNAP) in Mozambique and the inscribed property, the iSimangaliso Wetland Park World Heritage Property in South Africa are both identified in this section (see also 1.d & 1.e).

The Maputo National Park (MNAP) is located on the south-eastern coast of Maputo Province in the Matutuíne District, southern Mozambique (Map 4).

The MNAP extends from Ponta do Ouro in the south, where it borders with the iSimangaliso Wetland Park World Heritage Property in South Africa, around the northern tip of Ilha de KaNyaka to the Maputo River mouth in Maputo Bay. The park extends from the high-water mark to three nautical miles into the Indian Ocean and one nautical mile into the interior of Maputo Bay, including the surrounding waters of Inhaca and Portuguese Islands (DNAC, 2011). The terrestrial component of the park (formerly the Maputo Special Reserve) is bordered by Maputo Bay in the north, the Indian Ocean in the east, the Maputo River, the Fúti River and a line two kilometres east of the Salamanga–Ponta do Ouro road in the west, and the southern tips of Lake Xinguti and Lake Piti (DNAC, 2009).

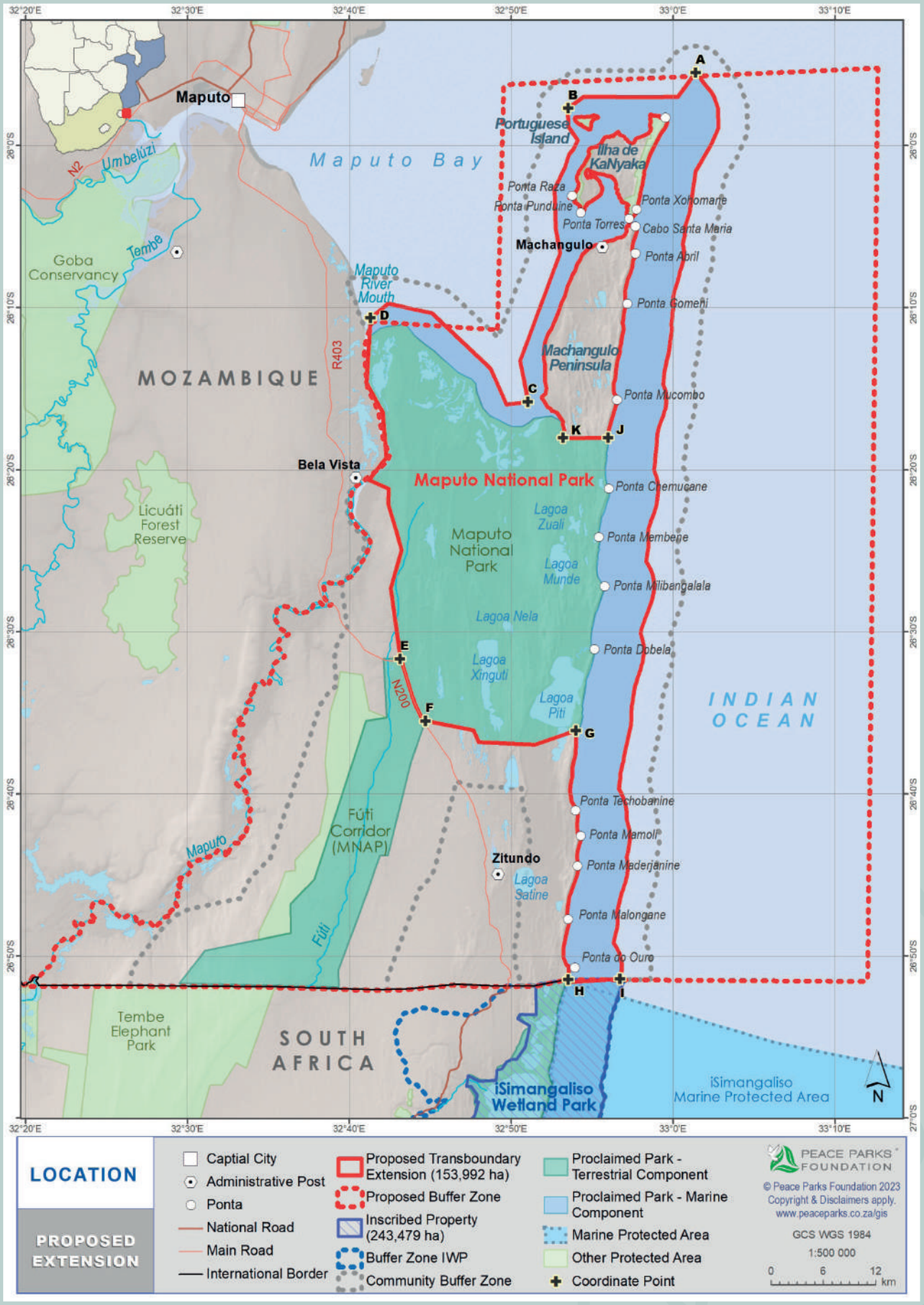
The Fúti Corridor is part of the proclaimed Maputo National Park but is not included in the proposed transboundary extension as it does not meet the World Heritage criteria for which the proposed transboundary extension is being nominated.

The Maputo Environmental Protection Area (MEPA), gazetted in 2019, is the MNAP's buffer zone. It serves this purpose as contemplated in paragraph 104 of the 'Operational Guidelines for the Implementation of the World Heritage Convention,' and safeguards the MNAP and mitigates environmental impacts.

The buffer zone covers 469,363 ha and includes Ilha de KaNyaka, part of the Administrative Posts of Bela Vista and Zitundo, the Administrative Post of Machangulo in its entirety, and the Municipal District of KaNyaka.

In the northwest, the Park boundary and buffer zone both follow the course of the Maputo River, and it is not feasible to extend the buffer zone west of the river along this part of the boundary. Also, the town of Bela Vista is situated along the western bank of the Maputo River, making the westward extension of the buffer zone in this area additionally impractical. In addition, there is a proclaimed community buffer zone of 120,194 ha which falls within the MEPA. It is set at 5 km from the MNAP boundary, and surrounds both its terrestrial and marine components. The purpose of the community buffer zone is to define communities who benefit from the MNAP, specifically, those who qualify for a 20% share in the MNAP's revenue. While the word 'buffer' is used in the MNAP proclamation, the purpose of the community buffer zone should not be confused with the buffer zone or MEPA as described above, and in the Foreword and Executive Summary.

***Map 4.*** *Location of the Proposed Transboundary Extension, the Maputo National Park (MNAP)*



The iSimangaliso Wetland Park is located along the north-eastern coast of KwaZulu-Natal Province in South Africa (Map 5). It is a single protected area covering approximately 241,574 ha of terrestrial land, and extending approximately 201 km along the KwaZulu-Natal coastline from the South African-Mozambique border north of Kosi Bay, and to Maphelane in the south, covering approximately one third of KwaZulu-Natal's coastline (see Map 5). In the east, the Park is bordered by the Indian Ocean. The Marine Protected Area extends approximately 38 km out to sea in the north to 84.4 km in the south, encompassing an area of 10,730 $km^2$ (1,072,965 ha). The western boundary ranges from between 1 to 55 km inland from the coast, incorporating the Lubombo Mountains in the extreme west, but with a narrower coastal strip north of Sodwana Bay. The Dukuduku/Futululu forests, parts of Lake St. Lucia's Western Shores, and the uMkhuze Game Reserve are part of the iSimangaliso Wetland Park but fall outside of the World Heritage Property (see Map 5).

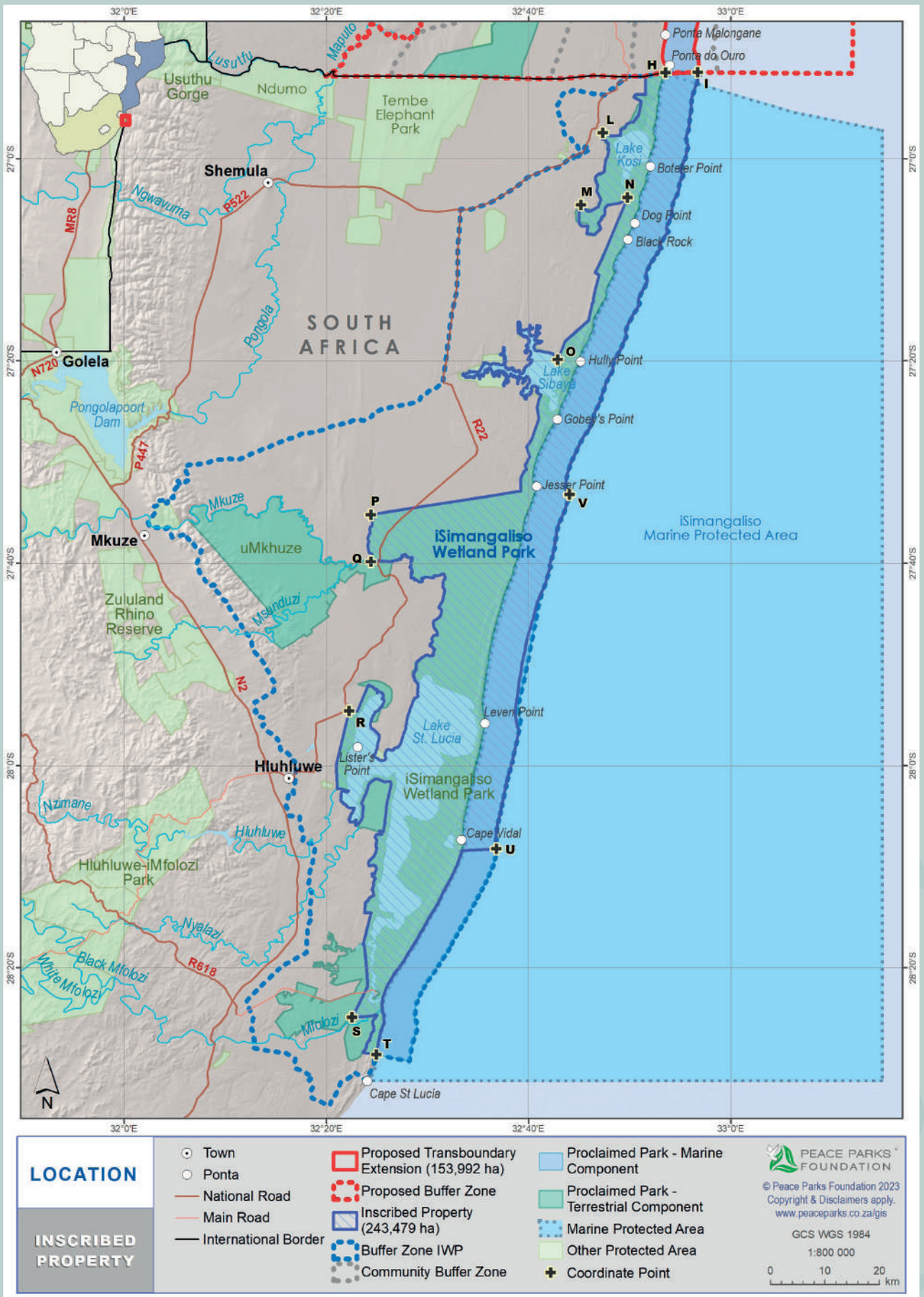
The buffer zone reflects the South African Strategy on Buffer Zones for National Parks and its delineation accords with the provisions of the iSimangaliso Wetland Park's Buffer Zone (Zone of Influence) policy, as described in its IMP. The iSimangaliso Wetland Park was inscribed on the World Heritage Site without a demarcated Buffer Zone. The South African government is currently undertaking Stakeholder consultation to proclaim a Buffer Zone, which will be followed by a request for Boundary modification.

The iSimangaliso Wetland Park has defined four sub-zones in the Park Buffer Zone for terrestrial and aquatic environments.

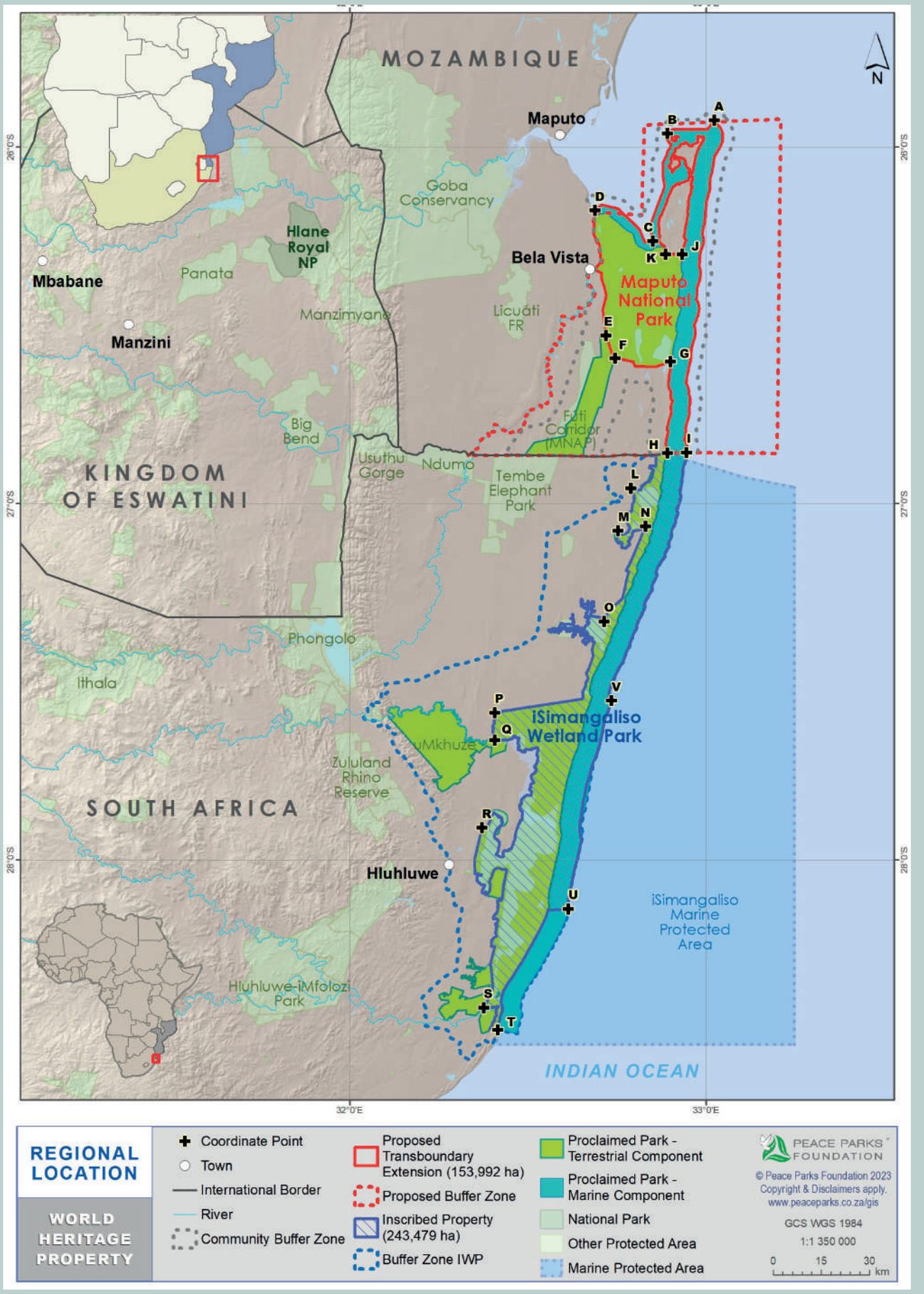
- Sub-Zone 1 relates to a 10 m wide strip of land, 5 m either side of the Park boundary, in which no land-use is permitted (save for necessary access points and management roads).
- Sub-Zone 2 indicates the 10 km buffer zone set by the Environmental Impact Assessment (EIA) Regulations, within which certain activities require environmental authorisation following a minimum of a Basic Assessment process.
- Sub-Zone 3 considers three physio-geographical factors that directly impact on the Park:
  - Sub-Zone 3A defines the important vegetation biomes in the general area of the Park.
  - Sub-Zone 3B considers the surface runoff directly feeding into the lakes. This does not account for rivers or groundwater flow.
  - Sub-Zone 3C is a viewshed model generated from the highest points in the Park. Its purpose is to consider the views around the Park.
- Sub-Zone 4 relates to rivers (including their catchments) that enter the iSimangaliso Wetland Park. Recognising the strategic and environmental importance of rivers, the Park Authority needs to exercise its influence upstream of where rivers enter the Park, as far as their sources. This area of influence is defined as a strip 32 m wide extending away from the bank on either side of the river. The Park Authority will exercise its influence in this area within the provisions of the Reserve, once the Reserve for each river has been determined by the Department of Water Affairs.

A combination of these Sub-Zones (excluding river catchments) was used to delineate the Park Buffer Zone. To increase the effectiveness of compliance/enforcement, the Buffer Zone boundary was defined using recognisable features such as roads where possible.

***Map 5.*** *Location of the Inscribed Property, the iSimangaliso Wetland Park World Heritage Property*



***Map 6.*** *Regional Location - Maputo National Park and iSimangaliso Wetland Park*



## 1.a COUNTRY

Republic of Mozambique; Republic of South Africa

## 1.b STATE, PROVINCE OR REGION

Maputo Province, Mozambique

## 1.c NAME OF NOMINATED PROPERTY

Maputo National Park – the proposed transboundary extension to the iSimangaliso Wetland Park World Heritage Property (Dossier 914)

## 1.d GEOGRAPHICAL COORDINATES TO THE NEAREST SECOND

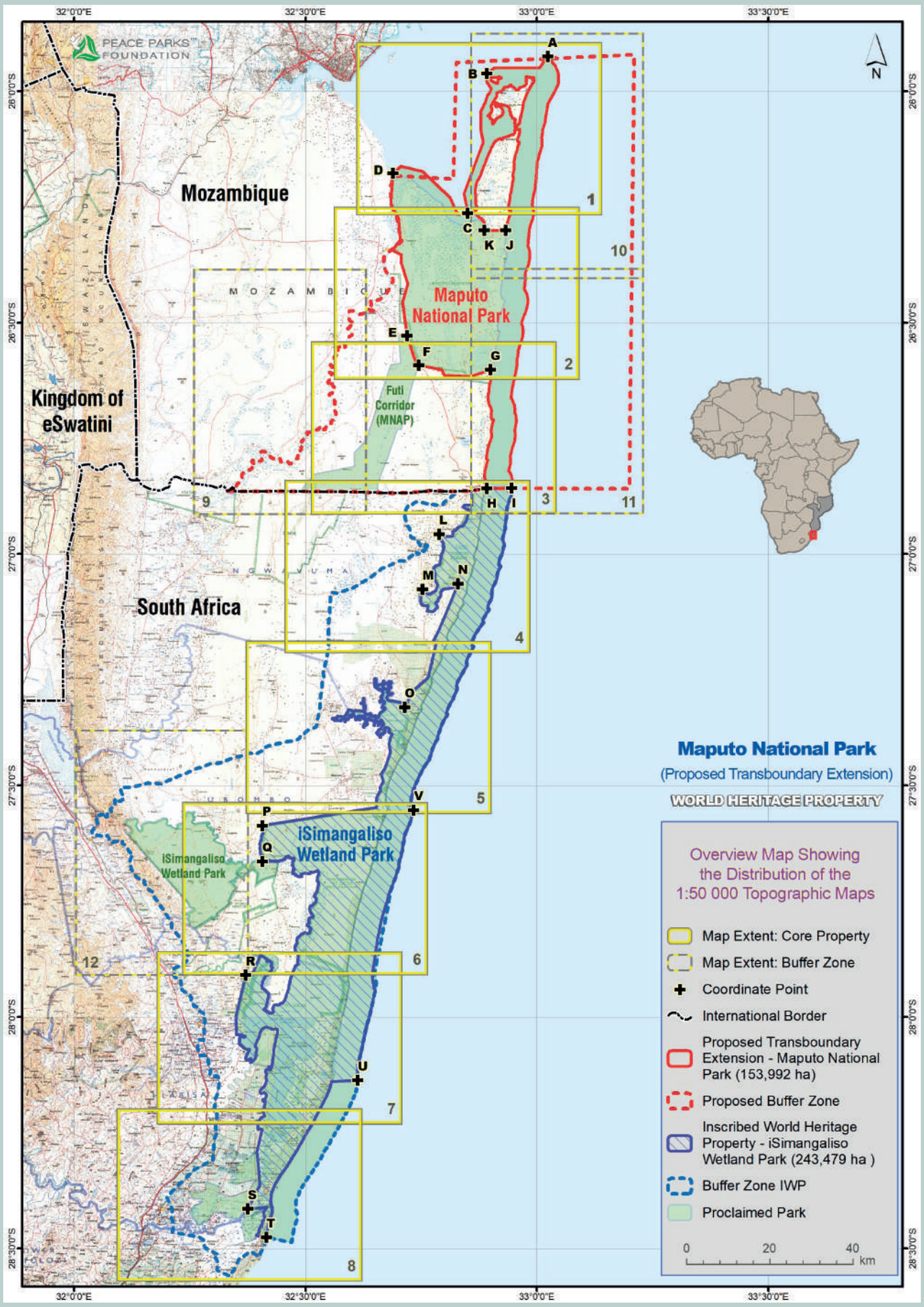
| NAME | REGION(S) / DISTRICT(S) | COORDINATES OF THE CENTRAL POINT | AREA | AREA OF BUFFER ZONE (HA) |
|---|---|---|---|---|
| Proposed transboundary extension, Maputo National Park (MNAP) | Mozambique, Maputo Province, Matutuíne District | S 26° 26′ 11″<br>E 32° 52′ 14″ | 153,992 ha | 469,363 ha |
| Inscribed property, iSimangaliso Wetland Park World Heritage Property | South Africa, KwaZulu-Natal | S 27° 50′ 20″<br>E 32° 33′ 00″ | 243,479 ha | 322,905 ha |
| **Total area in hectares** | | | **397,471 ha** | **792,268 ha** |

## 1.e MAPS AND PLANS, SHOWING THE BOUNDARIES OF THE NOMINATED PROPERTY AND BUFFER ZONE

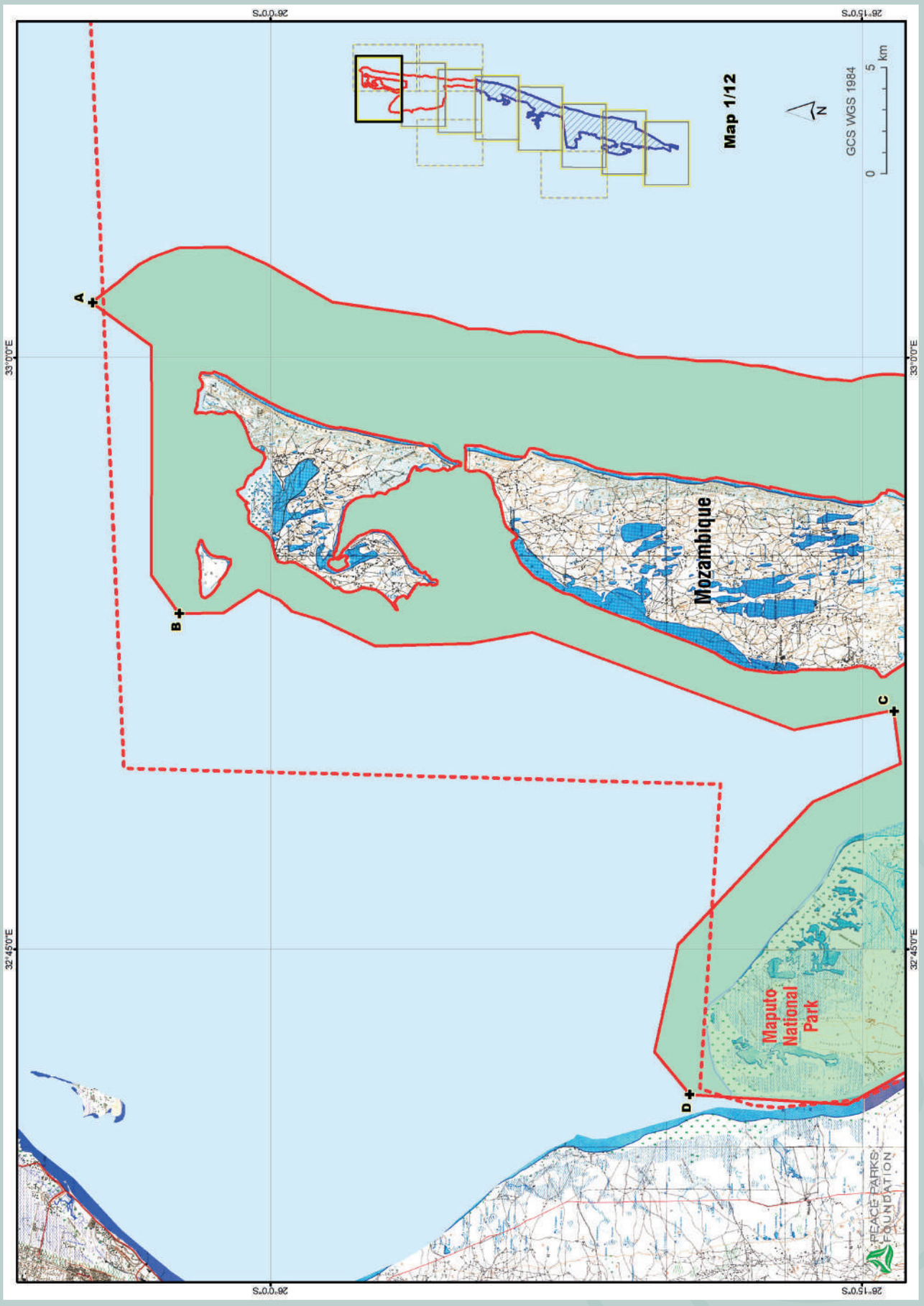
The A0 topographical maps have been submitted with the nomination dossier. These maps have been scaled to A4 and included in this section for ease of reference. Maps 10 and 11 have not been included here but are included in the A0 set.

| NAME OF THE COMPONENT PART | COORDINATE POINTS | LATITUDE S | LONGITUDE E | MAP N° |
|---|---|---|---|---|
| **Proposed transboundary extension, the Maputo National Park (MNAP)** | A<br>B<br>C<br>D<br>E<br>F<br>G<br>H<br>I<br>J<br>K | 25°55′ 29″<br>25°57′ 41″<br>26°15′ 49″<br>26°10′ 38″<br>26°31′ 41″<br>26°35′ 31″<br>26°36′ 06″<br>26°51′ 36″<br>26°51′ 32″<br>26°18′ 01″<br>26°18′ 01″ | 33°1′ 24 ″<br>32°53′ 31″<br>32°51′ 02″<br>32°41′ 19″<br>32°43′ 08″<br>32°44′ 42″<br>32°54′ 00 ″<br>32°53′ 31″<br>32°56′ 46″<br>32°55′ 59″<br>32°53′ 12″ | Topographic map series - 1: 50 000 Maps 1, 2, 3, 9, 10, 11 of 12 |
| **Inscribed property, the iSimangaliso Wetland Park World Heritage Property** | L<br>M<br>N<br>O<br>P<br>Q<br>R<br>S<br>T<br>U<br>V | -26°57′ 25″<br>-27°4′ 35″<br>-27°3′ 50 ″<br>-27°19′ 51 ″<br>-27°35′ 12 ″<br>-27°39′ 51″<br>-27°54′ 36″<br>-28°24′ 54″<br>-28°28′ 36″<br>-28°8′ 14″<br>-27°33′ 11″ | 32° 47′ 20″<br>32°45′ 10 ″<br>32°49′ 46″<br>32°42′ 52″<br>32°24′ 24″<br>32°24′ 24″<br>32°22′ 15″<br>32°22′ 31″<br>32°24′ 55″<br>32°36′ 48″<br>32°44′ 3″ | Topographic map series - 1: 50 000 Maps 3, 4, 5, 6, 7, 8, 12 of 12 |

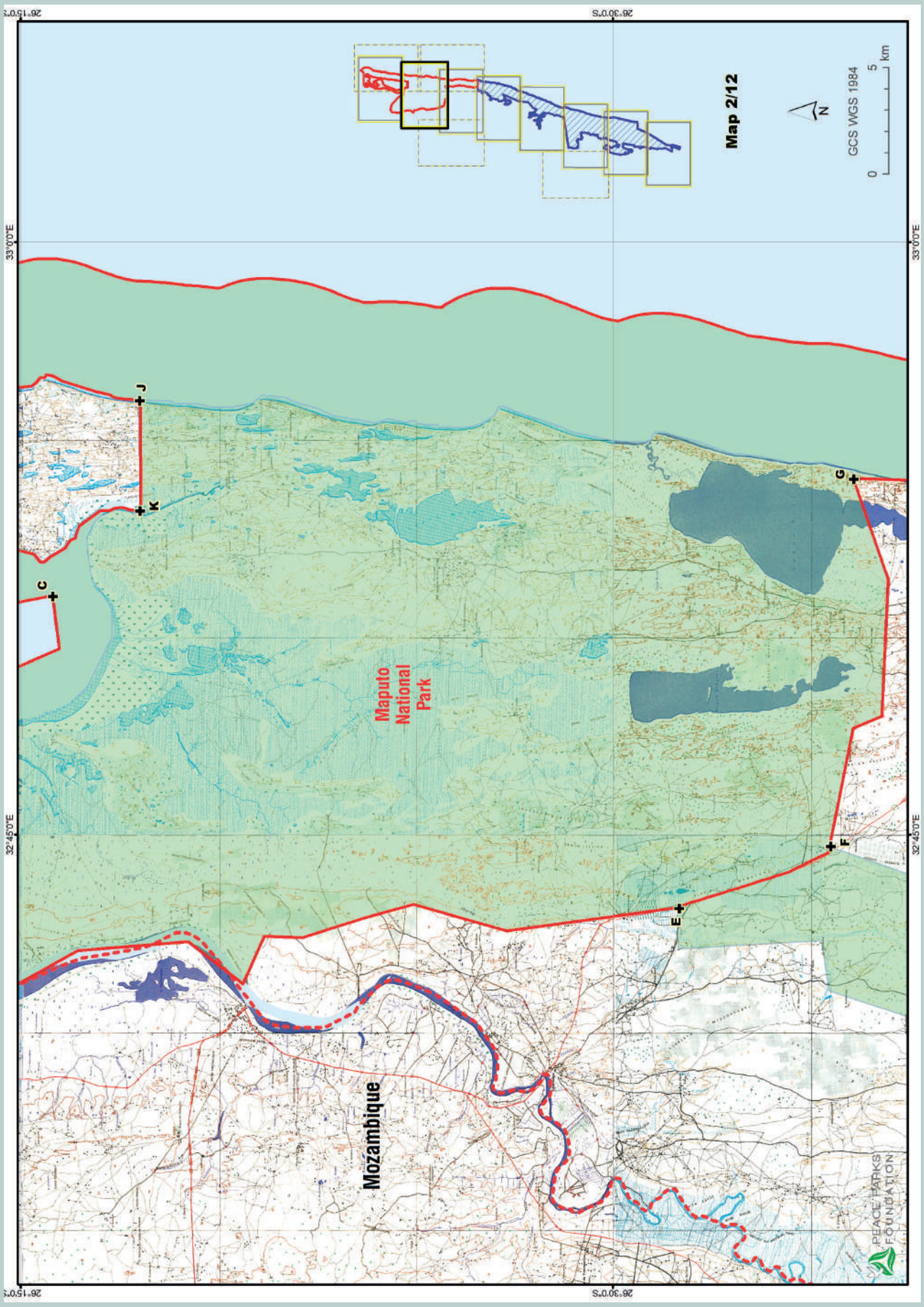
***Map 7.*** *Topographic Map Series Overview covering the Inscribed iSimangaliso Wetland Park World Heritage Property and Proposed Transboundary Extension, the Maputo National Park (MNAP)*



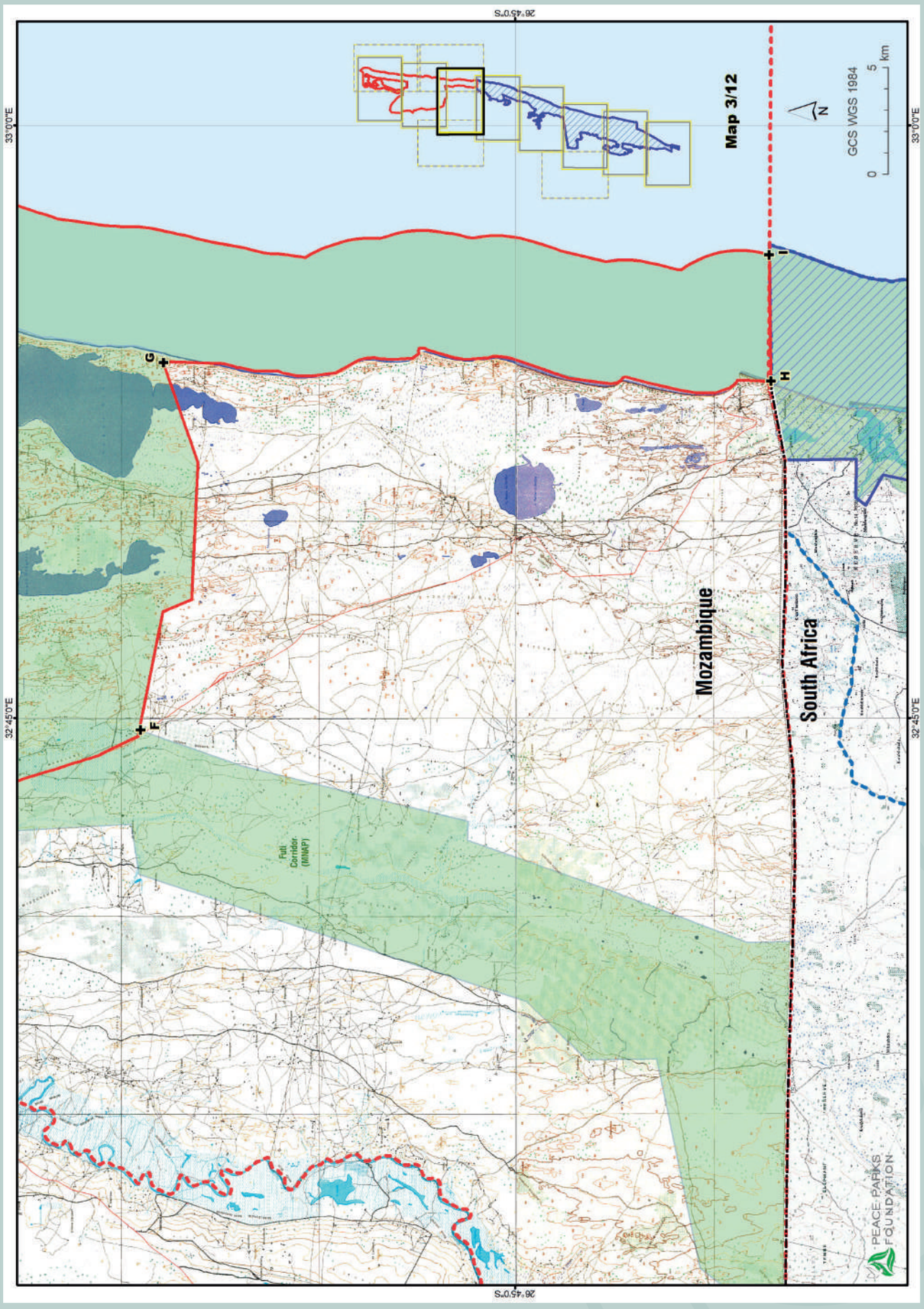
**Map 8.** Topographic Map Series 1 of 12: Boundaries of the Proposed Transboundary Extension, the Maputo National Park (MNAP)



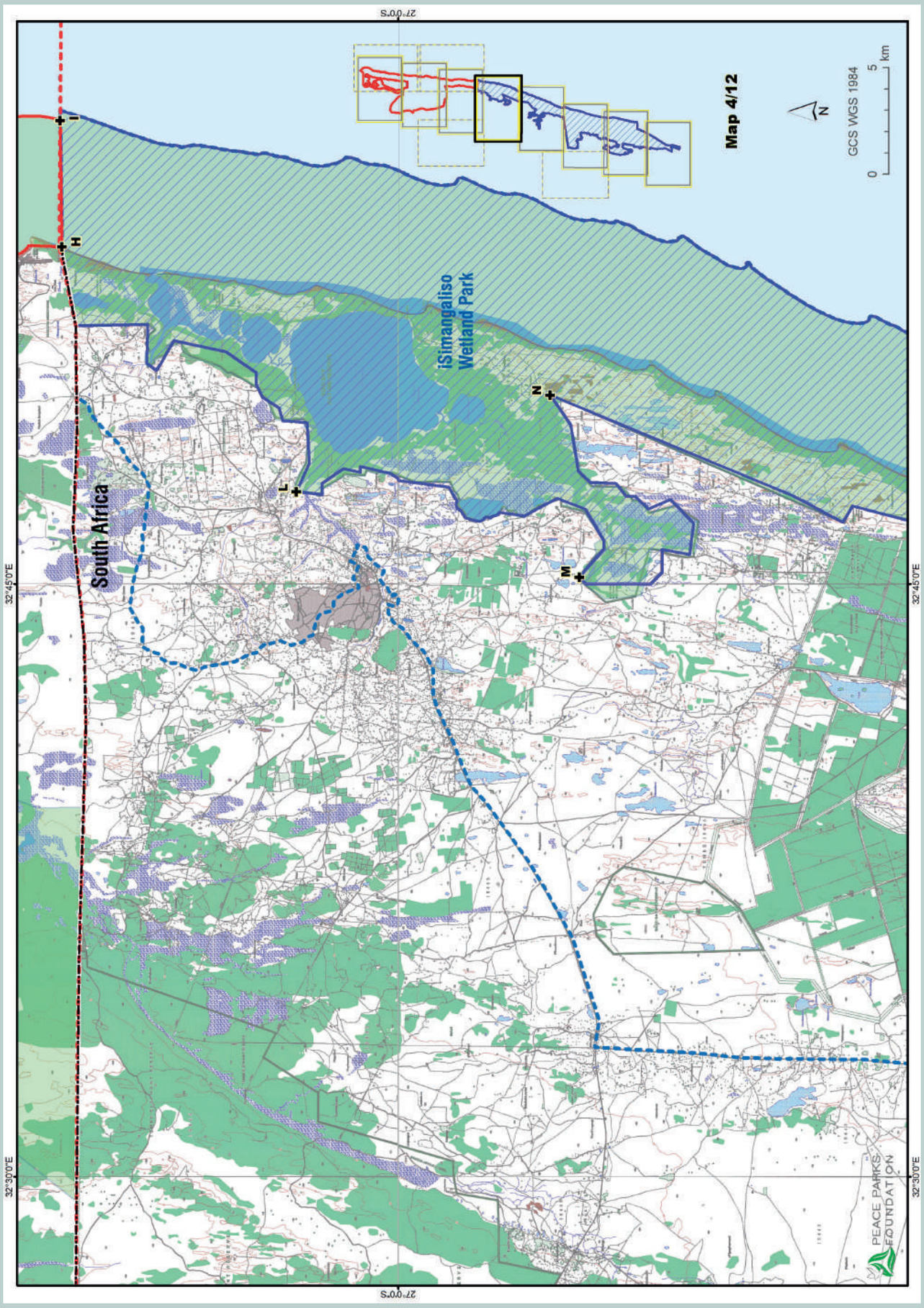
**Map 9.** Topographic Map Series 2 of 12: Boundaries of the Proposed Transboundary Extension, the Maputo National Park (MNAP)



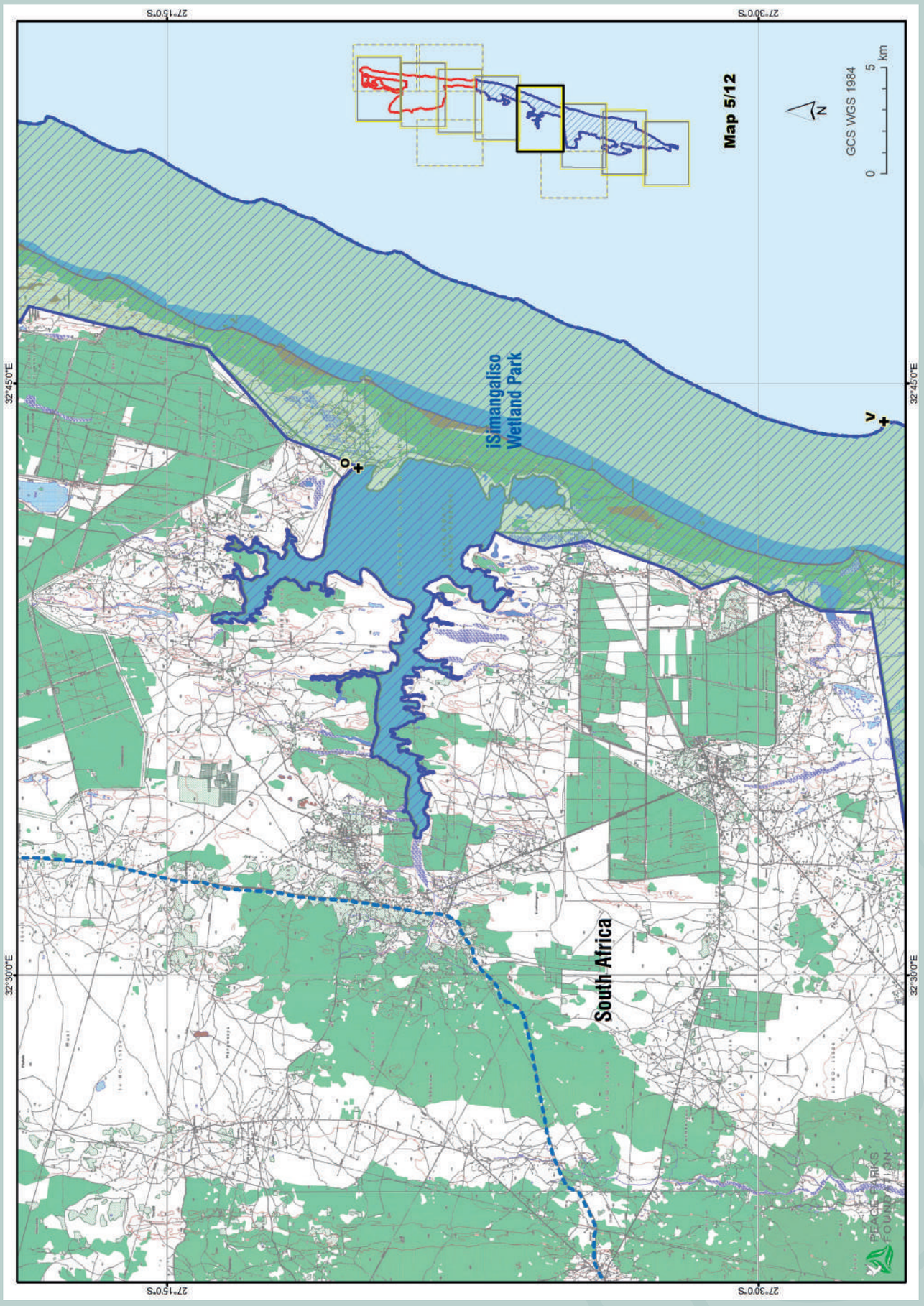
***Map 10.*** *Topographic Map Series 3 of 12: Boundaries of the Proposed Transboundary Extension, the Maputo National Park (MNAP) and Boundaries of the Inscribed Property, the iSimangaliso Wetland Park World Heritage Property*



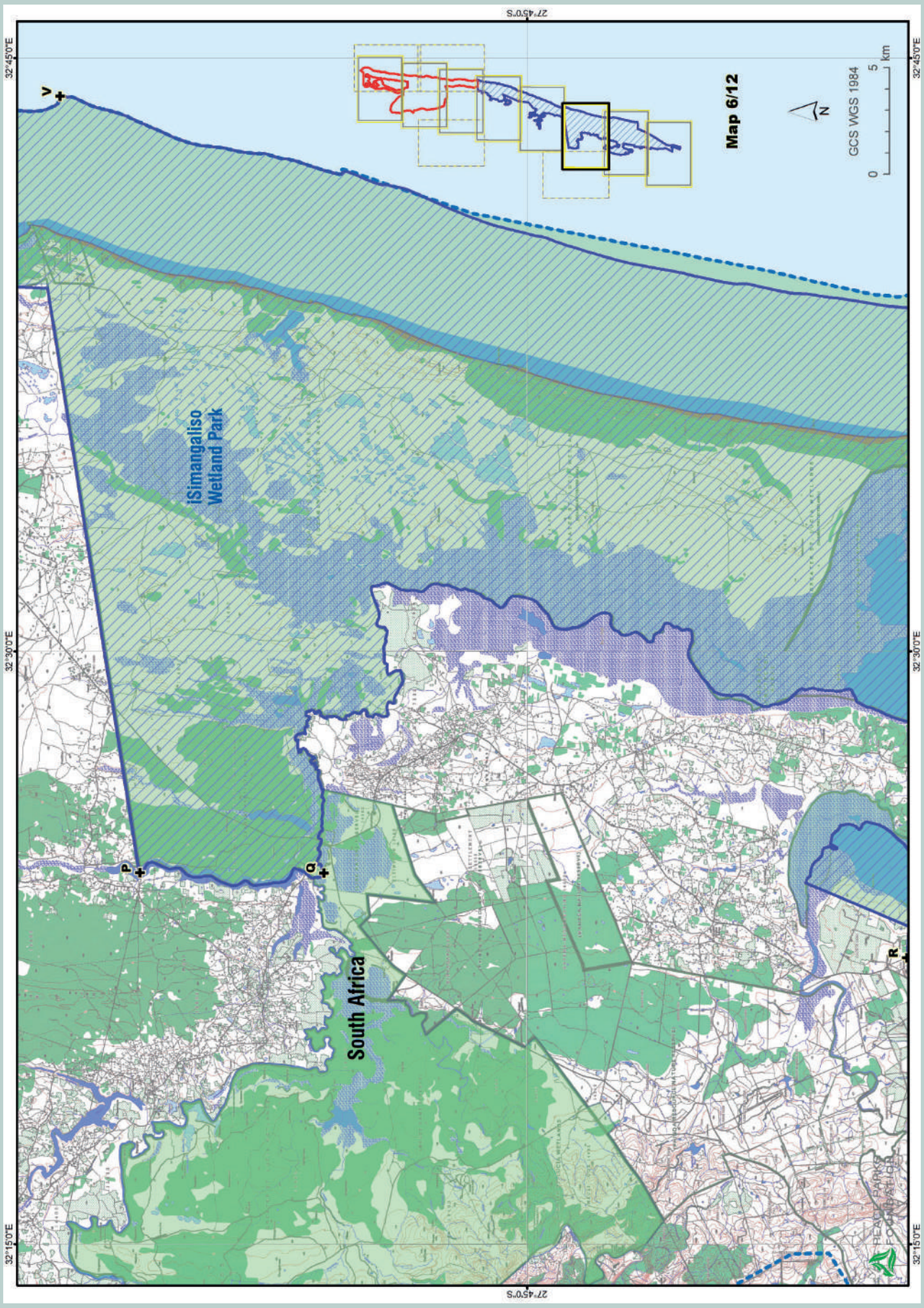
***Map 11.*** *Topographic Map Series 4 of 12: Boundaries of the Proposed Transboundary Extension, the Maputo National Park (MNAP) and Boundaries of the Inscribed Property, the iSimangaliso Wetland Park World Heritage Property*



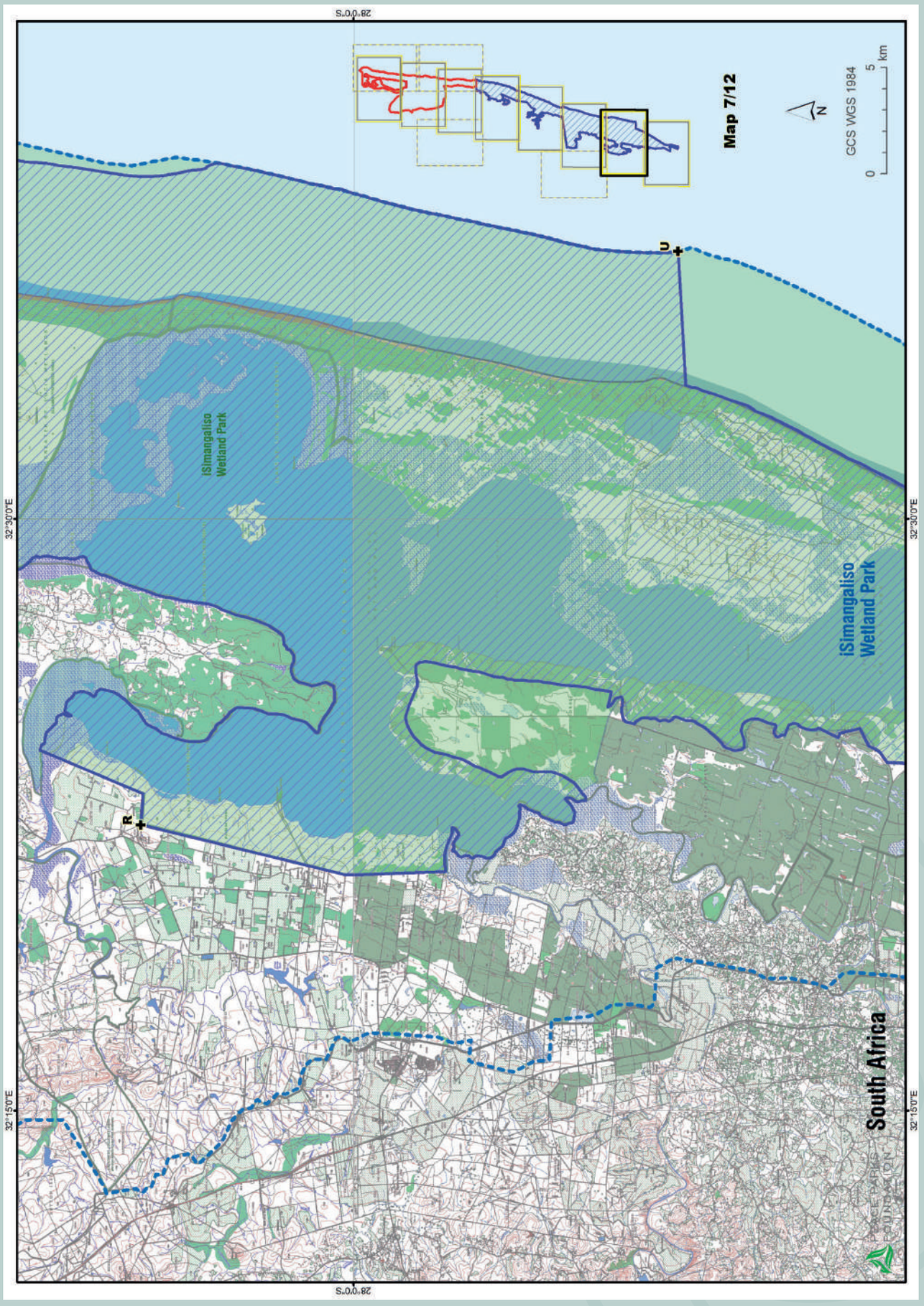
***Map 12.*** *Topographic Map Series 5 of 12: Boundaries of the Inscribed Property, the iSimangaliso Wetland Park World Heritage Property*



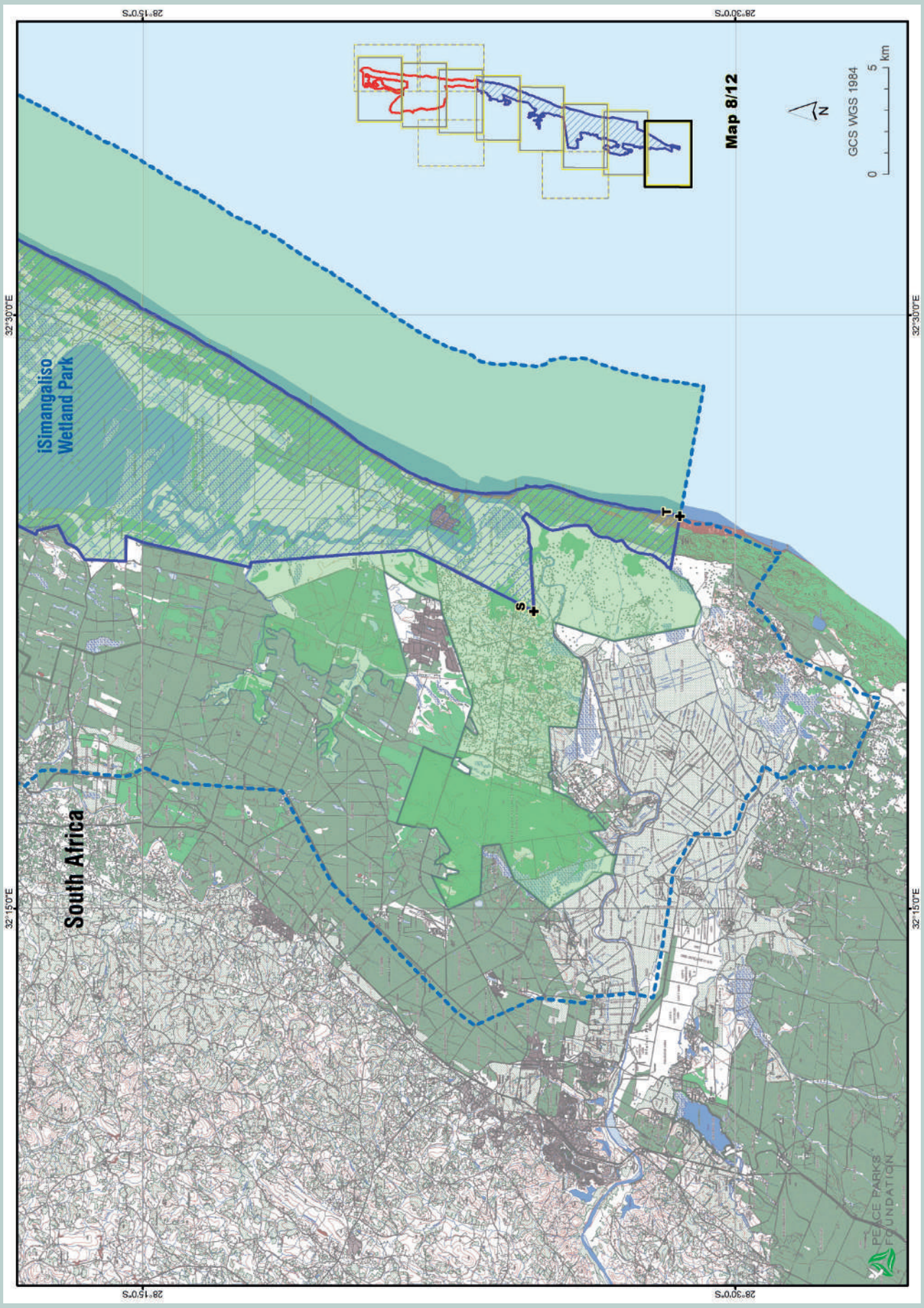
***Map 13.*** *Topographic Map Series 6 of 12: Boundaries of the Inscribed Property, the iSimangaliso Wetland Park World Heritage Property*



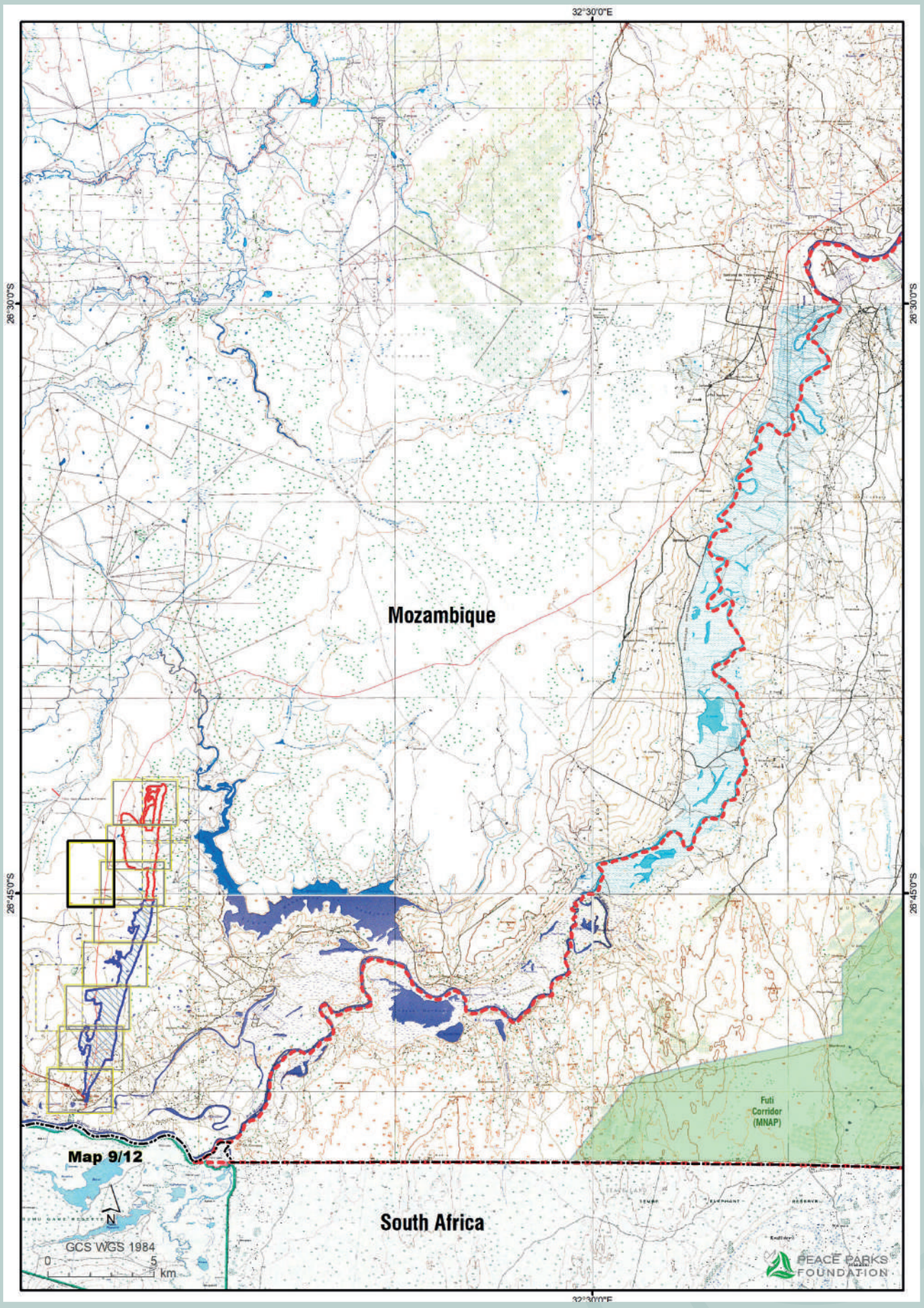
***Map 14.*** *Topographic Map Series 7 of 12: Boundaries of the Inscribed Property, the iSimangaliso Wetland Park World Heritage Property*



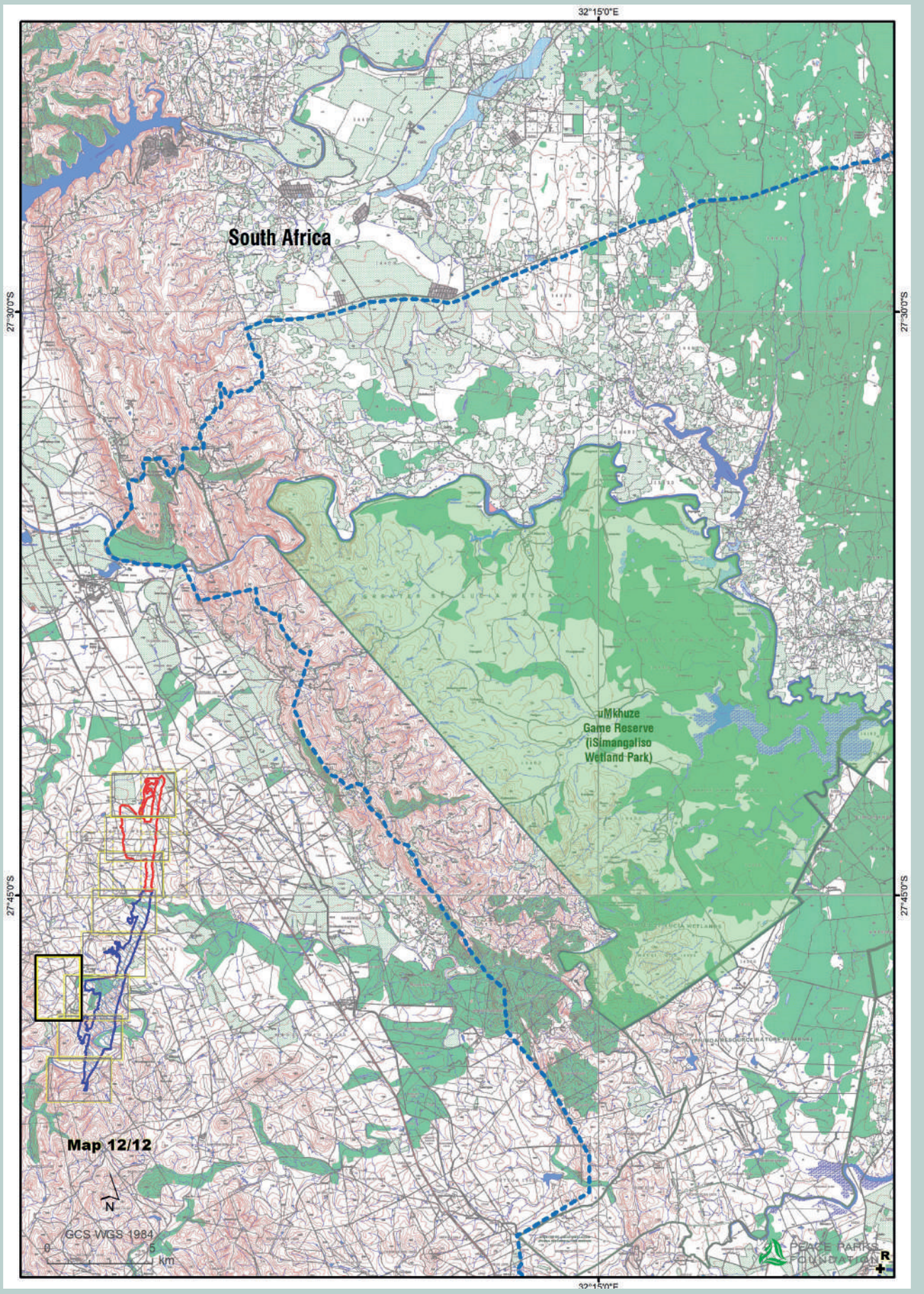
***Map 15.*** *Topographic Map Series 8 of 12: Boundaries of the Inscribed Property, the iSimangaliso Wetland Park World Heritage Property*



***Map 16.*** *Topographic Map Series 9 of 12: Boundaries of the Proposed Transboundary Extension, the Maputo National Park (MNAP)*

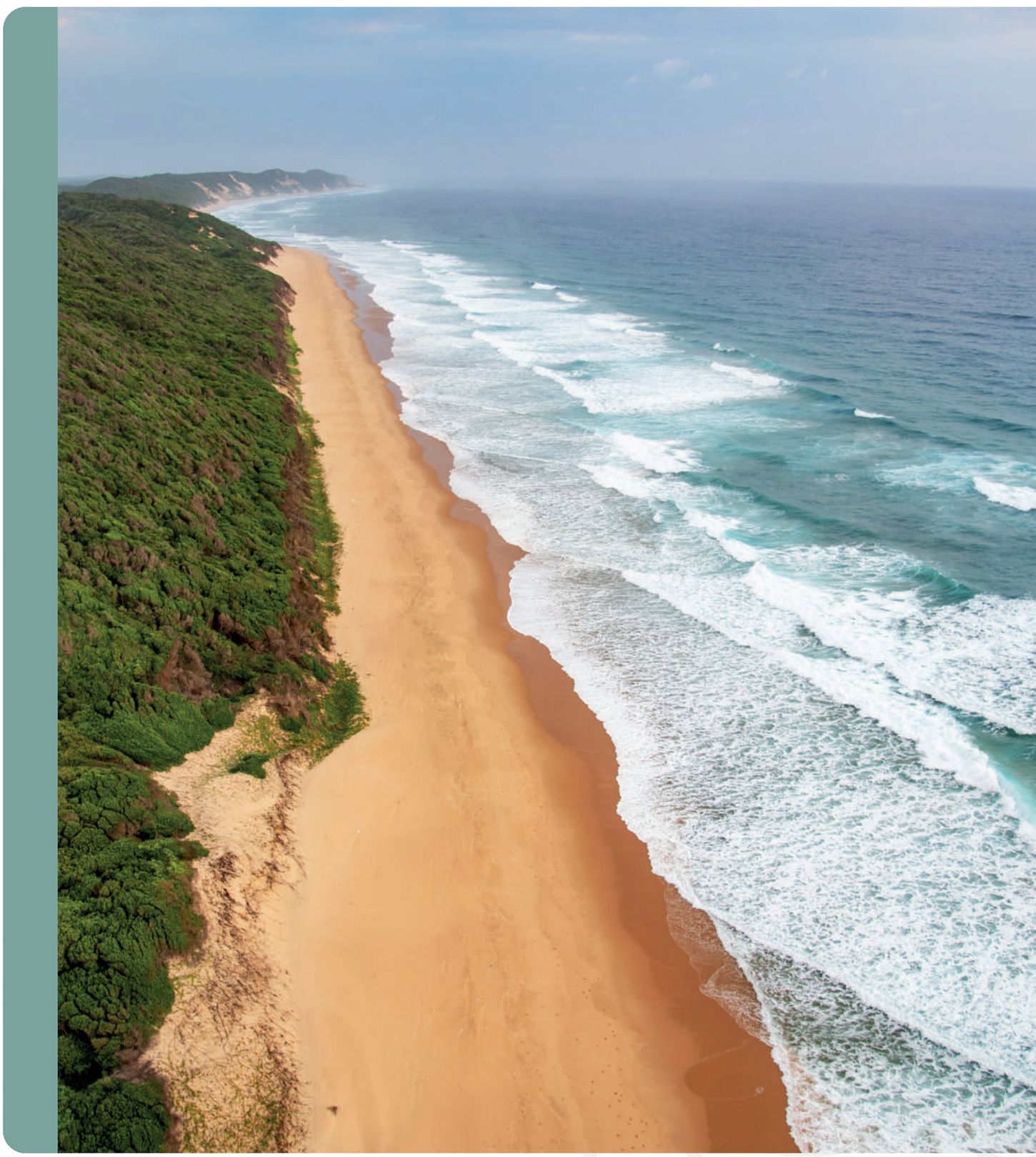


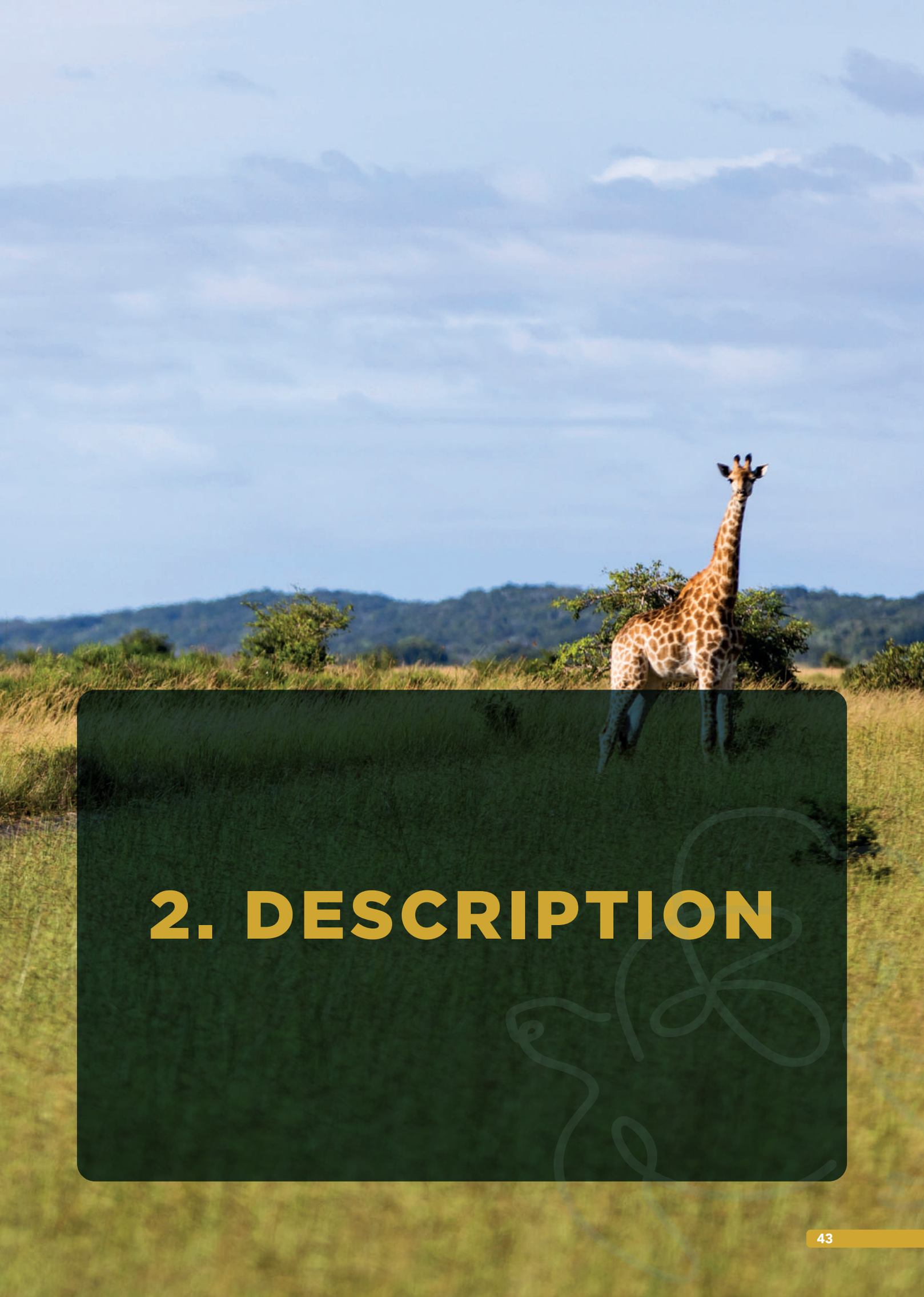
***Map 17.*** *Topographic Map Series 12 of 12: Boundaries of the Inscribed Property, the iSimangaliso Wetland Park World Heritage Property*



## 1.f AREA OF NOMINATED PROPERTY (HA) AND BUFFER ZONE

| | |
|---|---|
| Area of proposed transboundary extension (nominated property) | 153,992 ha |
| Area of buffer zone | 469,363 ha |
| Total area | 623,355 ha |





# 2. DESCRIPTION

# 2a

# DESCRIPTION OF THE NOMINATED PROPERTY

# INTRODUCTION

The Maputo National Park (MNAP) is located on the south-eastern coast of Maputo Province in the Matutuíne District of southern Mozambique. The MNAP was established on 31 December 2021, consolidating the existing Ponta do Ouro Partial Marine Reserve and the Maputo Special Reserve. The MNAP is being proposed as a transboundary extension to the iSimangaliso Wetland Park in South Africa, which was declared a World Heritage Property in 1999.

The MNAP extends from Ponta do Ouro in the south, at the border with the existing World Heritage Property, the iSimangaliso Wetland Park in South Africa, around the northern tip of Ilha de KaNyaka to the Maputo River mouth in Maputo Bay. The park extends from the high-water mark to three nautical miles into the Indian Ocean and one nautical mile into the interior of Maputo Bay, including the surrounding waters of Inhaca and Portuguese Islands (DNAC, 2011). The terrestrial component of park (formerly the Maputo Special Reserve) is bordered by Maputo Bay in the north, the Indian Ocean in the east, the Maputo River, the Fúti River and a line two km east of the Salamanga–Ponta do Ouro road in the west, and the southern tips of Lake Xinguti and Lake Piti (DNAC, 2009).

In its original nomination submission to UNESCO of June 1998, the then-Greater St. Lucia Wetland Park nomination property was described in detail in terms of: climate, geological formations, physiographic formations (Lebombo mountains, coastal plain and continental shelf), Lake St. Lucia (hydrology) and the coastal shelf; biogeographic significance and biological formations, including: flora – vegetation types (wetland types, grassland types, palm veld, open/closed woodlands, thickets, forest types (including mangroves) and marine vegetation; Fauna – terrestrial and aquatic invertebrates, fish, amphibians and reptiles, birds and mammals; threatened species habitats and species of global conservation importance. The submission was supported by schedules (checklists) of seed plants, seaweeds, butterflies, dung beetles, wasps, mollusks, fresh/marine/estuarine fish, amphibians, reptiles, birds, mammals, endemic species, and species of international/national conservation importance.

Similarly, the iSimangaliso Wetland Park's 2017–2021 & 2022–2031 Integrated Management Plans offer information on: climate, oceanographic features, paleontology, geomorphology, geology and soils, hydrology and geohydrology, ecosystems, vegetation and fauna, while the Park's natural values were also described in the IUCN's technical evaluation following its field visit to assess the nomination in January 1999.

To describe the proposed transboundary property, content from these documents, and some primary sources, is given together with information on the proposed transboundary extension in order to describe the characteristics of both properties – the iSimangaliso Wetland Park and the proposed transboundary extension – as a *single terrestrial and marine property*. This approach is taken to: (1) re-assert the importance of the natural features/processes – both terrestrial and marine – on which the iSimangaliso Wetland Park's status as a WHS rests, (2) show the comparable and complementary natural features – again, both terrestrial and marine – and adjacency on which the proposed transboundary extension's inscription is argued for, and (3) show the continuity and connectivity of marine and terrestrial landscapes, and associated ecological processes which link the two properties as an ecological whole. The advantages of complementarity and adjacency/continuity will be asserted throughout the nomination.

# THE MAPUTALAND CENTRE OF PLANT ENDEMISM

Notably, from a conservation perspective, the iSimangaliso Wetland Park and the proposed transboundary extension fall within the Maputaland Centre of Endemism, which is part of the larger Maputaland-Pondoland-Albany Hotspot, one of only 36 such regions of botanical conservation significance globally (Steenkamp *et al.* 2004 in Matthews, 2007). The Maputaland Centre of Endemism, approximately 17 000km$^2$ in extent, lies within southern Mozambique, north-eastern South Africa and western eSwatini, and its conservation value is recognised internationally because of its high levels of endemism and species richness, and because it hosts the iSimangaliso Wetland Park World Heritage Property. The iSimangaliso Wetland Park and the nominated transboundary extension also fall within what may be broadly described as the Maputaland region, which represents the southern limit of the southeast African Coastal Plain, a continuous feature which extends from Durban in South Africa to Beira in Mozambique (Momade & Achimo, 2004; Armitage *et al.*, 2006; Botha, 2015). The Maputaland region, also known as Greater Maputaland, stretches from Maputo in Mozambique southwards to the Lake St. Lucia estuary in South Africa, with an area of approximately 20 000 km$^2$. Drawing largely on Matthews (2007), a brief description of the Maputaland Centre of Endemism is given here as a broad introduction to the iSimangaliso Wetland Park and proposed transboundary extension.

The Maputaland Centre of Plant Endemism was defined and described by Van Wyk (1994, 1996) and Van Wyk & Smith (2001) as that part of southern Mozambique and north-eastern KwaZulu-Natal bounded by the Inkomati and Limpopo Rivers in the north, the Indian Ocean in the east, the western foothills of the Lebombo Mountains in the west and by the St. Lucia Estuary in the south. The area is known for its rich fauna and flora and high levels of endemism, and contains about 2 500 species of vascular plants, of which at least 230 species/infraspecific taxa are endemic or near-endemic to the region (Van Wyk 1996). Other endemics are one species and 14 subspecies of mammal, 23 reptile species, three frog species and eight fresh water fish species. The Centre also contains important areas for birds (Smith, 2008), the southern part of the south-eastern African coast Endemic Bird Area [EBA] (Matthews, 2007) and seven important bird areas in KwaZulu-Natal (Barnes 1998). Of the more than 472 taxa of birds in the Maputaland Centre (almost 60% of South Africa's total), five are endemic/near endemic to the Centre. Endemism applies to plants and animals, and reflects the large number of habitats found in the region, including five Ramsar properties, and its transitional setting between tropical and subtropical biotas (Moll & White 1978; White 1983). This status as a tropical subtraction zone makes the Maputaland Centre a region of considerable biogeographic interest because of the acute transformation of both plant and animal taxa in the region (Poynton 1961; Bruton & Cooper 1980). The geological history of the area suggests that its ecosystems are of recent origin, and many of the region's endemic plants are neo-endemics, or young taxa, suggesting that biological evolution, and notably speciation, are active in this geologically young environment. The Centre lies at the southern end of the tropics in Africa, and many tropical organisms reach the southernmost limit of their ranges within its borders. The flora and fauna of the Maputaland Centre are predominantly of Palaeotropical and Afrotropical origin, respectively.

*Table 1. Species Endemic or Neo-Endemic to the Mozambique Portion of the Maputaland Centre of Endemism (excluding the Lubombo Mountains), with their Locality and Recent IUCN Red List Assessment*

Mp=Maputo Bay area; SA=South Africa. Note: For IUCN Red List threat categories, LC=Least Concern, VU=Vulnerable, EN=Endangered, CR=Critically Endangered, EX=Extinct. A, B,C with numbers and lower case letters indicate sub-criteria (see IUCN, 2001 for details).

| FAMILY | SPECIES | IUCN STATUS | LOCATION |
|---|---|---|---|
| Malpighiaceae | *Acridocarpus natalitius* var. *linearifolius* | VU A4c; C1 | Mp, SA |
| Pedaliaceae | *Dicerocaryum forbesii* | LC | Mp, SA |
| Asteraceae | *Distephanus inhacensis* | LC | Mp, SA |
| Apocynaceae | *Emicocarpus fissifolius* | CR (possibly EX) | Mp |
| Rubiaceae | *Empogona maputensis* | EN A4d; B1ab (i,ii,iii,v) + 2ab (i,ii,iii,v) | SA |
| Melastomataceae | *Memecylon incisilobum* | CR B1ab (i,ii,iii,v); C2a(ii) | |
| Rubiaceae | *Pavetta vanwykiana* | LC | SA |
| Rubiaceae | *Psydrax fragrantissima* | NT | Mp, SA |

| FAMILY | SPECIES | IUCN STATUS | LOCATION |
|---|---|---|---|
| Arecaceae | *Raphia australis* | VU A3c; B1ab (iii) +2ab (iii) | Mp, SA |
| Acanthaceae | *Sclerochiton apiculatus* | VU B1ab (ii,iii,iv,v) | SA |
| Rubiaceae | *Vangueria monteiroi* | LC | Mp, SA |
| Melastomataceae | *Warneckea parvifolia* | EN A3c+4c; B1ab (i,ii, iii,v) | SA |
| Rutaceae | *Zanthoxylum delagoense* | LC | Mp |

Source: Matimele, 2016

# CLIMATE

The area falls within the humid subtropical zone of Africa (Köppen classification Cwa), and its climate is moderated by the warm Agulhas offshore current which confers a sub-tropical influence. The coastal region of the iSimangaliso Wetland Park and the nominated transboundary extension in Mozambique share a tropical rain savannah climate (Aw).

Summers are hot and humid, with temperatures ranging from 20–29°C; and winters are mild (16–25°C), with intermittent cold spells associated with the passage of cold fronts. About 75% of the rainfall along the coastal margin falls during spring and autumn (October to April), with this percentage increasing to 85% inland (i.e. winters are drier inland). Most summer rainfall occurs as convective thunderstorms or is associated with low pressure troughs, often linked to the eastward passage of coastal lows or cold fronts to the south. At times, cumulonimbus cells, formed offshore over the warm Agulhas Current, move onshore in early evening, causing coastal rainfall (Hunter, 1988). Episodic floods are occasionally caused by cut-off lows and tropical cyclones or tropical depressions moving southwards after crossing or moving down the Mozambique Channel.

Rainfall is, generally, temporally, and spatially highly variable in a pattern typical of subtropical regions. The most notable feature of rainfall in the area is the steeply declining gradient from east to west: Mean annual precipitation for the Maputuland Coastal Plain varies from > 1 200 mm per annum (pa) along the coast to approximately 500 mm pa along the Lubombo range. The close proximity of the warm Agulhas Current to the coast, especially offshore of Cape Vidal to Cape St Lucia in the iSimangaliso Wetland Park, drives precipitation along the coastal strip. Additionally, there is a declining rainfall gradient from St Lucia (>1 200 mm in places) northwards into the MNAP and a declining gradient in relative humidity (RH) from the coast inland. RH is high in summer, and for much of the year it exceeds 90%, although winters are dry, particularly inland, and a west-east climate gradient in the area means that part of the MNAP is classified as temperate with dry hot summers (Bsh). Evaporation rates are high, especially during the drier winter and early spring periods; there is similarly a gradient from the coast (1 300 mm pa) to inland (1 660 mm pa).

Along the coast, winds blow predominantly from the NNE and S to SW in approximately equal measure, associated with the South-West Indian Ocean Anticyclone and passage of coastal lows and cold fronts, respectively. There are seasonal variations, with NNE winds dominant during summer and SW and NW winds prevalent during winter. There is a diurnal onshore sea-breeze effect, especially in summer, particularly affecting the winds over Maputo Bay. Nocturnal offshore land breezes, draining from inland from the north to west during winter, can cause low temperatures at night and in the early morning. In Mozambique, prevailing winds blow parallel to the coast with the southerly component being the strongest and most frequent; summers are dominated by winds from the northeast and winters by winds from the southeast (Viola, 2012 cited by Palalane *et al.,* 2016). In the iSimangaliso Wetland Park and the MNAP, high dune cordons along the east coastline influence the velocity and direction of the winds (Tinley, 1985).

# OCEANS

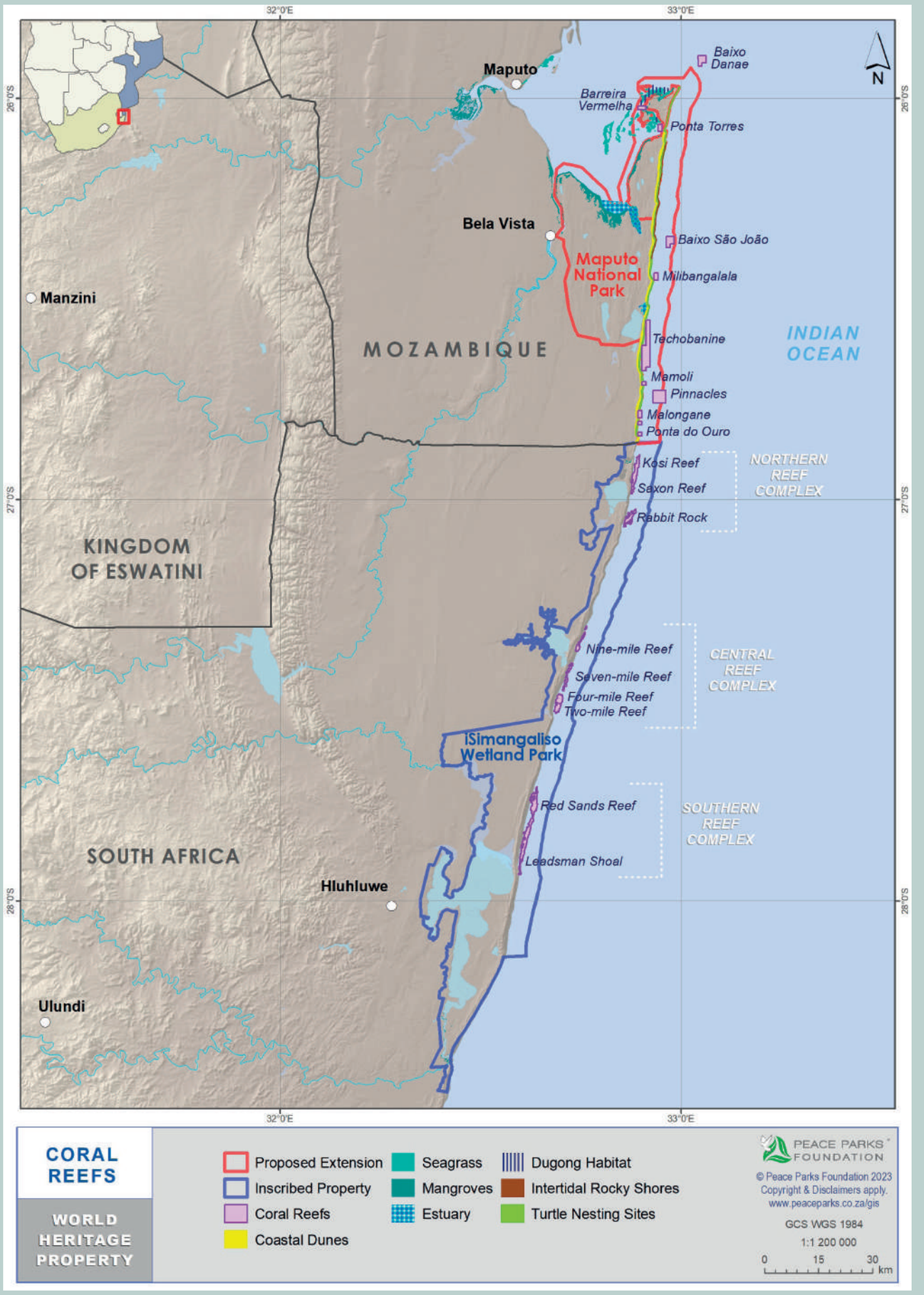
The most important large-scale oceanographic feature affecting the two properties is the south-flowing, oligotrophic Agulhas Current, the strongest western boundary current in the world, with a core velocity of more than 2 $m.s^{-1}$, to a depth of more than 2 000 m (Duncan, 1970; Beal *et al.*, 2011). Under the current's influence, sea surface temperatures (SST) range from 28°C in summer to 23°C in winter (Lutjeharms, 2006), and the annual mean sea surface temperature for the southern Mozambique and KwaZulu-Natal region is about 24°C (Robertson *et al.*, 1996). Bathymetry (the seabed topography) and coastal alignment largely determine current flow and wave refraction.

At Maputo Bay, the average water temperature varies from 17°C in winter to 27°C in summer (Saide, 2000) and seawater may reach 29–35°C in the intertidal flats as incoming tidal waters are heated (Kalk, 1995).

The Maputaland coastline is aligned NNE-SSW and is fairly straight, apart from a series of small aeoleonite or beachrock headlands and coastal platforms, which give rise to gentle log-spiral shaped sandy bays. The continental shelf (seabed near land where water depth is relatively shallow compared with the open ocean further offshore) is narrow, averaging 3 km wide between Ilha de KaNyaka in the MNAP and St Lucia in the iSimangaliso Wetland Park, with the shelf break (increased slope gradient toward the deep ocean bottom) between Ilha de KaNyaka and St Lucia at an approximate depth of 50 m and with a very steep gradient of up to 12°. Submarine canyons (Ramsay, 1994) extend to about 500 m depth. Inshore on the largely sandy shelf there are a number of patch coral reefs in both the iSimangaliso Wetland Park and the proposed transboundary extension which are the southern-most coral reefs on the African continent.

*Soft corals typical of a shallow, flat reef at Ponta Malongane in the proposed transboundary extension. Photograph: Marcos Pereira*

***Map 18.*** *Coral Reefs in the iSimangaliso Wetland Park and Proposed Transboundary Extension, the Maputo National Park (MNAP)*



The Agulhas Current is understood to form off the southern Mozambique/northern KwaZulu-Natal coast from the confluence of waters following complex paths down the Mozambique Channel and south of Madagascar. The current transports warm, oligotrophic (low nutrient, high oxygen) water southwards from the tropics and is believed to be fully constituted south of Ponta do Ouro in the proposed transboundary extension (Lutjeharms, 2006), where it is 70–100 km wide (Guastella, 2014) and flows along the shelf edge.

For much of the year the coast is impacted by long period swells from the SE (Mitchell et al., 2005) associated with the eastward passage of cold fronts and occasionally cut-off low pressure systems and dissipating tropical cyclones or storms. The prevailing long-shore winds blow with the current (northeasterly winds) or against it (southwesterly), generating swells 3.6–4.3 m high at intervals of 14–15s (Ramsay *et al.*, 1996).

There is a net northward longshore transport of sediment (shore-parallel sand-stream), which, together with cross-shelf sand movements, exert a major influence on intertidal habitats, including the sand-inundation of rocky shores. However, prolonged north-easterly winds can reverse longshore drift; and swell and wind variability superimposed on seasonal variability generates dynamic changes in sediment movement along the coast.

On the shelf north of Sodwana Bay in the iSimangaliso Wetland Park, inshore near-surface currents are wind responsive (Reaugh, 2006) and surface-layer inshore current reversals (i.e. northward currents) may occur during south-westerly winds. Cool water events, related mainly to shelf edge upwelling have been recorded off Sodwana Bay (Celliers & Schleyer, 2002). Tides are semi-diurnal, with two low waters and two high waters daily, with a tidal range average of 2 m, thus classified as mesotidal (Sete *et al.*, 2002).

In the proposed transboundary extension, Maputo Bay is a semi-enclosed large bay of over 1 000 km$^2$ with a shallow shelf and a mean depth of about 10 m at mean sea level (Saíde, 2000). However, depths can exceed 20 m in some channels and at the northeastern entrance (Saíde, 2000; Silva *et al.*, 2010). A narrow strait on the eastern side, south of Ilha de KaNyaka (Ponta Torres Strait) allows for restricted water exchange with the Indian Ocean open sea (Saide, 2000). The Agulhas Current forms a cyclonic eddy at Maputo Bay throughout most of the year, forming upwellings in the bay (Lutjeharms & da Silva, 1988).

About 30% of Maputo Bay is categorised as intertidal flats which dry at low water spring tides (Saíde, 2000). Although the largest intertidal flats are found in the southern part of the bay, close to Santa Maria, the most well studied intertidal sandflats, mudflats and mangrove forests are on the western shores of Ilha de KaNyaka (Kalk, 1995; Ferreira & Bandeira, 2014). These are submerged to depths of 2–3 m during high tides but greatly increase the area of the island at low tides. At low tide, networks of channels 10–15 m deep dissect the intertidal flats (Perry, 2003b). On the seaward edges, where water turbidity is low, these shallow waters provide coral reef and seagrass bed habitats for the subtropical fauna and flora of the area (Kalk, 1995).

Three rivers affect the Maputo Bay: the Maputo River in the southwest, the Umbeluzi in the west and the Incomáti River in the northwest (Hoguane, 1999; Sete *et al.*, 2002). The mean monthly discharge of these three rivers varies from 10 m3.s-1 to 800 m3.s-1 (Hoguane, 1999; Sete *et al.*, 2002). Maximum discharge occurs from January to March while August and September have insignificant discharge (Silva *et al.,* 2010). Lower discharges from the Tembe and Matola rivers via the Espírito Santo Estuary also occur (Saíde, 2000). The river's nutrient discharges play a major role in primary productivity (Quartly & Srokosz, 2004; Sá *et al.*, 2013). Phytoplankton production follows upwelling, river discharges and current flows which inject nutrients into the surface layers. Sá *et al.* (2013) estimated that upwelling contributes to the increase of silica, which has an average concentration of 8.86 µmol.L−1 in inner shore stations, favouring the growth of diatoms (Sá *et al.*, 2013). Barlow *et al.* (2008) reported very small nitrate values for Maputo Bay and related this depletion to the uptake of nutrients by diatoms.

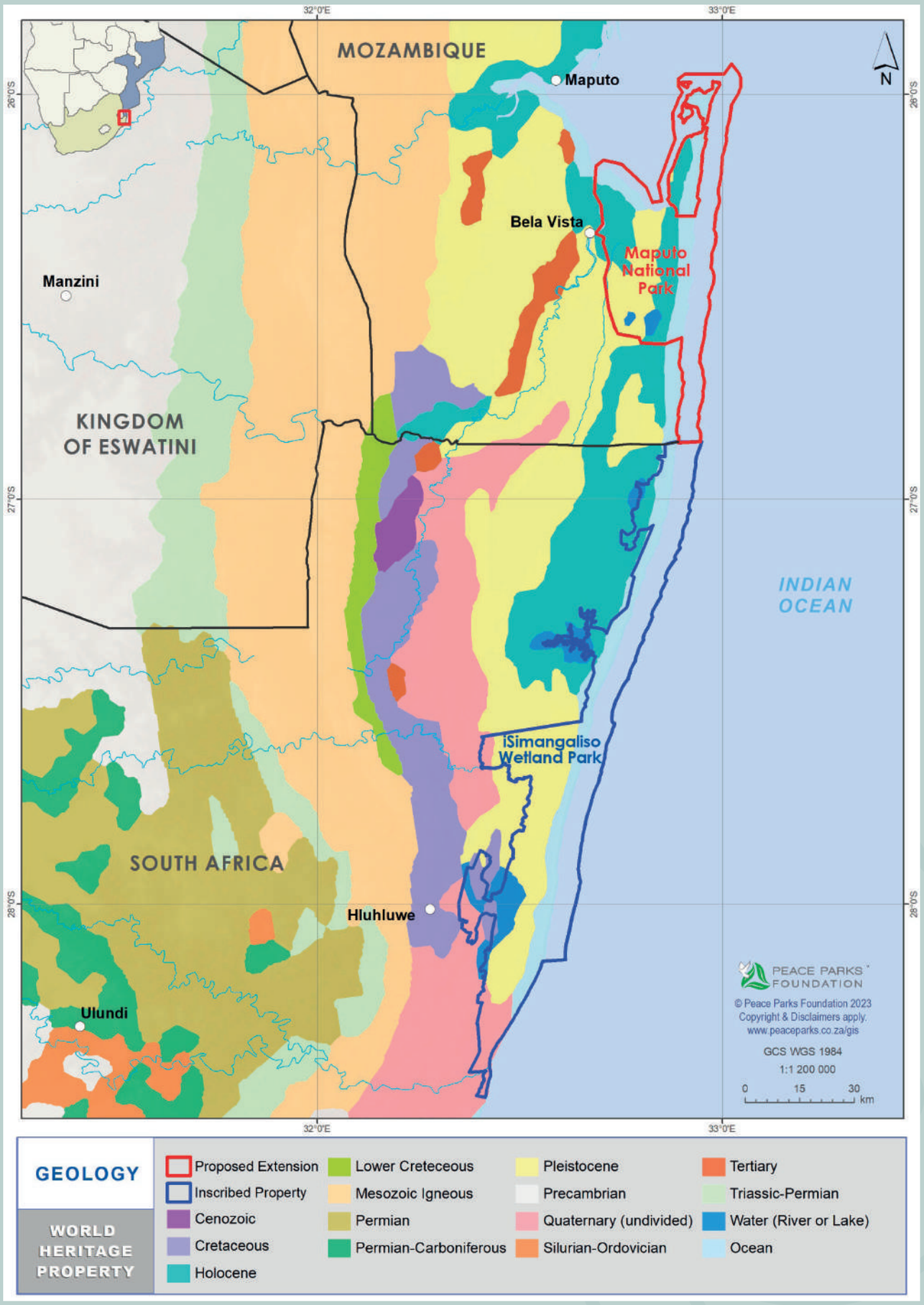
# GEOLOGY

Two major contiguous geomorphic units are present within the iSimangaliso Wetland Park and the proposed transboundary extension:

- The coastal plain, of gently undulating terrain at the base of the Lubombo mountains, sandy ridges, river-related systems and associated lakes and pans interspersed with relict dune cordons.
- The coast and its marine and estuarine environments and offshore continental shelf.

The area falls within the southernmost limit of the southeast African Coastal Plain, a continuous feature that extends from Durban in South Africa to Beira in Mozambique (Momade & Achimo, 2004; Armitage *et al.*, 2006; Botha, 2015). The topography of the region is characterised by the Lubombo Mountains in the west, and the low coastal plain, the high coastal dune cordon and the Indian Ocean in the east (Botha *et al.*, 2003; Momade & Achimo, 2004; Botha, 2015). The Maputo Bay, with its island barrier system (Inhaca and Portuguese Islands) is the largest embayment in Mozambique. The southeastern African Coastal Plain is a result of approximately 180 million years of geological and geomorphological processes that have included the rifting of the Gondwana supercontinent, volcanic eruptions, and the influx of proto-Indian Ocean waters into the continental margins (Botha, 2015). In the iSimangaliso Wetland Park and the MNAP, it is a low-lying feature with an area of approximately 600 km$^2$, extending 100 km and reaching heights of approximately 100 metres above sea level in some areas, with a width of 2 km (Momade & Achimo, 2004). Its geographic limits are the Lubombo Mountain range in the west, the coastal parabolic dune cordon in the east, Maputo Bay in Maputo Province in the north and the St Lucia Estuary in KwaZulu-Natal in the south (Botha *et al.*, 2003; Momade & Achimo, 2004; Botha, 2015). The most prominent characteristics of the coastal plain are the high north-south oriented extensive undulating sand dunes that enclose the coastal lakes and wetlands (Momade and Achimo, 2004).

***Map 19.*** *Regional Geology of the iSimangaliso Wetland Park and Proposed Transboundary Extension, the Maputo National Park (MNAP)*



The geology underlying the area consists of the Jurassic Period of 201–145 million years ago (Ma) lavas, followed by sediments of the Cretaceous (145–65 Ma), Tertiary (65–2.5 Ma) and Quaternary Periods (2.5 Ma–Present) covering the Makatini Flats of the Zululand Coastal Plain. It is predominantly underlain by sediments of the Zululand and Maputuland Groups.

The Zululand Group (130–66 Ma) comprises rocks of the Cretaceous Period and is comprised of the Makatini, Mzinene and St Lucia Formations.

1. The Makatini Formation, composed of marine conglomerates, sandstones and siltstones, outcrops along the base of the Lubombo Mountain range.
2. This is overlain by the Mzinene Formation, composed of marine siltstones and shelly concretionary horizons. As with the Makatini Formation, it outcrops along the base of the Lubombo Mountain range, but also east of the Makatini Formation extending as far south as Hluhluwe.
3. The St Lucia Formation is generally poorly exposed, but best seen in the False Bay area. It is composed of marine siltstones and shelly horizons and contains fossils.

The geology of the coastal plain may be summarised as a succession of Cretaceous to Quaternary sediment deposits. The underlying geology consists of Cretaceous siltstones, considered to comprise the hydrogeological bedrock, covered by sediments of Miocene and Pleistocene origin (Botha *et al.*, 2003; Momade & Achimo, 2004; Botha, 2015).

The plain is dominated by sediments of the Maputuland Group, reflecting the last circa 13 Ma years of earth's geological history. Rocks of this Group occur along the coastal margin and offshore. Littoral marine sediments and dune ridges indicate falling sea levels after a Mid-Miocene eustatic sea level highstand (Porat and Botha, 2008; Botha, 2018). Since then, sea-level changes have eroded older sequences and deposited more recent dune sequences, palaeo-estuary infills and wetland deposits (Botha, 2018).

1. The oldest formations are the Uloa, consisting of calcified beach gravels and tidal sandstone channels with oysters, and the Umkwelane comprising "Berea-Type" "Red Sands" (Botha, 2018).
2. This is followed by the Port Durnford Formation, which is sometimes exposed at the coast (Cooper, 1998), consisting of marine clays, sand and mammalian fossils.
3. Overlying the Port Durnford Formation is the Kosi Bay Formation comprising weathered dunes and iron-rich palaeosols with coastal plain and coastal barrier deposits. Discontinuous lignite beds are found near the base of this formation (Botha, 2018).
4. The Kwambonambi Formation is comprised of coastal parabolic dunes and interdune wetland peat and diatomite. Beachrock outcrops along the KwaZulu-Natal coast are assigned to the Isipingo Formation.
5. As the youngest part of the Maputuland Group, the Sibayi Formation is formed from stacked parabolic dune units, coastal barrier dune cordons, beach ridges around lakes/estuaries, beach washover fans and estuarine infill deposits (Botha, 2018).

This geology has given rise to nine landforms have been identified for the Maputuland area (Botha, 2015).

1. The Lubombo Mountains form a narrow ridge, reaching up to 650 m AMSL and extending approximately 750 km north-south, and the highest point in the iSimangaliso Wetland Park is Khombe Peak (464 m). The Usuthu, Ngwavuma, Phongola and Mkhuze Rivers transect the ridge forming impressive gorges.
2. Marine Rocks are exposed in low cliffs along the western edge of False Bay, and around Nibela and Hell's Gate on the Nhlozi Peninsula in the iSimangaliso Wetland Park. Marine fossils, such as ammonites, are well preserved in these outcrops. Exposure is limited as much of these rocks are covered by younger sediments (Botha, 2015).
3. The Uloa/Umkwelane Pliocene Shoreline consists of fossiliferous marine limestones and weathered dunes.
4. The Tshongwe-Sihanwane Megaridge is an approximately 15 km sand ridge extending north from the Mkhuze River to the Tembe Elephant Park and from the Phongola River in the west to the Muzi Swamps in the east. It is the remnant of a coastal dune field landscape, and its sands support Sand Forest endemic plants (Botha, 2015).
5. Kwambonambi Formation Parabolic Dunes and Interdune Wetlands - east of the Megaridge is the complex wetland system of the Muzi channel. Following the last glacial maximum, icecap melt led to rising groundwater which flooded interdune areas, forming peat swamps and freshwater lakes (Botha, 2015).
6. Forested Composite Coastal Barrier Dunes extend north from Cape St Lucia, formed by a complex history of sand accretion. These dunes are largely stabilised by coastal forests (Botha, 2015) and are among the highest in the world.
7. Polygenetic Coastal Lakes were formed by cyclic glacio-eustatic sea level fluctuations and dune development, and reflect complex links, interactions and feedback between tectonics, climate, and landscape development. Sea levels were lower over the past 2 Ma than they are today, and a marine transgression circa 18 thousand years ago gradually inundated the lake embayments. Barrier dunes and beach spit development subsequently cut off marine influence

to the lakes. Current lake levels were achieved within the last 1000 years (Botha, 2015). Lake St Lucia is the biggest coastal lake in South Africa, with "The Narrows" functioning as an intermittent link to the sea.

8. Wetland Landscapes lie between the high coastal barrier dunes and low-lying wetlands. These systems feed the lakes; many smaller lakes have limited catchment areas and groundwater base flow is a large contributor (Botha, 2015).
9. Coastline and Continental Shelf Landforms are largely shaped by beach/aeolian rock in the intertidal zone, prevailing winds, longshore currents, and the lack of major rivers. Sea level changes are the primary driver of the geomorphic features of Maputuland, and offshore coastal barrier dunes/beach rock formations formed the present-day patch reefs. The continental shelf is incised by deep, steep- sided submarine canyons which contain Coelacanths (Botha, 2015).

With specific regard to the proposed transboundary extension, Miocene deposits are present as north-south trending ridges, possibly representing old beach terraces. The Pleistocene sediments were deposited in a back-barrier lagoon environment (Botha *et al.*, 2003; Momade & Achimo, 2004; Botha, 2015). Sections of the coastal plain, especially along the eastern margins, are geologically quite recent, and these continue to expand. The sand dune cordons were formed during different periods of rising and receding sea levels of the Indian Ocean. The enclosed water bodies are remnants of barrier lakes segmented by advancing parabolic dunes (Momade & Achimo, 2004). The dune system comprises inland dunes, which are extended, parabolic, crested and hummocky, anciently oxidised and more or less lithified; and coastal dunes, which are young dunes, occurring in a narrow coastal cordon (Momade & Achimo, 2004). The coastal dunes are among the highest in the world (Botha et al., 2003; Momade & Achimo, 2004; Botha, 2015) and are probably only 10 000 to 30 000 years old, making them some of the youngest geological formations in southern Africa.

Also in the proposed transboundary extension, and a distinctive addition to the iSimangaliso Wetland Park, the Maputo Bay formed around 8 000–9 000 years BP, when sea level was 10 to 12 m below its present level, in the Holocene transgression (Achimo *et al.*, 2004; 2014). However, the present morphology of Maputo Bay and its modern sedimentary environments, including the formation of Inhaca and Portuguese barrier islands, may have evolved when sea level stood close to its present level, around 7 000–5 000 years BP ( Achimo *et al.*, 2004; 2014). Since this period, Maputo Bay has been more or less stable. Beach rock formation appears to have occurred during a minor Holocene sea-level highstand (approximately 2–3m) and at present sea level (Achimo *et al.*, 2004; 2014).

Similarly, the MNAP's Inhaca barrier island system adds a unique, distinctive feature to the iSimangaliso Wetland Park. The system faces the open Indian Ocean and is backed by the sheltered Maputo Bay. It comprises the Inhaca and Portuguese Islands and a series of unvegetated, unnamed small barrier islands. The system is formed by a core Pleistocene dune ridge (Cooper & Pilkey, 2002), reddish-orange in colour and possessing various levels of weathering (Cooper & Pilkey, 2002). Modern aeolian deposition has created sand dunes reaching heights of 120 m above sea level. These active dunes show a strong southeast-northwest orientation with numerous blowouts and transgressive dunes. The island's bay margin shows an alternation of high bluffs cut into the Pleistocene dune, and depositional areas where eroded sand has accumulated to form barriers and beaches with smooth coastal platforms hinged on beachrock/aeolianite outcrops (Cooper & Pilkey, 2002). Research has shown that Portuguese Island has undergone several periods of beach ridge accumulation and erosion (Cooper & Pilkey, 2002). Wave reworking during the past 6 000 years of the Holocene sea level highstand has resulted in the formation of spits, barriers, barrier islands and bluffs on the downdrift and bay side of the barrier island systems (Armitage *et al.*, 2006).

# SOILS

Soils are closely related to the geomorphological history, topography, microorganisms and rainfall patterns of the region (Hatton *et al.*, 1995), and most of the soils in the area are derived from recent aeolian, marine and fluviatile materials, with the larger proportion comprising sandy materials (Hatton *et al.*, 1995). The iSimangaliso Wetland Park has lithic soils in the west at the base of the Lubombo Mountains and ferruginous soils in the east, while lower-lying areas have calcimorphic soils in the west and vertisols in the east. From Sodwana Bay north to Kosi Bay the dominant soils are Arenosols. Ozabeni and the Wilderness Area in the iSimangaliso Wetland Park is mostly underlain by Arenosols with Gleysols and Vertisols. Mkhuze Game Reserve is underlain by Arenosols, Fluvisols, Leptosols, Luvisols, Phaeozems and Vertisols. Arenosols predominate in the soil groups in the St Lucia area followed by Fluvisols, Gleysols, Luvisols and Vertisols.

According to the National Administration of Conservation Areas (2021; see also appendix 1), the proposed transboundary extension is dominated by three soil types namely the sandy *Albic Arenosols*, the very sandy *Protic Arenosols,* and the loamy *Molli-Gleyic Fluvisols*. The two sandy soil types are associated with ancient sand dunes, occur along the coast and are unstable on steeper faces. They show minimal soil formation and are characterised by high permeability to water. The loamy soils have higher silt content, mainly as a result of fluvial deposits from the Maputo and Futi rivers, and thus have a higher capacity for water retention. The lower reaches of the river valleys are vulnerable to saline intrusion and thus saline in nature (Direcção Nacional de Ordenamento Territorial, 2020).

As described by MICOA (2013) the proposed transboundary extension is mostly comprised of sandy soils with weak capacity to retain water and with low organic matter content, followed by mananga sediments in distinct soil combinations with low to medium levels of organic matter, marine and estuarine sediments, basaltic soils and clayey alluvium soils (MICOA, 2013; see Appendix 1). The remaining typologies comprise red alluvium soils, colluvium soils, red stoneware soils and lytic soils (MICOA, 2013). The coastal and interior areas are comprised of sandy soils respectively (MICOA, 2013). Marine and estuarine sediment soils are found near the coast facing Maputo Bay (MICOA, 2013). Along the Maputo and Fúti River valleys, the soils are clayey alluvium soils, red stoneware soils and mananga (MICOA, 2013).

# HYDROLOGY AND GEOHYDROLOGY

Hydrology and geohydrology are crucial to understand the area's many aquatic habitats. These include major rivers and their floodplains, swamps, coastal lakes and estuaries, and smaller freshwater wetlands and pans which occur throughout. A number of rivers flow into the iSimangaliso Wetland Park, many of them draining into Lake St Lucia. The uMfolozi and uMkhuze are the largest of these rivers, and both of them have a significant portion of their catchments outside of the Park. The smaller rivers and streams entering and within the Park are largely seasonal, and are reduced to isolated pools during the dry months. Pans and swamps occur throughout the iSimangaliso Wetland Park, some of which are part of river and lake systems, while others form as a result of the perched water table. There are two types of coastal lake systems in the iSimangaliso Wetland Park: estuarine-linked lakes (St Lucia, Kosi and Mgobozeleni) and freshwater lakes (Sibaya, Bhangazi North and Bhangazi South). To these, the proposed transboundary extension adds a landscape of coastal lakes, swamps and temporary rain-filled pans, similarly separated from the sea by the longshore barrier dune system; the most important coastal lakes in the MNAP are lakes Piti, Xinguti and Satine.

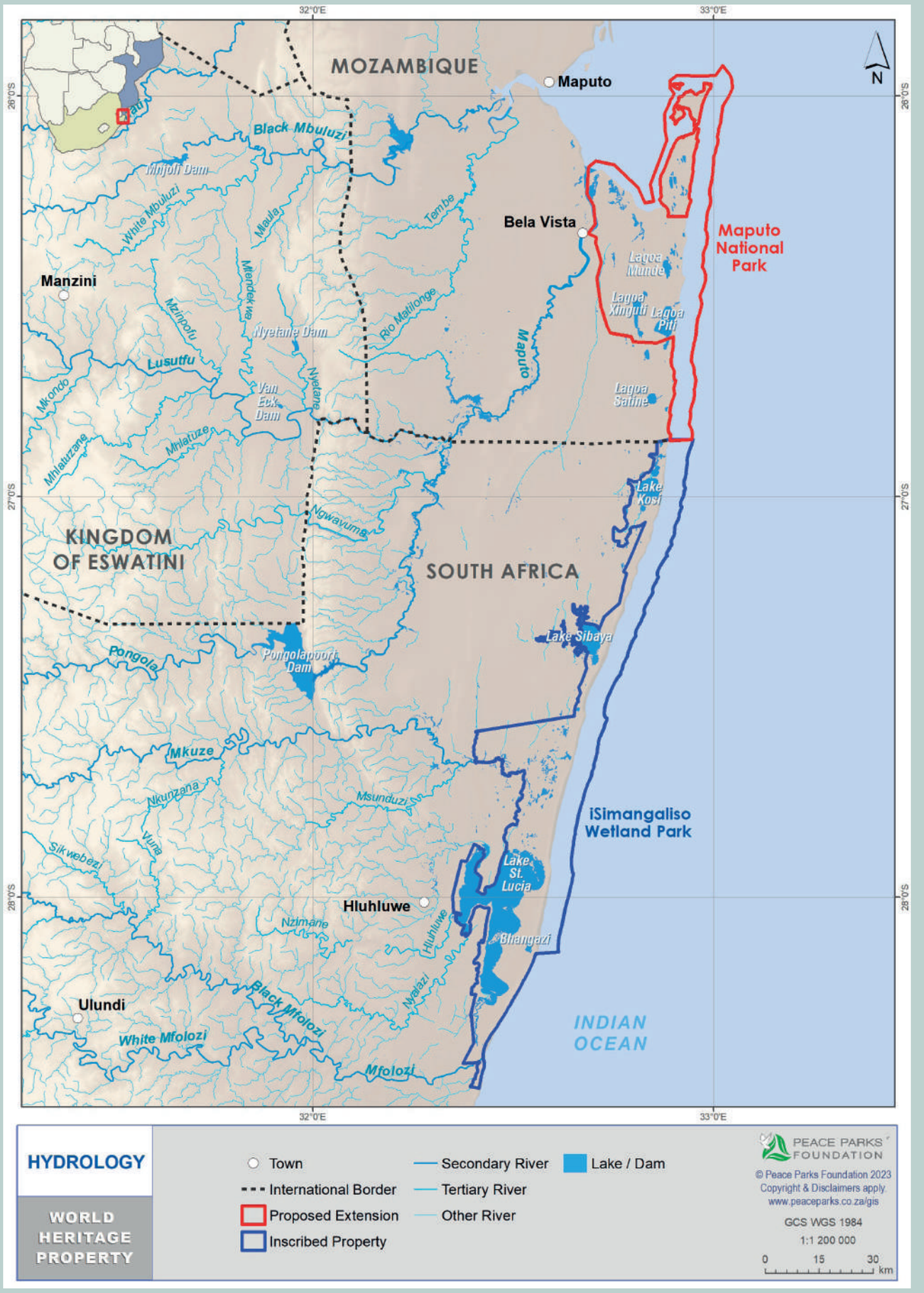
The MNAP is influenced by three major rivers which flow into Maputo Bay: the Maputo (known as the Pongola River in South Africa), the Incomáti and the Umbelúzi. Their watersheds are shared upstream with South Africa and the Kingdom of eSwatini (da Silva & Rafael, 2014). Maputo Bay thus receives freshwater from five rivers: the Incomáti River to the north, the Maputo River to the south and the Matola, Umbelúzi and Tembe Rivers to the west (Canhanga & Dias, 2014). The combined freshwater input from these sources is approximately 6 $km^3.year^{-1}$ with the Incomáti and Maputo rivers supplying the main discharges, mostly in the summer months (Canhanga & Dias, 2014). In general, this hydrological system is seasonal, and affected by upriver exploitation, topography and substrate.The mainland region of the proposed transboundary extension is further defined by the Maputo and Tembe river basins, of which the main rivers are the Maputo, Tembe, Fúti, Nsele and Chilichili (Governo da Província de Maputo, 2015).

## ECOSYSTEMS

The area provides habitat for a significant diversity of African biota, including a large number of rare, threatened and/or endemic species. Its ecosystems can be grouped into three broad biomes - marine, terrestrial and aquatic.

*The proposed transboundary extension's Lake Nela*

***Map 20.*** *Hydrology of the iSimangaliso Wetland Park and Proposed Transboundary Extension, the Maputo National Park (MNAP)*



# THE MARINE BIOME

Unlike their terrestrial components, the adjacency of the iSimangaliso Wetland Park and proposed transboundary extension's marine environments is unbroken; and indeed, the marine habitats offshore of South Africa and Mozambique are indivisible, and function ecologically as a single and inseparable environment. As such, arguments for a transboundary extension to the iSimangaliso Wetland Park draw strongly on this ecological reality.

The marine biome is characterised by a warm sea and includes dune, rocky shore, rocky reef, coral reef and pelagic ecosystems. Importantly, the iSimangaliso Wetland Park has the southernmost extension of coral reefs in Africa, submarine canyons that host the Coelacanth, and long sandy beaches used by Loggerhead and Leatherback turtles to nest. To these marine components the proposed transboundary extension adds 100 kms of coastline, with additional turtle marine habitat and nesting sites, and habitat for whales and dolphins; Maputo Bay, with its large tidally exposed mudflats and mangroves, unique high latitude coral reef complexes, and Ilha de KaNyaka's extensive sea grass meadows and Dugongs, and the sheltered coasts of Ilha de KaNyaka.

Two distinct marine biogeographic regions occur, with an important break at Cape Vidal.

- Maputaland Sub-province of the Tropical Indo-West Pacific Province (Cape Vidal northwards to Ponta do Ouro). Many of the species in this region are not found elsewhere in South Africa.
- Natal Sub-province of the Sub-tropical East Coast Province (South of Cape Vidal Point to Cape St Lucia), with many endemic marine species.

The proposed transboundary extension's coastline, with juxtaposed dune forests, and mosaics of coastal woodlands, grasslands and lakes

## COASTAL DUNES

The Indian Ocean's mainland coastline is bordered by a sandy shore and coastal dune system that extends approximately 300 km, from Cabo de Santa Maria in Mozambique towards the uMlalazi River in South Africa. The coastline between Maphelane in the south of the iSimangaliso Wetland Park and Ilha de KaNyaka in the north of the proposed transboundary extension is characterised by a series of long beaches with intermittent headlands, forming crenulated bays such as those found at Sodwana (iSimangaliso Wetland Park), Ponta de Ouro (MNAP) and Ponta Malongane. The **dune systems** vary across the coastline from up to 100m high, vegetated and generally stable dunes at Maphelane, to the mobile or active parabolic dunes and barchan dune fields found between Ponta Mucombo and Ilha de KaNyaka. There are at least five different dune forms across the iSimangaliso Wetland Park and the MNAP, each providing a unique coastal form (hummock or embryo, parabolic, barchan, longitudinal and transverse). The dune cordon within the MNAP forms a natural progression from that found within the iSimangaliso Wetland Park. The cordon of coastal dunes and sandy beaches along the shores of the iSimangaliso Wetland Park and the proposed transboundary extension are among the highest vegetated coastal dunes in the world, and reach heights of between 120 and 180 meters (Tinley, 1971; Momade and Achimo, 2004; Botha, 2015).

## ROCKY SHORES

The proposed transboundary extension hosts 13 primary rocky shore environments (between Ilha de KaNyaka and Ponta de Ouro) that complement the 15 primary rocky shore environments within the iSimangaliso Wetland Park (Kosi Bay to Maphelane, immediately south of St Lucia). These comprise Exposed Rocky Headlands, Semi-exposed Rocky Shores and Sheltered Boulder Bays.

Littoral rocky shores provide a transition between terrestrial and marine environments. This ecosystem is considered one of the most productive marine environments, and hosts many species of socio-economic and ecological importance (Kyle *et al.*, 1997). 527 species have been recorded in the proposed transboundary extension. The most diverse phyla are Arthropoda (193), Mollusca (152), Annelida (137), Echinodermata (55) and Cnidaria (56); 380 species of seaweeds have been recorded.

## SUBTIDAL REEFS

Coral reef communities in the iSimangaliso Wetland Park and the proposed transboundary extension grow on submerged dune and beach rock (aeolianite, sandstone) where they occur due to the influence of the Agulhas Current. These communities are made up of a mix of tropical and subtropical species at the southwestern limits of the large Indo-West Pacific Marine Province and, at a smaller biogeographic scale, in the Delagoa Bioregion that extends from Bazaruto Island in Mozambique to Leven Point in the iSimangaliso Wetland Park. There are important reefs between Ilha de KaNyaka and Ponta de Ouro i.e. Barreira Vermelha, Ponte Torres, Baixo Danae and Baixo São João, Techobanine, Malongane and Ponta de Ouro, and these are complemented by the Kosi and Sodwana Bay reefs in the iSimangaliso Wetland Park.

## SEAGRASS MEADOWS

Maputo Bay has the largest meadows of the seagrass *Zostera capensis* in the world, occupying some 1 400 ha (Bandeira et al., 2014, Bandeira, 2000), a species evaluated as globally vulnerable (IUCN Red List) following its documented decline in a number of sites throughout Maputo Bay. Other seagrass species (*Halodule uninervis* and *Halophila ovalis)* are important food for dugongs (Marsh *et al.*, 2012, Fernando *et al.*, 2014), and Dugongs do not occur in the property as currently inscribed, underscoring the importance of the proposed transboundary extension in this context. Nine seagrass species occur in the proposed transboundary extension, including significant stands of eelgrass, *Z. capensis,* which has been classified as Vulnerable in terms of the IUCN criteria (Short, 2011).

Dugongs (*Dugong dugon*) are found only in the proposed transboundary extension, in which Maputo Bay still supports at least 2–3 known individuals. Image courtesy of Stephan Kerkhof

# THE TERRESTRIAL BIOME

This biome includes savannah, sand forest, coastal forest and grassland ecosystems. On the eastern shores of Lake St Lucia in the iSimangaliso Wetland Park, sub-tropical forests and grasslands dominate. On the western shores, ancient shoreline terraces and dry savannah woodlands, thickets and sand forests occur on the higher lying ground between the coastal plain and the Lubombo Mountains. The vegetation of the MNAP is a mixture of forests, thickets, woodlands, scrub and savannah, and also includes extensive coastal grasslands and stands of mangroves.

# THE AQUATIC (FRESHWATER) BIOME

This biome includes wetland, riverine, and freshwater lake systems. In the iSimangaliso Wetland Park, the freshwater lake systems consist of three lakes (Sibaya, Bhangazi North and Bhangazi South). The uMkhuze River supports swamp forest and the uMfolozi floodplain contains extensive reed and papyrus wetlands. Within the proposed transboundary extension are extensive coastal lakes, wetlands, swamps and temporary rain-filled pans that occur on the low elevation plains, and Maputo Bay and Ilha de KaNyaka.

Three distinct ecosystems, viz. beaches, estuaries and swamp forest, which occur on both properties, cannot be classed as discrete biomes, but are influenced by the features or processes of two or more biomes. The estuaries - Kosi Bay, Mgobezeleni and Lake St Lucia in the iSimangaliso Wetland Park; and the Maputo River Estuary (the largest of the three), Espírito Santo (in the western part of Maputo Bay) and the much smaller Dobela Estuary to the south are shaped by a combination of terrestrial, freshwater, aquatic and marine processes and communities; while beaches and swamp forests are a product of land-sea and land-water interactions, respectively.

The major aquatic habitats may be described as follows:

## LAKE ST LUCIA

Lake St Lucia in the iSimangaliso Wetland Park is the largest estuarine system in South Africa and on the African continent (Begg, 1978). Sediment accumulation from river inflow has produced a shallow lake (average depth <1 m), in contrast to the deeper coastal lakes of the Sibaya and Kosi systems. Fresh water inputs are derived from stream-flow, rainfall and dune seepage, and these inputs determine salinities in Lake St Lucia, which are highly variable in response to variations in rainfall and run-off. Evaporative water loss exceeds inputs from direct rainfall, even in years of average or above-average precipitation. Water movement between the St Lucia lake and estuary is restricted by "The Narrows." Five rivers provide freshwater to the Lake St Lucia system - the uMkhuze, Hluhluwe, Mzinene, Nyalazi and uMfolozi Rivers. The uMkhuze River is a major source of freshwater in the north and carries large volumes of mud to the lake. The uMfolozi (one of KwaZulu-Natal's largest rivers) enters the sea to the south of St Lucia town at Maphelane. The Dukuduku and Futululu forest areas also play an important catchment role to supply fresh water to the lake system.

## KOSI SYSTEM

The Kosi System in the iSimangaliso Wetland Park is a chain of lakes (Amanzimnyama, kuNhlange, kuMpungwini and Makhawulani) connected by narrow shallow channels, and to the sea via the Kosi Bay Estuary. The estuary mouth is generally open throughout the year. The drainage system, which sustains the lakes and estuary, is ill-defined because of the numerous pans, swamps and marshes which surround them. No large rivers enter the system, but the lakes are fed by streams which drain extensive swamps in the surrounding catchment. There is a salinity gradient from freshwater in the south to sea water in the estuary (KZNNCS, 1998).

## MGOBOZELENI

Mgobozeleni is the smallest of the three estuarine lake systems and includes the Mgobozeleni and Shazibe lakes, which are connected via a narrow channel which flows through an extensive swamp forest and reed swamp to the sea at Sodwana Bay in the iSimangaliso Wetland Park. The estuary mouth is mobile, and migrates depending on rainfall and swell regime.

## LAKE SIBAYA, LAKE BHANGAZI NORTH AND LAKE BHANGAZI SOUTH

These freshwater lakes are found in depressions inland of the coastal dune barrier. They are fed from relatively small catchments and maintained largely from ground water seepage. The lakes are nutrient poor because of the predominantly sandy, leached nature of their substrates (KZNNCS, 1998). Lake Sibaya is the largest natural freshwater lake in South Africa and is deep (max depth 43 m). Lake Sibaya and Bhangazi North have no outlet (Jackson, 1992), whereas Bhangazi South drains southwards into Lake St Lucia (KZNNCS, 1998).

The proposed transboundary extension adds important additional components to the aquatic biome.

## COASTAL LAKES, WETLANDS AND SWAMPS

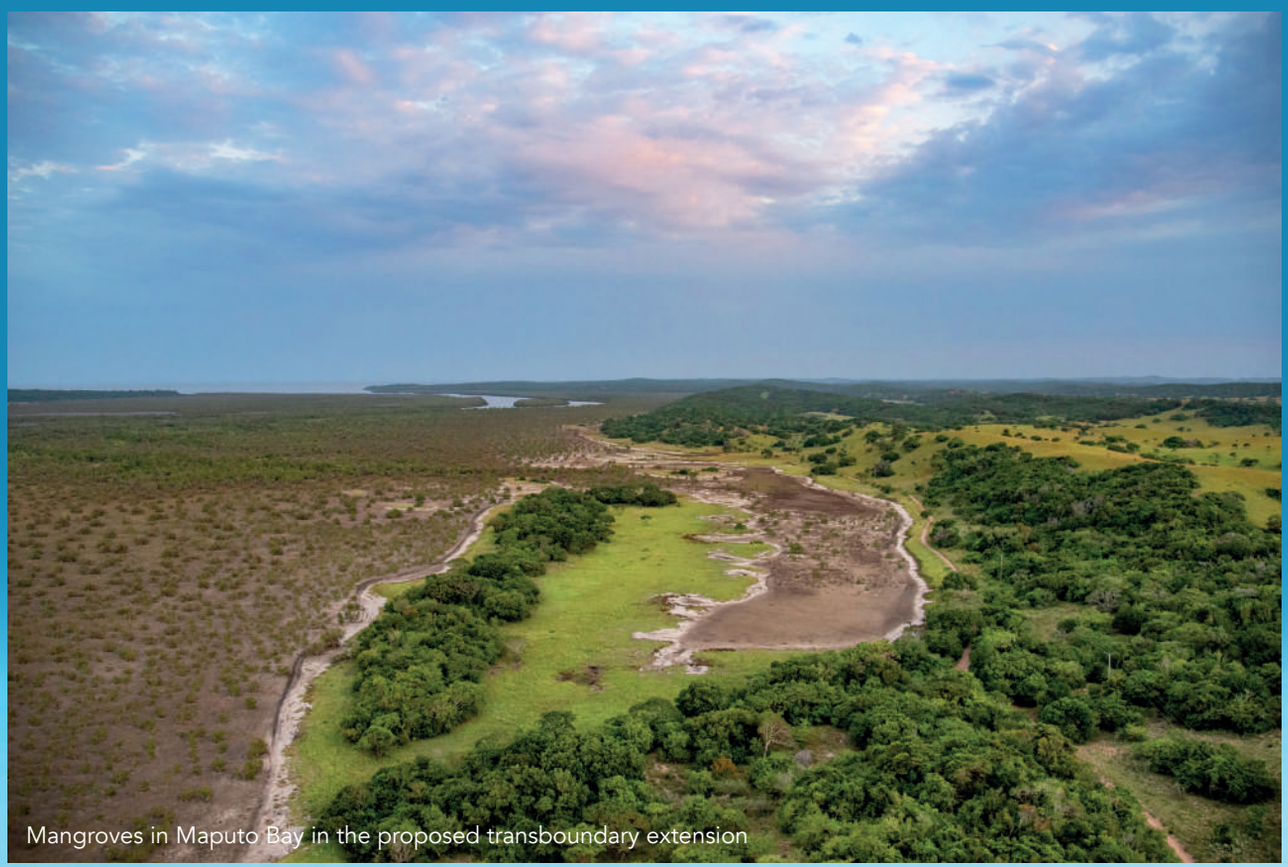
Within the MNAP are extensive wetlands, coastal lakes, swamps and temporary rain-filled pans that occur on the low elevation plains (Hatton *et al.*, 1995; Massinga & Hatton, 1996). The most important coastal lakes are Piti (27 $km^{2}$, Xinguti (11.5 $km^{2}$) and Satine (5 $km^{2}$). The smaller lakes have an average size of approximately 3 $km^{2}$ (Hatton *et al.*, 1995; Massinga & Hatton, 1996). They have an average depth of 5 m (Hatton *et al.*, 1995; Massinga & Hatton, 1996) and their limnology remains poorly studied (Massinga & Hatton, 1996). Topographic and edaphic variations within the MNAP have resulted in isolated wetlands separated by sandy elevated dunes, and comparable to systems found in the iSimangaliso Wetland Park. Extensive coastal grasslands also support wetlands bordered by the high north-south oriented extensive undulating sand dunes (Momade and Achimo, 2004).

## MAPUTO BAY AND ILHA DE KANYAKA

The proposed transboundary extension complements the abovementioned attributes most markedly through it inclusion of Maputo Bay and Ilha de KaNyaka.

Maputo Bay is the largest embayment in Mozambique at over 1 000 $km^{2}$; it is semi-enclosed by an island barrier system, comprised of Inhaca and Portuguese Islands, and a series of unvegetated, unnamed small barrier islands. A narrow strait on its eastern side, south of Ilha de KaNyaka (Ponta Torres Strait) allows for restricted water exchange with the Indian Ocean (Saide, 2000). It has a shallow shelf and a mean depth of about 10 m at mean sea level (Saíde, 2000); about 30% of the Bay is categorised as intertidal flats, the largest of which are found in the southern part of the bay, close to Santa Maria, and which dry at low water spring tides (Saíde, 2000). The Bay receives fresh water from five rivers, and its estuarine character supports a diverse array of species typical of the sheltered and muddy conditions within estuaries and mangroves. Ilha de KaNyaka supports mangroves, freshwater swamps, mudflats and dune forest habitats. Mangroves are found mostly at the southern and northern bays of Saco and Sangala, while on its seaward edges, where water turbidity is low, its shallow waters provide coral reef and extensive sea grass meadow habitat.

*Lake Xinguti, one of the proposed transboundary extension's most important coastal lakes*



Mangroves in Maputo Bay in the proposed transboundary extension

Ilha de KaNyaka – a distinctive feature of the proposed transboundary extension

# FLORA

Vegetation in the currently inscribed property has been classified according to the types and sub types recognised by the classification system of Mucina and Rutherford (2006), and are given below.

## SAVANNAH

- Lowveld Bioregion – Southern Lubombo Bushveld, Tembe Sandy Bushveld, Western Maputaland Sandy Bushveld, Western Maputaland Clay Bushveld & Makatini Clay Thicket

## INDIAN OCEAN COASTAL BELT

- Maputaland Coastal Belt
- Maputaland Wooded Grassland

## FORESTS

- Zonal and Intrazonal Forests – Northern Coastal Forest & Sand Forest
- Azonal Forests – Lowveld Riverine Forest, Swamp Forest & Mangrove Forest

## AZONAL VEGETATION

- Seashore Vegetation – Subtropical Seashore Vegetation
- Eastern Strandveld Vegetation – Subtropical Dune Thicket
- Inland Saline Vegetation – Subtropical Salt Pans
- Freshwater Wetlands – Subtropical Freshwater Wetlands, including (1) Freshwater Phragmites and papyrus swamps, (2) Saline reed swamps, (3) Eleocharis (sedge) swamp, (4) Salt marshes, and (5) Submerged macrophyte beds[5]

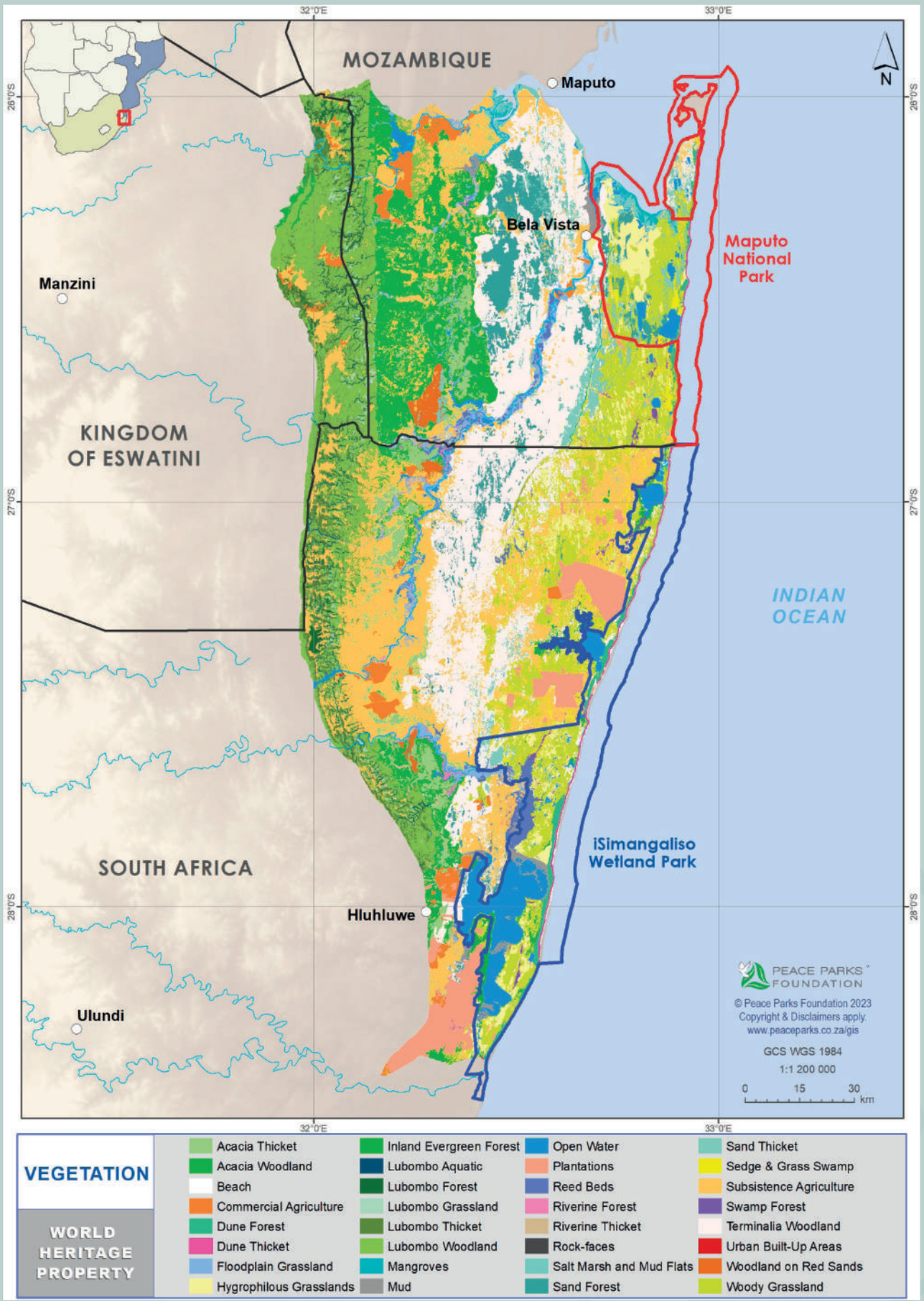
In the proposed transboundary extension, previous broad-scale vegetation studies (Pedro & Barbosa 1955, Wild & Barbosa 1967, White 1983) describe the area as a mixture of tree savanna, grassland, scrub, sand forest and dune thicket, the distribution of which is largely determined by topography, moisture and edaphic conditions. At a more detailed scale, Myre (1964, 1971) studied the grasslands of this part of Mozambique, and Mogg (1958, 1967) and De Koning & Balkwill (1995) provided detailed descriptions of the vegetation on Ilha de KaNyaka. Izidine (2003) described the Licuáti thicket area and the UEM Department of Biological Sciences (Departamento de Ciências Biológicas 2000; reference not available) produced a vegetation map of the Maputo Special Reserve at a scale of 1: 50,000. A vegetation map of the northern part of the proposed transboundary extension is given in Bandeira *et al.* (2014). Perhaps the clearest overall accounts are those of Moll & White (1978) and Bandeira *et al.* (2014).[6]

The following description of vegetation is based on landcover types as given in Smith and Leader-Williams (2006), which provides the only currently available vegetation map which uses the same vegetation classification method for the entire area into which the MNAP and the iSimangaliso Wetland Park fall, allowing for a consistent description across both properties. Species-level descriptions for these landcover types have been obtained from Matimele & Timberlake (2020) and Porter (1998).

5 This description is taken from the iSimangaliso Wetland Park IMP 2022–2031

6 the paragraph above is largely taken from Matimele & Timberlake (2020). Maputaland World Heritage Site application. Specialist study: terrestrial plants and vegetation.

***Map 21.*** *Vegetation of the iSimangaliso Wetland Park and Proposed Transboundary Extension, the Maputo National Park (MNAP)*



In the iSimangaliso Wetland Park and the MNAP taken together, vegetation can be broadly described as a mix of dune communities, forests, thickets, woodlands, grasslands, swamps and wetlands. Its distribution is largely determined by topography, moisture regimes and edaphic conditions, and the plant communities are given as follows:

The coastline of the iSimangaliso Wetland Park and the proposed transboundary extension is flanked by sandy beaches with rocky outcrops and dunes; **pioneer dune communities** occur between the shoreline and the higher, consolidated dunes, and host plants that can tolerate wind, sand movement and salt spray such as *Canavalia rosea*, *Carpobrotus dimidiatus*, *Cyperus crassipes*, *Ipomoea pes-caprae*, *Scaevola plumieri*, *Sophora inhambanensis* and the grass *Sporobolus virginicus*. These low, open dunes give way to dense stands of **coastal thicket**, represented by species such as *Brachylaena discolor*, *Chrysanthemoides monilifera*, *Ochna natalitia*, *Vepris lanceolata* and occasional clumps of *Encephalartos ferox*.

*Dune forests in the proposed transboundary extension*

Throughout both properties, these thickets grade into the area's iconic consolidated, secondary dunes, which are clothed in tall **Dune Forests** with an understory or herb layer, and in which common species are *Afzelia quanzensis*, *Eugenia capensis*, *Mimusops caffra* and *Sideroxylon inerme;* other woody species include *Acacia karroo*, *Acacia kraussiana*, *Albizia adianthifolia*, *Apodytes dimidiata*, *Brachylaena discolor*, *Croton gratissimus*, *Diospyros natalensis*, *Euclea divinorum*, *Strychnos decussata*, and others (see Bandeira *et al.* 2014).

Inland of the dune fields, both properties contain extensive plains of **hygrophilous and woody grasslands** with scattered trees, palms, and dwarf and woody plants. **Woody Grasslands** host low-growing species and grasses with scattered shrubs and trees in which the geoxylic suffrutices *Parinari capensis* and *Salacia kraussii* are common. **Hygrophilous Grasslands** are characterised by *Themeda triandra, Salacia kraussii* and *Parinari capensis*, and may contain thickets of *Albizia adianthifolia, Strychnos* species and grasses typical of moist habitats. There are also scattered individuals of *Syzygium cordatum* and the palms *Hyphaene coriacea* and *Phoenix reclinata*, while stands of the tree *Acacia xanthophloea* occur in some seasonally-inundated areas.

*The extensive coastal grasslands of the proposed transboundary extension*

Both properties contain discrete areas of localised **swamp forest**. In the iSimangaliso Wetland Park these are found predominantly on the eastern shores of Lake St. Lucia, and at Sodwana and Kosi Bay, and near Lake Piti in the MNAP, where they occur in areas with permanent water. Characteristic species are *Ficus trichopoda, Voacanga thouarsii, Syzygium cordatum, Barringtonia racemosa, Phoenix reclinata, Macaranga capensis, Bridelia micrantha, Psychotria capensis, Tarenna pavettoides, Psilotum nudum, Stenoclaena tenuifolia* and *Nephrolepis biserrata*.

The proposed transboundary extension includes a large portion of Maputo Bay in which **mangroves** occur along major rivers (the Incomáti, Maputo and Bembi Rivers), estuaries (Espírito Santo) and on the shores of Ilha de KaNyaka and the Machangulo Peninsula; while in the iSimangaliso Wetland Park they are found in the St. Lucia and Kosi Bay estuaries. Six true mangrove species occur in the two properties - *Avicennia marina*, *Rhizophora mucronata, Ceriops tagal, Bruguiera gymnorrhiza*, *Xylocarpus granatum* and *Lumnitzera racemosa,* and non-mangrove species common on the terrestrial fringes of mangroves include *Hibiscus tiliaceus, Thespesia pulpunea*, *Brexia madagascariensis, Derris trifoliata* and *Phoenix reclinata*.

Across both properties **Freshwater swamps and wetlands** occur extensively in the coastal grassland areas. In the MNAP, they are associated with *Cyperus papyrus* and other sedges, *Dissotis rotundifolia*, *Persicaria decipiens*, *Phragmites australis* and *Typha latifolia;* in the iSimangaliso Wetland Park, a number of wetland and swamp types occur, including Freshwater Phragmites and papyrus swamps, Saline reed swamps and Eleocharis (sedge) swamps. The iSimangaliso Wetland Park's freshwater Mkuze swamps are one of the largest wetlands in any protected area in South Africa; characteristic species are *Cyperus papyrus* and *Phragmites australis*. Trees associated with swampy areas include *Ficus trichopoda*, *Macaranga capensis*, *Rauvolfia caffra*, *Syzygium cordatum* and *Voacanga thouarsii*.

*In the proposed transboundary extension, coastal lakes, swamps and temporary rain-filled pans are found on the low elevation coastal plain, and substantially add to the iSimangaliso Wetland Park's complement of these habitats*

**Sand Forest**, a rare, climax dry forest is found throughout the MNAP, and near False Bay in the iSimangaliso Wetland Park. Typical species include *Balanites maughamii*, *Brachylaena huillense*, *Cleistanthus schlechteri*, *Cola greenwayi*, *Croton pseudopulchellus*, *Dialium schlechteri*, *Erythrophleum lasianthum*, *Hymenocardia ulmoides*, *Monodora junodii*, *Newtonia hildebrandtii*, *Ptaeroxylon obliquum*, *Pteleopsis myrtifolia* and *Uvaria lucida*.

**Coastal lowland/inland evergreen forest** occurs on the western shores of Lake St. Lucia as a mixed, subtropical climax community, and the largest remnant of this forest type in South Africa. Characteristic species are *Strychnos decussata, S. gerrardii, Hymenocardia ulmoides, Canthium inerme, Scolopia zeyheri, Ekebergia capensis*, and the lianas *Monanthotaxis caffra, Dalbergia armata, Landolphia kirkii,* and *Uvaria caffra*.

## WOODLANDS

In the iSimangaliso Wetland Park, Acacia woodlands, which are found largely on the eastern shores of Lake St. Lucia, are characterised by *Acacia nigrescens, A. gerrardii, A. tortilis, A. nilotica, Dichrostachys cinerea, Themeda triandra, Bothriochloa insculpta, Digitaria eriantha, Eragrostis* and *Panicum spp.* In the MNAP, woodlands are associated with older dunes and past human disturbance. Typical species include *Acacia karroo*, *Afzelia quanzensis*, *Albizia adianthifolia*, *Albizia versicolor*, *Deinbollia oblongifolia*, *Dichrostachys cinerea*, *Garcinia livingstonei*, *Sclerocarya birrea*, *Strychnos madagascariensis*, *Strychnos spinosa*, *Tabernaemontana elegans*, *Trichilia emetica* and *Vangueria infausta*, with the main grasses being *Hyperthelia dissoluta*, *Hyparrhenia* spp, *Cymbopogon* spp, *Cynodon dactylon*, *Melinis repens*, *Panicum maximum* and *Perotis patens*, depending on location and the period since disturbance (Matimele & Timberlake, 2020).

Overall, of a total of 781 higher plant species recorded to date (a figure not based on detailed surveys), there are about 455 species recorded from Ilha de KaNyaka, perhaps the best- and longest-studied part of the proposed transboundary extension (see Mogg, 1967, Campbell *et al.* 1988, de Koning & Balkwill, 1995), of which 16 are introduced and naturalised. Given the restricted number of habitats on Ilha de KaNyaka compared to the larger area, the proposed transboundary extension probably supports over 900 species (Matimele & Timberlake, 2020).

There are a number of species that are confined to the Maputaland area, here termed endemics (Darbyshire *et al.*, 2019). These are thought to be mostly neo-endemics of comparatively recent evolutionary origin (van Wyk & Smith, 2001). Neo-endemics are species confined to the Maputaland Centre of Endemism but found in both Mozambique and adjacent parts of South Africa (northern KwaZulu-Natal and the iSimangaliso Wetland Park). Four of them are Mozambique endemics, that is, not currently known from South Africa. The main endemics and neo-endemics are listed in Table 1 (Matimele & Timberlake, 2020).

The iSimangaliso Wetland Park Rare, Threatened & Endemic Species Project lists 2,185 vascular plants in the Park, representing 736 genera. 46 species are endemic, and for many plants in iSimangaliso, the Park is the southernmost extent of their distribution.

# FAUNA

The animals in the iSimangaliso Wetland Park and the proposed transboundary extension can be divided into six groups:

1. Invertebrates (Terrestrial and Aquatic)
2. Fish
3. Amphibians
4. Reptiles
5. Birds
6. Mammals

For the iSimangaliso Wetland Park, species totals given here are as listed in the iSimangaliso Wetland Park Rare, Threatened & Endemic Species Project and on the iSimangaliso website, https://isimangaliso.com/useful-information/animals/.

## INVERTEBRATES

For the currently inscribed property terrestrial invertebrates include 282 butterflies, 52 fruit chafer beetles, 38 dragonflies and damselflies, 228 spiders, 5 scorpions and 41 terrestrial molluscs as well as millipedes. There is a high diversity of marine molluscs on the coral reefs, in rock pools and off shore platforms, with 812 species recorded. Extensive beds of *Pinna bicolour* occur in the bioclastic dune troughs near Sodwana Bay (Ramsay et al., 1996). In the proposed transboundary extension, given their high species richness and abundance, especially in the shallow waters around Ilha de KaNyaka, molluscs are the most studied within the property. Chief among these are the gastropods (Gastropoda: which include several large groups such as snails, slugs, limpets and nudibranchs), bivalves (Bivalvia: clams, oysters, mussels), cephalopods (Cephalopoda: squid, octopuses) and chitons (Polyplacophora).

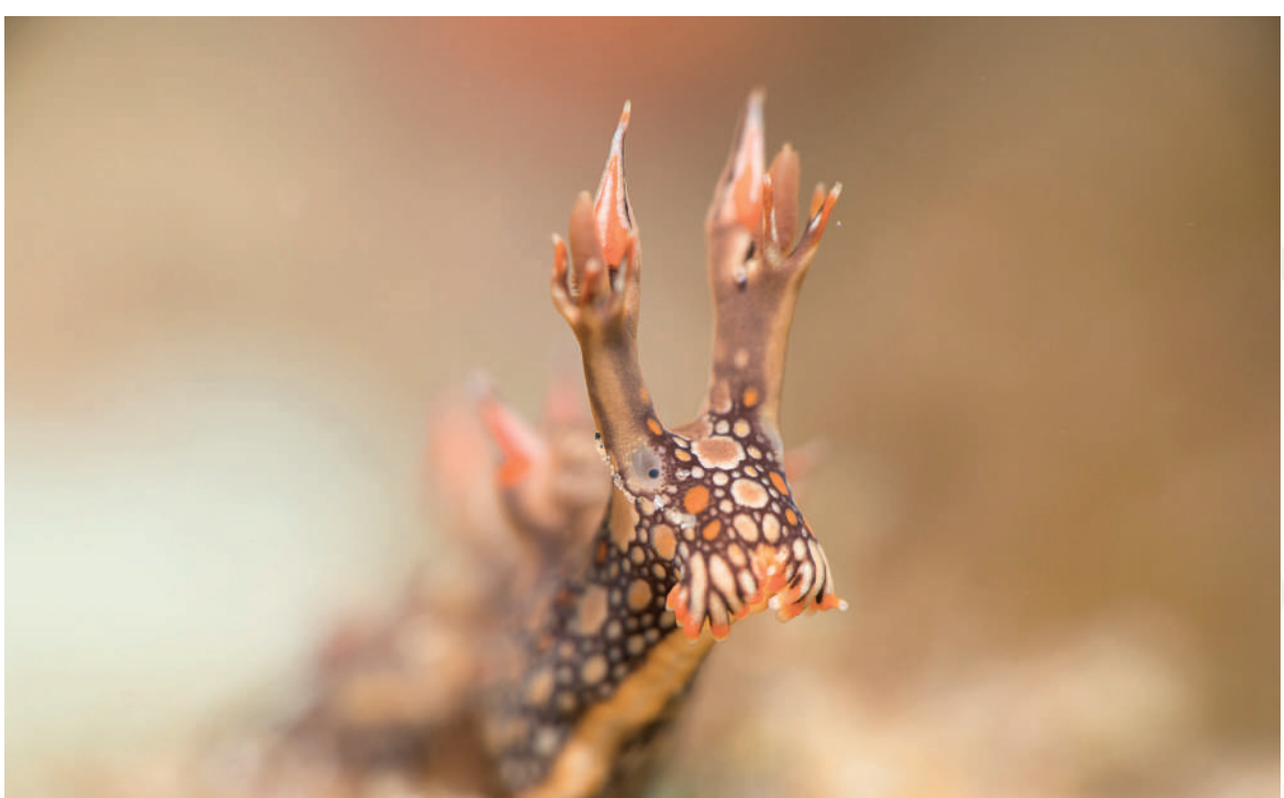
Other important groups are sponges (Porifera), corals, anemones and jellyfish (Cnidaria), crabs, shrimps and lobsters (Crustacea), starfish, sea urchins and cucumbers (Echinodermata) and other lesser-known groups such as sea squirts (Ascidiacea) and worm-like organisms (Platyhelminthes, Nematoda).

In the proposed transboundary extension, terrestrial invertebrates have been poorly studied, but it is likely that over 1 046 occur, including spiders (112 species), insects (413 species) and molluscs (77 species).

The most represented insect orders are Lepidoptera (180 species of moths and butterflies), Coleoptera (154 species of beetles, weevils, longhorns and related insects), Hemiptera (139 species of bugs, wilters and cicads), Diptera (80 species of flies and mosquitoes), Hymenoptera (80 species of wasps, bees and ants) and Orthoptera (65 species of crickets, grasshoppers and locusts), while terrestrial, aquatic and freshwater molluscs together are represented by over 75 species. The mussel *Brachidontes virgiliae* is found in the MNAP and the iSimangaliso Wetland Park (Appleton, 1996; Nel *et al.*, 2015; Manullang *et al.*, 2018) and both properties also host the truncated mangrove snail *Cerithidea decollata*.

At least six endemic species of molluscs and five gastropods have been recorded (Herbert & Moussalli, 2010; Herbert, 1998; Govender, 2007), and one vulnerable species occurs: *Natalina wesseliana* (Herbert, 2000).

Despite their location at their southernmost extension on the east African coast, in the iSimangaliso Wetland Park, coral reefs host 129 hard and soft coral species and 20 species of sponges, as well as species typical of inshore and coral reef environments e.g. sea anemones, hydroids and crustaceans. In the MNAP 38 species of soft coral and 93 species of hard coral have been recorded.



Nudibranchs from the MNAP – it is thought that as many as 100 new species of these molluscs may be found on the MNAP's reefs (picture – Jenny Stromvoll)

# FISH

The marine component of the iSimangaliso Wetland Park and proposed transboundary extension is considered unique in terms of icthyofauna, in that species from six different groups are found (Smith, 1980), including: i) Species from the Atlantic Ocean (e.g. Sand Steenbras, *Lithognathus mormyrus*); ii) Southern Ocean species (e.g. Twotone Fingerfin, *Chirodactylus brachydactylus*); iii) Endemic species (e.g. Slinger, *Chyrsoblephus puniceus*); iv) Wide-ranging circum-global species (e.g. Whale Shark, *Rhincodon typus*); v) Tropical Indo-Pacific species (e.g. Racoon-Butterflyfish, *Chaetodon lunula*); and vi) Deep sea species (e.g. Coelacanth, *Latimeria chalumnae*). Tropical Indo-Pacific species comprise 81% of this fish fauna. 992 marine species have been recorded in the iSimangaliso Wetland Park, of which 399 are reef species; approximately 16% are endemic to the area (Smith, 1980). The most notable fish in the iSimangaliso Wetland Park is the Coelacanth, found in the deep marine canyons. Another important species is the Brindle Bass, the largest reef-dwelling fish in the world. 55 freshwater fish and 212 estuarine fish are listed for iSimangaliso, and the St Lucia and Kosi estuaries are important nursery grounds for juvenile marine fish. Indeed, the species-rich ichthyofauna of the iSimangaliso Wetland Park is primarily due to the close proximity of marine, estuarine and fresh water environments. In both properties, the warm, clear offshore marine environment hosts a variety of demersal and pelagic fish (Guastella, 2002), while migratory pelagic gamefish in the offshore Agulhas Current are common in summer, including six Marlin species. Inshore areas are also occasionally visited by Whale sharks during summer and a number of shark species frequent inshore and offshore areas, including aggregations of Ragged Tooth Sharks. Large scale aggregations for feeding and breeding of Giant Trevally *Caranx ignobilis* (Daly *et al.*, 2018) and Brindle Bass *E. lanceolatus* (J. Rosado, pers. com.) have been reported to occur regularly in the proposed transboundary extension.

Large species such as sharks (including whale sharks, manta rays, tuna or the narrow-banded Spanish mackerel) also use the two areas as a migratory corridor and feeding ground (Daly *et al.*, 2013; Mann, 2013; Daly *et al.*, 2014). In the proposed transboundary extension, a total of 1 039 species from 171 families have been recorded: 1 002 saltwater species and 33 freshwater species.

The largest globally known aggregation of giant trevally (*Caranx ignobilis) occurs in the MNAP in the summer months*

# AMPHIBIANS

50 amphibians are listed for the iSimangaliso Wetland Park of which two are Red Data species, five are endemic to KwaZulu-Natal, and nine occur at the southernmost limit of their natural distribution; the iSimangaliso Wetland Park is the northernmost limit for the distribution of the Natal leaf-folding frog and Pickersgill's reed frog. In the proposed transboundary extension, amphibians are represented by the Ranidae (13 species), Arthroleptidae (1 species) and Hemisotidae (1 species) families. Healthy amphibian breeding populations from the Rhacophoridae (1 species), Pyxicephalidae (6 species) and, to a lesser extent, Bufonidae (4 species), Hyperoliidae (11 species), Microhylidae (3 species) and Pipidae (2 species) are known.

# REPTILES

162 reptiles have been recorded in the iSimangaliso Wetland Park, including 53 snakes. There are 12 species of turtles/tortoises (five marine, four freshwater and three terrestrial species) and iSimangaliso has the southernmost-recorded breeding population of the yellow-bellied hinge terrapin. Other reptiles include water monitors and 42 species of lizards, skinks, agamas, geckos and chameleons, including the endemic Setaro Dwarf chameleon.

The MNAP contains 48 species of snakes, four iguanas and 33 species from the the Amphisbaenidae, Atractaspididae, Cordylidae, Gekkonidae, Gerrhosauridae, Lacertidae, Scincidae and Varanidae, as well as Crocodiles and four tortoise species. Three southern Africa, nine southeast Africa (Branch, 1998; Bates et al., 2014) and one African endemic occur. According to the South African Red Data Book (2004), three species were classified as Vulnerable: Nile Crocodile (*Crocodylus niloticus*), Southern African Python (*Python natalensis*) and Eastern Green Mamba (*Dendroaspis angusticeps*). Two species were classified as Near Threatened: Pygmy Wolf Snake (*Lycophidion pygmaeum*) and Gaboon Adder (*Bitis gabonica*) and Bell's Hinged Tortoise (*Kinixys natalensis*) is a vulnerable species according to the IUCN.

Seven reptile species inhabiting the area are listed in Appendix II of CITES (2013, 2019): Southern African Python (*Python natalensis*), Nile Crocodile (*Crocodylus niloticus*), the White-throated Monitor (*Varanus albigularis*), Flap-neck Chameleon (*Chamaeleo dilepis*), the Leopard Tortoise (*Stigmochelys pardalis*), Bell's Hinged Tortoise (*Kinixys natalensis*), and Spekes's Hinged Back Tortise (*Kinixys spekii).*

Turtles are flagship species for the iSimangaliso Wetland Park and the proposed transboundary extension. iSimangaliso and the MNAP provide nesting beaches for Loggerhead and critically endangered Leatherback turtles, and are the only turtle nesting sites in South Africa and the region. Green, Olive Ridley and Hawksbill turtles are occasional visitors to subtidal habitats in both properties, which they feed in, and use as nursery grounds. The extensive seagrass, coral and mangrove habitats, including neritic and pelagic zones, are used extensively throughout the region as foraging habitats for all five species of marine turtle.

The St Lucia estuarine system is home to the second largest breeding population of Nile Crocodile in South Africa, one of the last two viable breeding populations in the country. Crocodiles frequent the rivers, lakes and estuaries, in particular the lower reaches of the uMfolozi, St Lucia Lake and Lake Bhangazi. There are an estimated 1 500 crocodiles of greater than 2 m in the St Lucia estuarine system alone, and this population is complemented by smaller populations in the proposed transboundary extension.

Hawksbill turtles (*Eretmochelys imbricata)* feed primarily on reef sponges in the MNAP and iSimangaliso Wetland Park marine areas

# BIRDS

The iSimangaliso Wetland Park boasts a checklist of 525 species which equate to 80% of the South African avifauna; this is due to the wide variety of terrestrial, wetland and aquatic habitats, and the Park is particularly well-known for its large populations of waterbirds, including waders, ducks, geese, herons, pelicans, terns and egrets. 47 subspecies of birds are endemic or near-endemic to the region, and the iSimangaliso Wetland Park has populations of four South African endemics. The Park provides habitat for the principal South African populations of Osprey, Neergaard's sunbird, Woodward's batis, Natal nightjar, Blackrumped button-quail, Black coucal and Short tailed pipit and is particularly important to the breeding success of Pinkbacked and White pelicans, Caspian terns, Pygmy geese, Rufous-bellied herons, Redwinged pratincoles and Greyrumped swallows. During hypersaline conditions the Lake may host up to 50 000 flamingos. 62 species occurring in the Park have been listed in the South African Red Data Book, and 73 appear in CITES appendices.

Of the approximately 690 bird species recorded in Mozambique, 343 are thought to occur in the proposed transboundary extension. There are nine bird habitats in the MNAP used by approximately 130 species of waterfowl and seabirds and 50 non-aquatic species, viz. offshore oceanic, inshore marine, estuarine, tidal mudflats, mangrove forests, coastal plains, marshes, lagoons and inland water bodies.

Critical bird habitat in the MNAP - while forest and woodland habitats occur in the iSimangaliso Wetland Park, it is only in the proposed transboundary extension that significant areas of adjoining grasslands are found, and for this reason the MNAP is thought to be a particularly important area for grassland, wetland and woodland birds. In the background is Lake Piti, one of the proposed transboundary extension's most important coastal lakes.

Ilha de KaNyaka hosts 299 bird species, representing 33% of all bird species occurring in southern Africa. The island is the southernmost point of the flyway for migratory birds on the east coast of Africa and provides important habitat for nine IUCN threatened species, viz. jackass penguin, white pelican, pink-beaked pelican, great-winged petrel, woolly-necked stork, open-billed stork, yellow-billed stork, Caspian tern and mangrove kingfisher. 65% of the bird species in the MNAP are common residents, 28% are palearctic and inter-African migrants, and the remaining 7% are seabirds. An important migratory bird to the MNAP is the flamingo.

# MAMMALS

The iSimangaliso Wetland Park is home to 110 terrestrial and 32 marine mammals, including the Big 5 (Elephant, Lion, Buffalo, Leopard, Rhinoceros). The terrestrial mammal fauna of the Park is particularly species-rich in the southern African context and has 32% of the Chiroptera; 51% of the Carnivora; 53% of the Artiodactyla; 22% of the Insectivora, and 21% of the Rodentia occurring in southern Africa. The iSimangaliso Wetland Park supports the largest single populations in South Africa of Hippo, Red duiker, Nyala and Southern Reedbuck, and the largest formally protected populations in KwaZulu-Natal of Thick-tailed bushbaby, Samango monkey, Side-striped jackal, Banded mongoose, Brown hyaena, Steenbok, Impala, Bushbuck, Tonga red squirrel, Cane rat and Four-toed elephant shrew.

In turn, the proposed transboundary extension hosts about 65 mammal species, and, as in the iSimangaliso Wetland Park, the Carnivora (16 species), Rodentia (14), Chiroptera (5) and Artiodactyla (16) are the most diverse.

Notable fauna in the iSimangaliso Wetland Park and the proposed transboundary extension include migratory whales, and Dolphins; iSimangaliso, in particular, has large herds of Hippo in the Lake St Lucia and Kosi Lake systems, and Elephant and Rhino on St Lucia's Western Shores. Other notable iSimangaliso fauna are Samango Monkey, Leopard and large ungulates such as Buffalo, Giraffe and Zebra. In the proposed transboundary extension, population numbers of most large terrestrial mammals were dramatically reduced during the civil war (1976–1992) (Hatton *et al.*, 2001), but post-war recoveries of Hippo, Elephant, Reedbuck, Nyala, and Kudu have been recorded, and Buffalo, Giraffe, Blue Wildebeest, Zebra, Eland, Impala, Oribi, Warthog and Waterbuck have been re-introduced as well as reintroduced Hyena to supplement the numbers and address the ecosystem balances.

Healthy Reedbuck populations occur in the proposed transboundary extension's extensive coastal grasslands

***Table 2.*** *Number of Species of International Conservation Importance in the iSimangaliso Wetland Park and Proposed Transboundary Extension*

NT = near threatened; Vu = Vulnerable; En = endangered; CR = critically endangered.

| TAXA | ENDEMIC SPECIES | IUCN RED LIST CATEGORY | | | |
|---|---|---|---|---|---|
| | | NT | VU | EN | CR |
| Terrestrial plants | | 1 | | 2 | 1* |
| Seagrasses | Southern Africa: 1 | | 1 | | |
| Corals | Southern Africa: 5 | | | | |
| Gastropods | Mozambique: 1<br>Southern Africa: 47<br>WIO: 88 | | | | |
| Amphibians | Southern Africa: 3 | | | | |
| Fish | Mozambique: 4<br>Southern Africa: 36<br>WIO: 47 | 10 | 20 | 6 | 5* |
| Marine reptiles | | | 2 | 1 | 2 |
| Terrestrial reptiles | | | | 1 | |
| Birds | | 17 | 6 | 11 | 3 |
| Marine mammals | | | 1 | 3 | 2 |
| Terrestrial mammals | Southern Africa: 3 | 3 | 4 | 1 | 1 |
| **Total** | **184** | **31** | **34** | **25** | **14** |

(*) 1 species possibly extinct

*Humpback Whale; photo courtesy of Jenny Stromvoll*

# EXTENT AND METHODS OF USE OF NATURAL RESOURCES

## COASTAL AND MARINE

Harvesting intertidal organisms has been an integral part of coastal societies in southern Africa for at least 120 000 years and continues to be important today (Griffiths & Branch 1997, Kyle *et al.*, 1997; Pereira, 1998; Griffiths *et al.* 2004; Julaia, 2017). Harvesting is easily carried out in the intertidal zones during low tide. During spring tides captures are greater as they do not require diving (Kyle *et al.*, 1997; Pereira, 1998; de Boer, 2000; Julaia, 2017).

Invertebrates of rocky shores such as mussels, tunicates (Ascidians), oysters, limpets, sea cucumbers and sea urchins are historically considered of great socioeconomic importance in Ilha de KaNyaka and Ponta do Ouro Village (Pereira, 1998; de Boer, 2000; DNAC, 2011). At least 31 species on the rocky shores are edible. Women and children collect them, mostly for local consumption (Kyle *et al.,* 1997; Pereira, 1998; Louro *et al.*, 2017) though some are also traded (de Boer & Longamane, 1996; de Boer, 2000; DNAC, 2011). Julaia (2017) reported an average of 3.8 kg of capture per collector per day in Ponta Mazondué, and 3.06 kg for Ponta do Ouro, mostly *Perna perna*, followed by *Pyura stolonifera* (3% and 13%, respectively) and gastropods *Mancinella alouina* (1% for both areas) and *Purpura panama* (1% for both areas).

Beautiful shells from conus and cowrie species occur in both the proposed transboundary extension and the iSimangaliso Wetland Park, and are sold as curios to tourists (Peters *et al.*, 2013) and as food (Pereira, 1998). Currently there is no evidence of ornamental shells being collected on rocky shores. They are sourced from coral reefs. A shell seller in Ponta do Ouro said "The shells are collected at Santa Maria at a depth of approximately 10 meters, with SCUBA gear". The same seller gave a price of 100 meticais for *Cyprae tigris*, 150 meticais for a species of *Tridacna* and 1 000 meticais for a Trumpet triton – *Charonia tritonis*).

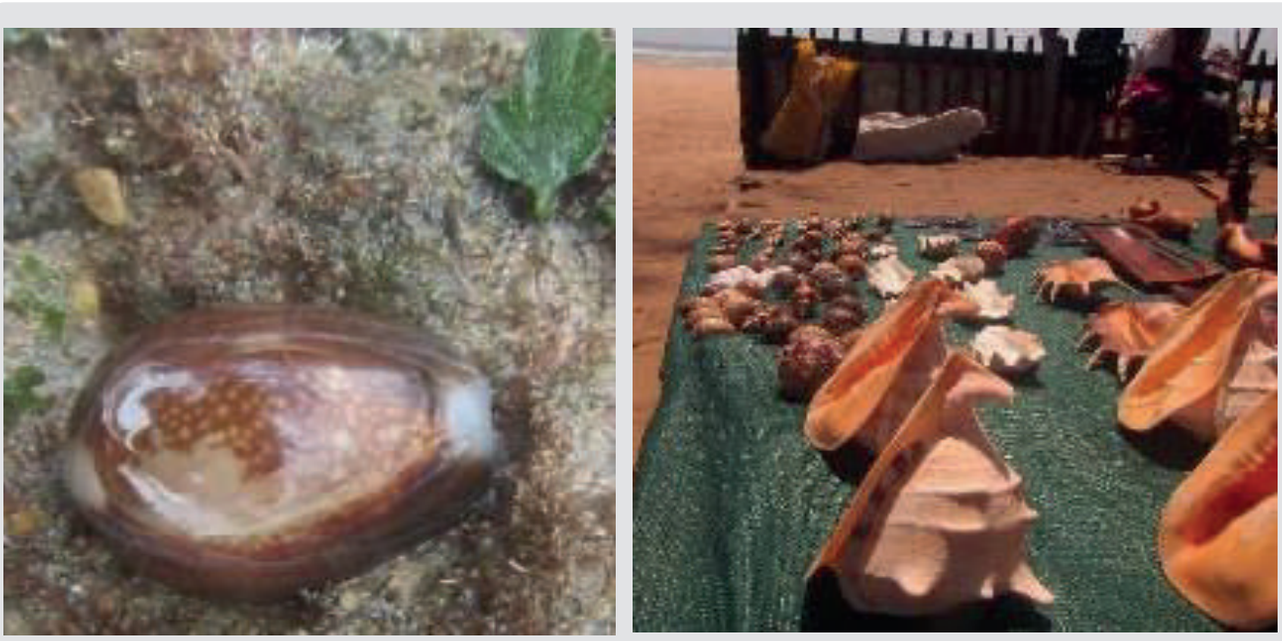


***Figure 1.*** *Cowrie shell (Cypraea caputserpentis) in its natural habitat in a rock pool, Ponta do Ouro, and shells for sale next to Beach Bar at Ponta do Ouro, September 2020. (Photographs: Raquel Fernandes).*

Informants from Machangulo Peninsula confirmed that seaweeds are used in traditional medicine to treat wounds, but they were not aware of species or harvesting grounds, and claimed that the algae came from "outside the reserve" (Marcos Nhaca, pers. comm. 2020). The collection of sponges, echinoderms and molluscs for medicinal treatment has also been reported in KwaZulu-Natal (Kyle *et al.*, 1997; Herbert *et al.*, 2003). Research should be conducted on species collected, markets and general uses in the proposed transboundary extension. The most recent information about the local animal trade was that terrestrial reptiles (including from Matutuíne) were sold for traditional medicine at the Xipamanine and Xiquelene markets in Maputo City (Wiliams *et al.*, 2016).

Shoreline subsistence and recreational fisheries occur all along the coast, but fishers seem to have a preference for the rocky shores close to Ponta do Ouro, Ponta Milibangalala and Ponta Chemucane (Fernandes & Pereira, 2017).

***Figure 2.*** *Subsistence rock and surf fishers at low tide at Ponta do Ouro, MNAP, August 2020 (Photograph: Raquel Fernandes).*

***Figure 3.*** *A rock and surf fisher's daily catch at Ponta do Ouro, MNAP, August 2020 (Photograph: Raquel Fernandes).*

### Management Response:

According to the iSimangaliso Wetland Park Integrated Management Plan (2017–2021), all forms of extractive use, including all fishing, harvesting of intertidal or shallow subtidal organisms, and the collection of biota and marine products such as shells, driftwood, rocks, and sand are prohibited in "wilderness zones" and "sanctuaries". Walking on the rocky shores is also forbidden. Recreational (catch and release only) and restricted small-scale rock and surf angling, as well as restricted small-scale invertebrate harvesting are allowed in the "restricted zone". The number of recreational and small-scale users may be higher in the "controlled zones" (iSimangaliso Wetland Park IMP, 2016).

Three zonations exist in the MNAP: the Sanctuary zone, the Restricted Use zone and the Multiple Use Zone (DNAC, 2011). As in the iSimangaliso Wetland Park, extractive uses and walking on rocky shores within the Sanctuary zone are not allowed. Exploring the rocky shores (without collecting), and harvesting for intertidal organisms at subsistence level, or under special permit, is allowed in both Restricted Use and Multiple Use zones (DNAC, 2011).

## SUBSISTENCE AND ARTISANAL FISHERIES

Both inland and maritime subsistence and artisanal fishing is important for a large segment of the population, and practiced by men, women and children throughout the year (Louro *et al.*, 2017). Artisanal and subsistence fisheries generate revenue and provide food security. In Matutuíne District and Ilha de KaNyaka, fisheries are permanent and make up 31.8% (n=28) of all fishing in Maputo Province and Maputo City. 823 fishers are registered (MIMAIP, 2018).

Artisanal and subsistence fisheries are typically multi-geared with nine types of gears reported: beach seine, boat seine, bottom gillnet, surface gillnet, handline, *quinia* (double stick nets), cast net, traps, and gamboa (fence nets). Invertebrates are also collected (Louro *et al.*, 2017; MIMAIP, 2018). Within inland waters, in the Piti, Chinguti, Muti and Sotiva lakes, the most prevalent fishing gear identified was the gillnet (Brito & Afonso, 2018; MIMAIP, 2018). The use of illegal and destructive fishing practices includes mosquito nets, small mesh sizes, traps and the use of poisonous substances (Lopes & Gervásio, 1999; Santana Afonso, 2006; ASCLME, 2012).

## SEMI-INDUSTRIAL FISHERIES

A semi-industrial fishery is defined as the use of fishing units with a closed or open deck, measuring between 8 and 20 meters, with more than 48 hours' autonomy and containing crew, fish and ice facilities. In Maputo Bay, two semi-industrial fleets operate, a semi-industrial shrimp trawling fleet (using ice for preservation) and a semi-industrial line fish fishery fleet (ADNAP, 2016). Within the last few years, these fishing fleets have remained stable with approximately 20 and 13 vessels, respectively (ADNAP, 2016). Catches are dominated by pelagic and demersal species and commercial penaeid shrimps (ADNAP, 2016). Shallow water trawl fishing occurs between Cabo da Inhaca, Ponta da Macaneta and the channel accessing the Maputo Port, as well as the area around the western region of Maputo Bay (Tenreiro de Almeida, unpublished report).

## PLANT USE

There are 11 endemic and near-endemic plant species in the MNAP of which five are IUCN least concern, three are IUCN vulnerable (*Acridocarpus natalitius* var. *linearifolius*, *Raphia australis* and *Sclerochiton apiculatus)*, and two are IUCN endangered (*Empogona maputensis* and *Warneckea parvifolia*). The most significant threat to these plants is from felling for charcoal production throughout Mozambique. Apart from trees felled for charcoal production, there are many plants in the MNAP that are of economic importance to the rural people living in or near the proposed transboundary extension, and who depend on wild plant resources, as subsistence agriculture is not always adequate to sustain livelihoods. Plants provide food (leaves and wild fruits), beverages, medicines, construction materials, craftwork materials, utensils, and traps for fish and wildlife. In addition, natural grazing is important for domestic livestock such as cattle and goats. Fruit is harvested from wild trees and is believed to be an important source of vitamins and micronutrients. Most popular are the fruits of *Landolphia kirkii*, *Manilkara discolor*, *Sclerocarya birrea*, *Strychnos madagascariensis*, *Strychnos spinosa*, *Syzygium cordatum, Trichilia emetica, Dialium schlechteri*, *Garcinia livingstonei* and *Vangueria infausta*. The fruits of *Hyphaene coriacea, Phoenix reclinata, Sclerocarya birrea* and *Strychnos spinosa* are used to make fermented beverages.

Plant use in the Matutuíne area has been described by Kloppers 2001, Izidine 2003, Senkoro *et al.* 2014, Martins & Shackleton 2017, 2018, and also on Ilha de KaNyaka (Barbosa, Senkoro & Bandeira 2014). In her thesis, Kloppers (2001) outlined the economic aspects and pattern of renewable natural resource utilization across the whole of Matutuíne District and showed that the rural population is very dependent on wild plant resources as agriculture is not always adequate for their livelihood. Plants provide food (such as both leaves and wild fruits), beverages, medicines, construction materials, utensils, and traps for fish and wildlife. In addition, natural grazing is very important for domestic livestock such as cattle and goats.

***Table 3.*** *Plants Used in the Maputaland Area*

| SPECIES | USES | | |
|---|---|---|---|
| | FOOD | MEDICINAL | HOUSEHOLD |
| *Afzelia quanzensis* | | | timber, furniture |
| *Albizia adianthifolia* | | roots | |
| *Albizia versicolor* | | bark | |
| *Balanites maughamii* | | bark, roots | timber |
| *Brachylaena discolor* | | leaves | timber |
| *Dialium schlechteri* | fruit | bark | timber |
| *Erythrophleum lasianthum* | | bark | |
| *Garcinia livingstonei* | fruit, drink | bark, roots | |
| *Hyphaene coriacea* | drink | | baskets, mats |
| *Kigelia africana* | | bark | |
| *Landolphia kirkii* | fruit | | |
| *Manilkara discolor* | fruit, drink | bark | walls |
| *Newtonia hildebrandtii* | | | timber |
| *Phoenix reclinata* | drink | | baskets |
| *Sapium integerrimum* | | bark | timber |
| *Sclerocarya birrea* | fruit, drink | bark | |
| *Securidaca longepedunculata* | | bark | |
| *Strychnos madagascariensis* | fruit | roots | string |
| *Strychnos spinosa* | fruit, drink | roots | |
| *Synaptolepis kirkii* | | sap | |
| *Syzygium cordatum* | fruit | | walls |
| *Tabernaemontana elegans* | fruit | roots, latex | |
| *Terminalia sericea* | | bark, roots | timber, string |
| *Trichilia emetica* | fruit | bark | |
| *Vangueria infausta* | fruit | roots | |

(source: Kloppers 2001, Izidine 2003, Senkoro et al. 2014 and others).

Kloppers (2001) found that at least 48% of people in Matutuíne used medicinal plants and she provided a detailed list of many of these, while Izidine (2003) recorded 45 species used medicinally just in the Licuáti thicket area. Senkoro *et al.* (2014) addressed the medicinal uses of nine tree species used for their bark on Ilha de KaNyaka.

Matimele (2016) and Tokura *et al.* (2020) have suggested that plant resources, such as fuelwood and building materials, alongside subsistence farming forms an important source for sustaining livelihoods in Maputaland. Field observations carried out from 2015 to 2017 noted piles of woody species including *Pteleopsis myrtifolia*, *Combretum imberbe* and *Hymenocardia ulmoides*, which are used for construction locally, with occasional demand from areas near cities. Most of the building material is collected by targeting selected species within thickets and surrounding forests, and also from areas cleared for subsistence farming.

# 2b

# HISTORY AND DEVELOPMENT

# 2.b HISTORY AND DEVELOPMENT[7]

## THE PRECOLONIAL PERIOD

Evidence of ancient human settlement (110 000 BCE) in the Maputaland coastal plain has been found near the iSimangaliso Wetland Park. From 250 AD, the coastal plain was widely settled by pre-colonial agriculturists, as evidence from the Matola archaeological site shows (Adam *et al.*, 2014).

The Portuguese travellers who preceded the Dutch sailors of 1652 were not the "first contact" with non-Africans for all indigenous southern Africans. From about 800 AD there is evidence from the east coast of southern Africa of trade with the Arab world via the Limpopo River Valley. Glass beads, cloth and other exotic items were traded for ivory, and possibly slaves as well. By 1200 AD hierarchical societies with centralised control of wealth had arisen on the edges of the Kalahari and in the Limpopo River Valley. Within a few centuries of initial commercial contact, early southern African states such as Mapungubwe and Zimbabwe were trading regularly with the Medieval Arab world. Because of the scattered nature of the small groups of people living in what are today MNAP and the iSimangaliso Wetland Park, it is likely that this trade did not benefit them, although they might have been involved in the ivory trade as suppliers.

We know roughly how long "Iron Age" people - people who made iron tools, grew crops and domesticated animals – have lived in the area (many hundreds of years before the arrival of white settlers), but the concept of distinct 'ages' (Stone Age, Iron Age) explained in terms of simple technological development was discredited in the 1980s by archaeologists such as Martin Hall. Hall explained how kingdoms arose in southern Africa: over a long period, and where climate allowed, people began to use and accumulate cattle within families or 'lineages', which slowly gave rise to a different form of society with a different economy. Cattle acted as a mobile form of stored wealth, allowing larger groups of people to live together in a more complex way. When larger groups lived together, labour could become more specialised. Men could spend more of their time in the roles of warrior, ritual specialist, woodcarver and blacksmith with the assurance that they would be fed by the agricultural labour of others. Wealth was counted as the accumulation of descendants, children and grandchildren; cattle were prized because they were essential for paying bride wealth. While women continued to gather and to cultivate annual crops - the basis of subsistence - men owned and controlled cattle, the basis of wealth accumulation and political power.

Political systems developed to control and direct labour and surplus production. Older men controlled the labour of younger men and all women. In some areas, for example the southeast coast of South Africa, a more hierarchical form of social organisation began to develop. Powerful patriarchs became local chiefs and then kings of larger areas. Regiments of military specialists were created to extract tribute (an early form of taxation) by force, from smaller and less powerful groups in the area, which in turn built the wealth and resources of favoured members of the larger group. The Zulu polity developed in this way. This is the context within which to understand the relationship between the indigenous people living in southern Mozambique and the powerful, hierarchically organised cattle keepers to the south of them.

The term Ronga/Thonga refers to the people living in the area of what is today Mozambique south of the Sabi river, and including northern KwaZulu-Natal (Junod, 1962 cited by Kloppers, 2001; Adam *et al.*, 2014). The Mabhudu, Tembe and Nyaka clans all lived in and around the iSimangaliso Wetland Park. Records from 1554 show that for approximately 250 years, from the middle of the 16th century, the Tembe ruled the area surrounding Maputo Bay (Adam *et al.*, 2014).

7 This section is based largely on the following references, and on training materials developed for the iSimangaliso Wetland Park Authority.
- Klopper, S. 1992. *The Art of Zulu-Speakers in Northern Natal-Zululand: An Investigation of the History of Beadwork, Carving and Dress from Shaka to Inkatha.* Unpublished PhD dissertation, University of the Witwatersrand.
- Hamilton, C. and Wright, J. 1989. 'Traditions and transformations: The Phongolo-Mzimkhulu region in the late eighteenth and early nineteenth centuries; in Duminy and Guest (eds) *Natal and Zululand from earliest times to 1910: A new history.* University of KwaZulu-Natal Press: Durban.
- Kotze, S. & Guy, J. 1996. *Political power and land distribution in the St Lucia area from the 19th Century.* Unpublished research paper, History Department, University of Natal.
- Wilson, M. and Thompson, L. 1969. *The Oxford History of South Africa I: South Africa to 1870.* Oxford University Press: London.
- Giliomee, H. 2003. *The Afrikaners: Biography of a People.* Tafelberg: Cape Town.
- Walker, C. 2008. *Landmarked - Land claims and land restitution in South Africa.* Ohio University Press/Jacana.

People living in this part of southern Africa existed as separate groups that had little to do with each other apart from sharing various cultural practices and languages. There was no general term to describe people living in this region before they came into contact with the Zulu and the colonial settlers (Klopper, 1992). They lived in small-scale political units that ranged over a few hundred to several thousand square kilometres, and in size from a thousand or fewer individuals to several thousand or more. In some, the ruling chief exercised a lightly felt managerial and ritual authority over the people who recognised his rule and paid him tribute. In larger units, the dominant chief's power was to a greater or lesser extent based on physical force.

Chiefdoms were made up of shifting clusters of homesteads. Ties of kinship, of clientship, and of marriage operated to bind households into communities. The acts of allegiance people made to a particular chief and the distribution of some of the tribute given by him to favoured individuals also provided some stability and political cohesion. But both communities and chiefdoms were generally fluid and unstable entities, enlarging, splitting, forming and reforming, sometimes peacefully, sometimes violently, as members quarrelled over access to resources and power. This was because there were no institutions through which the chief could exercise more than a temporarily effective command over the armed men of the chiefdom. For the same reason, these chiefdoms of the mid-eighteenth century and earlier were not divided along class lines - permanently opposed groups of "haves" and "have-nots" - because a ruling group did not have the institutional means to seize exclusive control of a chiefdom's basic resources. There was however inequality between men and women, and between older and younger people.

During the second half of the 18th century, the Mabhudu chieftaincy was the strongest in southeast Africa, establishing its control from Maputo Bay to Lake St. Lucia, and from the Pongola River to the Indian Ocean. However, in the 19th century (1801-1900), the Tembe rule was disrupted by European and Zulu power.

The Mabhudu established their capital near present-day Mabudula, a site that offered natural protection from enemies. The Mabhudo did not keep cattle because the area was afflicted by tsetse fly, but they kept pigs, chickens and goats as livestock. They used the ancient agricultural technique of slash-and-burn, which involved cutting and burning vegetation to produce ash as a fertiliser for the poor sandy soils. The Portuguese explorer, Manuel de Mesquita, named the area Terra dos Fumos - Land of Smoke, most likely due to this land use.

## EUROPEAN INFLUENCE

The European influence began when the Portuguese explorer, Pedro Álvares Cabral, "discovered" Maputo Bay in 1501. However, it was only after 1544 when Lourenço Marques, a Portuguese merchant, discovered the great potential in the area for the ivory trade that Europeans started to show interest in the area. The city that developed during colonial rule was named Lourenço Marques. It was named Maputo after independence from Portugal was achieved in 1975. The name of Delagoa Bay derives from the Portuguese Baía de Lagoa, Bay of the Lagoon.

Portuguese ships anchored at the river mouths surrounding the bay to trade elephant tusks, hippopotamus teeth and rhino horns for cloth and other goods from India. The slave register at Klein Constantia in Cape Town[8] lists slaves from Mozambique as workers on the wine farm, so there was a slave trade too, although the extent of it is unknown. During this period, the Portuguese did not attempt to establish their political power over the area. From 1688 to 1796, the Portuguese, British, Dutch, Austrians and French all established trading stations in Maputo Bay and competed for ivory and gold.

At the beginning of the 1800s, this social and political system began to change. Historians do not really know why the long-established balance between small independent chiefdoms made up of not more than four or five villages collapsed. Some historians think that it was the work of powerful individuals – notably Dingiswayo and Shaka, African kings who rose to great prominence in the early part of the 19th century. Others claim that the change was due to the presence of white colonials, who inspired these local rulers to adapt and expand their military tactics and quest for domination. There have been other suggestions, including that certain chiefs sought economic control of trade networks extending up into what is now Malawi, or that an expanding population needed new land for settlement.

More recent accounts suggest that the international trade in ivory provided the initial dynamic. Studies in other parts of Africa have linked the revival of the European ivory trade at Delagoa Bay from the mid-eighteenth century onwards to political conflict and the formation and expansion of states, where previously there were no states.

8 Klein Constantia in the Western Cape of the Republic of South Africa dates back to **1685** when Simon van der Stel chose the most favourable location for his vast and fertile farm called "Constantia". The farm was dependant on slave labour until slavery was formally abolished in South Africa in 1834.

A series of conquests known as the *Mfecane* occurred when some of the chiefdoms along the south east coast and its interior began to absorb other more poorly defended chiefdoms and become large and powerful kingdoms. The most powerful and commanding of the polities to arise from these wars was the Zulu Kingdom with its famous king, Shaka kaSenzangakhona. Shaka took over a small chiefdom called the Zulu, at the time a group of about two thousand people. He developed a military system that included some of his own tactical inventions, including the short stabbing spear and body-length shield. Shaka developed effective battle formations and strategies, and his soldiers were strictly trained and disciplined. In 1818 his old enemy, Zwide, chief of the Ndwandwe, killed Dingiswayo, the Zulu chief. Shaka took over his command to become the strongest ruler north of the Thukela River.

The rise of the Zulu kingdom brought about mass displacement of people across the eastern coast and its interior. Refugees from Shaka's battles were forced into southern and northern territories. Others found refuge in the mountains to the west, or were absorbed into the Zulu nation. The conflict in Zululand resulted in the forced migration of many groups that settled temporarily or permanently in Maputaland. Ndwandwe leaders like Soshangane, Zwangendaba, Ngwane and Nxaba fled northwards to Maputaland, leaving a path of destruction and misery in their wake. The Soshangane settled near Maputo Bay, north of Mabhudu, extracted tribute from Lourenço Marques and took women and children from surrounding chiefdoms.

In the pre-colonial period southern Mozambique was dominated by several competing chieftaincies. It was traditionally granted that the people along the shores of Lake St Lucia, stretching up to Maputo Bay, fell under the sway of the Mabhudu king. When the Mthethwa - led by Dingiswayo kaJobe - and subsequently the Zulu state of Shaka kaSenzangakhona expanded into the ivory-rich coastal region, Ronga/Thonga speaking people were forced to move away from the Mfolozi valley into the iSimangaliso Wetland Park area. The aggression of the Thembe king to the north at the same time further concentrated Ronga/Thonga speaking people around Lake St Lucia. Although the various communities would have spoken different dialects of the Ronga/Thonga language, and would not have seen themselves as a 'nation' as we understand the term today, most would have recognised the political authority of the Mabhudu king.

By 1824 Shaka had extended Zulu authority over the Ronga/Thonga speaking people. The area was never formally incorporated into the Zulu state but the Mabhudu king Makasana was regarded as having a 'client' relationship with the successors of Shaka. This meant that while the king was free to reign in his own territory, he was expected to supply tribute to the Zulu kings in the form of cattle, trade goods and sometimes labour. This situation continued until the death of king Makasana in 1853, at which point the reigning Zulu monarch (Shaka's successor Mpande kaSenzangakhona) tightened his control over the Ronga/Thonga speaking people of the coast.

James Stuart, an interpreter and administrator in Natal, Swaziland and Zululand, writing around the 1920s, records an interview with a Zulu-speaking man named Bikwayo kaNoziwawa that shows what the Zulu tributary control over Tsonga/Ronga lands implied, even in the late 19th Century:

> *I used to go to Tongaland with my father – as a mat-bearer. My brother Mnyaiza… used also to go. We used to go for genet skins for the warriors' dancing girdles; blue monkey skin for the strips worn at the side of the face; leopard and otter skin for the warriors' headbands; blue cloth to be worn by the king's isigodhlo [women's enclosure in the king's quarters]; large red beads, and lion and leopard claws worn by chiefs; elephant tusks for the king (who would send them on to the Europeans); rhinoceros horns for making snuff boxes of the type carried in the ear lobe (for the amakosikazi [older royal women]); beads, calabashes, gourds, etc; beer baskets, food baskets, ubusenga rings [worn around the upper arm and calf], ornamental sticks and knob sticks, and many other articles – ostrich feathers and amampabane beads worn by chiefs…. When the things were ready, the Tonga king would furnish men to accompany us with the things to Zululand, they acting as the carriers. Things were fetched from Tongaland year by year. No year passed without this being done (Webb and Wright in Klopper, 1992).*

Mpande supported the claim of the 14-year-old Nozingile over Makasana's heir Makasanyana. The new young king was thus secured as an ally of the Zulu state, an alliance that was further cemented when Mpande presented him with a wife. Following the Zulu Civil War of 1856, Cetshwayo kaMpande settled some of his followers around the Phongolo River. The border chiefs south of Kosi Bay became increasingly independent of the Mabhudu king as Zulu power and influence over the Mabhudu chiefs increased both north and south of Lake St Lucia.

## COLONIAL RULE

Imperialism influenced the lives of Ronga/Thonga speaking people in the early 1870s when Britain and Portugal came into conflict over the crucial question of trade rights on the southeast coast. The French president MacMahon was asked to arbitrate and without any consultation with the people who lived there, the territory of the Mabhudu king was carved in two. All the land from Delagoa Bay (modern Maputo) to 26'30'' (just north of Lake St Lucia) was granted to the Portuguese while everything south of that, and as far west as the Mkhuze River, became part of the Zulu kingdom, therefore in the general sphere of British interest. In this way, the Maputo National Park and iSimangaliso Wetland Park areas were for the first time separated politically.

In 1876, the year after the MacMahon arbitration, the Mabhudu king Nozingile died and his brother Muhena became regent with the support of Cetshwayo kaMpande. After the Zulu defeat at the hands of the British in 1879 there was an extraordinary palace coup when Nozingile's Swazi widow Zambili secured the throne for her juvenile son, declared herself Queen-Regent and forced all other claimants into exile. By agreeing to assist in their suppression of Zulu authority, she engineered British support for her position. The Anglo-Mabhudu 'treaty of friendship' was signed in July 1887. The Queen-Regent was a formidable character and quite capable of holding her own in international relations. When the British refused to extend her territory south of the Mkhuze River she swung her allegiance to the Portuguese. In 1888 the British annexed Zambili's land to the new colony of Zululand to prevent the extension of Portuguese claims on her land. With the new dispensation, the northern shores of Lake St Lucia fell under the minor Mabhudu chiefs Sibonda and Ncamana. The British claimed that all the people living along the shores of Lake St Lucia were henceforth to be considered "Zulu" subjects of the British crown. After generations of Mabhudu political leadership, the Ronga/Thonga-speaking people of the area found themselves under new political masters.

The Portuguese and British colonial systems differed. The British adopted the policy of indirect rule. The rule of traditional leaders was recognised (and paid for) by the British Government, thus maintaining chiefly authority. The Portuguese adopted a strict assimilation system, forcing elites to become Portuguese, culturally and politically, thus weakening chiefly power. In 1896, the Mabhudu chief sought British protection by moving to "British AmaThongaland" in the southern part of Maputaland.

## THE POSTCOLONIAL PERIOD

In 1975, after Mozambique gained independence, the new Constitution of Mozambique declared that all land and natural resources belonged to the state, to be held in trust for all Mozambique's people. The right of traditional authorities to allocate land – the basis of chiefly power – was removed as part of a government campaign to eliminate traditional authorities in Mozambique. In 1976, the South Africa Government, claiming that the Ronga/Thonga were Zulu, incorporated southern Maputaland into the KwaZulu homeland.

## HISTORY OF CONSERVATION EFFORTS IN THE REGION

### The Period between the Late 19th and the Mid-20th Centuries

In the late 1890s, European colonies in East and Central Africa established a hunting licensing system to control sport and commercial hunting when it was clear that the spectacular colonial destruction of wildlife during the troubled 19th century would spell the end of the native fauna. However, it was recognised that hunting regulations were not sufficient as wildlife hunting continued to increase (José, 2017). The first nature conservation areas were established in South Africa (St. Lucia Reserve was established in 1895) and North America (Yellowstone National Park in 1872) at the end of the 19th century, when great species loss through uncontrolled hunting using firearms had already occurred, and most of the land had been taken from native peoples.

The establishment of hunting laws, game reserves and national parks by the English colonial governments in Africa opened up a new dialogue on the need to preserve wildlife in southern Africa. In southern Mozambique, the Portuguese instituted hunting regulations but unregulated hunting for wildlife near emerging urban areas continued, as both Portuguese and Africans had easy access to firearms (José, 2017). In May 1900, due to the lack of effective measures to halt the loss of African wildlife, the Germans and the British organised a Convention on the Preservation of Wildlife, Birds and Fish in Africa that took place in London. As a result, Portugal urged chartered companies, which controlled the central and northern provinces, to introduce game laws to regulate hunting and also urged the government of Save Province to address the issues of fauna protection and hunting regulation more seriously. In 1903, the Lourenço Marques District established a game board, the Comissão de Caça da Província de Lourenço Marques (CCLM) that, in the same year, introduced the first hunting regulation of the district. In 1906, this regulation was reviewed and became the hunting regulation for the Província do Sul do Save. The regulation detailed the hunting methods and hunting seasons allowed as

well as the cost of hunting licenses. The regulation prevented Africans from commercial hunting. Africans who could not pay the licensing fees were excluded from hunting large game and were only allowed to hunt small game.

In 1910, the Mozambique Game Board, known as the Comissão de Caça da Colónia de Moçambique (CCM) was established in the colony of Mozambique to advise on the establishment of hunting reserves and hunting seasons and to improve game management. The board promulgated the 1910 Hunting Regulation that further limited hunting for Africans, who relied on bush meat for subsistence as well as for trade (José, 2017). As a result, local hunters became poachers (José, 2017), although according to this author there was no effective enforcement of hunting regulations in southern Mozambique.

The Hunting Regulations of 1910 also addressed the need for wildlife protection by limiting the numbers of animals from threatened species that could be hunted. This regulation did not give local communities any role in hunting management (José, 2017). Apart from these regulations, no efforts were made to set aside areas for the protection of fauna and flora such as game reserves or national parks, despite international pressure to do so. The CCM chose the interests of sport and commercial hunters over the protection of wildlife (José, 2017).

From the late 1930s, Mozambican naturalists and ecologists became seriously concerned about wildlife conservation (José, 2017). They lobbied for the establishment of cooperation agreements with South Africa through the establishment of transfrontier parks for the protection of migratory species in particular (Jose, 2017). However, no significant efforts were made. The Portuguese government chose guaranteed revenues from hunting over expensive wildlife conservation (Jose, 2017). Finally, in 1947, the Governor-General created a team to develop new conservation policies and hunting regulations for the colony that reviewed the numbers of animals killed per license and the prices of licenses. However, the loss of wildlife in southern Mozambique was not due to the lack of hunting regulations but to the lack of the resources to enforce them and the failure of the government to declare conservation areas (Jose, 2017). In the 1950s, the design and enforcement of hunting regulations was weak because of the lack of detailed scientific research on the status of wild fauna, as well as the lack of effective conservation management. Pressure from conservationists eventually resulted in Decree 40.040, which established a single forest and wildlife regulatory regime for all the Portuguese colonies, and the hiring of skilled hunting scouts in Mozambique.

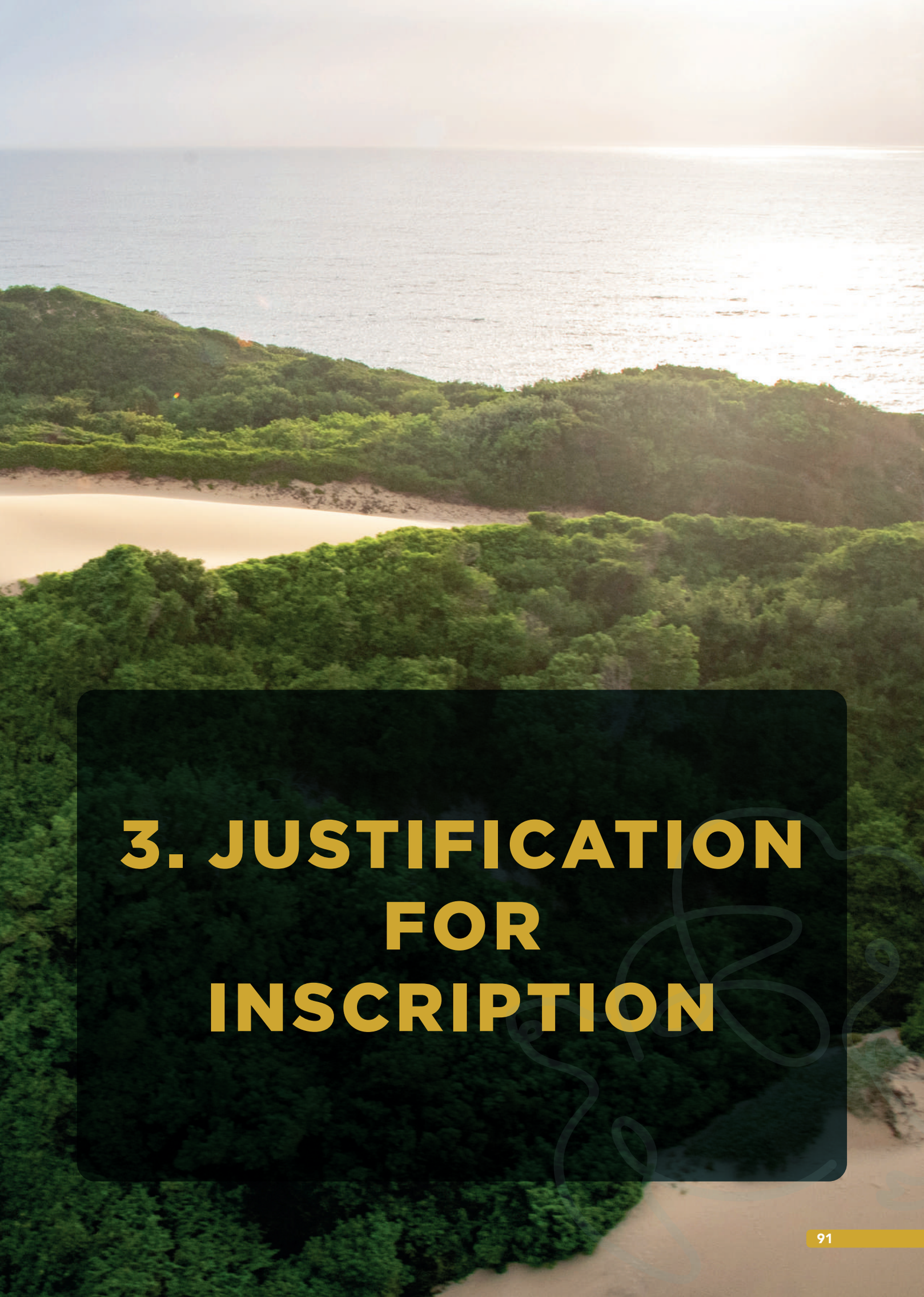
## Protected Areas

In 1909, a hunting ground that bordered Maputo Bay in the north (and was known in Portuguese as 'coutada de caça') was created to regulate sports hunting. It was proclaimed in 1927. In 1932 it was renamed the Reserva Especial para a Protecção dos Elefantes (Special Reserve for Elephant Protection) and hunting in the reserve was completely prohibited. In the 1960s and 1970s, the Portuguese colonial government officially declared a number of national parks, reserves and hunting grounds (Soto, 2009). Four important protected areas were established: the Maputo Special Reserve (MSR), the Nyakeni Forest Reserve, Ilha de KaNyaka and lastly, the PPMR. More recently, in 2019, this area was declared the Maputo Environmental Protection Area (Área *de Protecção Ambiental* de Maputo).

At the international level, the Mozambican Government has made efforts to adopt trans-boundary conservation measures through the creation of Transfrontier Conservation Areas (TFCAs). In 2000, a protocol was agreed and signed by Mozambique, South Africa and eSwatini to establish the Lubombo Transfrontier Conservation and Resource Area, with an area of 10 029 km$^2$, that included four transfrontier conservation areas. The Transfrontier Conservation and Resource Area (TFCA) includes the first marine TFCA in Africa, the Ponta do Ouro–Kosi Bay TFCA, which links the MNAP directly to the iSimangaliso Wetland Park (PPF, 2020).

## Institutional and Regulatory Framework

In 1975, after Mozambique achieved independence from Portuguese colonial rule, the new Constitution stated that the country's natural resources would be directly controlled by the state. However, in the early 1980s the civil war reduced the country's capacity to manage protected areas and to control natural resource use (Soto, 2009). In 1992, Mozambique took part in the United Nations Conference on Environment and Development. This resulted in a greater commitment to international agreements through the approval of policies, strategies, laws and regulations to strengthen the environmental legal and institutional framework, as well as a commitment to the declaration of further conservation areas in the country (Soto, 2009).



# 3. JUSTIFICATION FOR INSCRIPTION

## 3.1.a BRIEF SYNTHESIS

The proposed transboundary extension, the Maputo National Park (MNAP) is located on the south-eastern coast of southern Mozambique, and the inscribed World Heritage Property, the iSimangaliso Wetland Park, lies adjacently along the north-eastern coast of South Africa. Together – these properties cover a unique wetland, marine/coastal and terrestrial area at the southern limit of the east African coastal plain recognised for its global conservation significance. The MNAP is proposed as a transboundary extension of both the marine and terrestrial portions of the iSimangaliso Wetland Park to create a single World Heritage Property straddling the border between Mozambique and South Africa.

Together, the proposed transboundary extension and the inscribed property fall within the Maputaland Centre of Plant Endemism and the Maputaland-Pondoland-Albany Hotspot, one of only 36 such regions of botanical conservation significance globally. They contain a largely pristine and uninhabited continuum of marine, coastal, wetland, estuarine and terrestrial ecosystems in which diverse, interlinked habitats support an intact flora and fauna of exceptional species diversity and endemism. 6 500 plant and animal species are recorded for the iSimangaliso Wetland Park and 4 935 for the proposed transboundary extension. The two properties' marine components uniquely represent a number of biogeographic provinces and form one of eight key biodiversity seascapes of global importance within the Eastern African Marine Ecoregion.

## 3.1.b CRITERIA UNDER WHICH INSCRIPTION IS PROPOSED (AND JUSTIFICATION FOR INSCRIPTION UNDER THESE CRITERIA)

The iSimangaliso World Heritage Property was inscribed for the same criteria (vii, ix, x) upon which the proposed transboundary extension submission is argued, suggesting the equivalence and complementarity of their attributes. These criteria, as set out below, are described here for this proposed, consolidated site.

### Criterion (vii): Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

Together, the iSimangaliso Wetland Park and the Maputo National Park offer terrestrial, coastal and marine land and seascapes of exceptional beauty. The clear, sparkling waters of the Indian Ocean, punctuated by coral reefs, break on wide sandy beaches and rocky shores, and a forested cordon of five dune forms abut an expansive mosaic of wetlands, grasslands, estuarine systems, lakes, savannah, swamp- and sand-forests to offer rich landscape texture, remote wilderness and sweeping vistas. Tidal mangroves and seagrass meadows in Maputo Bay add to this moving spectacle. Outstanding natural phenomena are large numbers of nesting Leatherback and Loggerhead turtles on the beaches, dolphins and migrating whales and whale sharks, dugongs, the largest aggregation of giant trevally in the world, large numbers of waterfowl, large breeding colonies of pelicans, storks, herons and terns, and the southerly flyway for migratory birds of the east coast of Africa make this area one of the most important bird refuges on the southern African subcontinent. In the iSimangaliso Wetland Park, naturally shifting salinity states in Lake St. Lucia are linked to wet and dry climatic cycles, with the lake responding accordingly with shifts from low to high-saline states.

### Criterion (ix): Be outstanding examples 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.

The iSimangaliso Wetland Park and the Maputo National Park are located at the narrow southern limit of the East African coastal plain on which early Pleistocene fluvial, marine and aeolian forces, together with climate, geology, oceanography and soils, have produced a richly textured mosaic of terrestrial, wetland, estuarine, coastal, and marine elements. Climatic stability in the Pleistocene has enabled species to persist, leading to high levels of endemism. The area's transitional location between sub-tropical and tropical biotas, and its coastal setting also support exceptional species diversity. Past speciation in the Maputaland Centre of Endemism is ongoing against a backdrop of undisturbed landscape-level and geological unfolding. In the marine environment, sediments transported by the Agulhas current are trapped by submarine canyons on the continental shelf, allowing for clear waters and coral reefs.

### Criterion (x): 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.

The range of habitats (terrestrial, wetland, coastal and aquatic) in the iSimangaliso Wetland Park and the Maputo National Park support a conservation-significant diversity of African biota, including many threatened and/or endemic species. Of over 6,500 plant and animal (including 521 bird) species recorded from the iSimangaliso Wetland Park, those of conservation importance include 11 species endemic to the Park, 108 species endemic to South Africa, and 467 species listed as threatened in South Africa. Of 4,935 species recorded in the MNAP, 104 are of international conservation significance, and 184 are endemic or near endemic to Mozambique (5), southern Africa (95) and the WIO (135).

Specifically, the iSimangaliso Wetland Park and the Maputo National Park share natural habitats for in-situ conservation of threatened species of outstanding universal value for science and conservation.

Leatherback and Loggerhead turtles, listed as 'Near Threatened' on the IUCN Red List, use the coastal dunes and sandy beaches of both Parks as critical inter-nesting, mating, and nesting grounds. In terms of population size, these habitats support the second most important nesting population in the Indian Ocean.

In the Maputo National Park, the waters of the western shores of Ilha de KaNyaka shelter the last remnant individuals of the Dugong population of Maputo Bay. Also on the western shores of Ilha de KaNyaka, the reefs of Barreira Vermelha and Ponta Torres occur under extreme environmental conditions. These reefs are isolated from others along the East African coastline and are unique within the Western Indian Ocean region. Adding to these features, Ilha de KaNyaka has the largest coverage of seagrass (Zostera capensis) in the world, a species categorised as Vulnerable on the IUCN Red List because of its decline in Maputo Bay.

## 3.1.c STATEMENT OF INTEGRITY

According to the IUCN's 1999 Technical Evaluation of the iSimangaliso Wetland Park's World Heritage Property application, even as a stand-alone property, iSimangaliso "is of sufficient size and retains most of the key elements that are essential for long-term functioning of the ecosystem." The addition of the proposed transboundary extension will add 153,992 ha to the iSimangaliso World Heritage Property's 243,479 ha, and expand the WHS area contained within the Maputaland Centre of Endemism by approximately 60% to create a single, new, 397,471 ha Protected Area[9]. This area will reap the protective advantages of its larger size, and is additionally protected by buffer zones in both properties – iSimangaliso WHS: 322,905 ha; MNAP: 469,363 ha. It will also profit from the species-area relationship, a more advantageous edge-to-area ratio and greater biogeographic coverage. Its flora and fauna may have larger ranges, and more viable population sizes and migratory possibilities. The area's situation within the larger Lubombo Transfrontier Conservation and Resource Area, with its many Parks and Protected Areas, is also notable, and bears testimony to the history of conservation and co-operation in the region. The proposed transboundary extension consolidates the integrity of the overall property, exhibiting many of the habitats, landscapes, and processes of the iSimangaliso Wetland Park, and adding novel features and species. Together, the two properties deliver a generous arena for terrestrial and marine attributes and natural processes important for long-term conservation and functioning of ecosystems.

## 3.1.d STATEMENT OF AUTHENTICITY (FOR NOMINATIONS MADE UNDER CRITERIA (I) TO (VI)

Only for cultural properties

9 This excludes the iSimangaliso Marine Protected Area of 1 070 203 ha

## 3.1.e PROTECTION AND MANAGEMENT REQUIREMENTS

The iSimangaliso Wetland Park is managed by the iSimangaliso Wetland Park Authority, according to national legislation which affords it legal protection; it is surrounded by a buffer zone, and managed as a single, largely fenced and uninhabited Protected Area according to its Integrated Management Plan (IMP), which defines zonation of terrestrial and marine areas and permissible/non-permissible use according to zone. Funding for conservation management comes from National and Provincial Government, donors, and private sector and commercial revenue. Threats to iSimangaliso include degradation of the upper Mfolozi Swamps by agriculture; droughts, which affect the salinity and water levels in Lake St. Lucia; unsustainable fishing and alien invasive plants, the state of catchments outside the Park and land claims.

Conservation management of the MNAP is well advanced due to prior work by the Mozambique Government to establish formally protected areas in southern Mozambique, and interest in recent years from donors, international conservation agencies and the Peace Parks Foundation. The MNAP is managed by the National Administration of Conservation Areas (ANAC) through a Management Unit with a Park Administrator (appointed by ANAC) and an Operational Manager appointed by Peace Parks via a co-financing agreement between the two entities.

The protection and management of MNAP is subject to the legal framework of the Government of Mozambique. The Maputo Environmental Protection Area (MEPA) was gazetted in 2019, providing a buffer zone for the MNAP, which was proclaimed in 2021.

The MNAP's Management Plan was approved by the Government of Mozambique on the 25th November 2022. The Management Plan will address Policy Frameworks, Strategies, Heritage, Social Management, Livelihood and Commercial Development. The Park's Specific Regulation, which includes the zonation plan, park rules, and tourism concession activity limits govern many potentially harmful activities. Park-specific Tourism, Business and Elephant Management plans have also been approved.

The co-management agreement with Peace Parks Foundation spans 15 years, and its injection of skilled staff, capital and operational funds is laying a firm foundation for progressive conservation management. Part of this foundation is that the rewilding of the Park has been largely completed, Eucalyptus plantations have been removed and protection services improved, and the Park is now attractive to tourists and has moved into a tourism development phase. Stakeholders, including communities living in the Park and its buffer zone (MEPA), Government, NGOs, Transfrontier conservation structures and Research institutions are consulted regularly and represented on management forums and committees.

Despite this level of organisation and consolidation, the Park still faces a number of development-, environment-, and tourism-related challenges. Chief among these are the socio-economic conditions in which the MNAP finds itself - the state of regional development, the poverty of those who live in and around the Park, and the reliance of these inhabitants on natural resources, livestock and farming.

The MNAP also faces specific challenges - climate change will affect it, as may pollution in the marine environment in the case of marine disasters, or artisanal and semi-commercial over-fishing. Charcoal and firewood production, invasive species, and the growth of tourism are notable, as are expanding road networks, the proximity of Maputo port, the potential construction of a deep-water port at Techobanine and interests in mining, oil and gas exploration.

However, the Mozambique government's strategic development plans for the region seek to safeguard the environment, together with the legal framework and management system for the property.

# 3.2 COMPARATIVE ANALYSIS

The UNESCO World Heritage list includes 90 World Heritage wetlands, which overlap to varying degrees with approximately 130 Ramsar sites. Compared with the 32 marine/coastal and inland natural wetland forms recognised by the Ramsar Convention as occurring across these 130 properties, the iSimangaliso Wetland Park-MNAP property contains 23 of these forms, and available information suggests that no other locality offers so many wetland types in a single area. According to the IUCN's Technical Evaluation of the iSimangaliso Wetland Park's World Heritage Nomination, even as a stand-alone property, there are no other properties in the world that have the same range of values. To this range, the proposed transboundary extension will add extensive areas of swamps, freshwater lakes, coastal lagoons, mangroves, sea-grass meadows, and Maputo Bay to consolidate the robustness of the IUCN's evaluation.

In Africa, the only World Heritage Property comparable to the iSimangaliso Wetland Park World Heritage Property and its proposed transboundary extension, the MNAP, is the Banc d'Arguin National Park in Mauritania, which contains sandy marine and estuarine waters but does not have freshwater habitats or coral reefs. The same is true of Shark Bay in Western Australia, the Whale Sanctuary of El Vizcaino in Mexico and, to a lesser extent, Donaña National Park in Spain. But none of these properties have the same terrestrial species complement as the iSimangaliso-MNAP property, which has megaherbivores such as Rhino and Hippo, predators such as Leopard and Crocodiles, provides habitat for a significant diversity of African biota at viable population sizes, and harbours 48 species listed as threatened internationally, offering critical habitat to marine, wetland and savanna taxa. The iSimangaliso Wetland Park and the proposed transboundary extension are similar in some respects to the K'gari (Fraser Island) World Heritage Property in Australia which has coastal sand dunes, and turtles, dolphins, whales and abundant fish and marine invertebrates; however the iSimangaliso Wetland Park-MNAP property is still distinctive in terms of its range of saline and freshwater wetlands, estuaries, floodplains, savanna and megafauna.

Regionally, important coastal wetlands are found at Walvis Bay, Cape Cross and Sandwich Harbour in Namibia but these are arid areas without the range of ecosystems and biota as found in the iSimangaliso Wetland Park-MNAP property; and while the South African coast hosts approximately 50 conservation areas, the iSimangaliso-MNAP property remains distinctive in containing the largest estuarine system in Africa, coral reefs, globally acknowledged diversity and a high number of threatened species. Whether comparisons are regional or global, iSimangaliso-and-the-MNAP remain distinctive in their range of saline and freshwater wetlands, estuaries, floodplains and savanna. While freshwater lagoons and estuaries occur further north on the Mozambique coast they lack the range of natural values of iSimangaliso-MNAP and do not enjoy the same prospects for protection.

Within the South African Woodland/Savanna Biogeographical Province there are 389 protected areas, many large in size such as Kruger, Hwange and the Okavango Delta World Heritage Property. All of these properties are inland and lack the coastal/marine features of the iSimangaliso Wetland Park-MNAP property.

This coastal/marine attribute is reflected in the 46 World Heritage Properties (out of a total of nearly 936) listed specifically for their coastal and/or marine values. However, within the Indian Ocean Region only the iSimangaliso Wetland Park and Aldabra Atoll in Seychelles are inscribed in the World Heritage list. While inscribed under the same criteria as the iSimangaliso Wetland Park, Aldabra Atoll is not comparable to iSimangaliso, as it is a remote, isolated, coral atoll in the open ocean.

Research is underway to identify coastal and marine areas in the Western Indian Ocean with potential OUV, and a number of properties have been identified in the Mozambique Channel, on the Mascarene Plateau, Northeast Madagascar, South Africa, the French Southern Territories and the Lamu-Kiunga Archipelago. These areas have unique regional features pertaining to Geology, Oceanography, Biodiversity and Biogeography; specific habitats and species including coral reefs, mangroves and seagrasses, and fauna such as Coelecanths, sharks and rays, turtles, marine mammals and seabirds. However, it is thought that, while such features are spread across the region, only a few properties express them to a sufficient level to meet the OUV criteria of the World Heritage Convention, and properties such as the iSimangaliso Wetland Park and proposed transboundary extension are likely to remain rare. Indeed, World Heritage data show a trend of decreasing inscriptions - specifically regarding criterion vii – as this criterion is most strongly associated with early-detected iconic properties which established a level of value more-and-more difficult to match. Thus, comparative analysis is now more likely to reveal that existing properties on the World Heritage List surpass new nominations in their demonstration of this value. As an exemplar of OUVs, the anchor role of the iSimangaliso Wetland Park property is

notable, and the combined property, to which the proposed transboundary extension adds unique features, is likely to compare favourably with established and newly-nominated World Heritage Properties.

Finally, to assess comparator properties, the transboundary nature of the iSimangaliso Wetland Park-MNAP property is relevant. This is because such properties illustrate the aspiration for marine World Heritage in which governments co-operate to pursue an ecosystem approach to property selection. This approach improves on conventional country-by-country methods and may enhance the marine World Heritage List by identifying ecologically optimal properties (Obura *et al.*, 2012). In the ecologically borderless oceans, new ways to identify marine phenomena and conservation properties require regional approaches at the scale of marine provinces, or biomes. The iSimangaliso Wetland Park and proposed transboundary extension is instructive in this regard, as it includes Tropical Indo-West Pacific and Sub-tropical East Coast Provinces, and boasts, as a result, an ichthyofauna considered unique; also, the marine area covered by the iSimangaliso Wetland Park and proposed transboundary extension falls within one of eight key biodiversity seascapes of global importance within the Eastern African Marine Ecoregion (EAME). This is because, in biogeographic terms, the area spans a transitional subtraction zone, conserving tropical and sub-tropical biotas on land and at sea; as an example, its high-latitude reefs occur at the southern geographical limit of corals in the western Indian Ocean, while on land, the area conserves many taxa at the southernmost limit of their distribution. Thus, the proposed transboundary extension to the iSimangaliso Wetland Park is arguably instructive as a supra-national approach to securing a property which is distinctive in its marine and terrestrial biogeography.

# 3.3 DRAFT STATEMENT OF OUTSTANDING UNIVERSAL VALUE

## BRIEF SYNTHESIS

The proposed transboundary extension, the Maputo National Park (MNAP) is located on the south-eastern coast of southern Mozambique, and the inscribed World Heritage Property, the iSimangaliso Wetland Park, lies adjacently along the north-eastern coast of South Africa. Together – these properties cover a unique wetland, marine/coastal and terrestrial area at the southern limit of the east African coastal plain recognised for its global conservation significance. The MNAP is nominated as a transboundary extension of both the marine and terrestrial portions of the iSimangaliso Wetland Park World Heritage Property to create a larger World Heritage Property straddling the border between Mozambique and South Africa.

Together, the proposed transboundary extension and iSimangaliso Wetland Park fall within the Maputaland Centre of Plant Endemism and the Maputaland-Pondoland-Albany Hotspot, one of only 36 such regions of botanical conservation significance globally. They contain a largely pristine and uninhabited continuum of marine, coastal, wetland, estuarine and terrestrial ecosystems in which diverse, interlinked habitats support an intact flora and fauna of exceptional species diversity and endemism. 6 500 plant and animal species are recorded for the iSimangaliso Wetland Park and 4 935 for the proposed transboundary extension. The two properties' marine components uniquely represent a number of biogeographic provinces and form one of eight key biodiversity seascapes of global importance within the Eastern African Marine Ecoregion.

## JUSTIFICATION FOR CRITERIA

The iSimangaliso World Heritage Property was inscribed for the same criteria (vii, ix, x) upon which the proposed transboundary extension submission is argued, suggesting the equivalence and complementarity of their attributes. These criteria, as set out below, are described here for this proposed, consolidated site.

## Criterion (vii): Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

Together, the iSimangaliso Wetland Park and the Maputo National Park offer terrestrial, coastal and marine land and seascapes of exceptional beauty. The clear, sparkling waters of the Indian Ocean, punctuated by coral reefs, break on wide sandy beaches and rocky shores, and a forested cordon of five dune forms abut an expansive mosaic of wetlands, grasslands, estuarine systems, lakes, savannah, swamp- and sand-forests to offer rich landscape texture, remote wilderness and sweeping vistas. Tidal mangroves and seagrass meadows in Maputo Bay add to this moving spectacle. Outstanding natural phenomena are large numbers of nesting Leatherback and Loggerhead turtles on the beaches, dolphins and migrating whales and whale sharks, dugongs, the largest aggregation of giant trevally in the world, large numbers of waterfowl, large breeding colonies of pelicans, storks, herons and terns, and the southerly flyway for migratory birds of the east coast of Africa make this area one of the most important bird refuges on the southern African subcontinent. In the iSimangaliso Wetland Park, naturally shifting salinity states in Lake St. Lucia are linked to wet and dry climatic cycles, with the lake responding accordingly with shifts from low to high-saline states.

## Criterion (ix): Be outstanding examples 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.

The iSimangaliso Wetland Park and the Maputo National Park are located at the narrow southern limit of the East African coastal plain on which early Pleistocene fluvial, marine and aeolian forces, together with climate, geology, oceanography and soils, have produced a richly textured mosaic of terrestrial, wetland, estuarine, coastal, and marine elements. Climatic stability in the Pleistocene has enabled species to persist, leading to high levels of endemism. The area's transitional location between sub-tropical and tropical biotas, and its coastal setting also support exceptional species diversity. Past speciation in the Maputaland Centre of Endemism is ongoing against a backdrop of undisturbed landscape-level and geological unfolding. In the marine environment, sediments transported by the Agulhas current are trapped by submarine canyons on the continental shelf, allowing for clear waters and coral reefs.

## Criterion (x): 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.

The range of habitats (terrestrial, wetland, coastal and aquatic) in the iSimangaliso Wetland Park and the Maputo National Park support a conservation-significant diversity of African biota, including many threatened and/or endemic species. Of over 6,500 plant and animal (including 521 bird) species recorded from the iSimangaliso Wetland Park, those of conservation importance include 11 species endemic to the Park, 108 species endemic to South Africa, and 467 species listed as threatened in South Africa. Of 4,935 species recorded in the MNAP, 104 are of international conservation significance, and 184 are endemic or near endemic to Mozambique (5), southern Africa (95) and the WIO (135).

Specifically, the iSimangaliso Wetland Park and the Maputo National Park share natural habitats for in-situ conservation of threatened species of outstanding universal value for science and conservation.

Leatherback and Loggerhead turtles, listed as 'Near Threatened' on the IUCN Red List, use the coastal dunes and sandy beaches of both Parks as critical inter-nesting, mating, and nesting grounds. In terms of population size, these habitats support the second most important nesting population in the Indian Ocean.

In the Maputo National Park, the waters of the western shores of Ilha de KaNyaka shelter the last remnant individuals of the Dugong population of Maputo Bay. Also on the western shores of Ilha de KaNyaka, the reefs of Barreira Vermelha and Ponta Torres occur under extreme environmental conditions. These reefs are isolated from others along the East African coastline and are unique within the Western Indian Ocean region. Adding to these features, Ilha de KaNyaka has the largest coverage of seagrass (Zostera capensis) in the world, a species categorised as Vulnerable on the IUCN Red List because of its decline in Maputo Bay.

# STATEMENT OF INTEGRITY

According to the IUCN's 1999 Technical Evaluation of the iSimangaliso Wetland Park's World Heritage Property application, even as a stand-alone property, iSimangaliso "is of sufficient size and retains most of the key elements that are essential for long-term functioning of the ecosystem." The addition of the proposed transboundary extension will add 153,992 ha to the iSimangaliso Wetland Park World Heritage Property's 243,479 ha, and expand the WHS area contained within the Maputaland Centre of Endemism by approximately 60% to create a single, new, 397,471 ha Protected Area[10.] This area will reap the protective advantages of its larger size, and is additionally protected by buffer zones in both properties – iSimangaliso WHS: 322,905 ha; MNAP: 469,363 ha. It will also profit from the species-area relationship, a more advantageous edge-to-area ratio and greater biogeographic coverage. Its flora and fauna may have larger ranges, and more viable population sizes and migratory possibilities. The area's situation within the larger Lubombo Transfrontier Conservation and Resource Area, with its many Parks and Protected Areas, is also notable, and bears testimony to the history of conservation and co-operation in the region. The proposed transboundary extension consolidates the integrity of the overall property, exhibiting many of the habitats, landscapes, and processes of the iSimangaliso Wetland Park, and adding novel features and species. Together, the two properties deliver a generous arena for terrestrial and marine attributes and natural processes important for long-term conservation and functioning of ecosystems.

## Requirements for protection and management

The iSimangaliso Wetland Park is managed by the iSimangaliso Wetland Park Authority, according to national legislation which affords it legal protection; it is surrounded by a buffer zone, and managed as a single, largely fenced and uninhabited Protected Area according to its Integrated Management Plan (IMP), which defines zonation of terrestrial and marine areas and permissible/non-permissible use according to zone. Funding for conservation management comes from National and Provincial Government, donors, and private sector and commercial revenue. Threats to the iSimangaliso Wetland Park include degradation of the upper Mfolozi Swamps by agriculture; droughts, which affect the salinity and water levels in Lake St. Lucia; unsustainable fishing and alien invasive plants, the state of catchments outside the Park and land claims.

Conservation management of the MNAP is well advanced due to prior work by the Mozambique Government to establish formally protected areas in southern Mozambique, and interest in recent years from donors, international conservation agencies and the Peace Parks Foundation (PPF). The MNAP is managed by the National Administration of Conservation Areas (ANAC) through a Management Unit with a Park Administrator (appointed by ANAC) and an Operational Manager appointed by PPF via a co-financing agreement between the two entities.

10 This excludes the iSimangaliso Marine Protected Area of 1 070 203 ha

The protection and management of MNAP is subject to the legal framework of the Government of Mozambique. The Maputo Environmental Protection Area (MEPA) was gazetted in 2019, providing a buffer zone for the MNAP, which was proclaimed in 2021.

The MNAP's Management Plan was approved by the Government of Mozambique on the 25th November 2022. The Management Plan will address Policy Frameworks, Strategies, Heritage, Social Management, Livelihood and Commercial Development. The Park's Specific Regulation, which includes the zonation plan, park rules, and tourism concession activity limits govern many potentially harmful activities. Park-specific Tourism, Business and Elephant Management plans have also been approved.

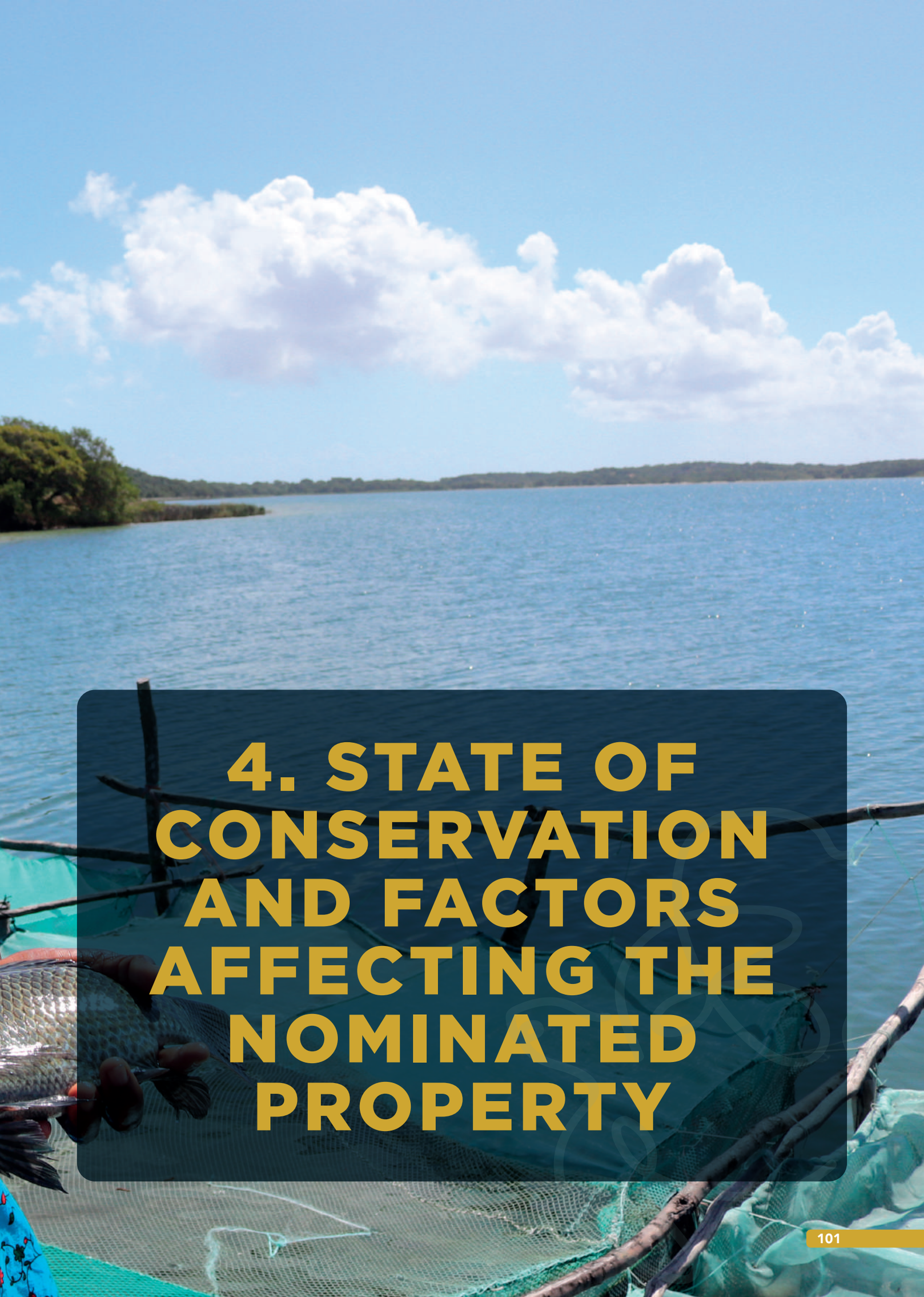
The co-management agreement with PPF spans 15 years, and its injection of skilled staff, capital and operational funds is laying a firm foundation for progressive conservation management. Part of this foundation is that the rewilding of the Park has been largely completed, Eucalyptus plantations have been removed and protection services improved, and the Park is now attractive to tourists and has moved into a tourism development phase. Stakeholders, including communities living in the Park and the buffer zone (MEPA), Government, NGOs, Transfrontier conservation structures and research institutions are consulted regularly and represented on management forums and committees.

Despite this level of organisation and consolidation, the MNAP still faces a number of development-, environment-, and tourism-related challenges. Chief among these are the socio-economic conditions in which the MNAP finds itself - the state of regional development, the poverty of those who live in and around the Park, and the reliance of these inhabitants on natural resources, livestock and farming.

The MNAP also faces specific challenges - climate change will affect it, as may pollution in the marine environment in the case of marine disasters, or artisanal and semi-commercial over-fishing. Charcoal and firewood production, invasive species, and the growth of tourism are notable, as are expanding road networks, the proximity of Maputo port, the potential construction of a deep-water port at Techobanine and interests in mining, oil and gas exploration.

However, the Mozambique government's strategic development plans for the region seek to safeguard the environment, together with the legal framework and management system for the property.


PESCA ARTESANAL, NUM



# 4. STATE OF CONSERVATION AND FACTORS AFFECTING THE NOMINATED PROPERTY

This dossier argues for the nomination of a site which will consolidate the iSimangaliso Wetland Park World Heritage Property and the Maputo National Park as a single property. Thus, it follows that relevant sections emphasise both these properties in arguing the nomination. Section 4, however, emphasises the state of conservation in the transboundary extension to specifically present the factors supporting the nomination of the as-yet-un-inscribed component of the proposed, consolidated property. For this reason, section 4 mentions both properties mainly when factors common to both are relevant, but otherwise retains its focus on the transboundary extension. Comparable information on the currently inscribed property, the iSimangaliso Wetland Park, can be found in the original nomination and the Park's Integrated Management Plan 2022–2030.

# 4.a PRESENT STATE OF CONSERVATION

The MNAP's present state of conservation reflects its regional and recent history. The MSR was proclaimed in 1960, the PPMR in 2009, and the MNAP in 2021 as a consolidation of these two Parks. Human settlement in the area (1960s–1980s) introduced many cattle, and the civil war (1976–1992) led to a great loss of wildlife. But the war-time evacuation of most local residents and the destruction of their livestock provided an ecological reprieve, and degraded areas recovered, setting the scene to start re-stocking the area in 2010, with large-scale supplementation of game taking place in 2017 and subsequent years.

Against this backdrop, the Lubombo Conservancy-Goba and Ponta do Ouro-Kosi Bay TFCAs were established in 2000, along with the Usuthu-Tembe-Fúti TFCA which connects the MNAP to the Tembe Elephant Park in South Africa. Subsequently the Lubombo Conservancy-Goba and Usuthu-Tembe-Fúti TFCAs were merged in 2014. More broadly, the MNAP's situation within the larger Lubombo TFCA (see map 14), with its many Parks and Protected Areas, is notable. These developments have already produced results, such as the tarred road between Hluhluwe (South Africa) and Maputo (Mozambique), and the Farazela/Ponta do Ouro Border Post which facilitates tourism development, and turtle and elephant research and management.

***Map 22.*** *TFCAs and Protected Areas in the Region of the iSimangaliso Wetland Park and Proposed Transboundary Extension, the Maputo National Park (MNAP)*

The natural phenomena on which its nomination rests speak to the health of the MNAP across diverse terrestrial and marine components shaped by undisturbed landscape-level and geological processes. Its area is sufficiently large to maintain natural processes for long-term conservation and ecosystem functioning, and it retains much of its historical fauna and flora at viable population sizes of resident, migratory and breeding populations. To protect these riches, the Park has a 469,363 ha buffer zone (MEPA), gazetted in 2019. The MNAP falls within the Matutuíne district, which is one of the least populated in the country and has been little modified by large-scale development or infrastructure.

Conservation management of the MNAP has greatly benefited in recent years from the interest shown by donors, international conservation agencies, NGOs and the Peace Parks Foundation.

As a result of this history, and recent developments, the MNAP's key attributes are in good condition, and are tracked by the MNAP and a range of NGOs and specialist researchers who monitor coral reefs, Turtles, Bull sharks, Kingfish, Trevally, marine mammals, mangroves, line and artisanal/subsistence fishing; and are soon to start rocky shore, seagrass and Blue crab monitoring. This work often involves local community monitors and MNAP staff.

The area's reef monitoring programme began in 2011 and is now conducted annually, with the latest reports current to March 2021. The program monitors (1) benthic community cover (e.g. hard coral, soft coral, rock, algae, sand, other benthic organisms); (2) threats (e.g. coral bleaching, crown of thorns star fish - COTS); (3) reef fish and (4) SCUBA divers' behaviour. A marine biologist recently employed by the MNAP will establish water quality monitoring stations in Maputo Bay, while rehabilitation projects are being planned for mangroves, seagrass beds and primary dunes.

Turtles have been monitored since 1994 and this work, undertaken with South Africa, is active and ongoing. The program tracks the conservation status of marine turtles in the Park, and aims to: (1) assess monitoring effort per site; (2) determine number of tracks and nests by species; (3) assess coastal threats (eg. nests lost by anthropogenic causes, flooding, erosion, among other causes); (4) monitor turtle mortality; (5) estimate the nesting population of female turtles, and study other biological traits, based on data from titanium tagged and recaptured turtles.

Terrestrially, management priorities relating to the integrity of ecosystems include fire management, restoration of vegetation, alien plant control, species monitoring, compliance, control of cattle in the EPA, resource use and expansion of the conservation footprint.

Alien clearing takes place in the Park, and 800 ha of gum trees were recently removed, while Casuarinas are soon to be cleared from the primary dunes at Ponta do Ouro. There are no mines or mining applications in the Park, little poaching or agriculture, and no logging. Harvesting of plants for thatching and craftwork is permitted and controlled; mangrove trees are used for fuel, boat building, and construction, but this too is controlled. In some areas, the Park's Mangrove Rehabilitation community project collects mangrove seeds and uses them to re-seed areas where tree loss has occurred; some mangroves were flooded in 2000 but are naturally recovering.

A primary driver of the MNAP's conservation and tourism credentials has been the large-scale re-introduction of wildlife. The latest aerial census took place in 2021 to determine the status of large herbivores in the MNAP, and to gather data on long-term population trends and the spatial distribution of animals, which provides information on habitat use. While mammal population numbers declined significantly during the civil war, they have steadily increased since re-introductions began in 2010, and the Aerial Census Report, published of January 2022 confirmed the success of these introductions, with most species growing in numbers, and, in some cases, expanding their ranges within the Park. As elephant numbers increase, and elephants begin to influence vegetation structure and composition, Mozambican graduates are being sought to monitor these changes, and will start in November.

Knowledge of the medium and large mammal population has improved significantly in recent years (van Aarde *et al.*, 2004; Matthews & Nemane, 2006; Matthews, 2006; Matthews, 2008; Bodasing, Hanekom & Cumbane, 2011; Bodasing *et al.*, 2012; Hanekom & Cumbana, 2014; Bodasing *et al.*, 2016; Cumbana, 2019), but small mammal numbers are unknown. The census indicated that bushbuck, bushpig, grey and red duiker, elephant, giraffe, impala, kudu, nyala, steenbok, suni, reedbuck, waterbuck, warthog, blue wildebeest and zebra are now found in sufficient numbers to form founder populations for the MNAP. Buffalo and cheetah, however, are required in greater numbers.

While cattle in the buffer zone remain a cause for concern, the 'Herding for Health' program is improving grazing management, seeking better markets for cattle, and will support herders to move into the wildlife economy.

A significant challenge for the MNAP is to manage the semi-industrial and subsistence/artisanal fisheries which operate in Maputo Bay/Ilha de KaNyaka area, and on the western coast of the MNAP. Maputo Bay is the second largest fishing production area in Mozambique (Paula & Bandeira, 2014), and contributes significantly to livelihoods and food security

of the coastal population (Inácio *et* al., 2014). Catches are dominated by pelagic and demersal fish and penaeid shrimps (ADNAP, 2016), and crabs, molluscs and sea urchins in intertidal areas. The Park has a management plan for the use of extractive resources (2018–2022) and a technical report: Monitoring of Subsistence and Artisanal Fisheries on the West Coast of Maputo National Park, South Mozambique: August 2016–July 2021. The former report aims to quantify and monitor marine resources and pursue their sustainable harvesting in a multiple use area, and to establish compliance strategies under existing legal instruments relevant to the MNAP, and to address the economic and social well-being of users through community engagement and livelihood strategies; the second, technical report, brings together efforts by the MNAP, ANAC and PPF to use fisheries sustainably and to protect associated habitats along the MNAP's western coast through long-term monitoring and research.

Species lists published by ANAC and PPF for the MNAP cover birds, mammals, marine mammals, amphibians (frogs), inland fish and turtles. Various specialist reports provide checklists of sharks and rays, marine fish, mangroves, crustaceans and reptiles. While terrestrial invertebrates have been poorly studied, many spiders (112 species), insects (413 species) and molluscs (77 species) have been recorded, and much information is known about the MNAP's marine invertebrates of rocky shores and coral reefs - sponges (Porifera), corals, anemones and jellyfish (Cnidaria), crabs, shrimps and lobsters (Crustacea), starfish, sea urchins and cucumbers (Echinodermata) and other lesser-known groups such as sea squirts (Ascidiacea) and worm-like organisms (Platyhelminthes, Nematoda).

An atlas of the birds of southern Mozambique was produced in 1999, and the birds of the then-MSR were surveyed in 2000 (Parker, 2000); these data, combined with historical information for Ilha de KaNyaka and the South African Bird Atlas Programme (SABAP2) establish the MNAP as an exceptionally species rich (343 species) area. Ilha de KaNyaka alone hosts 33% of species occurring in southern Africa and the MNAP's largely pristine coastal grasslands are especially important for grassland, wetland and woodland birds. Species lists and interpretive materials have been produced to guide visitors, and the Park's large and diverse avifauna are a major attraction.

# 4.b FACTORS AFFECTING THE PROPERTIES

The MNAP and iSimangaliso Wetland Park have similar challenges. Chief among these are the socio-economic conditions in which the two properties find themselves, the poor state of regional development, poor historical relationships between conservation and communities, the poverty of those who live in and around the two Parks, and the reliance of these inhabitants on natural resources and farming.

While protected areas and their tourism sectors act as regional economic drivers, their impacts in this role are limited, and may not match the expectations held by land claimants and neighbouring communities. Protected areas increasingly adopt necessary development mandates but cannot transform regional economies or alleviate entrenched poverty in under-developed areas. National, multi-level interventions which address structural constraints are still required.

Land use challenges also affect both properties. In the iSimangaliso Wetland Park, commercial plantations and land use in catchments may affect groundwater and disrupt wetlands, while 80% of the Matutuíne District's population are farmers, some of whom live inside the MNAP and/or its buffer zone.

Climate change will affect both Parks, as may pollution in the marine environment in the case of marine disasters. Other common threats are fishing and poaching, unsustainable resource use, and invasive species.

In the proposed transboundary extension specifically, charcoal and firewood production and the growth of tourism are notable, as are expanding road networks, the proximity of a major port, and interests in mining, oil and gas exploration, and port and railway developments.

In the iSimangaliso Wetland Park, specific challenges include managing the Lake St. Lucia estuary, and encroachment and development on Park boundaries.

# 4.b (i) DEVELOPMENT PRESSURES AND MANAGEMENT RESPONSE

## CHARCOAL AND FUELWOOD

Driven by rising demand from Maputo and Matola cities since the mid-1990s, charcoal and firewood production has been an expanding, and partly unregulated economic activity in the Matutuíne District, and in areas inside and adjacent to the MNAP. According to some research (Tokura *et al.* 2020; Strategic Development Plan 2015–2024 for Maputo Province) the trade has recently slowed, and showed a decrease between 2012–2014 in the number of charcoal sacks from 116 000 to 26 000. Charcoal and fuelwood from mangrove forests are readily available in coastal areas for domestic and commercial purposes (de Boer, 2002; Macamo *et al.*, 2015), and other species are used from coastal and terrestrial ecosystems in the MNAP for domestic and small-scale commercial purposes (Matimele & Timberlake, 2020). In this regard, the National Strategy and Action Plan for Mangrove Management in Mozambique (2020-2024) aims to promote management of mangrove forests through protection, restoration, education and research.

The Specific Regulation for the Maputo National Park states that collection of dry and dead wood is only allowed for household consumption and within 1km of designated settlement footprints, and that wood may not be sold to tourists or any other users or visitors.

## HUNTING

In the Matutuíne District, animals are hunted for food and income (MICOA, 2013). Hunting takes place at the Administrative Posts of Bela Vista and Zitundo and, illegally, in the MNAP, including the Fúti Corridor (MICOA, 2012). The Specific Regulation for the MNAP prohibits hunting in the Park, and increased patrols and compliance efforts from the Park authority include hiring 25 rangers, and better patrolling using a helicopter and radio digital communication. As a result, in 2022, only five hunters were detained, 688 traps were removed, six firearms retrieved and only five known animals were poached (Gonçalves, M., *pers. comm.*). These numbers are low when compared to 2019, when 41 hunters were caught, 1 250 traps removed, 20 firearms confiscated and 20 animals poached (Gonçalves, M., *pers. comm.*). This trend is also evidenced by growing wildlife populations between 2016 and 2019. According to Hanekom (2019), wildebeest, zebra, nyala and giraffe numbers doubled during this period. Poaching of elephants for ivory and removal of species from coral reefs for their ornamental value are of concern and need to be prevented as a management priority.

## SUBSISTENCE AND ARTISANAL FISHERIES

Both inland and marine subsistence and artisanal fishing is important for a large segment of the population, and practiced by men, women and children for food security and revenue throughout the year (Louro *et al.*, 2017). In Matutuíne District and Ilha de KaNyaka, fisheries are permanent and make up 31.8% (n=28) of all fishing in Maputo Province and Maputo City. 823 fishers are registered (MIMAIP, 2018).

The number of fishers appears to be rising as subsistence and artisanal fisheries are a secure livelihood and food source (Blythe *et al.*, 2013). These fisheries are typically multi-geared with nine types of gears reported: beach seine, boat seine, bottom gillnet, surface gillnet, handline, *quinia* (double stick nets), cast net, traps, and gamboa (fence nets). Invertebrates are also collected (Louro *et al.*, 2017; MIMAIP, 2018). Within inland waters, in the Piti, Xinguti, Muti and Sotiva lakes, gillnets are most often used (Brito & Afonso, 2018; MIMAIP, 2018). Illegal fishing takes place using mosquito nets, small mesh sizes, traps and poisonous substances (Lopes & Gervásio, 1999; Santana Afonso, 2006; ASCLME, 2012).

All fishing requires permits, and is governed by the Park's zonation. Anti-poaching activities and visitor surveillance take place according to the Park's Law Enforcement and Anti-Poaching Strategy and Action Plan and strict controls apply to the kind of fish which can be caught and permissible equipment. In addition, there are 16 Community Based Natural Resource Management Committees in and around MNAP.

## SEMI-INDUSTRIAL FISHERIES

Semi-industrial fisheries are defined as the use of boats/fishing units with a closed or open deck, between 8 and 20 meters long, with more than 48 hours' operating time, with crew and freezing facilities. In Maputo Bay there are semi-industrial shrimp trawling and line fish fleets (ADNAP, 2016) which over the last few years have been stable with approximately 20 and 13 vessels, respectively (ADNAP, 2016). Catches are dominated by pelagic and demersal species and commercial penaeid shrimps (ADNAP, 2016). Shallow water trawl fishing takes place between Cabo da Inhaca and Ponta da Macaneta, in the channel leading in to Maputo Port, and the area around the western region of Maputo Bay (Tenreiro de Almeida, unpublished report).

As per the Park's zonation, fishing in managed through two Marine Controlled Use Areas (CUAs), and semi- and industrial fishing, fishing for bottom fish, and the use of vertical jigging and fish aggregating devices, among other methods, are prohibited in both these CUAs.

## AGRICULTURE

80% of the Matutuíne District's population are farmers (MICOA, 2012) who occupy roughly 1.63% (8 847 ha) of the district's area for irrigated and rainfed agriculture on 0.5 ha family (Lopes, 2017) and small commercial plots. Productivity is highest on the alluvial soils near coastal lakes and the Maputo River where maize, bananas, sweet potatoes and vegetables are grown for subsistence and trade (Brito & Afonso, 2018). In the remaining areas, poor nutrient soils and high water salinities (MICOA, 2012) limit crops to cassava, sesame, pigeon pea and peanuts.

The Matutuíne District has much potential for livestock farming, especially along the borders with the Kingdom of eSwatini and South Africa (MICOA, 2012) and cattle farming has steadily grown in the last decade. Within and adjacent to the Park, cattle and goats are common, and recent assessments (Hanekom & Cumbane, 2015; Hanekom, 2019) showed that cattle numbers increased from 50 head in 2008 to 611 in 2016, and fell to 169 head in 2019. Domestic livestock currently occur in the MNAP at community settlements, but are prohibited in the Park according to the Specific Regulation, and are subject to the Livestock Removal Incentives Strategy and the 'Herding for Health' programme. Concerning agriculture, designated cultivation areas for household consumption may not change or expand without approval, and no agricultural machinery may be used to farm. Local community fora help to manage these agreements, and conservation agriculture workshops are regularly held.

*A community conservation agriculture workshop in the proposed transboundary extension*

## ROAD SYSTEMS

The road network between Maputo City and the Matutuíne District is approximately 773 km of classified and non-classified roads (ANE, 2020) including the newly-built 225 km road that links Maputo City, kaTembe, Bela Vista and Boane (Mendonca *et al.*, 2013). The network includes 11 bridges, including the Maputo-Katembe bridge, the longest suspension bridge in Africa (Mendonça *et al.*, 2013). The construction of a tarred road between South Africa and Maputo that bisects the MNAP facilitates access to the property and may increase the risk of poaching of wildlife and plants. Litter is regularly removed from roads in the MNAP, traffic is controlled by a checkpoint gate system, with a speed limit of 40km per hour and signage and speed bumps as further controls.

## PORT AND RAILWAYS

Maputo Port, in Maputo City, is one of the most important ports in south-eastern Africa (Scarlet & Bandeira, 2014), and its proximity to the MNAP is notable. In addition, since the 1960s, the construction of a deep-water port in Maputo Bay has been considered due to the costs of dredging and maintaining a channel for large ships to enter Maputo Port. Such a port has been mooted for an area about 70 kms south of Maputo between Ponta Dobela and Ponta Techobanine. This area now falls within the MNAP. The port would have an industrial area of approximately 30 000 ha, and include roads/railways enabling Botswana to export coal, mainly to China (Manuel & César, 2014). However, at present, the MNAP is supported by the Mozambique Government, and there are currently no plans to pursue this development, which the Specific Regulation prohibits. ANAC and the MNAP will continue to monitor the situation and engage with political principals. More broadly, the Strategic Plan for the Development of Maputo Province (2015–2024) seeks to safeguard the environment and consider environmental aspects in social and economic development.

## INDUSTRY

The Matutuíne District produces clay, limestone and rock (Mozbio, in prep.), and the industrial sector is small, and based on charcoal and cement block production. Approximately 44 small-scale operations produce cement blocks for construction, bakeries and cereal mills (MAE, 2014; Mozbio, in prep.). At Salamanga, the District's single railway line carries limestone to make cement (MICOA, 2013) from a deposit estimated at approximately 1 200 million tons in an area of 17 $km^2$ (Afonso & Marques 1993 cited by MICOA, 2013). In 2010, the company Cif-Moz began to construct a cement factory in Mudada (Manuel & César, 2014; Mozbio, in prep.); the factory is still being built and will have a production capacity of 5 000 tons/day (Mozbio, in prep.). Many prospecting licenses for limestone are pending approval (MIREME & TrimbleLand, 2020). The Ministry of Mineral Resources and Energy (Ministério de Recursos Minerais e Energia – MIREME) has declared a heavy minerals exploitation area of 8 100 ha in the Zitundo Administrative Post and opened it for bidding (MIREME & TrimbleLand, 2020).

There is currently no mining in the MNAP, and DUATs previously issued and relating to mineral concessions and mining that fall within the boundaries of the MNAP are no longer valid. In addition, with the recent proclamation of the EPA, all future developments in and surrounding the MNAP will require a Special Licence issued by MTA and based on the management and integrated development plans for the EPA and the PEOT for part of the district of Matutuíne and Ilha de KaNyaka. The MNAP will be invited to give input into Special Licence applications.

## POLLUTION

In Maputo Bay, pollution comes from industry and agriculture, and from storm water runoff into coastal and marine areas. Although no recent information is available, it is estimated that agricultural pollution of coastal waters is low (Scarlet & Bandeira, 2014).

In the MNAP, beach clean-ups and awareness raising take place, but there is no monitoring or quantifying of solid waste from the main human settlements, or litter on beaches. Nonetheless, it is inferred that solid waste and marine litter are increasing (UNEP & WIOMSA, 2008; RePensar, 2020). A great concern is the loss of fishing gear (nets, lines and hooks) which can injure/kill marine mammals, reptiles and fish, and microplastics (<5mm) produced by mechanical breakdown and photodegradation of plastic pollution, which are now found in food chains and are vectors for organic pollutants in water (Katzenberger & Thorpe, 2015).

## SETTLEMENT OF LAND CLAIMS

A threat specific to the iSimangaliso Wetland Park is the slow resolution of land claims. In the IUCN's 1999 technical evaluation of the iSimangaliso Wetland Park's World Heritage submission it was noted that the settlement of land claims was expected in the near future, that these settlements should be compatible with the Park's conservation management goals, and that the Park's inscription should not prejudice the settlement of claims. However, the slow settlement of claims, and an extension of the deadline to submit claims has led to uncertainty, and deteriorating relations between the iSimangaliso Wetland Park and claimants, as high expectations of benefits from the land go unmet. In some areas, competing land claims have arisen, adding further to conflict.

# 4.b (ii) ENVIRONMENTAL PRESSURES, NATURAL DISASTERS AND RISK PREPAREDNESS

## FIRES

The use of fire to make charcoal, stimulate new growth for livestock grazing, clear land for agriculture or homesteads, and for illegal hunting is common in the Matutuíne District, within and adjacent to the MNAP, and on the banks of the Maputo and Tembe rivers (Hanekom, 2019; Tokura *et al.*, 2020). Uncontrolled fires negatively impact grasslands and woodlands, particularly *Syzygium cordatum* (Souane, 2017) and the silver cluster-leaf (*Terminalia sericea*; Cambula, 2018; Datizua, 2019). It is thought that the recent absence of herbivores may have led to high fuel loads in coastal grasslands, and hotter fires than those with which the system has evolved.

The MNAP's Fire Management Plan strives for a near-natural fire regime which controls negative impacts such as penetration of fire into sensitive forest margins and boundary fire breaks to reduce the risk of uncontrolled fires entering the parks.. The plan also aims to adjust controlled burns in response to lightning fires and those lit by neighbouring communities. All infrastructure must be protected from fire, usually by means of a firebreak, early in the fire season. According to the Specific Regulations, fires are prohibited in the Park, and managers are authorised to close the Park, or part of it, if a fire ban is in force or the risk of uncontrolled fire is deemed extreme.

## INVASIVE SPECIES

To stabilise coastal dunes, *Casuarina equisetifolia,* an Australian native species, was introduced to southern Africa during the colonial period where it was planted in northern KwaZulu-Natal and southern Mozambique (Tinley, 1971) at Ilha de KaNyaka, Ponta do Ouro and other locations. The species lacks the attributes of a dune pioneer, does not help to form dunes, and prevents native species from establishing and forming dune forest (Tinley, 1971).

Syliver *et al*. (2020) identified 26 Invasive Plant Species (IPS) in the MNAP, the most common of which are *Lantana camara*, *Eucalyptus* sp., *Ricinus communis*, *Psidium guajava*, *Pinanga coronata* and *Senna didymobotrya,* and all of which are concentrated along the Fúti River. Human settlements, roads, and burning and grazing are the main spreaders of alien plants, which cause a 37.7% decline in species richness in invaded areas with a loss of grazing for wild animals. Invasive aliens also affect native species by introducing pathogens or parasites that can cause disease or death, and may threaten the MNAP through losses to biodiversity and wildlife habitat (Syliver *et al.*, 2020).

At Ilha de KaNyaka, the house crow (*Corvus splendens*) was first recorded between the 1960s and 1970s, and is now found in all settlements on the island, especially in Ribjene (Nhancale, 1998). The Estação de Biologia Marítima da Ilha de KaNyaka (EBMI) has tried to eradicate this species, but its efforts need to be assessed.

An Alien Plant Control Plan is being developed, and aims to map the distribution and abundance of alien plants as a baseline for the MNAP.

## WEATHER

Africa's climate is predicted to become more variable, and extreme weather to be more frequent and severe, with increasing socioeconomic and biophysical risks (Boko *et al.*, 2007). Severe, or unseasonal weather may include tropical cyclones, floods and droughts driven by multiple causes (Broska *et al.*, 2020).

Tropical cyclones occasionally make landfall on the Mozambican and South African coasts, and bring heavy rains and floods to southern Mozambique, the northern parts of South Africa, western Madagascar, and Zimbabwe. However, cyclone frequency in the southern region is generally low compared to the central and northern regions of Mozambique (Mavume *et al*. 2014). Between 1950 and 2012, southern Mozambique, including Maputo Bay, has been affected by eight tropical cyclones. Of these, six made landfall in Mozambique's southern region (Mavume *et al.*, 2009).

Mesoscale Convective Complexes (MCCS) may account for up to 20% of summer rainfall (November–March) in the eastern region of southern Africa and can cause floods in Mozambique and KwaZulu-Natal (Blamey & Reason, 2013). Extreme floods (in 1955, 1958, 1972, 1976, 1984 and 1999/2000), their fluvial discharge and sediment loads have affected the eastern side of Maputo Bay (Perry, 2003a), while droughts have become more intense and widespread in the region during El Niño events (Richard *et al.*, 2000; 2001).

Mozambique has adopted the National Adaption Plan of Action to Climate Change (NAPA, 2007) and the National Strategy for Adaptation and Mitigation of Climate Change (2013–2025). Together, these plans identify the country's urgent climate change needs, focussing on early warning, adaptive capacity for farmers, reducing climate change effects in coastal areas and promoting low-carbon development and the green economy via sectoral and local planning.

## ST. LUCIA ESTUARY

Foremost, and most topical among environmental pressures facing the iSimangaliso Wetland Park is the management of the St. Lucia Estuary, following a perceived change in the Park Authority's management plan in 2021.

The St. Lucia estuary has not functioned naturally since the early 1950s, when the uMfolozi floodplain was cleared of indigenous wetlands and canalised to accommodate sugar cane farming, largely depriving Lake St. Lucia of its major supply of fresh water. In 1952 the uMfolozi River was partially separated from the Lake, further reducing the inflow of fresh water, and altering the natural opening-and-closing of the estuary mouth; then, the St Lucia estuary mouth was breached in 1956 and artificially maintained in an open state. At the time of its inscription in 1999 the St Lucia Estuary was noted as a centrepiece of the iSimangaliso WHS and its ecological restoration was deemed key to maintaining its OUVs. In 2011/2012, following a decade of research and an inter-disciplinary GEF-funded study commissioned by iSimangaliso, the management approach was changed to one of minimum interference, with no artificial breaching and the re-establishment of the uMfolozi's natural course. However, debates about estuarine management in the Park continued, and in January 2021, following stakeholder pressure and management concerns, the mouth of the St. Lucia estuary was breached. The Minister of Environment, Forestry and Fisheries appointed an independent panel to investigate the breach (October–March 2022) and to update guidelines to manage the system. In the interim, the 44$^{th}$ session of the World Heritage Committee of July 2021 welcomed the panel's appointment, urged the State Party to emphasise the protection of the iSimangaliso Wetland Park's OUVs, and requested that the panel/State Party submit its findings to the World Heritage by February 2022 for examination by the World Heritage Committee at its 45th session (https://whc.unesco.org/en/decisions/7892/). At the time of writing, the 45th Session remains postponed.

The 44th Session of the World Heritage Committee (July 2021) also covered the foremost threats to the iSimangaliso Wetland Park, noting the following:

1. The clearing and burning of swamp forest for subsistence agriculture; the Committee requested that the State Party continue to monitor the situation and to engage with local communities to resolve outstanding issues and to prevent further damage.
2. The significant drop in average water levels in Lake Sibaya since the time of inscription; the Committee welcomed efforts to develop a holistic approach to mitigate water loss in Lake Sibaya, and to consult stakeholders, and requested the State Party to assess the effectiveness of these efforts and strengthen its management responses where necessary.
3. Welcomed the objection of the management authority to the proposed prospective mining and offshore exploratory drilling outside of the property, and requested the State Party to subject activities which may jeopardise the iSimangaliso Wetland Park's OUVs to an EIA and in line with the IUCN World Heritage Advice Note on Environmental Assessment.

# 4.b (iii) VISITATION, OTHER HUMAN ACTIVITIES AND SUSTAINABLE USE

Until recently, and before COVID restrictions, the MNAP hosted over 13,000 visitors annually; however, with recent tourism investments and reduced travel restrictions, this number is soon expected to exceed 20 000. Tourists and community members may only enter the Park during publicised gate hours, and are encouraged to time entry to reach their destinations before sunset. Tourists may self-drive in the MNAP during the day on approved roads, and leave their cars at designated points such as picnic and view sites, and tourist camps. Game and night drives are available from private companies, and game walks and mountain biking are on offer from registered service providers. Some visitors use the Park to reach the Machangulo peninsula, and may have negative impacts if they speed and litter. The freeway through the Park is cleared of litter twice a month and the main spine road between Fúti and Machangulo gate is cleared monthly.

Increased traffic poses a danger to visitors and wildlife, and brochures and signage alert drivers to Park regulations; vegetation is cleared from road verges to make driving safer.

Tourism numbers remain small, and a tourism plan and management controls are in place. Marine rangers have been effective, and stopped illegal driving, fishing and drinking on beaches, and issued fines.

## RECREATION AND SPORTS

In the MNAP, private tourism operators, most of which are at Ponta do Ouro, offer SCUBA diving and fishing as the main activities (Pereira, 2004; Fernandes & Pereira, 2015; SafariNow, 2020). Many tourists own fishing boats, jet skis and canoes, and visit frequently. Data from 2010–2014 showed diving as the main activity, with 12 907 boat launches, followed by fishing (11 810 boat launches), dolphin swims (2 871 boat launches) and ocean safaris (2 273 boat launches) (Fernandes & Pereira, 2015).

The Specific Regulation for the MNAP sets tourism concession activity limits for snorkeling tour operators and for dive sites, while Park zonation and CUAs refer specifically to how different parts of the Park may be used recreationally.

***Table 4.*** *Principal Reefs and Dive Sites in the MNAP*

| REEF | LOCALITY | DEPTH (M) | APPROX. REEF LENGTH (KM) | REEF DESCRIPTION |
|---|---|---|---|---|
| **ILHA DE KANYAKA** | | | | |
| Barreira Vermelha | 26°01.179'S 32°54.179'E | 1-5 | <1 | Sheltered reef landward of Ilha de KaNyaka within Maputo Bay. Good coral community representative of reefs adapted to high turbidity and variations in salinity. |
| Ponta Torres | 26°03.853'S 32°57.523' E | 1-3 | <1 | Shallow reef of Porites bommies, faviids and Acropora sp., fringing a sandbank channel. The reef top is exposed at low tide. |
| Baixo Danae | 25°54.100'S to 25°54.600'S 33°03.136'E | 16-18 | 1 | Extensive rocky massif with scattered corals; corals marginal because of turbidity and sand scour (coral cover ~35%). Important dive sites for local dive operators. Extensively fished. |
| Baixo São João | 26°21.060'S to 26°21.780'S 32°58.440'E | 12-26 | 1 | Extensive rocky massif with scattered corals; corals marginal because of turbidity and sand scour (coral cover ~45%). |
| Milibangalala | | 15-24 | <1 | Rocky reef with good fish communities but low coral cover. |
| Techobanine | | 5-20 | 17 | Extensive reef running from Ponta Techobanine almost to Ponta Dobela. Good coral cover (variable but up to 65%) with high species diversity. The most significant reef in the MNAP. |
| **PONTA MAMOLI** | | | | |
| Bass City | | 20 | <1 | Small rocky massif with low coral cover. |
| Ponta Malongane | | | | Overall, Malongane reefs have good coral cover (variable but up to 70%) and high species diversity. |
| Anchor | 26°47.165'S 32°54.279'E | 18-20 | <1 | Two parallel ridges. |
| Bread Loaf | 26°47.620'S 32°54.049'E | 10-15 | <1 | Coral garden. |
| Blacks | | 15-18 | <1 | ? |
| Kev's Ledge | 26°46.673'S 32°54.268'E | 18-26 | <1 | Large ledge, cleaning station. |
| Maverick's | 26°44.756'S 32°54.902'E | 25-28 | <1 | Pinnacle in sand, about ~20 x 30 m in area. |
| Paradise Ledge | 26°46.975'S 32°54.173'E | 14-20 | <1 | Coral garden. |
| Pinnacles | 26°45.337'S 32°56.158'E | 28-42 | <1 | Single pinnacle. |
| Shallow Malongane | 26°46.784'S 32°53.993'E | 13-17 | 3 | Reef with many gullies and caves. |
| Texas | 26°46.275'S 32°54.105'E | 9-19 | <1 | Large reef with a deep gully, and moderate coral cover (~60%). |
| The Ridge | 26°46.511'S 32°54.116'E | ? | <1 | Ledge with high profile (~4 m) and good hard and soft coral cover. |
| Three Sisters | 26°47.250'S 32°54.532'E | 19-26 | <1 | Three large boulders, cleaning station and overhangs. |
| Wayne's World | 26°46.334'S 32°54.516'E | 25 | <1 | Part of Malongane's deep reef system. |

| REEF | LOCALITY | DEPTH (M) | APPROX. REEF LENGTH (KM) | REEF DESCRIPTION |
|---|---|---|---|---|
| Ponta do Ouro | | | | Reefs at Ponta do Ouro tend to be small with relatively low coral cover (≤55%). |
| Checkers | 26°49.000'S 32°54.125'E | 15-18 | <1 | Large horseshoe-shaped ridge. |
| Creche | 26°48.371'S 32°53.622' E | 10-14 | <1 | Small reef; two parallel ridges. |
| Doodles | 26°49.890'S 32°53.910'E | 15-17 | <1 | Small reef with scattered caves. |
| Fingers | 26°48.333'S 32°53.840'E | 12-14 | <1 | Small reef with numerous gullies, crevices and sandy patches. |
| Steps | 26°49.005'S 32°53.664'E | 14-16 | ? | Long narrow reef, caves, overhangs. |
| Steve's Ledge | 26°49.010'S 32°53.874'E | 14-19 | <1 | Narrow reef (extension of Steps). |

## TOURISM

The MNAP is located in the south regional profile established to implement the Strategic Plan for the Development of Tourism in Mozambique I (2004–2013; Plano Estratégico para o Desenvolvimento do Turismo em Moçambique – PEDTM) which is comprised of Maputo Province, Maputo City, Gaza and Inhambane Provinces; the area has also been identified as a Priority Area for Tourism Investment (Áreas Prioritárias para o Investimento no Turismo – APITs; MITUR, 2004).

Within the region, Ponta do Ouro, Ponta Malongane, Ponta Mamoli and Cabo de Santa Maria have been identified as sites with tourism development potential (Mozbio, in prep.), and Ponta do Ouro, where most tourism infrastructure is found (Mozbio, in prep) is a growing destination (Jury et al., 2011; Mozbio, in prep.). A growing housing market has increased the demand for goods and services, and led to an influx of labourers and businesses, both formal and informal. All along the coast, but especially at Ponta do Ouro, the growth of tourism infrastructure is unplanned and environmentally damaging (Mozbio, in prep.). Ponta do Ouro is outside the MNAP, but lies within the MEPA, and while visitors to Ponta do Ouro use the marine environment of the MNAP, such use is subject to the Park's Management Plan and the Specific Regulation, and activities are controlled via the Park's zonation and CUAs. Recreational activities at Ponta do Ouro are offered through concessions and further controlled through the regulations governing these concessions. More specifically, a Local area Development Plan for Ponta do Ouro, Bela Vista and Salamanga is being prepared and a Management Plan for the Use of Extractive Resources on the Western Shores of the Ponta do Ouro Marine Partial Reserve (2018–2022) has been prepared by ANAC.

Existing tourism facilities can accommodate an estimated 3,100 visitors daily and the Park's Strategic Plan for Tourism Development allows for tourism management and visitor number controls. While the Park relies on tourism for revenue, and tourist numbers are growing, there is minimal risk that tourism will threaten the Park, or undermine its natural values. Within the MNAP a luxury lodge has been developed at Ponta Chemucane in partnership with the Zameni Chemucane community, and a luxury resort at Ponta Milibangalala. Other Tourism Development Areas are located at Ponta do Ouro, Malongane, Mamoli, Machangulo, Santa Maria and Ilha de KaNyaka. A key reason to establish the Maputo EPA is to promote sustainable livelihoods in the region and, with the MNAP as the recognised core area, to promote socio-economic activity surrounding the Park that is compatible with the Park's objectives. This includes the development of tourism facilities and nature-based activities. MozBio's Special Plan of Territorial Planning of a Portion of the District of Matutuíne and Ilha de KaNyaka (PEOT) has been submitted for approval and contains guidelines to avoid land use conflict in the area, and to support sustainable tourism while promoting conservation of biodiversity; it also offers planning priorities for expanding human settlements and guides spatial planning, control and monitoring.

## RESIDENTS IN THE MNAP

In the context of the MNAP, the term "local communities" includes both those living in the area surrounding the Park and the five communities living inside the Park. As the governance of the larger protected area landscape, including the buffer zone (MEPA), continues to be clarified, so the management of MNAP will have to refine its understanding of the term "local communities." Based on 2020 estimates by the District of Matutuíne, the population of surrounding administrative regions is about 41,000, distributed as follows: Bela Vista (19,065); Catembe (6,934); Machangulo (3,381); Zitundo (4,140); and Catuane (7,557). The population on Ilha de KaNyaka is estimated to be close to 6,000 people, most of whom live in Inhaca village.

There are four settlements of resident communities within MNAP (Lihundo, Buingane, Muvukuza and Tsolombane), totalling approximately 110 families and about 550 people. Although these communities live legally in the MNAP, their activities may be constrained and their impact on the protected area is regulated. This involves recording their physical footprint, including coordinates of structures and impacted areas, numbers of homesteads and occupants, and livelihood activities and means of access. After being recorded, these details may not be changed without approval by Park Management. Additionally, families assisted to move out of the park may not return.

***Map 23.*** *Communities Living in and Around the Maputo National Park*

Neighbouring and resident communities participate in regional and local Community Based Natural Resource Management (CBNRM) structures. These structures are potential recipients of the 20% revenue share from MNAP (which is part of the current national policy framework), but most require improvements in governance.

Living in or adjacent to a protected area carries an elevated risk of Human Wildlife Conflict (HWC), and the management of HWC by Park authorities will determine the long-term prospects of conservation as a form of land use in the MNAP. A recent Social Assessment of Protected Areas (SAPA) indicates that some local communities perceive conservation negatively due to HWC, and the lack of compensation for HWC incidents; and also that they feel let down by promises of employment and community development (Calengo, Chibequete, Mendonca, Tembe, & Machava, 2019). For these reasons, MNAP Park Management have committed to review the Park's Community Action Plan and mitigation of HWC, to expand the environmental awareness and education programmes, and to strengthen community management of natural resources.

The zonation plan is used to manage and protect the values of the Maputo National Park. Each zone is governed by rules which define how that zone may be used, including which activities are prohibited, which are allowed, and which require a permit.

Zones also determine whether Park infrastructure and tourism development are permitted, and set the size of tourism facilities by specifying bed and visitor numbers.

The Zonation of the Park is presented in the Management Plan, in which the framework is established, and in the Specific Regulation for the Maputo National Park, where the rules of use are given in some detail.

The Maputo National Park has the following zones as shown in Map 15:

## Total Protection Area (TPA)

A zone with a high degree of protection of natural resources. No tourism developments or extractive use. Specific conditions apply to resident communities.

## Controlled Use Area (CUA)

A zone in which sustainable activities and development may be allowed subject to specific rules or codes of conduct.

## Terrestrial Controlled Use Areas (CUA-t)

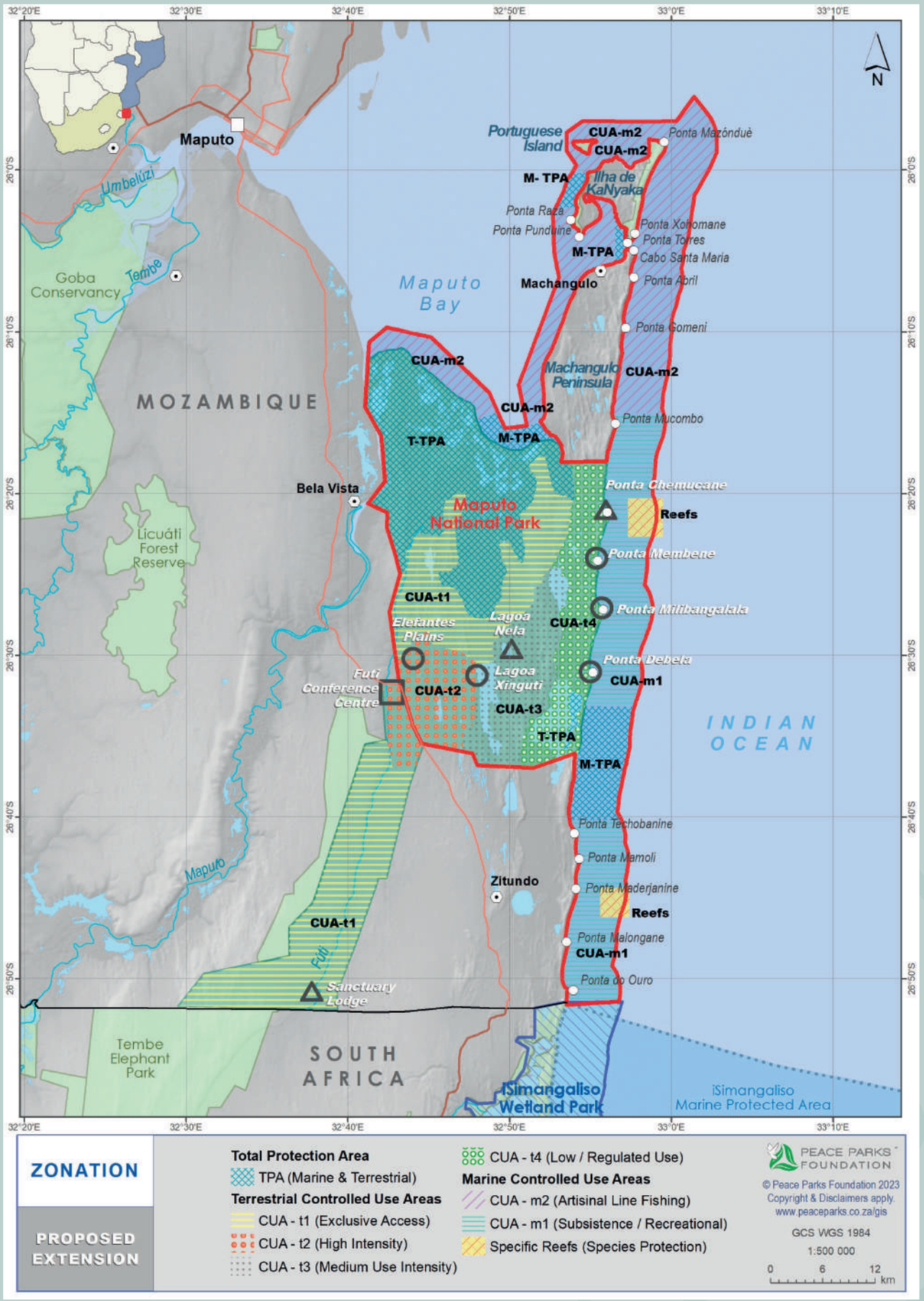
- **CUA-t1** is a **low intensity visitor use area** in which access to the Park is through tourism concessions, guided adventure activities and game drives, and a limited number of 4x4 trail permits.
- **CUA-t2** is a **high intensity visitor use zone** with public access tourism developments and a road network designed for day visitors seeking a game viewing experience.
- **CUA-t3** is a **medium intensity visitor use area**, catering for day visitors and those wanting to overnight in medium and low-density tourism development areas.
- **CUA-t4** is a **low intensity use area** with access to certain areas through guided concessions, and includes both medium and low-density tourism development areas.

## Marine Controlled Use Areas (CUA m)

Activities along the coast, such as horse riding or walking, are regulated through the marine zonation.

- **CUA-m1** allows for a range of recreational and subsistence activities. Anchoring and artisanal fishing are not allowed.
- **CUA-m2** allows for a range of recreational and subsistence activities. Anchoring and artisanal fishing are allowed**.**

***Map 24.*** *Controlled Use Zones in the Maputo National Park (MNAP)*



# 5. PROTECTION AND MANAGEMENT OF THE NOMINATED PROPERTY

This dossier argues for the nomination of a site which will consolidate the iSimangaliso Wetland Park World Heritage Property and the Maputo National Park as a single property. Thus, it follows that relevant sections emphasise both these properties in arguing the nomination. Section 4, however, emphasises the protection and management of the transboundary extension to specifically present the factors supporting the nomination of the as-yet-un-inscribed component of the proposed joint property. Comparable information on the currently inscribed property, the iSimangaliso Wetland Park, can be found in the original nomination and the Park's Integrated Management Plan 2022–2030.

# 5.a STAKEHOLDERS

The MNAP has a range of stakeholders with a direct interest in and relationship with the Park, including communities living in the Park and the EPA, Government, NGOs, Transfrontier conservation structures and Research institutions. Table 5 describes these stakeholders in more detail.

***Table 5.*** *MNAP Stakeholder Analysis*

| STAKEHOLDER | RELATIONSHIP WITH MNAP | STRATEGY TO ENGAGE STAKEHOLDER |
|---|---|---|
| COMMUNITIES | | |
| Communities living in the buffer zone | • The community 'buffer' zone (5km from the boundary) delineates the Park's beneficiaries, defining the communities that receive a 20% share of revenue.<br>• Sustainable use of natural resources<br>• Socio-economic benefits: jobs, projects<br>• Participate in environmental awareness | Regular meetings with Park management, participation in Park forums, participation in consultative processes, beneficiaries of projects |
| Communities living in the Park | • Sustainable use of natural resources<br>• Share of revenue Communityfrom the Park (communities inside the MNAP are Park beneficiaries)<br>• Socio-economic benefits: jobs, projects<br>• Participate in environmental awareness<br>• Support for voluntary resettlement with continued access to natural resources | Regular meetings with Park management, participation in Park forums, participation in consultative processes, beneficiaries of projects |
| Traditional Leaders/ Council (Community Leaders) | • Formally represent community interests<br>• Act as link between the Park, local authorities, and communities | Regular meetings, participation in Park forums |
| Governance structures: Community-based Organisations (CBOs), Natural Resource Management Committees (NRMCs), Community Fisherman Councils (CCPs), Farmer Groups/Associations, Youth Future Leader Groups, Women's Savings Groups VSLA's and other women's associations/groups. | • Sustainable use of natural resources<br>• Socio-economic benefits: jobs, projects<br>• Participate in environmental awareness<br>• Represent stakeholder interests to Park management | Regular meetings, sharing reports, participation in consultative processes, beneficiaries of projects |

| STAKEHOLDER | RELATIONSHIP WITH MNAP | STRATEGY TO ENGAGE STAKEHOLDER |
|---|---|---|
| **NATIONAL GOVERNMENT** | | |
| Ministry of Land and Environment | • Develop and approve Park regulations<br>• Oversight function, alignment of Park strategies and plans to national government strategies, particularly ecosystem conservation<br>• Involvement in general planning, implementation and monitoring of activities related to conservation | Participate in key events, oversight of annual plans, reports & meetings |
| Ministry of Sea, Inland Waters and Fisheries | • Coordination to align Park plans and projects with national government strategies and plans for agriculture, food security and sustainable livelihoods<br>• Involvement in general planning, implementing and monitoring activities related to sustainable livelihoods, particularly agriculture<br>• Support for ongoing Government activities | Participate in key events, share annual plans and reports, regular coordination meetings |
| Ministry of Health | • Coordination to align Park plans and projects with national government strategies and plans<br>• Provide health services in area<br>• Health education<br>• Joint projects | Participate in key events, share annual plans and reports, regular coordination meetings |
| Ministry of Education and Human Development (Includes Education, Youth, Sports and Technology) | • Coordination to align Park plans and projects with national government strategies and plans<br>• Joint projects<br>• Collaborate with Park in community-based skills training projects; services and support for youth<br>• Support Park projects in schools | Participate in key events, share annual plans and reports, regular coordination meetings |
| National Administration of Conservation Areas (ANAC) under the auspices of Ministry of Land and Environment | • Oversee and approve Park plans, strategies, protection approaches<br>• Provide resources, project, and administrative support | Participate in key events; joint planning, reporting & oversight |
| National Institute of Fisheries and Aquaculture (IDEPA) under the auspices of Ministry of Sea, Inland Waters and Fisheries | • Reduce overfishing, disseminate good fishing practices; monitor fishing practices<br>• Fisheries management partner<br>• Collaborate to regulate fisheries & implement sustainable fishing projects (tilapia farming and bivalves) | Joint fisheries management, participate in key events, share annual plans and reports, regular coordination meetings |
| National Maritime Institute (INAMAR) | • Enforce regulations and safety of marine transport and personnel, protect port infrastructure, licensing<br>• Key government partner in licensing and law enforcement in the MPA | Joint operations and collaborate in marine law enforcement, regular meetings |

| STAKEHOLDER | RELATIONSHIP WITH MNAP | STRATEGY TO ENGAGE STAKEHOLDER |
|---|---|---|
| **PROVINCIAL AND LOCAL GOVERNMENT** | | |
| Provincial Directorate of Land and Environment of Maputo Province and Maputo City | • Coordinate Park plans and projects to comply with government strategies, particularly on ecosystem conservation | Participate in key events, share annual plans and reports, regular coordination meetings |
| Provincial Directorate of Agriculture of Maputo Province and Maputo City | • Coordinate Park plans and projects to align with provincial strategies and plans<br>• Promote livelihood interventions that contribute to Food Security and household income | Participate in key events, share annual plans and reports, regular coordination meetings |
| Government of Maputo Province | • Coordinate to align Park plans and projects with provincial strategies and plans | Participate in key events, share annual plans and reports, regular coordination meetings |
| Municipality of Maputo | • Coordinate to align Park plans and projects with municipal strategies and plans | Participate in key events, sharing annual plans and reports, regular coordination meetings |
| Local Government of Matutuíne District | • Coordination to align Park plans and projects with municipality strategies and plans | Participate in key events, share annual plans and reports, regular coordination meetings |
| District Services of Economic Activities (SDAE), District Directorate for Health, Women and Social Action (DDSMAS), Local Government of Matutuíne District | • Coordination to align Park plans and projects with municipality strategies and plans | Participate in key events, share annual plans and reports, regular coordination meetings |
| Infrastructure and Planning District Services (SDPI) – report to Matutuíne District Administration | • Coordination to align Park plans and projects with municipality strategies and plans | Participate in key events, share annual plans and reports, regular coordination meetings |
| **INTERNATIONAL** | | |
| Transfrontier Conservation Area Structures | • Cross border coordination and collaboration between South Africa, eSwatini and Mozambique<br>• Joint TFCA Task Groups | Regular meetings between governments and park managers, joint operations |
| **TOURISM** | | |
| Tourism – operators, businesses, concessionaires, tourism associations and organisations operating in and around the Park | • Marketing | Participate in key events, meetings & consultative forums |
| Tourists (Local and international) | • Recreational use of area | Media, marketing, biodiversity awareness |
| **NON-GOVERNMENTAL ORGANISATIONS** | | |
| For example, Forum of National NGOs working in Marine Area (FOSCAM), RARE, CTV | • Represent communities<br>• Implement programmes to complement project management<br>– Monitoring and research<br>– Socio-economic projects<br>– Community capacity building | Consultation and meetings, peer learning, joint planning and sharing reports, joint advocacy, lobbying and awareness campaigns |
| **RESEARCH INSTITUTIONS** | | |
| For example, Agrarian Investigation Institute of Mozambique (IIAM), Universidade Eduardo Mondlane (UEM), Instituto de Investigação Pesqueira (Fisheries Research Institute) – IIP | • Research and monitoring to support conservation e.g. fisheries management, use of natural resources<br>• Research and community development in agriculture, natural resource use<br>• Capacity building of stakeholders to protect eco-systems | Share research, joint advocacy |

# 5.a (i) OWNERSHIP AND INHABITANTS

The proposed transboundary extension falls within the Republic of Mozambique in which all land is owned by the State.

## ESTIMATED POPULATION

The estimated population located within the proposed transboundary extension is 936. Year 2022.

Within the buffer zone[11] is 37,825. Year 2021

## OWNERSHIP AND INHABITANTS

There are four resident communities with legal rights of access who may use the land and natural resources, namely, Lihundo, Buingane, Muvukuza and Tsolombane. In 2020 there were 186 families living in the Park. However, over 75% of these families have taken advantage of a voluntary resettlement support package offered by the Park, and have resettled. It is expected that approximately 41 families will remain in the MNAP in Buingane (10 families), Tsolombane (17 families) and Muvukuza (14 families). The families that remain, and those who have resettled, have continued access to the MNAP for sustainable resource use, such as fishing.

# 5.a (ii) INDIGENOUS PEOPLES

There are no communities formally designated or identifying as indigenous people in Mozambique.

# 5.a (iii) PARTICIPATION

Public consultation for the nomination of MNAP as a WHS was undertaken from September 2021–February 2022. The proclamation to consolidate the MSR and PPMR as the MNAP, and the MNAP's Park Management Plan (PAMP) and associated Specific Regulation (see section 5b) were published for public comment over the same period (The MNAP's Management Plan was approved by the Government of Mozambique on the 25th November 2022). The consultation process included:

1. A broad public consultation with communities and key stakeholders
2. A Government review

The Park held community consultation workshops, public open days and meetings, and the consultation process was publicised in a national newspaper, on radio (Radio Maputo and Ponta do Ouro Community Radio), on the Park's website and on social media. The public were invited to submit comments by 24 November 2021, and the dates for public open days were advertised. Documents were published on the website, including a background information document, the PAMP, the Specific Regulation for the MNAP, and a comment sheet. Stakeholders were invited to comment on-line, via email or in person, and comments were recorded at meetings.

Four open day meetings were held from 2–5 November 2021. Approximately 111 people attended and 79 signed an attendance register. The Open days were held at Ponta do Ouro, Maputo City, Machangulo Peninsula and Ilha de KaNyaka. Meetings with communities living inside the Park and in its buffer zone were held in October and November, and attended by about 340 people. These meetings were held at Buingane, Gala, Guengo, Lihundo, Mabuluco, Madjedjane, Maphanga, Massonhane, Mhala, Muvukuza, Ponta Mucombo, Ndelane, Nhonguane, Tsolombane and Zitundo.

The main comments raised at these meetings included:

1. Impact of regulations on natural resource use, income generation, cultural and traditional practices
2. Would nomination of the Park as a WHS change how it was managed?
3. Clarification of the boundaries of the MNAP
4. Clarity was sought on who would implement Park regulations
5. Reintroduction of carnivores and potential human-wildlife conflict, and the need to address related issues
6. Threats to the Park from development and deforestation, and what management was doing about them
7. Would people be resettled if the MNAP was proclaimed?

11 The buffer zone (MEPA) includes Mozambique's Matatuine District and the Municipal District of Inhaca which falls under the Maputo City Municipality. The district has five administrative posts, two of which (Catuane and Catembe-N'sime) are outside the buffer zone. Thus, the estimated number of inhabitants in the Park's buffer zone is calculated as: Bela Vista (19,065) + Mashangulu (5,425) + Zitundo (9,379) + Inhaca (6,095) to give a total of 39,964.

8. Requests and suggestions to share knowledge and communicate on regulations and laws governing fishing, the declaration of the Park, and the World Heritage nomination process
9. Clarity on economic benefits and employment for communities
10. Environmental education and awareness on the value of the Park's natural resources to communities
11. Requests to provide drinking water
12. Management response to uncontrolled fires and illegal fishing
13. Improved communication with communities to discuss and resolve issues
14. Requests for updates on the declaration of the Park and WHS nomination

In addition, Park management consulted with government departments who offered support for the WHS nomination. Comments on the Management Plan and Specific Regulation were received from various government departments, organisations and individuals, and those related to the PAMP and Special Regulation were incorporated as appropriate. A report describing this exercise and consolidating comments and responses was produced and is included the documentation submitted to UNESCO as part of the dossier (see section 7b).

Ongoing participation of communities and stakeholders in the management of the MNAP is described in section 5c.

# 5.b PROTECTIVE DESIGNATION

The proposed transboundary extension is a National Park, established on **31 December 2021.** The Maputo National Park consolidated the Ponta do Ouro Partial Marine Reserve and the Maputo Special Reserve through the proclamation of ***Decree No. 100/2021, 31 December 2021: Creates the Maputo National Park and establishes the Buffer Zone around the Maputo National Park***. The buffer zone is set at 5 km from the Park boundary, and delineates the communities who have a right to access benefits from the Park, specifically access to a 20% share in revenue.

In terms of ***Decree No. 103/2019, 29 December 2019,*** the Maputo Environmental Protection Area (MEPA), the Park's buffer zone, was gazetted by the Mozambique Government in December 2019. The MEPA will be managed according to its own IDP which will specify zones and standards to use and conserve natural resources.

Managing the property is subject to the legal framework of the Government of Mozambique and its international commitments. National legislation to regulate the conservation of biodiversity and natural resources and management of National Parks and other protected areas includes:

1. ***Land Law 19/1997***, of 1 October, the authority to establish, modify or extinguish areas of total or partial protection is conferred upon the Council of Ministers. Relevant to the nomination is that this Law categorises MNAP as a public domain dedicated to the conservation and preservation of certain animals and plants, of biodiversity, historical monuments, and scenery in a management regime, preferably with local community participation, determined in specific legislation. Based on this law, in these protection zones, land use rights cannot be acquired. Furthermore, local communities have the right to participate in managing natural resources based on customary norms and practices, and to participate in delimiting community lands.

2. ***Environmental Law 20/1997***, of 1 October, wherein the general principles of biodiversity conservation are established.

3. ***Fisheries Law 22/2013***, of 1 November, allows Government to regulate the definition, condition and declaration of resource protection zones. Importantly, this Law lists norms for fishing vessels and gears, catch limits and volumes, types of licenses, and revocation and infractions.

4. ***Protection, Conservation and Sustainable Use of Biological Diversity Law 5/2017,*** of May 11 and ***Regulation Decree No. 89/2017,*** 29 December, establishes the basic principles of protection, conservation, restoration and sustainable use of biological diversity, and confers on the Council of Ministers the power to define policies to manage conservation areas. The Law covers participative management, finance and compensation, classification and zonation of conservation areas, permitted activities, requirements to create, modify and manage conservation areas, restoration of biological diversity, management of species threatened with extinction, resettlement of people, access and use fees, and compliance, infractions and penalties. The Law is regulated by Decree No. 89/2017 in which the measures that must be taken are specified.

5. ***National Administration for Conservation Areas (ANAC) Decree No. 16/2022***, 29 April, establishes the designation, competencies, autonomy, management, budgetary regime, organisation, and operation of ANAC.

6. ***The Water Law, Law n°16/1991***, of August 3, establishes, among other principles and norms, water resources in the public domain, water use regimes and management, and people's rights and duties with regard to water.

7. ***Management and Planning of the Coastal Zone and Beaches, Decree No. 97/2020***, of November 30, establishes principles and norms to manage and plan the coastal zone and beaches, and to protect and conserve the coastal zone, sensitive ecosystems (beaches, dunes, native vegetation, mangroves, wetlands and seagrass beds), and maintain the quality of waters and sands, and the health of their users. It defines management of coastal and marine biodiversity, the criteria for the concession of coastal zones and beaches, and identifies and establishes regimes to safeguard areas at risk.

Mozambique is signatory to a number of international conventions, and has made commitments to manage biodiversity in Mozambique that are relevant to the MNAP.

- United Nations Convention on International Trade in Endangered Species of Wildlife Fauna and Flora, 1975
- United Nations Convention on Migratory Species of Wild Animals, 1983
- United Nations Convention on Biological Diversity, 1992
- World Heritage Convention Act, 1982
- African Convention on the Conservation of Nature and Natural Resources, revised, 2003
- Southern African Development Community (SADC) Protocol on Wildlife Conservation and Law Enforcement of 1999

Of particular relevance is the role of the MNAP in the Lubumbo TFCA, and the establishment of a trans-boundary World Heritage Property. In 2000, two transfrontier protocols were signed to establish the framework for co-operation between South Africa and Mozambique. These were (1) The General Transfrontier Conservation and Resource Area Protocol, signed by the Mozambique, eSwatini and South African Governments, and (2) the Lubombo-Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area Protocol signed by the Mozambique and South African governments.

# 5.c MEANS OF IMPLEMENTING PROTECTIVE MEASURES

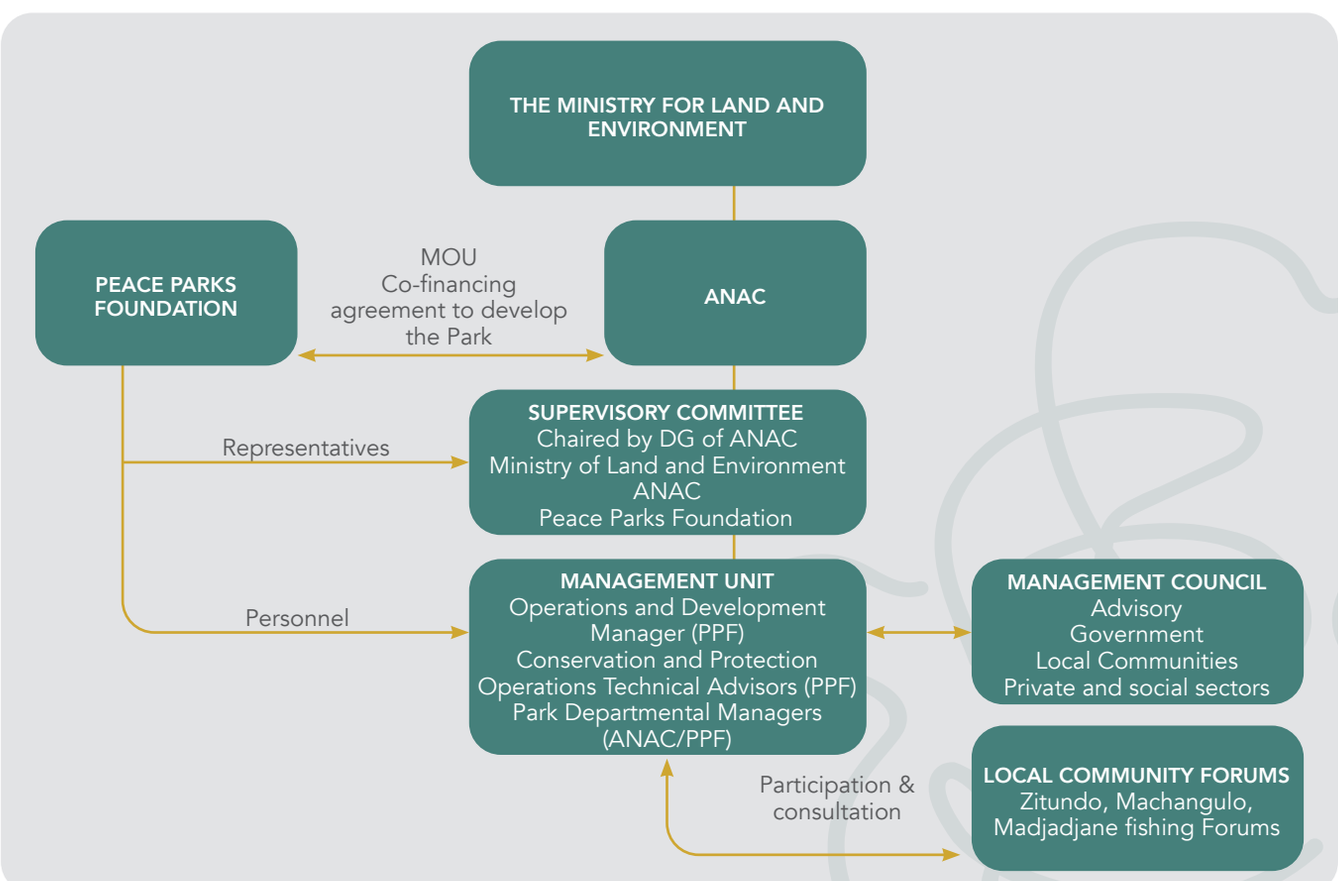
ANAC administers all Protected Areas in Mozambique including the MNAP. ANAC is a government entity under the Ministry of Land and Environment, tasked "to coordinate and develop a National System of Conservation Areas in Mozambique." ANAC reports to the Minister of Land and Environment.

The MNAP is managed by ANAC through a Management Unit with a Park Administrator (appointed by ANAC) and an Operational Manager or Technical Advisor appointed by PPF via a co-financing agreement between the two entities. The Park Administrator has overall responsibility for the Park, and oversees and coordinates the following:

- Conservation
- Community Development
- Tourism
- Terrestrial and Marine Protection and Compliance
- Communication and Stakeholder Engagement
- Infrastructure
- Finance and Administration

The Management Unit is chaired by the Park Administrator and reports to a Supervisory Committee chaired by the Director General of ANAC with representatives from the Ministry of Land and Environment (MTA), the Provincial Directorate of Land and Environment, ANAC and PPF. Other Government representatives are invited depending on issues to be discussed.

***Figure 4:*** *MNAP Management Structure*



The Management Unit prepares and implements workplans, manages technical and financial tasks, carries out recommendations from the Supervisory Committee, and collaborates with Government and stakeholders.

The Supervisory Committee meets at least twice annually to:

- Approve the appointment of Management Unit members
- Review and approve workplans and budgets, or material change requests from the Management Unit
- Review and approve strategic documents
- Attract private sector and donor interest in the the MNAP, including tourism
- Plan for cost efficient development and management of MNAP
- Monitor development and management of the MNAP
- Comply with financial procedures

A Management Council has been established[12] in terms of the Law for the Protection, Conservation and Sustainable Use of Biological Diversity to advise Park Management. The Management Council is chaired by the Park Administrator and includes representatives from local communities, private and social sector associations, and administrator(s) of the district(s) in which the Park falls. Their inputs concern the following functions as defined in Chapter II, Article 7 of the foregoing Law:

- Oversight of the activities of the MNAP
- Implementing the Management Plan
- Developing communities legally living in the MNAP and buffer zone
- Plans to develop the MNAP
- Income generation to reduce pressure from local communities on biodiversity
- Supervising concessions and developing public-private and community partnerships
- Strengthening local conservation capacity

Regionally, four community fora have been established in Zitundo, Machangulo, Bela Vista and Ilha de KaNyaka; there are 16 community-based Natural Resource Management Committees and four Community Fisheries Boards represented on the Park Management Council.

There are also private sector tourism committees for the coastal areas of Ponta do Ouro, Malongane, Ponta Madejane, Mamoli, Techobanine and the Machungulo Peninsula, and for concessionaires in the terrestrial area of the Park.
Government stakeholders at central, provincial and district levels (Table 6) are engaged when needed and through scheduled meetings.

The Park cooperates with government at national (e.g. Ministries), provincial (e.g. provincial directorates) and district level (e.g. district administrations and administrative posts).

Inter-ministerial memoranda have been drawn up by ANAC with the ministries of Sea, Inland Waters and Fisheries, Defence, and the Interior to help the MNAP to control fishing, enforce the law, and combat poaching and environmental crimes.

12 The Management Council was established in May 2019.

***Table 6.*** *Cooperation Between Government & ANAC – National, District and Provincial*

| NATIONAL LEVEL | PROVINCIAL LEVEL | DISTRICT LEVEL |
|---|---|---|
| • Ministry of Agriculture and Rural Development<br>• Ministry of Culture and Tourism<br>• Ministry of Defence<br>• Ministry of Economics and Finance<br>• Ministry of Education and Human Development<br>• Ministry of Public Works and Buildings<br>• Ministry of Sea, Inland Waters and Fisheries<br>• Ministry of Transport and Communication<br>• National Fisheries Administration<br>• National Institute for Fisheries and Aquaculture Development<br>• National Institute for Fisheries Research<br>• National Maritime Administration<br>• National Maritime Institute | • Independent Battalion of Boane<br>• Provincial Directorate of Agriculture and Food Security<br>• Provincial Directorate of Culture and Tourism<br>• Provincial Directorate of Economics and Finance<br>• Provincial Directorate of Education and Human Development<br>• Provincial Directorate of Land and Environment<br>• Provincial Directorate of Public Works and Buildings<br>• Provincial Directorate of Sea, Inland Waters and Fisheries<br>• Provincial Directorate of Transport and Communication | • Matutuíne District Administration<br>• City of Maputo's KaNyaka District Administration<br>• Administrative Heads of the five administrative posts: Bela Vista, Catembe Nsime, Catuane, Machangulo & Zitundo<br>• District Services for Education and Human Development<br>• District Services for Planning and Infrastructures<br>• District Services for Economic Activities |

# 5.d EXISTING PLANS

## EXISTING PLANS RELATED TO MUNICIPALITY AND REGION IN WHICH THE NOMINATED PROPERTY IS LOCATED (E.G., REGIONAL OR LOCAL PLAN, CONSERVATION PLAN, TOURISM DEVELOPMENT PLAN)

*Table 7. Plans Relevant to the MNAP*

| PLANS | DATE | AGENCY RESPONSIBLE FOR PREPARATION | PURPOSE |
|---|---|---|---|
| **REGIONAL TFCA** | | | |
| Integrated Development Plan for the Combined Lubombo Conservancy – Goba and Usuthu-Tembe-Fúti TFCA | 2014 | Team with members from Partner Countries (Mozambique, eSwatini and South Africa) with support of PPF | This document is the IDP for the combined Lubombo Conservancy-Goba and Usuthu-Tembe-Fúti TFCA (LCG-UTF TFCA). It was informed by stakeholder consultation and existing documents relevant to the TFCA and individual country components. It aligns with approaches from other TFCAs and Transfrontier Parks in the Southern African Development Community (SADC) region, and:<br>• Defines the extent of the TFCA<br>• Aligns component plans<br>• Addresses institutional arrangements<br>• Finance for joint actions<br>• Policy alignment between, and independence of partners<br>• Ecosystem integrity<br>• Integrated management<br>• M&E for development and management<br>• Implement joint development plans/actions<br>• Benefits – 10-year plan with 5-yearly components and business plans to guide LCG-UTF TFCA staff as part of integrated framework to assess/review performance |
| The MSR-Tembe Elephant Park Joint Operational Strategy | 2013 | Usuthu-Tembe-Fúti TFCA Task Group | **Purpose:** To guide MSR and Tembe Elephant Park to establish TFCA and report to stakeholders |
| **NATIONAL LEVEL** | | | |
| National Adaptation Plan of Action to Climate Change (NAPA) | 2007 | MTA | **Purpose:** identify urgent country needs, and participative assessment to: (1) strengthen warning system for natural disasters; (2) improve capacity/ awareness of farmers to adapt to climate change; (3) reduce climate change effects in coastal areas; and (4) improve water resources management |
| National Strategy for Adaptation and Mitigation of Climate Change (2013–2025) | 2012 | MTA | **Purpose:** establish resilience by reducing climate risk in communities and the national economy; promote low-carbon development/green economy, and integrate into sectoral and local planning |
| National Strategy for Development (2015–2035) | 2014 | Republic of Mozambique | **Purpose:** guide long-term social and economic development and translate priorities into actions<br>**Priority Areas**: Agriculture and fisheries |

| PLANS | DATE | AGENCY RESPONSIBLE FOR PREPARATION | PURPOSE |
|---|---|---|---|
| National Strategy and Action Plan of Biological Diversity of Mozambique (2015–2035) | 2015 | National Directorate of the Environment (DNAB), MTA | **Purpose:** counteract degradation of biodiversity and work towards resilient, healthy ecosystems; sustainable use and benefits thereof to contribute to sustainable national development |
| National Strategy for Reducing Emissions from Deforestation and Forest Degradation, Conserving Forests and Increasing Carbon Reserves through Forests (REDD+) (2016–2030) | 2016 | MTA | **Purpose:** highlight priority actions for agriculture, forestry and energy; align these sectors to reduce deforestation, and promote forest conservation/ restoration<br>**Priority Areas:** Three development sectors: (1) Agriculture: production and reforestation; (2) Forestry: conservation areas, sustainable use, restore forests and degraded areas; (3) Energy: production and consumption (production of biomass energy) |
| National Strategy and Action Plan for Mangrove Management in Mozambique (2020–2024) | 2020 | MIMAIP | **Purpose:** manage mangrove forests through protection, restoration, education and research<br>**Priority Areas:** (1) integrate management, protection and sustainable use; (2) Strengthen and enforce the law; (3) Strengthen capacity and institutional coordination; (4) Strengthen education and environmental awareness; and (5) Strengthen monitoring and research |
| PROVINCIAL LEVEL | | | |
| Strategic Plan for the Development of Maputo Province (2015–2024) | 2015 | Maputo Province Government | **Mission:** Promote an institutional environment for the balanced development of Maputo Province, tuned to people-centred economic growth, with the District as a spatial reference<br>**Strategic objectives**: (1) Human Capital: work towards the well-being and access to basic services of the population and amplify the human capital of the province; (2) Economic Growth: Develop the economy of Maputo Province by valorising local resources and using local potential and opportunities<br>**Strategy:** Safeguard the environment and consider environmental aspects in social and economic activities |
| DISTRICT LEVEL | | | |
| Spatial Plan of Territorial Planning of a Portion of the District of Matutuíne and Ilha de KaNyaka (PEOT) | 2021 | MozBio | **Purpose:** (1) Prepare guidelines to avoid land use conflicts in the area, to develop sustainable tourism, conserve biodiversity and maintain conservation areas; (2) Establish planning priorities for human settlement expansion and biodiversity conservation, and construct the main road and communication infrastructures whilst taking into account social and environmental issues; and (3) Identify principles to guide spatial planning, control and monitoring |
| LOCAL LEVEL | | | |
| Management Plan for the Use of Extractive Resources on the Western Shores of the Ponta do Ouro Marine Partial Reserve (2018–2022) | 2018 | PPMR, ANAC | **Purpose:** help the Park accomplish its goals through (1) manage coastal and marine natural resources; (2) increase knowledge of threats posed by different user groups; (3) monitoring and research; (4) strategies to implement legislative instruments; and (5) Promote the well-being of the population through a 'shared responsibilities' approach |

# 5.e PROPERTY MANAGEMENT PLAN OR OTHER MANAGEMENT SYSTEM

According to the Protection, Conservation and Sustainable Use of the Biological Diversity Law (Law 5/2017, of May 11) and Decree 89/2017 of 29 December, all conservation areas are required to have an approved and up-to-date Management Plan. In addition, a Specific Regulation for a protected area must be developed alongside its Management Plan to codify into law the planning and management instruments, such as zonation and Park rules.

Both the Management Plan and Specific Regulation for the MNAP have been approved by the Government of Mozambique's Minister of Land and Environment. Other Park plans are given in the table below.

*Table 8. Additional Plans Relevant to the MNAP*

| PLANS | DATE | PURPOSE |
|---|---|---|
| **Park plans** | | |
| Maputo National Park Management Plan | 2022 | 10-year Management Plan for strategic interventions in the MNAP for 2022–2032; builds on earlier plans for the MSR & PPMR, and is the first plan for the consolidated MNAP & EPA. Provides framework to integrate conservation, tourism, and economic development of local communities in and adjacent to the Park while protecting the outstanding natural value of the area, and candidacy for WHS status |
| Specific Regulation for the Maputo National Park | 2022 | States rules for management, conservation and uses of biophysical and cultural resources of MNAP; includes zonation plan for the Park |
| MSR & PPMR Strategic Plan for Tourism Development | 2016 | Long-term plan for ANAC to unlock tourism potential of the Park - covers the following:<br>• General background<br>• Mandate, vision and management principles for tourism development<br>• Situational analysis<br>• Master plan for tourism development<br>• Guidelines for implementation |
| MSR & PPMR Strategic Plan Business Plan | 2018 | To attain ecological/economic/social functionality by consolidating MSR (Mozambique) and Tembe Elephant Park (SA) in the Lubombo TFCA, and adjacent marine components - the Ponta do Ouro Partial Marine Reserve (PPMR) and Maputaland Marine Reserve |
| Maputo National Park Elephant Management Plan | 2021 | ANAC and PPF require plans to manage elephants in the MNAP and surrounds; while much of MNAP is fenced, elephants move in-and-out of the Park, and inhabit the region in large numbers<br><br>The preliminary strategy has engaged stakeholders and outlines interventions such as wildlife corridors, protected area expansion, community conservation initiatives, and community benefits to mitigate human-wildlife conflict (HWC) |

# TRANSBOUNDARY MANAGEMENT

## The Lubombo SDI - Trilateral Cooperation between Mozambique, eSwatini and South Africa

The General Protocol on the Lubombo Spatial Development Initiative (SDI) was signed by the Heads of State of Mozambique, eSwatini and South Africa in 2000, laying the foundation for transboundary cooperation in agriculture, tourism development and regional conservation. The iSimangaliso Wetland Park was South Africa's anchor project for the Lubombo SDI, having received recognition through its inscription as a World Heritage Property in 1999. The intention to extend the iSimangaliso Wetland Park World Heritage Property into Mozambique was formalised through the Lubombo SDI, which included legal mechanisms for transboundary management.

## Transfrontier Conservation Areas (TFCAs)

The general Lubombo SDI protocol enabled the three countries to sign the Lubombo TFCA protocol that recognised four TFCAs[13], of which one is encompassed by the iSimangaliso Wetland Park World Heritage Property and the MNAP. A trilateral TFCA committee with representatives from national government departments and the TFCAs develops policies and procedures, and harmonises regulations and legislation to promote sustainable development and conservation of TFCAs.

## Transboundary management committee: iSimangaliso Wetland Park and the MNAP

Under this framework, there is a bilateral agreement between the iSimangaliso Wetland Park and the MNAP, which was signed by the South African and Mozambique governments in 2001. The agreement establishes a transboundary management structure, which is legally empowered to take decisions regarding the management of the transboundary area and foster cooperation. The agreement sets out the mandate and terms of reference for a bilateral management committee, giving it legal authority to meet, take decisions and fulfil its terms of reference. To date, the iSimangaliso Wetland Park Authority and the MNAP have aligned their operations to manage cross border issues in research, disaster management, law enforcement and tourism operations. This committee is thus well placed to extend its activities to include the management of the proposed transboundary world Heritage Property.

The transboundary management committee meets quarterly, and has three representatives each from the iSimangaliso Wetland Park and the MNAP, with the requisite conservation, tourism and development expertise. Where deemed necessary, non-voting members, advisors or observers may also be included on the committee.

## Terms of reference of the iSimangaliso Wetland Park-MNAP transboundary management committee

1. Cooperate, and align management to protect the biodiversity, ecological processes and superlative natural beauty of the World Heritage Property.
2. Formulate and implement an Action Plan for joint management and cooperation in conservation, law enforcement and security, tourism, wildlife management, community development, alien species control, research and monitoring. Include permanent joint management mechanisms that are required.
3. Conduct strategic studies in order to formulate an agreed Action Plan.
4. Develop, market and promote the World Heritage Property as a sustainable tourism destination.
5. Provide sustainable socio-economic benefits for local communities living in and around the World Heritage Property.
6. Interpret and present World Heritage values for the purposes of conservation, education and tourism.
7. Prevent external activities from detrimentally affecting the property by identifying threats and acting appropriately to remove or mitigate them.
8. Inform partners of activities or issues within the jurisdiction of either Party that may negatively impact on the World Heritage Property.
9. Consult on how to prevent or minimise impacts, and implement agreed actions that are necessary to accomplish this.
10. Support research and training, and monitor the environmental effects of human activities in and near the property, including direct and indirect effects of development and adjacent land-use.
11. Make use of the opportunities and advantages offered by the transnational nature of the World Heritage Property.
12. Promote cross border co-operation and interaction between the Parties at all levels, including local communities, the private sector, NGOs and government agencies.

13 Lubombo Conservancy-Goba TFCA (Mozambique, Swaziland), Ponta do Ouro-Kosi Bay TFCA (Mozambique, South Africa), Nsubane-Pongola TFCA (South Africa, Swaziland) and Usuthu-Tembe-Futi TFCA (Mozambique, South Africa).

***Figure 5.*** *TFCA Management Arrangements between Mozambique, eSwatini and South Africa*

**Lubombo SDI: Trilateral Cooperation between Mozambique, eSwatini and South Africa**

Heads of State sign General Protocol on the Lubombo Spatial Development Initiative (SDI) in 2000.

**Purpose**
- Regional economic development: agriculture & tourism
- Conservation and protection of biodiversity
- Alleviation of poverty

**Transfrontier Conservation Areas (TFCAs): Mozambique, eSwatini and South Africa**

Lubombo Transfrontier Conservation and Resource Area Protocol signed by Heads of State in 2000.
Establishes trilateral TFCA committee with representatives from national government & TFCAs

**Purpose**
- Recognised four TFCAs, one of which is encompassed by the iSimangaliso Wetland Park and Maputo National Park (i.e.,Ponta do Ouro-Kosi Bay TFCA)
- Develop policy, procedures, and harmonise regulations and legislation

**Transboundary management of the World Heritage property – iSimangaliso Wetland Park and Maputo National Park agreement**

**Transboundary Management Committee**
- Legally empowered to make management decisions and cooperate
- Align management of the property
- 3 representatives each from iSimangaliso Wetland Park and Maputo National Park
- Meets quarterly

**Purpose**
Transboundary management alignment and cooperation to support protection of World Heritage Values, promote the property and provide sustainable socio-economic benefits for local communities.

# 5.f SOURCES AND LEVELS OF FINANCE

Over the last five years the MNAP has received significant investment to lay a foundation to manage the Park and generate tourism revenue.

This infrastructure development has included:

- Three entrance gates and tar roads from Maputo and the South African border to the main Fúti entrance gate and head office
- Marine and terrestrial head offices with upgraded water, power and communications services
- A protection control room and digital radio network covering the Park
- Airfield and hanger
- Staff accommodation and field ranger bases
- Upgraded electric boundary fence
- Training and Research Centre

Assets include:

- 15 4x4 vehicles, and motorbikes and quadbikes
- Two offshore boats
- Savannah aircraft
- SAMIL Crane truck and three tractors with trailers
- Staff uniforms, radios, patrol gear and office equipment

The rewilding of the Park has been largely completed, with the exception of predator re-introductions, for which budgets are secured; Eucalyptus plantations have been removed and protection services improved, and the Park is now attractive to tourists and has moved into a tourism development phase.

Overall capital investment over this period is estimated at US$25 million sourced primarily by PPF and Mozbio with support from Biofund.

Other investments to boost tourism are a naturally surfaced airfield at the coast near Ponta Dobela and improvements to the internal sand road network. The former will require fundraising or an external investor and the sand roads are being upgraded by the Park with compactable locally sourced sand as time and budgets permit. It is expected that the spine road to the main coastal tourism camps will be upgraded over the next five years. Funding is also needed for a waste management facility (~US$350 000) at the Park entrance as tourism numbers rise.

The Park also has a Training and Research centre which is operational since 2023 and may generate revenue for the Park given its proximity to Maputo and demand for such facilities.

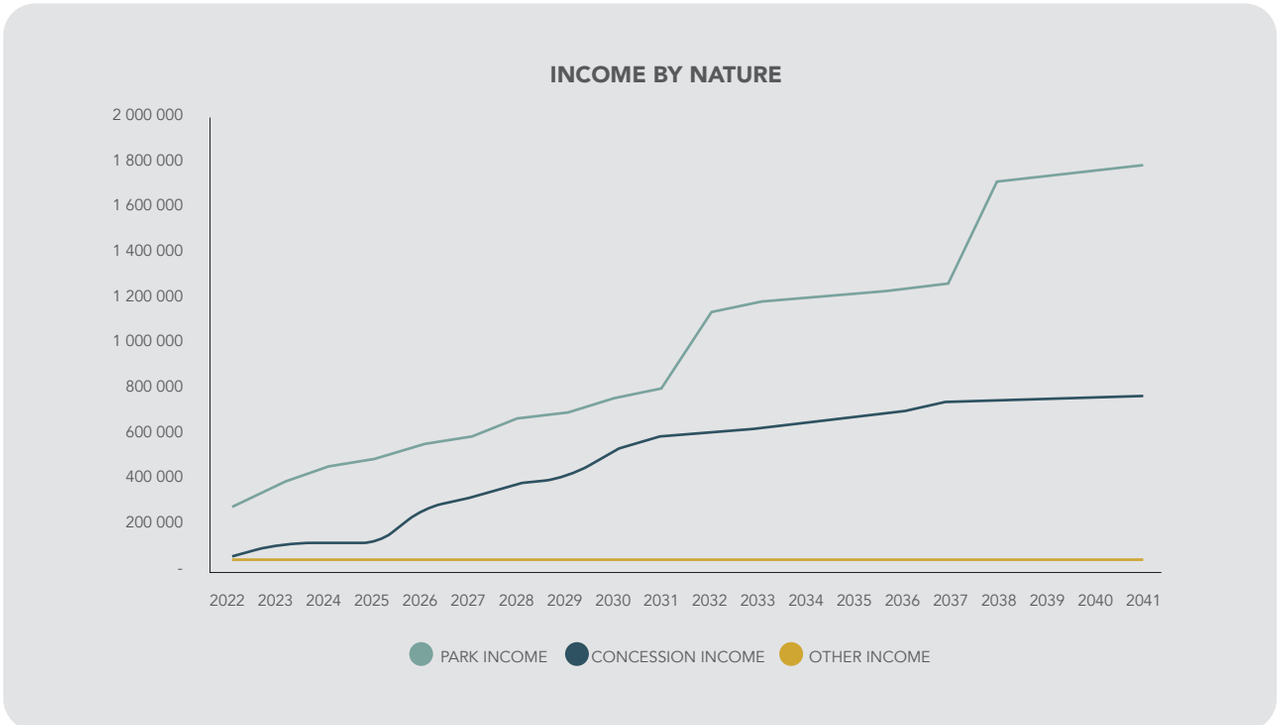
ANAC provides salaries for key operational staff and most rangers (~US$110 000 pa) while Park revenues cover certain operational positions (~US$90 000 pa). PPF and Mozbio currently fund additional specialist staff and top up salaries (~US$650 000 pa). All salaries are covered until 2025 and shortfalls will be met by increasing Park revenues and new and extended donor funding.

Similarly, PPF, Mozbio and ANAC currently fund core or committed Park operational costs (~ US$750 000 pa) until 2025 and shortfalls will be covered by increasing Park revenues and new and extended donor funding.

The short-term strategy (for the next 5 years) to fund capital and operating costs is through continued support from existing donors i.e. PPF, Mozbio and Biofund. Peace Parks has a 15-year technical and financial co-management agreement with ANAC to develop the MNAP while the Mozbio funding programme continues until at least 2024 and may be extended. Biofund may continue its US$50 000 - US$100,000 per annum funding of the Park.

In the medium to long-term (5 to 10 years), in addition to continued ANAC salary support, operational expenses will be increasingly funded by Park revenues from tourism concessions (refer graph) and entrance fees and activities as visitor numbers increase and private sector tourism facilities become available.

Figure 6. Projected MNAP revenues 2022–2041




Historically, the Park offered very basic and rustic camping facilities, accommodating about 5 000 visitors per year. Two upmarket lodges have been developed; an 18-bed facility at Ponta Chemucane has operated for over five years, and a 40-bed facility at Ponta Milibangalala opened in 2022. Further high-tier tourism camps will be funded by external investors while mid-tier camps will be funded jointly by tourism investors and Park donors. These include Ponta Dobela and potentially the conference centre near the main gate.

The first mid-tier tourism camp, the 80-bed Ponta Membene, was funded by PPF for US$5 million and has recently opened in mid 2023. Donor financing (of approximately US$1 million–2.5 million depending on the camp design) is required to develop Lagao Xinguti as a second mid-tier tourism camp. 4x4 and camping facilities have been built and are operated by the Park, and tenders have been placed for investor-financed tourism activities.

Tourism revenue is projected to increase over the next 10 years as more facilities are developed. 12 000 people visited the Park in 2019 (pre-COVID) with only one lodge operating, and this figure is projected to exceed 100 000 by 2030 as facilities are developed. The projected gross revenue per guest from entrance and concession fees will grow from the current modest $7.80 to $16.00 per guest per day as facilities, activities and the tourism experience improve. This will provide the projected $1,6 million required (see projected expenses and revenue in Figure 6).

Based on recent COVID experience, revenues are best secured by diversifying. The MNAP is fast emerging as a local, regional and international destination, and does not depend on a single tourism market. Products range from high-end to budget camping and day visitor markets. Additional revenues from the Training and Research centre and Blue Carbon market are being investigated.

Secured finance for 2022–2027 is shown below. Notable are the two large PPF-funded programmes – the 2022 Membene tourism camp construction and the five-year Blue Action Fund Eco-systems-based adaptation programmes which run until 2027.

*Table 9. MNAP Sources of Finance 2022–2027*

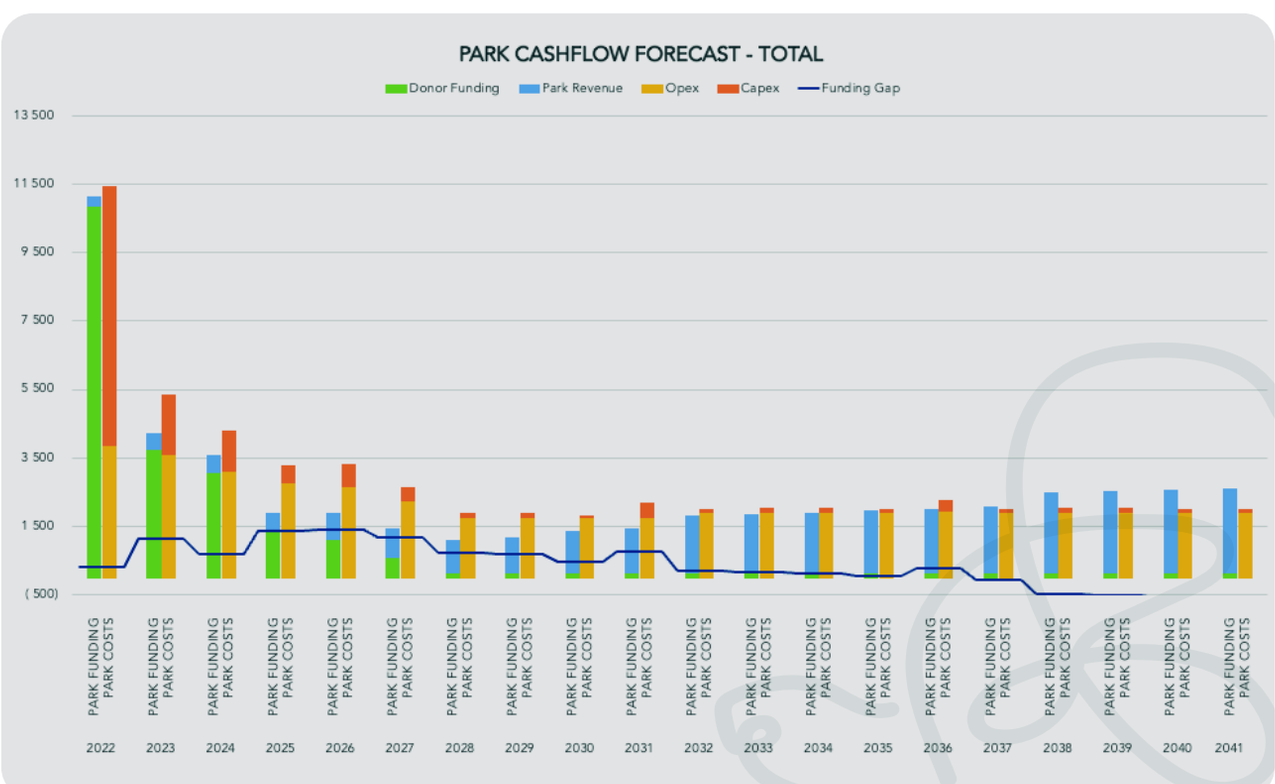
| | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | TOTAL |
|---|---|---|---|---|---|---|---|
| PPF | 7 841 506 | 2 654 623 | 2 508 691 | 1 205 370 | 985 129 | 476 289 | **15 671 607** |
| MOSBIO | 3 544 898 | 932 184 | 430 867 | - | - | - | **4 907 949** |
| BIOFUND | 99 999 | 100 000 | - | - | - | - | **199 999** |
| GOM | 108 243 | 110 408 | 112 616 | 114 869 | 117 166 | 119 509 | **682 812** |
| SHORTFALL | - | - | - | 1 166 826 | 1 158 514 | 1 239 080 | **3 564 420** |
| **TOTAL** | **11 594 646** | **3 797 215** | **3 052 174** | **2 487 065** | **2 260 809** | **1 834 878** | **25 026 787** |

*figures in US$*

The Strategic Business Plan forecasts that the MNAP can become financially self-sustaining within ten years on account of its tourism product, and regional and international market appeal. The amounts in Table 9 will be needed to lay the foundation for this income-generating potential as the Park develops through ongoing investment.

Forecast revenues and expenses are shown in Figure 6. The contribution of Park revenues is expected to increase, resulting in less dependence on donor funding. Annual operating costs are US$1.6 million, some of which are covered by donor grants which generally have a 3–5-year implementation period, and thus, beyond this, no donor funding has been assumed. The resulting financial model's funding gap thus peaks at US$600 000 in 2027 and totals US$2.25 million between 2025–2031. Given the history of the Park and its partners, and recent donor interest, this cumulative funding gap is expected to be covered over 2022–2031 by PPF, donor programmes and rising Park incomes.

*Figure 7. MNAP Expenditure and Projected Revenues 2022–2041*



# 5.g SOURCES OF EXPERTISE AND TRAINING IN CONSERVATION AND MANAGEMENT TECHNIQUES

The expertise, and on-and-off-site training available to the MNAP is considerable. Expertise is available within ANAC, and a number of MNAP staff are internationally recognised for their work. Conservation and management staff are academically and technically qualified, and the core management team has decades of experience, with many senior staff having spent over ten years in the Park. All ranger training meets national requirements, and field staff undergo regular refresher training.

Where internal candidates are not available for key positions, staff in finance, administration, community relations, tourism and infrastructure have been externally sourced.

Within the Park, PPF has appointed three expert personnel to the Operations and Development, and Conservation and Protection units, to provide on-the-job training to the management team. The Maputo PPF office offers strategic and operational oversight, and specifically supports protection, community, M&E, public relations, finance and administration functions. PPF also provide a fixed wing pilot; an MNAP Head Ranger has qualified as a pilot, and another ranger is in training.

Staff training is also offered through the Southern African Wildlife College (SAWC); annually, one MNAP ranger attends the NQF level 5 Terrestrial Natural Resource Management course, and marine and terrestrial refresher training takes place regularly. SAWC also provides annual Human Rights for Conservation training to all park staff, especially in the Protection and Community functions, so that community outreach is understood by staff as integral to the Park's ethos and success.

Staff routinely attend courses in tax, sales management, database management, tourist guiding, first aid, ranger operations and marine guard boat operations.

# 5.h VISITOR FACILITIES AND INFRASTRUCTURE

It is widely held that the MNAP and MEPA have the tourism potential to drive economic development, and the tourism development strategy is part of the Park's Management Plan, and identifies potential tourism development sites; the Specific Regulation sets the number of tourism activity concessions for each site, as tabulated below (and see Map 16).

*Table 10. Tourism Development Sites*

| TOURISM DEVELOPMENT SITES | TYPE | FACILITY TYPE AND ACCESS | INTENSITY OF USE |
|---|---|---|---|
| Fúti Sanctuary Lodge | Lodge | Concession<br>Private access | Low |
| Fúti North | 4x4 Campsite | Park facility<br>Permitted access | Low<br><100 |
| Fúti Corridor | 4x4 Campsite | Park facility<br>Permitted access | Low<br><100 |
| Fúti Conference centre | Lifestyle | Park facility<br>Public access | High<br>300+ |
| Elefantes Plains | 4x4 Campsite | Park facility<br>Permitted access | Medium<br>100–300 |
| Lagoa Xinguti | Serviced Campsite | Park facility<br>Public access | Medium<br>100–300 |
| Lagoa Nela | 4x4 Campsite | Park facility<br>Permitted access | Medium<br>100–300 |
| Ponta Chemucane (Anvil Bay) | Lodge | Concession<br>Private access | Low <100 |
| Ponta Membene | Serviced Campsite | Park facility<br>Public access | Medium<br>100–300 |
| Ponta Milibangalala (Montabelo) | Lodge | Concession<br>Private access | Medium<br>100–300 |
| Ponta Dobela | Lodge | Concession<br>Private access | Medium<br>100–300 |

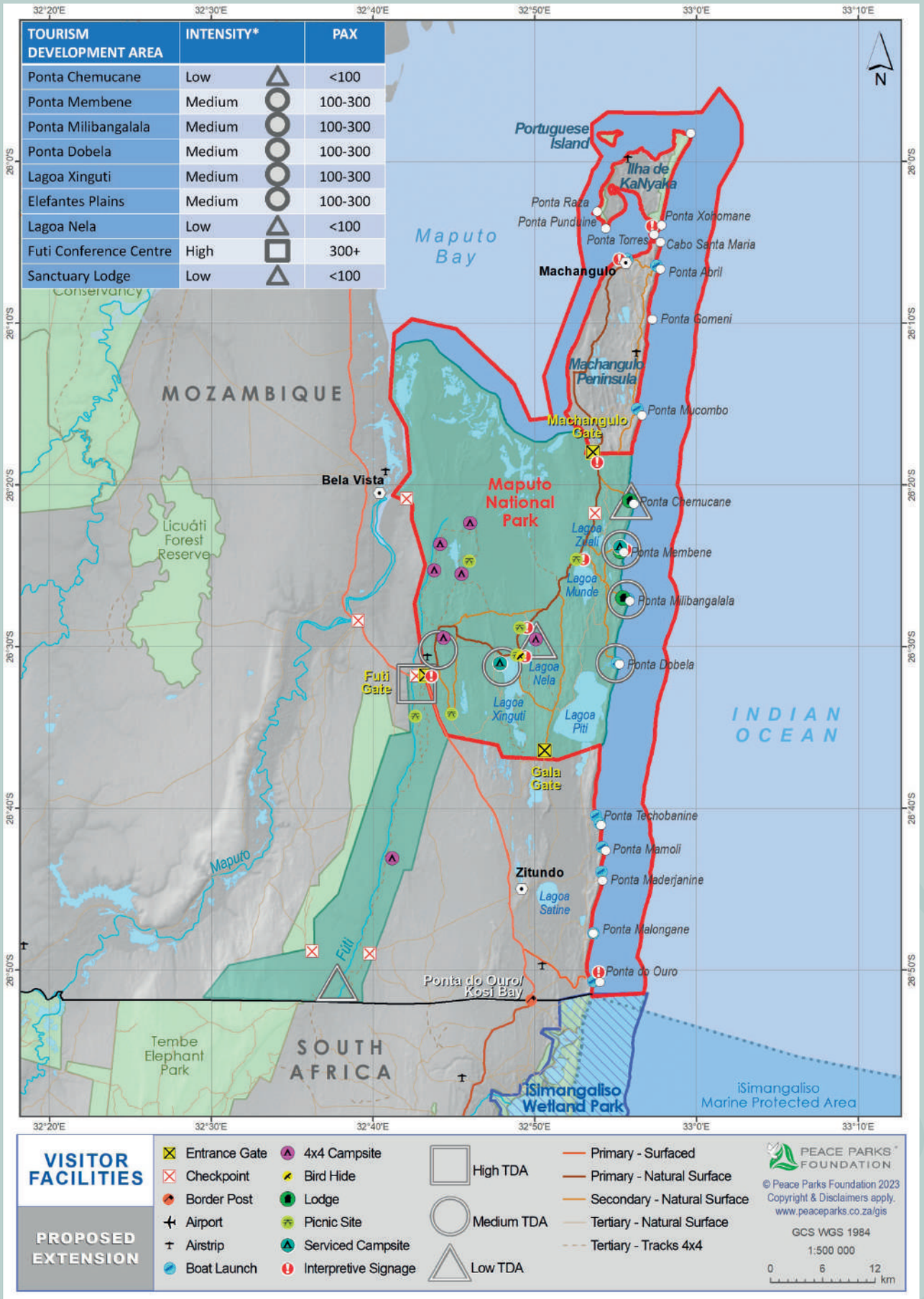
Potential negative impacts associated with these sites are managed by the Tourism Development Plan through zonation, pricing, and tourism density limits for each site as per the zonation plan. Given tourism numbers and their expected growth, it is not anticipated that these sites will expose the MNAP to negative effects.

*Table 11. Tourism Activity Concession Limits*

| SITE | NUMBER OF OPERATORS PERMITTED | | |
|---|---|---|---|
| | SCUBA DIVING | MARINE MAMMAL AND CARTILAGINOUS FISH WATCHING OPERATORS | RECREATIONAL SNORKELING TOUR OPERATORS |
| Gold Tip | 6 | 2 | 6 |
| Ponta Malongane | 2 | 1 | 2 |
| Ponta Mamoli | 1 | | 1 |
| Mamoli Tip | | 1 | |
| Techobanine | 2 | | 2 |
| Ponta Dobela | 1 | | 1 |
| Ponta Milibangalala | 1 | | 1 |
| Membene Tip | 1 | | 1 |
| Tip Chemucane | 1 | | 1 |
| Ponta Mucombo | 1 | | 1 |
| Ponta Abril | 1 | | 1 |
| Ponta Santa Maria | 1 | | 1 |
| Machangulo Peninsula | | 1 | |
| Ilha de KaNyaka | 2 | 1 | 2 |

Most of the MNAP is fenced, and is accessible through three gates. The main entrance is Fúti Gate on the western side of the Park, about 70km south of Maputo and 40km north of Ponta do Ouro and the Kosi Bay border post. Gala Gate is on the southern boundary of the Park, and Machangulo Gate on the Machangulo Peninsula is in the north. The national road (N1) runs in a north-south direction from Maputo to the border post with South Africa between the Fúti Corridor and the core of the MNAP (Map 16). Traffic is controlled by a checkpoint gate system, with a speed limit of 40km per hour and signage and speed bumps as further controls.

*Map 25.* *Visitor Facilities and Roads in the Maputo National Park (MNAP)*



The tourism plan is being implemented, but accommodation in the Park is currently limited. At present there are two private concessions in the Park, both five-star lodges, one at Ponta Chemucane (Anvil bay) and one at Ponta Milibangalala (Montabelo). The Ponta Membene tourism development area has recently opened in mid 2023 and has camping facilities and 3-star accommodation facilities with 80-beds. This is a Park owned asset which operates through a private sector operator concession. This lodge will be aimed at a midlevel market, with accommodation affordable to Mozambicans. A newly-built campsite at Lagoa Xinguti is operating, as are the four 4x4 campsites at Fúti North, Fúti Corridor, Elefantes Plains and Lagoa Nela. As the Park grows in popularity and offers more facilities, it is envisaged that visitor numbers will increase to over 37,000 per annum.

Currently, activities vary from a typical bush experience with game drives along a permit-only 4x4 route of 155km, and 185km of non-permit roads for the general public through various terrestrial habitats.

For the adventure seeker, specialist trails for both terrestrial and marine activities are on offer, including hiking, cycling, surfing, fishing, canoeing, kayaking, snorkelling, SCUBA diving, turtle safaris and mangrove forest excursions. More activities are planned once regulatory requirements and accredited operators are in place. Visitors will be able to tailor their activities according to season e.g. turtles breed between November–February, the songs of Humpback whales may be heard between October–December, and migrating birds are seen in the Park over the winter months. To cater to the growing popularity of birdwatching, and to share the Park's spectacular avifauna, bird lists, maps and brochures have been developed, and bird hides will be built as soon as funds are available. Guided by research and recommendations from Birdlife International following a study in early 2021, and subject to funding, additional bird hides will be built in popular destinations.

## ADDITIONAL FACILITIES

Six picnic sites with magnificent views have been built, each with three separate areas, and each of which can accommodate approximately 36 visitors. Where appropriate, each site will have barbeque facilities, tables and benches, and a shared ablution block. Two of the six sites will only be accessible to 4x4 permit-only visitors, giving them exclusive use.

Interpretive signage on biophysical, cultural and historical aspects of the Park will be placed at key locations, nine of which have been identified, from Ponta do Ouro in the south to Ilha de KaNyaka in the north. Each sign will focus on key aspects of the area, such as Park history, elephants, marine systems and wetlands.

A tourist road through the MNAP's coastal grasslands

# 5.i POLICIES AND PROGRAMMES RELATED TO THE PRESENTATION AND PROMOTION OF THE NOMINATED PROPERTY

Following its formal proclamation in 2021, the new Maputo National Park was rebranded, and a new logo and promotional materials were launched to highlight the Park's marine-terrestrial character through the catchphrase - '*where nature meets*'. The MNAP's goal is now to promote itself to a growing tourism market, and to its supporters and stakeholders. The Park is working to share its achievements in conservation and community development, to highlight its environmental awareness programmes, and to showcase and interpret the natural attributes upon which its WHS application rests.

*Figure 8: MNAP's Logo*

PARQUE NACIONAL
DE MAPUTO

To achieve this publicity and brand awareness the MNAP works with communications teams from ANAC and the PPF, an external public relations specialist, and interns. When funding allows, it is envisaged that a Park communications officer will be appointed. This team has developed the Park's website (www.parquemaputo.gov.mz) and using Facebook and Instagram (parquenacionaldemaputo), and its PR specialist works with local and regional media, who are regularly hosted by the Park to cover events. Breaking news and stories are aired regularly, and in Portuguese, and amplified via ANAC, and PPF. The PPF head office in South Africa shares events and achievements with local and international supporters through press releases and audio-visuals through print and broadcast media houses, and its online platforms. These are the PPF website (www.peaceParks.org), Facebook profile, Twitter profile, Instagram profile, LinkedIn account and Youtube channel, and the Foundation recently launched its own streaming channel, www.peaceParks.tv, linked to various social media accounts.

PPF employs experienced writers, brand coordinators and visual production specialists, has networks with journalists globally, and endeavours to host these journalists in the Park to maximise exposure for donors and partners. The Park is also supported by the ANAC Public Relations department which will lead and manage large scale media events and/or publications. In the Park itself, a brochure and map are available to the public at the gate, and can be downloaded from the Park website, while a billboard near the Maputo-Katembe bridge creates awareness and welcomes visitors.

A Tourism Manager and Tourism Officer manage marketing, communications, and promotions, supported by the Maputo-based PR Specialist and the ANAC and PPF communications teams. A General Inquiries and Tourism Bookings email address and telephone number are available, and staff respond to requests/queries daily. Tourism staff use the platforms described above, and work with local media on niche activities such as 4x4 clubs, birding groups, and adventure film crews to target these parts of the market.

While seldom used, paid advertising is sometimes the most effective way to reach specific audiences, or delivers value-added returns on investments and PR. New avenues for brand exposure are often explored, and PPF is planning to acquire video advertising at relevant international airports.

The Park also plans to attend national and international fairs, and works with tourism associations from Maputo Province and the Matutuíne district. Private sector business opportunities are advertised in national newspapers and sent directly to the Confederation of Economic Associations (CTA) and the National Tourism Institute.

# 5.j STAFFING LEVELS AND EXPERTISE (PROFESSIONAL, TECHNICAL, MAINTENANCE)

MNAP falls under ANAC within the Ministry of Land and Environment and is co-managed by ANAC and PPF, who are represented on the Supervisory Committee (see Figure 8) which provides the Park's strategic direction. The Committee is chaired by an ANAC representative, the Park Management Unit is led by an ANAC-appointed Park Administrator, and its head of Operations and Development is appointed by PPF.

The Park Management Unit is made up of nine department heads – four from ANAC and five seconded from PPF.

The PPF Head of Operations and Development is assisted by a Counter Poaching Co-ordinator and an Operations Manager (Conservation and Infrastructure) who implement management actions and provide oversight and training.

These structures are shown in the organogram below. The Park has 69 terrestrial and 15 marine rangers and a core management team of 31. Currently, it has sufficient staff to cover core functions but will need more staff as its activities expand. A growing focus on Ilha de KaNyaka will require more marine rangers and these will be sought through the Eduardo Mondlane University marine ranger unit.

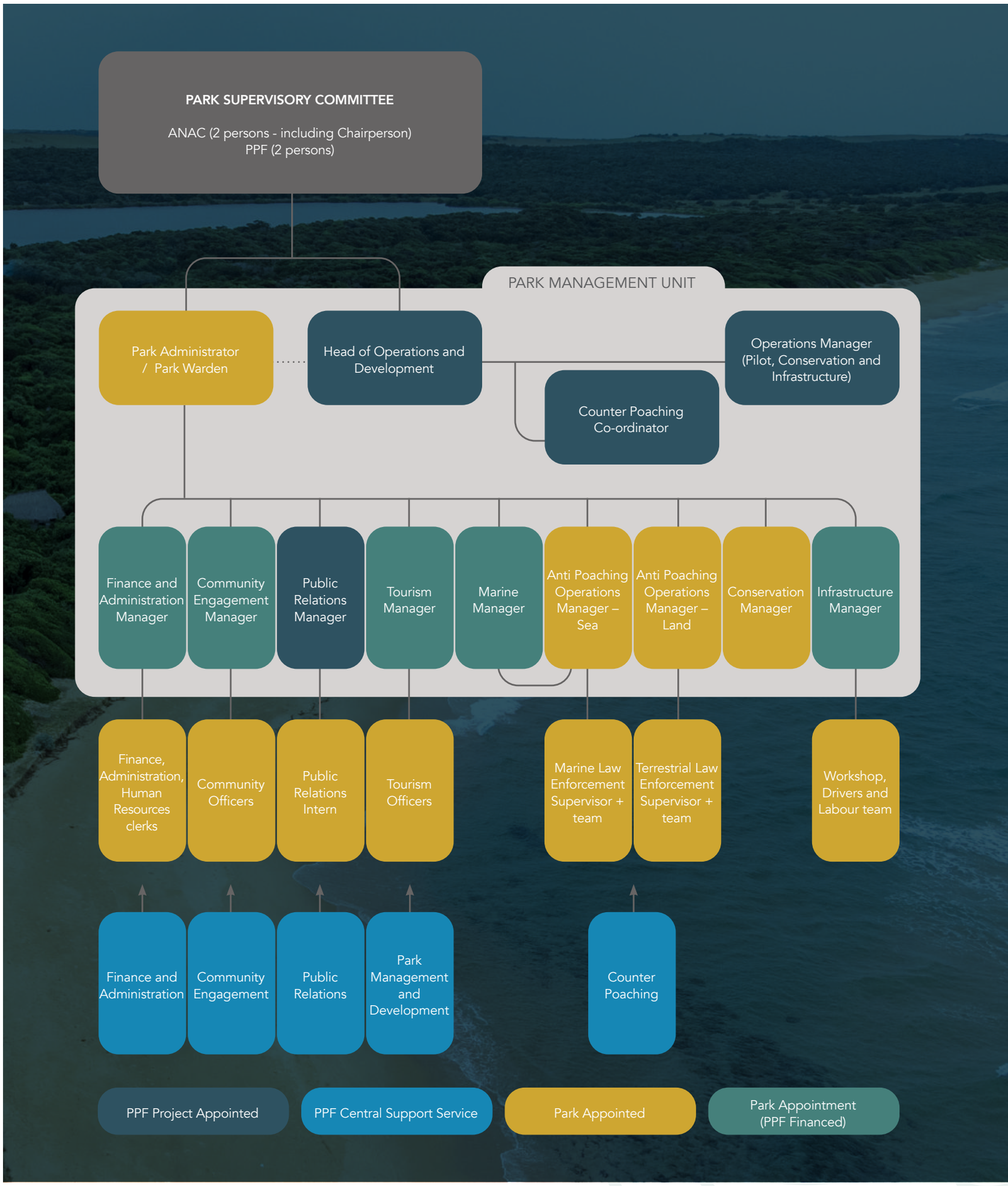
The Park community team has four field staff under a Community Co-ordinator, the Tourism Manager is assisted by a tourism officer, nine staff man the entrance gates and six run the Membene and Xinguti campsites.

The Park's marine and terrestrial Counter Poaching units are aided by the army, police and conservation police, who can jointly muster up to 50 people.

Recently, and in particular since COVID, the Park has started an eco-jobs programme to clear alien vegetation and maintain roads, fences and other infrastructure. The programme has employed 30–100 community members at any one time.

The co-management MoU with PPF spans 15 years, and its injection of skilled staff, capital and operational funds is laying a firm foundation for progressive conservation management. It has also, through the structure described in Figure 8, reduced pressure on the Park Administrator and strengthened law enforcement, tourism development, wildlife management, financial sustainability, community outreach and stakeholder support functions.

*Figure 9: MNAP Organogram*



# 6. MONITORING

This dossier argues for the nomination of a site which will consolidate the iSimangaliso Wetland Park World Heritage Property and the Maputo National Park as a single property. Thus, it follows that relevant sections emphasise both these properties in arguing the nomination. Section 4, however, emphasises monitoring in the transboundary extension to specifically present the factors supporting the nomination of the as-yet-un-inscribed component of the proposed joint property.

The proposed transboundary extension's ten-year Management Plan was approved by the Government of Mozambique on the 25th November 2022. The Management Plan contains a list of monitoring and research needs, and takes into account monitoring and research budgets in the context of the Park's technical and financial partnerships. These activities will provide data to monitor the state of the property.

Since 2015, the MSR and PPMR regularly assessed their protected area management using the METT14 assessment (see Stolton 2016). This assessment covers approximately 30 questions (with sub-questions) spanning (a) protected area design and planning (b) adequacy of management systems and processes, and (c) delivery of protected area objectives, including conservation of values. There is a standard scoring system which results in a score out of 100. The METT assessments for the MSR and PPMR in 2015, 2017, 2019, 2020 and 2021 showed an improvement in management effectiveness with scores of 49, 56, 60, 62 and 66 respectively. Since the MNAP was proclaimed at the end of 2021, future METT assessments will be for the MNAP.

The results indicate that, while scoring of the questions varies, that the increasing scores show clear improvements in a number of areas. These areas are boundary demarcation, the implementation of a regular work plan, improved access control systems, staff numbers, management capacity, financial resources and community engagement on governance and awareness.

At a strategic level, the implementing of the Management Plan will be measured and reported on against key measures for the implementation of the various management programmes; and at an operational level, it will be linked to the performance measures set out in the various operational plans.

The management programmes are:

- Natural resources programme - terrestrial and aquatic (freshwater and marine) ecosystems, and the sustainable use of resources
- Cultural and heritage resources programme
- Tourism programme
- Communities programme
- Management and administration.

The research and monitoring programs listed on the following page are preliminary and will be refined regularly.

14 METT – Management Effectiveness Tracking Tool.

# 6.a KEY INDICATORS FOR MEASURING STATE OF CONSERVATION

*Table 12. MNAP - Key Indicators of the State of Conservation*

| THEME/ INDICATORS | TIME COURSE | PERIODICITY | LOCATION | ORGANISATION |
|---|---|---|---|---|
| **PHYSICAL-CHEMICAL** | | | | |
| Meteorological stations/ air temperature, precipitation, pressure and wind force and direction data, collected with Davis Instruments (Weatherlink Network Data) | Five meteorological stations were stablished in 2018 | Continuously | MNAP | INAM |
| Sea mooring stations / temperature, salinity, $pCO_2$, pH, dissolved oxygen and fluorescence at different ocean depths | Not established | Continuously | MNAP | |
| Sea Surface Temperatures (SSTs), Chlorophyll and sea level rise, satellite imagery | Not established | Annual | MNAP | |
| Extreme events (cyclones, floods or droughts): number of events; effects measured or photographed (water turbidity and salinity; sedimentation; coastal erosion; river flow and lake water levels) | Alerts of extreme events by INAM | Continuously | MNAP | INAM |
| Climate change/ Sea Surface Temperatures, sea level and ocean acidification | Satellite imagery (decade 90) | Five/ ten-year analysis | MNAP | |
| Pollution/ solid debris types and quantity; ground and seawater quality using chemical (metals, pesticides and fertilisers), microbiological (pathogenic microorganisms) and physical-chemical indicators (oxygen, nitrogen, phosphorous, others) | To be established, although some surveys on solid debris have been made at Ponta do Ouro | Biannual (summer and winter) | MNAP | |
| **ECOSYSTEMS** | | | | |
| Human-wildlife conflict | | Continuous | MNAP | |
| Coastal lakes | Monitoring program to be established (physical and biological monitoring) | | MNAP | UEM CTV |
| Beach profiles (Coastal dunes, sandy and rocky shores): sediment dynamics; anthropogenic impacts (development; marine debris; pedestrian paths in the dunes) | No monitoring program established, only short-term surveys | Annual | MNAP | |
| Mangrove forest/ Mangrove area; mangrove gain/ loss; Mangrove diversity, biomass, regeneration; associated macrofauna (e.g. crabs) and species of particular significance and endemism (e.g. birds) | 2017-ongoing Surveys conducted, mostly at Ilha de KaNyaka | Annual | MNAP | CTV UEM |
| Seagrass beds/ Seagrass area, seagrass gain/loss; Seagrass diversity and density | No monitoring program established, only short-term surveys | Annual | MNAP | CTV UEM |
| Rocky shores/ higher taxonomic percentage cover; indicator species | 2019- ongoing Surveys conducted, mostly at Ilha de KaNyaka and Ponta do Ouro | Annual | MNAP | CTV UEM |
| Coral reefs/ Coral cover: percentage and mortality, fish diversity and size, diving impacts; effects of extreme events on bleaching (e.g. floods at Barreira Vermelha and Ponta Torres; cold fronts at southern reefs) | 2014-ongoing Surveys conducted since 1998 | Annual (alternating between reefs from north and south sections) | MNAP | CTV |

| THEME/ INDICATORS | TIME COURSE | PERIODICITY | LOCATION | ORGANISATION |
|---|---|---|---|---|
| Invasive species/ photos of invasive species per ecosystem | Not established | Continuous | LRF, MNAP | UEM<br>CTV<br>Tourism operators |
| **SPECIES OF SPECIAL CONCERN** | | | | |
| Terrestrial mammals (Elephant, hippopotamus, zebra): aerial surveys and density maps; animals tagged and recaptured | 1972 - ongoing | Annual | MNAP | Ezemvelo KwaZulu-Natal Wildlife |
| Marine turtles: number of nests and tracks (density maps); tagged and recaptured females; migratory routes and foraging grounds (satellite tags); mortality, entanglements and strandings | 1988/89 - ongoing | Monitoring seasons from October to March | MNAP | CTV<br>Tourism operators<br>IIP<br>Regional partners |
| Elasmobranchs/ tagged animals | No monitoring program established, only short-term surveys | | MNAP | WCS<br>Regional partners |
| Marine mammals/ Animals fluke photo-ID; aerial surveys; sightings map (migration, reproduction, breeding, and foraging aggregation) | 2009 - ongoing<br>Aerial surveys (2009 and 2018) | | MNAP | Dolphin Encounters Research Centre<br>Back to Basics Adventures |
| Birds: Develop a baseline assessment of bird richness and abundance and a continuous monitoring programme for significant and endemic species, especially in forest and grasslands | No monitoring program established, only short-term surveys | | MNAP | |
| Sea slugs: Species presence per reef | Not established | Annual | MNAP | Back to Basics Adventures |
| **RESOURCE EXTRACTION/ USES** | | | | |
| Non-consumptive recreational activities (safaris, sea safaris, SCUBA diving and swimming with dolphins); number of launches and persons; visitor demographics); most popular sites | 2008 - ongoing | Continuous | MNAP | CTV |
| Recreational fisheries: fishing effort; capture per unit effort; species composition and size classes for indicator species for offshore fisheries (e.g. *Thunnus albacares*, *Scomberomorus commerson*, *Aprion viriscens*, *Euthynnus affinis*/ *Sarda orientalis*, *Coryphaena hippurus* and *Acanthocybium solandri*) and for shoreline fisheries (e.g. *Trachinotus botla* and *Pomadasys kaakan)* | 2008-ongoing | Continuous | MNAP | CTV<br>IIP |
| Intertidal harvesting on rocky shores and seagrass: fishing effort; capture per unit effort; species composition and size/ weight for indicator species (e.g. *Perna perna*, *Saccostrea cucullata*, *Pyura stolonifera*, *Tripneustes gratilla*, *Barbatia decussata, Pinna muricata, Modiolus philippinarum, Pinctata capensis, Holothuria scabra* and Cypreidae) | 2016 at Maputo bay - ongoing<br>2019 at Ponta do Ouro and Ponta Milibangalala – ongoing<br>Short-term surveys | Continuous | MNAP<br>IIP | CTV<br>UEM |
| Subsistence and artisanal fisheries at Maputo Bay: fishing effort; capture per unit effort; species composition, size/weight for indicator species (e.g. *Hilsa kelee*, *Sillago sihama*, *Pomadasys maculatum, Otolithes ruber*, *Portunus segnis* and *Scylla serrata*); interaction with megafauna | 2016 - ongoing<br>Previous IIP monitoring data exists for Maputo Bay fisheries | Continuous | MNAP | CTV<br>RARE<br>IIP |
| Subsistence and artisanal fisheries at coastal lakes, fishing effort; capture per unit effort; species composition and size classes for indicator species (e.g. *Oreochromis mossambicus)* | 2018 | Continuous | MNAP | IIP |
| **ILLEGAL RESOURCE EXTRACTION (WITHIN THE RESERVES)** | | | | |
| Wood and charcoal production | No monitoring program established, only short-term surveys | Annual | MNAP | IIAM |
| Fires | Satellite imagery 2000 | Annual | MNAP | |
| Resettlements and crop fields | Satellite imagery | Annual | MNAP | |

# 6.b ADMINISTRATIVE ARRANGEMENTS FOR MONITORING PROPERTY

Most current research and monitoring is implemented together with Centro Terra Viva (CTV), the Museum of Natural History (MNH), the Wildlife Conservation Society (WCS), Rare, the World Wildlife Fund for Nature (WWF), Universities, government institutions (IIP, INAM), tourism operators (Dolphin Encounters Research Centre and Back to Basics Adventures) and regional partners (Oceanographic Research Institute and Ezemvelo KwaZulu-Natal Wildlife). These collaborations begin with a formal presentation of the project or programme to ANAC and the manager of the Park. Monitoring and research data, and publications, are archived by the Park and ANAC.

At the operational level, efforts will be made to improve collaboration with a range of stakeholders. There is a need to establish an annual monitoring program for physical indicators with institutions such as the National Meteorological Institute (INAM; *Instituto Nacional de Meteorologia)*, the National Directorate of Water (DNA; *Direcção Nacional de* Águas*),* the National Institute of Hydrography and Navigation (INAHINA; *Instituto Nacional de Hidrografia e Navegação*), the National Institute of Fisheries Research (IIP; *Instituto Nacional de Investigação Pesqueira*), the Mozambique Agricultural Research Institute (IIAM; *Instituto de Investigação Agrária de Moçambique*), the Climate Change Directorate (DMC; *Direcção das Mudanças Climáticas*), and the National Institute for Disaster Management and Risk Reduction (INGD; *Instituto Nacional de Gestão e Redução do Risco de Desastres*). These collaborations are needed to optimise data collection, reporting, and making recommendations to improve strategies and operational plans.

| |
|---|
| **Maputo National Park (MNAP)**<br>Miguel Goncalves – Park Warden<br>Cellphone: + 258 82) 27 6434 & + 258 84 716 1970<br>Email: chifununo@yahoo.com<br>www.parquemaputo.gov.mz/ |
| **Universidade Eduardo Mondlane (UEM)**<br>3453 Avenida Julius Nyerere, Maputo, Mozambique<br>Phone: +258 21 430 239<br>Email: cecoma@uem.ac.mz |
| **Centro Terra Viva (CTV)**<br>2HXR+24Q, Maputo, Mozambique/ Bairro da Coop, Rua C, No. 148 – Maputo, Mozambique<br>Phone: + 258 21 41 80 79/ + 258 82 30 02 496<br>Email: ctv@ctv.org.mz |
| **Ezemvelo KwaZulu-Natal Wildlife**<br>1 Peter Brown Drive<br>Pietermaritzburg<br>3201<br>Phone: +27 (0) 33 845 1999<br>www.kznwildlife.com |
| **Instituto Nacional de Investigação Pesqueira (IIP)**<br>Address: 389 Av. Mao Tse Tung, Maputo, Mozambique<br>Phone: +258 21 490 307<br>Email: iip@iip.gov.mz<br>www.iip.gov.mz/ |

## Wildlife Conservation Society (WCS)

2300 Southern Boulevard
Bronx, New York 10460
Phone: + 1 718 220 5100
www.wcs.org

**Mozambique Office:**
Faustino Vanombe street, No. 61, 2nd floor
Sommerschield, PO. Box 421
Maputo-Mozambique
Email: wcsmozambique@wcs.org
Phone: +258 21 496965

## Rare

Business centre Sommerschield 2, 41 Rua Beijo da Mulata, Maputo, Mozambique
www.rare.org

## Mozambique Agricultural Research Institute (IIAM)

Av. of FPLM, No. 2698, Maputo, Mozambique
Phone: +258 21 460190
PO Box 3658
www.iiam.gov.mz/

## Dolphin Encounters Research Centre

Ponta do Ouro Main Beach, Ponta do Ouro, 0025, Mozambique
Phone: +258 84 330 3859; +27 79 528 8400
www.dolphinencountours.org/

## Back to Basics Adventures

N Beach Road, Ponta do Ouro, Mozambique
Phone: +258 846115589
www.backtobasicsadventures.com/

# 6.c
# RESULTS OF PREVIOUS REPORTING EXERCISES

With the exception of long-term monitoring programmes mentioned in Table 12, current knowledge of the biodiversity and ecosystems of the MNAP is based on short-term surveys undertaken as fieldwork for academic theses. However, these surveys have informed and supported management decisions on zonation and resource use and have assisted the development of the Management Plan and its complementary Business Plan.

Reports on the state of conservation at national level and with national targets were submitted in compliance with international agreements and programmes, for example the "Sixth national report on the implementation of the Convention on Biological Diversity in Mozambique" (MITADER, 2019a), the COP13 National Report on the implementation of the Ramsar Convention on Wetlands (MITADER, 2018), and the IOSEA marine turtles Memorandum of Understanding - national reporting 2019 [IOSEA Signatory: Mozambique] (MITADER, 2019b) for the Convention on Migratory Species (CMS).

The MNAP's environment is tracked with the assistance of a range of NGOs and specialist researchers who monitor coral reefs, Turtles, Bull sharks, Kingfish, Trevally, marine mammals, mangroves, line and artisanal/subsistence fishing; and are soon to start rocky shore, seagrass and Blue crab monitoring.

The Park has in place a Management Plan for the Use of Extractive Resources on the West Coast of Ponta do Ouro Partial Marine Reserve (2018–2022) and a technical report: Monitoring of Subsistence and Artisanal Fisheries on the West Coast of Maputo National Park, South Mozambique: August 2016–July 2021. The second, technical report, brings together efforts by the MNAP, ANAC and PPF to use fisheries sustainably and to protect associated habitats along the MNAP's western coast through long-term monitoring and research.

The area's reef monitoring programme began in 2011 and is now conducted annually, with the latest reports current to March 2021. Turtles have been monitored since 1994 and this work, undertaken with South Africa, is active and ongoing. Knowledge of the medium and large mammal population has improved significantly in recent years (van Aarde et al., 2004; Matthews & Nemane, 2006; Matthews, 2006; Matthews, 2008; Bodasing, Hanekom & Cumbana, 2011; Bodasing et al., 2012; Hanekom & Cumbana, 2014; Bodasing et al., 2016; Cumbana, 2019).

Species lists published by ANAC and PPF for the MNAP cover birds, mammals, marine mammals, amphibians (frogs), inland fish and turtles. Various specialist reports provide checklists of sharks and rays, marine fish, mangroves, crustaceans and reptiles. While terrestrial invertebrates have been poorly studied, many spiders, insects and molluscs have been recorded, and much information is known about the MNAP's marine invertebrates of rocky shores and coral reefs - sponges, corals, anemones and jellyfish, crabs, shrimps and lobsters, starfish, sea urchins, cucumbers and other lesser-known groups such as sea squirts and worm-like organisms.

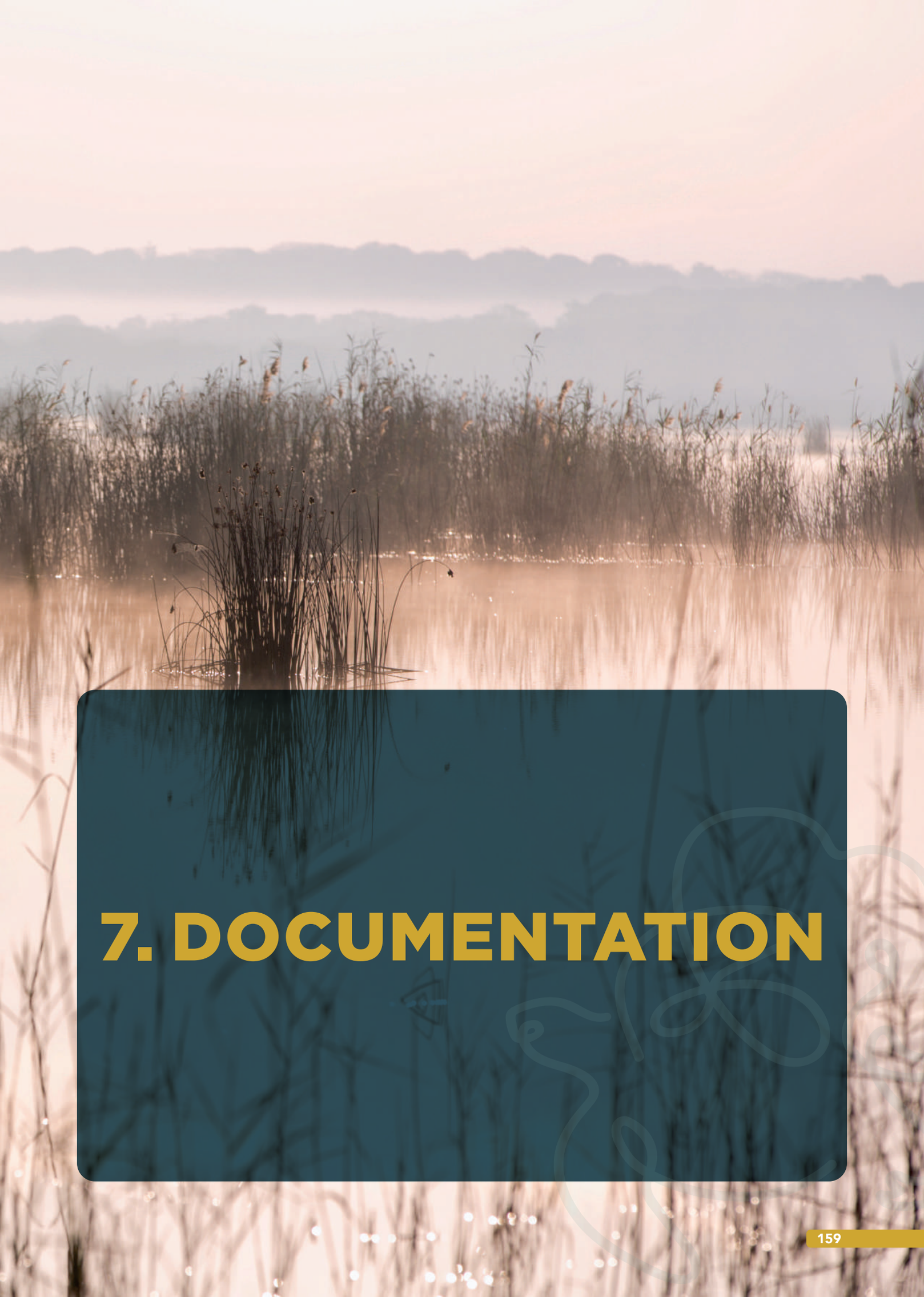
An atlas of the birds of southern Mozambique was produced in 1999, and the birds of the then-MSR were surveyed in 2000 (Parker, 2000). The South African Bird Atlas Programme (SABAP2) has also contributed to knowledge of the Park's birds.

References relating to the state of conservation in the proposed transboundary extension are given below:

| THEME | REFERENCE (SEE BIBLIOGRAPHY FOR FULL CITATION) |
|---|---|
| **Natural resource use/management** | • ANAC (2018).<br>• de Boer, W. F. & F. Longamane (1996).<br>• de Boer, W. F. (2000).<br>• de Boer, W. F., A. F. Blijdenstein & F. Longamane (2002).<br>• de Boer, W. F., T. Pereira & A. Guissamulo (2000).<br>• Kloppers, R. J. (2001).<br>• Marshall, N., E. S. A. H. Milledge & P. S. Afonso (2001).<br>• MIMAIP (2018).<br>• Pereira, M. A. M. & R. van der Elst (2014).<br>• Pereira, M. A. M., K. G. S. Abrantes & E. J. S. Videira (2002).<br>• Scarlet, M. P. J. (2005).<br>• Williams, R. et al. (2018).<br>• Robertson, W. et al. (1996). |
| **Community conservation:** | • ANAC (2014).<br>• Garnier, J. et al. (2012). |
| SPECIES-LEVEL DESCRIPTIONS AND RESEARCH: | |
| **Seagrasses:** | • Bandeira, S. (2014).<br>• Bandeira, S. (2002).<br>• Bandeira, S. et al. (2014).<br>• Duarte, M. C., S. Bandeira & M. M. Romeiras (2012).<br>• Lanyon, J. M., C. J. Limpus & H. Marsh (1989). |
| **Mangroves:** | • Barbosa, F. M., C.C. Cuambe & S. O. Bandeira (2001).<br>• de Boer, W. (2002).<br>• Macamo, C. F. C., H. Balidy, S. O. Bandeira & J. G. Kairo (2015).<br>• Paula, J., C. Macamo & S. Bandeira (2014). |
| **Birds:** | • BirdLife International (2021).<br>• de Boer, W. F. (2002).<br>• de Boer, W. F. & C. M. Bento (1999).<br>• Fishpool Lincoln, C. D. & M. I. Evans (2001).<br>• Guldemond, R. A. R. &. R. J. van Aarde (2010).<br>• Parker, V. & W. F. de Boer (2000).<br>• Parker, V. (1999). |
| **Invertebrates/corals:** | • Calcinai, B. et al. (2020).<br>• Celliers, L. & M. H. Schleyer (2008).<br>• Costa, A., M. A. M Pereira., H. Motta, & M. Schleyer (2005).<br>• Macdonald, A. H. H., M.H. Schleyer & J. Lamb (2009).<br>• Porter, S. N. (2009).<br>• Schleyer, M. H. & L. Celliers (2003a).<br>• Schleyer, M. H. & L. Celliers (2003b).<br>• Schleyer, M. H. & L. Celliers (2005b).<br>• Schleyer, M. H. (1995).<br>• Schleyer, M. H. (2000).<br>• Schleyer, M. H. (2009).<br>• Schleyer, M. H., A. Kruger & L. Celliers (2008).<br>• Schleyer, M. D., Obura & M. Rodrigues (1999).<br>• Schleyer, M.H. & L. Celliers (2005a).<br>• Stromvoll, J. & G. Jones (2019).<br>• Tibiriçá, Y. & M. A. E. Malaquias (2017).<br>• Tibiriçá, Y., M. Pola & J. L. Cervera (2017). |
| **Terrestrial Plants/algae:** | • Campbell, B. M. et al. (1988).<br>• Clarke, G. P. (1998).<br>• Coppejans, E. F., Leliaert & T. Schils (2002).<br>• Critchley, A. T. et al. (1997).<br>• Darbyshire, I. J. et al. (2019).<br>• Datizua, C. (2018).<br>• de Koning, J. & K. Balkwill (1995).<br>• du Randt, F. (2018).<br>• Izidine, S. A. (2003).<br>• Matimele, H. & J. Timberlake (2020).<br>• Matimele, H. A. (2016).<br>• Syliver, B. et al. (2020).<br>• van Wyk, A. E. & G. F. Smith (2001).<br>• van Wyk, A. E. (1996). |

| THEME | REFERENCE (SEE BIBLIOGRAPHY FOR FULL CITATION) |
|---|---|
| **Sharks and Fish:** | • Daly, R. et al. (2018).<br>• Daly, R. et al. (2014).<br>• Daly, R., P. W. Froneman & M. J. Smale (2013).<br>• Nagel, K. & C. Degerstedt (1999).<br>• Pereira, M. A. M. & E. J. S. Videira (2005).<br>• Smith, J. L. B. (1955a).<br>• Smith, J. L. B. (1955b).<br>• Smith, J. L. B. (1958). |
| **Turtles:** | • de Wet, A. (2012).<br>• Fernandes, R. S. et al. (2016).<br>• Frazier, J. G. (2005).<br>• Fuentes, M., D. A. Pike & A. Dimatteo (2013).<br>• Lanyon, J. M., C. J. Limpus & H. Marsh (1989).<br>• Luschi, P. et al. (2006).<br>• Pereira. M. A. M. et al. (2014b).<br>• Poloczanska, E. S., C. J. Limpus & G. C. Hays (2009).<br>• Robinson, N. J. et al. (2016).<br>• IUCN (1996).<br>• Nel, R., A.E. Punt & G.R. Hughes (2013).<br>• Trindade, J. C. C. N. (2012).<br>• Williams, J. L. et al. (2017).<br>• Wallace, B. P. et al. (2010).<br>• Williams, J. L. et al. (2019).<br>• Mellet, B. (2015). |
| **Marine Mammals/Dugongs:** | • Cockcroft, V. (2020).<br>• Fernando, S., S. Bandeira & A. Guissamulo (2014).<br>• Findlay, K. (2016).<br>• Lanyon, J. M., C. J. Limpus & H. Marsh (1989).<br>• Guissamulo, A. (2014).<br>• Guissamulo, A. T. & V. G. Cockcroft (1997). |
| **Terrestrial mammals:** | • Ntumi, C. (2020). |
| **Geology, Geomorphology & Oceanography:** | • Achimo, M. et al. (2014).<br>• Cooper, J. A. G. & O. H. Pilkey (2002).<br>• de Boer, W. F., L. Rydberg & V. Saide (2000).<br>• Palalane, J., M. Larson, H. Hanson & D. Juízo (2016). |
| **Monitoring reports:** | • Bachoo, S. (2019).<br>• Blythe, J. L., G. Murray & M. S. Flaherty (2013).<br>• Bodasing, T. (2011).<br>• Bodasing, T. (2012).<br>• Esteban, N., J. A. Mortimer & G. C. Hays (2017)<br>• Fernandes, R. S. et al. (2018).<br>• Floros, C. et al. (2012).<br>• Hanekom, C. C. (2019).<br>• Hanekom, C. C. & R. Cumbane (2014).<br>• Hanekom, C. C. & R. Cumbane (2015).<br>• Hanekom, C. C. & R. Cumbane (2016).<br>• Matthews, W. M. & M. Nemane (2006).<br>• Matthews, W.S. (2006).<br>• Matthews, W.S. (2008).<br>• Motta, H., M. A. M. Pereira & M. H. Schleyer (2002).<br>• Nel, R. (2014).<br>• Nel, R. (2016).<br>• Pereira, M. A. M. et al. (2014).<br>• Pereira, M. A. M. & M. H. Schleyer (2005).<br>• Pereira, M. A. M., E. J. S. Videira & A. C. D. Costa (2008).<br>• Pereira, M. A. M. et al. (2003).<br>• Robinson, N. J. et al. (2019).<br>• Rodrigues, M. J. et al. (1999).<br>• Stalmans, M. (2015).<br>• Stalmans, M. (2018).<br>• Tokura, W., H. Matimele, J. Smit & M. T. Hoffman (2020). |

| THEME | REFERENCE (SEE BIBLIOGRAPHY FOR FULL CITATION) |
|---|---|
| **Conservation management – area descriptions, management/ conservation plans, status reports, situational analyses, buffer zone/ corridor reports, socio-economic studies, conservation planning tools** | • Bandeira, S. et al. (2014).<br>• Calengo, J. et al. (2019).<br>• Centro Terra Viva (2016).<br>• da Silva, A. & J. Rafael (2014).<br>• ANAC (2011).<br>• Fernandes, R. S., C. Litulo, M.A.M. Pereira & T.I.F.C. Pereira (2016).<br>• Ferreira, M. A. & S. Bandeira (2014).<br>• Halpern, B. S. et al. (2007).<br>• Hatton, J. et al. (1995).<br>• José, P. L. (2017).<br>• Kalk, M. & F. Costa (1995).<br>• Massinga, A. & J. Hatton (1996).<br>• ANAC (2019).<br>• Nhabinde, S., V. Julien & C. Bento (2014).<br>• Pereira, M.A.M. et al. (2014a).<br>• Pereira, M.A.M. (2004).<br>• Scarlet, M. & S. Bandeira (2014).<br>• Senkoro, A., S. Bandeira & F. Barbosa (2014).<br>• Smith, R. J. & N. Leader-Williams (2006).<br>• Smith, R. J. et al. (2008).<br>• Smith, R. & Leader-Williams, N. (2006).<br>• Smith, R., P. Goodman & W. Matthews (2006).<br>• Stattersfield, A., Crosby, M., Long, A. & Wege, D. (1998).<br>• Macnae, W. & M. Kalk (1958).<br>• Macnae, W. & M. Kalk (eds) (1969) |



# 7. DOCUMENTATION

# 7.a PHOTOGRAPHS AND AUDIO-VISUAL IMAGE INVENTORY AND AUTHORISATION FORM

The table below includes the images and videos that UNESCO has been granted, free of charge, the non-exclusive cession of rights to use in terms of Annex 5 section 7a of the Operational Guidelines.

| ID. NO | FORMAT (SLIDE/ PRINT/ VIDEO) | CAPTION | DATE OF PHOTO (MO/YR) | PHOTOGRAPHER/DIRECTOR OF THE VIDEO | COPYRIGHT OWNER (IF DIFFERENT THAN PHOTOGRAPHER/ DIRECTOR OF VIDEO) | CONTACT DETAILS OF COPYRIGHT OWNER | NON-EXCLUSIVE CESSION OF RIGHTS |
|---|---|---|---|---|---|---|---|
| MNAP_001 | Digital Image | Local farmers are trained in conservation agriculture – nature-friendly farming techniques that offer improved yields and income generation | 2019 | Peace Parks Foundation | n/a | Peace Parks Foundation 11 Termo Lane Techno Park Stellenbosch +27 21 880 5100 ppfcoms@peaceparks.org | yes |
| MNAP_002 | Digital Image | Maputo National Park offers a unique bush/beach experience from pristine beaches to terrestrial wilderness | 2019 | Peace Parks Foundation | n/a | Peace Parks Foundation 11 Termo Lane Techno Park Stellenbosch +27 21 880 5100 ppfcoms@peaceparks.org | yes |
| MNAP_003 | Digital Image | Maputo National Park offers a unique bush/beach experience from pristine beaches to terrestrial wilderness | 2022 | Peace Parks Foundation | n/a | Peace Parks Foundation 11 Termo Lane Techno Park Stellenbosch +27 21 880 5100 ppfcoms@peaceparks.org | yes |

| ID. NO | FORMAT (SLIDE/ PRINT/ VIDEO) | CAPTION | DATE OF PHOTO (MO/YR) | PHOTOGRA-PHER/DIREC-TOR OF THE VIDEO | COPYRIGHT OWNER (IF DIFFERENT THAN PHO-TOGRAPHER/ DIRECTOR OF VIDEO) | CONTACT DETAILS OF COPYRIGHT OWNER | NON-EXCLUSIVE CESSION OF RIGHTS |
|---|---|---|---|---|---|---|---|
| MNAP_004 | Digital Image | Maputo National Park infrastructure has been completely upgraded with new office buildings, entrance gates, roads and signage | 2019 | Peace Parks Foundation | n/a | Peace Parks Foundation 11 Termo Lane Techno Park Stellenbosch +27 21 880 5100 ppfcoms@peaceparks.org | yes |
| MNAP_005 | Digital Image | After a decade of rewilding, Maputo National Park has a thriving wildlife population | 2015 | Peace Parks Foundation | n/a | Peace Parks Foundation 11 Termo Lane Techno Park Stellenbosch +27 21 880 5100 ppfcoms@peaceparks.org | yes |
| MNAP_006 | Digital Image | Lake Xinguti in Maputo National Park | 2022 | Peace Parks Foundation | n/a | Peace Parks Foundation 11 Termo Lane Techno Park Stellenbosch +27 21 880 5100 ppfcoms@peaceparks.org | yes |
| MNAP_007 | Digital image | Hawksbill turtles feed on reef sponges in the Maputo National Park | 2010 | Caine Daly | Caine Daly | Park Warden Maputo National Park Cellphone: +258 (82) 7276434 and +258 (84) 7161970 Email: chifununo@yahoo.com | yes |
| MNAP_008 | Digital image | Corals of the Maputo National Park | 2013 | Ryan Daly | Ryan Daly | Park Warden Maputo National Park Cellphone: +258 (82) 7276434 and +258 (84) 7161970 Email: chifununo@yahoo.com | yes |

| ID. NO | FORMAT (SLIDE/ PRINT/ VIDEO) | CAPTION | DATE OF PHOTO (MO/YR) | PHOTOGRA-PHER/DIREC-TOR OF THE VIDEO | COPYRIGHT OWNER (IF DIFFERENT THAN PHO-TOGRAPHER/ DIRECTOR OF VIDEO) | CONTACT DETAILS OF COPYRIGHT OWNER | NON-EXCLUSIVE CESSION OF RIGHTS |
|---|---|---|---|---|---|---|---|
| MNAP_009 | Digital image | Leatherback Turtle | 2008 | Mathew Prophet | Mathew Prophet | Park Warden Maputo National Park Cellphone: +258 (82) 7276434 and +258 (84) 7161970 Email: chifununo@yahoo.com | yes |
| MNAP_010 | Digital image | Leatherback turtles lay their eggs in the Maputo National Park | - | Green Renaissance | Green Renaissance | Park Warden Maputo National Park Cellphone: +258 (82) 7276434 and +258 (84) 7161970 Email: chifununo@yahoo.com | yes |
| MNAP_011 | Digital image | Loggerhead turtles lay their eggs in the Maputo National Park | - | Green Renaissance | Green Renaissance | Park Warden Maputo National Park Cellphone: +258 (82) 7276434 and +258 (84) 7161970 Email: chifununo@yahoo.com | yes |
| MNAP_012_ video | Video | A celebration of achieve-ments in Maputo National Park since it's proclamation | 2020 | Peace Parks Foundation | n/a | Peace Parks Foundation 11 Termo Lane Techno Park Stellenbosch +27 21 880 5100 ppfcoms@peaceparks.org | yes |
| MNAP_013_ video | Video | *Rewilding Africa _Eland to Maputo Special Reserve* A founder population of Eland is introduced into Maputo National park | 2019 | Peace Parks Foundation | n/a | Peace Parks Foundation 11 Termo Lane Techno Park Stellenbosch +27 21 880 5100 ppfcoms@peaceparks.org | yes |

# 7.b
# TEXTS RELATING TO PROTECTIVE DESIGNATION

**Texts relating to protective designation, copies of property management plans or documented management systems and extracts of other plans relevant to the nominated property**

| PROTECTIVE DESIGNATION | FORM PROVIDED |
|---|---|
| **LEGISLATION** | |
| Decree No. 100/2021, 31 December 2021: Creates the Maputo National Park and establishes the Buffer Zone around the Maputo National Park | See Appendix 3 |
| Decree No. 103/2019, 29 December 2019, Creating the Maputo Environmental Protection Area (MEPA) | See Appendix 3 |
| Land Law 19/1997, of 1 October | Summary in 5b |
| Environmental Law 20/1997, of 1 October | Summary in 5b |
| Fisheries Law 22/2013, of 1 November | Summary in 5b |
| Protection, Conservation and Sustainable Use of Biological Diversity Law 5/2017, of May 11 and Regulation Decree No. 89/2017, 29 December, | Summary in 5b |
| National Administration for Conservation Areas (ANAC) Decree No. 16/2022, 29 April | Summary in 5b |
| The Water Law, Law n°16/1991, of August 3 | Summary in 5b |
| Management and Planning of the Coastal Zone and Beaches, Decree n°97/2020, of November 30 | Summary 5b |
| The General Transfrontier Conservation and Resource Area Protocol, signed by the Mozambique, eSwatini and South African Governments (2000) | See Appendix 3 |
| The Lubombo-Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area Protocol (2000) | See Appendix 3 |
| **CONSULTATION** | |
| Public Consultation Report on the nomination of the World Heritage Site (December 2021) | See Appendix 4 |
| Stakeholder engagement and validation report: 2022-2032 Park Management Plan and Specific Regulation | See Appendix 4 |
| **PLANS (REGIONAL)** | |
| Integrated Development Plan for the Combined Lubombo Conservancy – Goba and Usuthu-Tembe-Fúti TFCA | Summary in 5d |
| The MSR-Tembe Elephant Park Joint Operational Strategy | Summary in 5d |
| National Adaptation Plan of Action to Climate Change (NAPA) | Summary in 5d |
| National Strategy for Adaptation and Mitigation of Climate Change (2013–2025) | Summary in 5d |
| National Strategy for Development (2015–2035) | Summary in 5d |
| National Strategy and Action Plan of Biological Diversity of Mozambique (2015–2035) | Summary in 5d |
| National Strategy for Reducing Emissions from Deforestation and Forest Degradation, Conserving Forests and Increasing Carbon Reserves through Forests (REDD+) (2016–2030) | Summary in 5d |
| National Strategy and Action Plan for Mangrove Management in Mozambique (2020–2024) | Summary in 5d |
| Strategic Plan for the Development of Maputo Province (2015–2024) | Summary in 5d |
| Spatial Plan of Territorial Planning of a Portion of the District of Matutuíne and Ilha de KaNyaka (PEOT) | Summary in 5d |
| Management Plan for the Use of Extractive Resources on the Western Shores of the Ponta do Ouro Marine Partial Reserve (2018–2022) | Summary in 5d |
| **PARK PLANS** | |
| Maputo National Park Management Plan | See Appendix 5 |
| Specific Regulation for the Maputo National Park | See Appendix 5 |
| MSR & PPMR Strategic Plan for Tourism Development | Summary in 5e |
| MSR & PPMR Strategic Plan Business Plan | Summary in 5e |
| Maputo National Park Elephant Management Plan | Summary in 5e |

# 7.c
# FORM AND DATE OF MOST RECENT RECORDS OR INVENTORY OF THE NOMINATED PROPERTY


Balfour, D. (2021). Maputo Special Reserve and Ponta de Ouro Partial Marine Reserve: specialist study on Management Effectiveness 18 June 2021. Unpublished internal management report. 12pp.

Fernandes, R. S., Louro C. M. M. (2021). Marine turtle monitoring at the Ponta do Ouro Partial Marine Reserve: 2020-2021. 21 pp. Maputo, CTV.

Gonçalves, G., Cumbane, R., Nhangumele, G., Nhanala, F., Agostinho, E., Ngovene, N., Sumbane, E., Chilengue, A., Julaia, J., Chauqúe, E., Policarpo, C. (2021). Ferramenta de Acompanhamento da Eficácia da Gestão – "METT" da AP. Unpublished internal management report.

Hanekom, C. C. (2022). Aerial Census Report for Maputo Special Reserve, Fúti Corridor and the Sanctuary January 2022. EKZNW unpublished report. Pgs 1-17.

Louro, C. M. M., Fernandes, R. S & Litulo, C. (2022). Monitoring of subsistence fisheries and artisanal on the west coast of Maputo National Park, Southern Mozambique: August 2016 – July2021, 59 pp. Maputo, Centro Terra Viva.

Maputo Special Reserve Census and Game Introductions. (2022). Unpublished Internal management report.

Pereira, M.A.M., Louro C.M.M & Fernandes, R.S. (2021). Reef monitoring at the Ponta do Ouro Partial Marine Reserve: 2019-2020, 21 pp. Maputo, CTV.

Pereira, M.A.M., Louro C.M.M & Fernandes, R.S. (2021). Research and Monitoring of Species and Ecosystems in Marine Conservation Areas in Mozambique: Ponta Do Ouro Partial Marine Reserve Monitoring Programs: Coral Reef Monitoring Programme: Southern Section Update March 2021. 5pp. Maputo, CTV.

Terblanche, C., Liversage, T., Nicolau, D., Bila, S., Nazerali, S., Costa., H., Duarte, E. (2022). Assessment of Invasive Species Status and Development of a Restoration Strategy & Management Plan for Maputo National Park (MNAP), Mozambique. Colterra, BIOFUND, WCS. Maputo, Mozambique. 70 pp.

Williams, J. L., Pereira T. I. F. C., Pereira, M. A. M., Litulo, C., Louro, C. M. M. & Fernandes, R. S. (2018). Management plan for the use of extractive resources on the western coast of the Ponta do Ouro Partial Marine Reserve. 63 pp. Maputo, ANAC/CTV.

# 7.d
# ADDRESS WHERE INVENTORY, RECORDS AND ARCHIVES ARE HELD

Hard copy and digital records are kept at the park headquarters,
ANAC Maputo office and DINAF Maputo office.
Correspondence should be addressed to:
Park Warden, Maputo National Park
Phone: +258 85 6000 900
Cellphone: +258 (82) 7276434 and +258 (84) 7161970
Email: chifununo@yahoo.com
reservas@parquemaputo.gov.mz

# 7.e BIBLIOGRAPHY


Abdula, R. G. & I. Lichucha (2000). Alguns aspectos da biologia das principais espécies capturadas à linha e com covos no sul de Moçambique. *Boletim de Divulgação do Instituto de Investigação Pesqueira* 33: 14-23.

Abreu-Groboi, A. & P. Plotkin (2008). *Lepidochelys olivacea*. The IUCN Red List of Threatened Species, e.T11534A3292503

Achimo, M., J. A. Mugabe, F. Momade & S. Haldorsen (2014). Geomorphology and evolution of Maputo Bay, in: Bandeira, S. & J. Paula (Eds.). The Maputo Bay Ecosystem, WIOMSA, Zanzibar Town, pp. 31-37.

Achimo, M., J. Mugabe, F. Cuamba & S. Haldorsen (2004). Late Weichselian to Holocene Evolution of the Maputo Bay, Mozambique. *Boletim Geologica* 43: 20-27. https://aquadocs.org/handle/1834/450

Adam, Y., J. Machele & O. Saranga (2014). Human settings in Maputo Bay, in: Bandeira, S. & J. Paula (Eds.). The Maputo Bay Ecosystem, 67-86 pp, Zanzibar Town.

ADNAP (Administração Nacional das Pescas) (2016). Relatório de actividades 2015. Delegação de Maputo. 19 pp. Ministério das Pescas.

AmphibiaWeb (2019). University of California, Berkeley, CA, USA. Retrieved from https://amphibiaweb.org on 17 Apr 2019.

ANAC (Administração Nacional para as Áreas de Conservação) (2014). Community Action Plan for the Maputo Special Reserve and the Ponta do Ouro Partial Marine Reserve. 55 pp. Lubombo Transfrontier Conservation and Resource Area. Reserva Especial de Maputo, Reserva Marinha Parcial da Ponta do Ouro.

ANE (Administração Nacional de Estradas) (2020). Mapas rodoviários. Retrieved from https://www.ane.gov.mz/mapas-rodoviarias/ on 21 October 2020

Anon. (2002). SABONET Expedition 2001. Provisional plant checklist. *SABONET News* 7(1): 23-29.

Appleton, C.C. (1996). Freshwater mollusk of Southern Africa. University of Natal Press. Pietermaritzberg.

Aramuge, A., A. P. A. Rocha & A. Silva (2014). A contribution to climate change assessment of storm surge along the coast of Mozambique. In: Green A.N. & J.A.G Cooper. (eds.) Proceedings of the 1st International Coastal Symposium (Durban, South Africa). 70, pp. Journal of Coastal Research Special Issue No. 253-258, ISSN 0749-0208.

Armitage, S. J., G. A. Botha, G. A. T. Duller., A.G. Wintle., L. P. Rebelo, & F. J. Momade. (2006). The formation and evolution of the barrier islands of Inhaca and Bazaruto, Mozambique. *Geomorphology* 82: 295-308.

Bachoo, S. (2019). Sea Turtle Conservation and Monitoring in KwaZulu-Natal – A Report on Activities during the 2018/2019 Season. Ezemvelo KZN Wildlife Internal Report, Pietermaritzburg, South Africa. 31pp.

Baker, P.J., J. Kabigumila, T. Leuteritz, M. Hofmeyr & J.M. Ngwava (2015). *Stigmochelys pardalis*. The IUCN Red List of Threatened Species 2015: e.T163449A1009442. Retrieved from http://dx.doi.org/10.2305/IUCN.UK.20154.RLTS.T163449A1009442.en on 22 April 2019.

Bandeira, S. (2014). *Zostera capensis* a vulnerable seagrass species. In: Bandeira, S. and Paula, J. (eds.). The Maputo Bay Ecosystem. WIOMSA, Zanzibar Town, pp. 171-173.

Bandeira, S. O. (2002) Diversity and distribution of seagrasses around Ilha de KaNyaka, southern Mozambique. *South African Journal of Botany*. 68: 191-198.

Bandeira, S., A. Senkoro, F. Barbosa, D. Mualassace & E. Figueiredo (2014). The terrestrial environment adjacent to Maputo Bay. In: Bandeira, S. & J. Paula (eds). The Maputo Bay Ecosystem, WOMSA, Zanzibar Town, Tanzania, 239-254.

Bandeira, S., M. Gullström, H. Balidy, D. Samussone & D. Cossa. (2014). Seagrass meadows in Maputo Bay, in: Bandeira, S. & J. Paula (Eds.). The Maputo Bay Ecosystem, WIOMSA, Zanzibar Town, pp. 147-169.

Barath, S. (2015). Delineation of Groundwater Region 65: Zululand Coastal Plain Aquifer, KwaZulu-Natal, 182 pp, North-West University (South Africa), Potchefstroom Campus.

Barbosa, F. M., C.C. Cuambe & S. O. Bandeira, (2001). Status and distribution of mangroves in Mozambique *South African Journal of Botany*, 67(3): 393-398.

Barlow, R., M. Kyewalyanga, H. Sessions, M. van den Berg & T. Morris (2008). Phytoplankton pigments, functional types, and absorption properties in the Delagoa and Natal Bights of the Agulhas ecosystem. *Estuarine, Coastal and Shelf Science* 80: 201-211.

Barradas, L. (1965). Rochas do Quaternário da beira-mar (sul de Moçambique). Memórias do Instituto de Investigação Científica de Moçambique 7, Série A: 37-84.

Bates, M. F., W. R. Branch, A. M. Bauer, M. Burger, J. Marais, G. J. Alexander, M.S. de Villiers & V. Moosa (2014). The Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland. Surica 1. South African National Biodiversity Institute.

Bazelet, C. & P. Naskrecki (2014). *Cymatomera denticollis*. The IUCN Red List of Threatened Species 2014: e.T20657592A56181317. Retrieved from https://dx.doi.org/10.2305/IUCN.UK.2014-3.RLTS.T20657592A56181317.en on 2 January 2021.

Beal, L. M., T. K. Chereskin, Y. D. Lenn & S. Elipot (2006). The sources and mixing characteristics of the Agulhas Current. Journal of Physical Oceanography 36(11): 2060-2074.

Beal, L. M., W. P. de Ruijter, A. Biastoch, R. Zahn, M. Cronin, J. Hermes, J. Lutjeharms, G. Quartly, T. Tozuka & S. Baker-Yeboah (2011). On the role of the Agulhas system in ocean circulation and climate. *Nature*, 472(7344): 429-436.

Beentje, H. & S. Bandeira (2007). Field Guide to the Mangrove Trees of Africa and Madagascar Kew Publishing, UK.

BirdLife International (2021). Important Bird Areas factsheet: Maputo Special Reserve. Retrieved from http://www.birdlife.org on 28/02/2021 on 28 February 2021.

Bellwood, D. R. & T. P. C Wainwrigh. (2002). The history and biogeography of fishes on coral reefs. In: Sale, P. F. (ed). Coral reef fishes – Dynamics and diversity in a complex ecosystem. San Diego, Academic Press, pp 5-32.

Bellwood, D. R. (1998). What are reef fishes? - Comment on the report by D. R. Robertson: Do coral-reef fish faunas have a distinctive taxonomic structure? *Coral Reef*s 17: 187-189.

Bellwood, D. R. 1(996). The Eocene fishes of Monte Bolca: the earliest coral reef fish assemblage. *Coral Reefs* 15: 11-19.

Bennett, D. (1995). A Little Book of Monitor Lizards: A Guide to the Monitor Lizards of the World and Their Care in Captivity. Viper Press. ISBN 978-0952663201.

Bento, C. & R. Beilfuss (2003). Wattled Cranes, Waterbirds and Wetland Conservation in the Zambezi Delta, Mozambique. Report submitted to the Biodiversity Foundation for Africa for the IUCN - Regional Office for Southern Africa: Zambezi Basin Wetlands Conservation and Resource Utilization Project.

Blythe, J. L., G. Murray & M. S. Flaherty (2013). Historical perspectives and recent trends in the coastal Mozambican fishery. *Ecology and Society*, 18: 65.

Bodasing, T. (2011). Aerial census report for Maputo Special Reserve and Fúti Corridor 2011. EKZNW unpublished report. Pgs 1-19.

Bodasing, T. (2012). Aerial census report for Maputo Special Reserve and Fúti Corridor. Ezemvelo KZN Wildlife unpublished report.

Bogan, A. (2008). Global diversity of freshwater mussels (Mollusca, Bivalvia) in freshwater. Freshwater Animal Diversity Assessment. *Hydrobiologia* 595: 139–147.

Borghesio, L., B. Armakobe., S. Bakari., H. Balidy., D. Biasol & M. Menomussanga (2009). A bird survey of the Ruvuma Delta, northern Mozambique. *Bulletin of the African Bird Club* 16: 197–203.

Boshoff, P. H. (1958). Development and constitution of the coral reefs. In: MACNAE, W. & KALK, M. (eds). A natural history of Ilha de KaNyaka, Moçambique. Witwatersrand University Press, Johannesburg, South Africa, pp 49-56.

Boshoff, P. H. (1981). An annotated checklist of southern African Scleractinia. Investigational Report, *Oceanographic Research Institute* (49): 1-45.

Botha, G. A., C. S. Bristow, N. Porat, G.A. T. Duller, S. J. Armitage, H. M. Roberts, B. M. Clarke & W. K. P. Schoeman (2003). Evidence for dune reactivation from GPR profiles on the Maputaland coastal plain, South Africa, in: Bristow, C.S & H.M. Jol (Eds.), Ground Penetrating Radar in Sediments, Geological Society, London, pp. 29-46.

Botha, G.A (2015). The Maputaland Corridor: A coastal geomorphological treasure, in: Grab, S., Knight, J. (Eds.), Landscapes and Landforms of South Africa, World Geomorphological Landscapes, Springer International Publishing Switzerland.

Botha, M. (2010). Nest site fidelity and nest site selection of loggerhead, *Caretta caretta*, and leatherback, *Dermochelys coriacea*, turtles in KwaZulu-Natal, South Africa. MSc thesis, p. 115, South Africa, Metropolitan University.

Calcinai, B., G. Belfiore, D. Pica, F. Torsani, M. Palma & C. Cerrano (2020). Porifera from Ponta do Ouro (Mozambique). *European Journal of Taxonomy*, 698: 1-56.

Campbell, B. M., C. A. M. Attwell, J. C. Hatton, P. de Jager, J. Gambiza, T. Lynam, E. Mizutani & P. Winter (1988). Secondary dune succession on Ilha de KaNyaka, Mozambique. *Vegetatio* 78: 3-11.

Canhanga, S. & J. M. Dias (2014). Hydrology and circulation of Maputo Bay, In: Bandeira, S. & J. Paula (eds). The Maputo Bay Ecosystem. 45-54 pp. Zanzibar Town. WIOMSA.

Celliers, L. & M. H. Schleyer (2008). Structure and management of high-latitude coral communities at Sodwana Bay, South Africa. *Biodiversity and Conservation* 17: 3097-3117.

Centro Terra Viva (2018). Terms of Reference in respect of specialist natural studies towards the nomination dossier for the listing of the Ponta do Ouro Partial Marine Reserve and the Maputo Special Reserve as a World Heritage Property.

CIA (Central Inteligence Agency) (2017): The World Factbook. Retrieved from https://www.cia.gov/library/publications/resources/the-world-factbook/

Clancey, P. A. (1971). A handlist of the birds of southern Mozambique. *Memórias do Instituto de Investigação Científica de Moçambique* 11: 1-167.

Clarke, G. P. (1998). A new Regional Centre of Endemism in Africa. In: C. R. Huxley, J. M. Lock & D. F. Cutler (eds). Chorology, Taxonomy and Ecology of the Floras of Africa and Madagascar. 53–65 pp. Royal Botanic Gardens, Kew, UK.

CLIFF, G., S. F. J. Dudley & B. Davis (1989). Sharks caught in the protective gill nets off Natal, South Africa. 2. The great white shark, *Carcharodon carcharias* (Linnaeus). *South African Journal of Marine Science 8: 131-144.*

Cockcroft, V. (2020). Specialist study: marine mammals. Ponta do Ouro Marine Partial Reserve and the Maputo Special Reserve World Heritage Property Application. 17 pp. Maputo. REM/RMPPO. PPF. CTV.

Cohen, C., C. Spottiswoode & J. Rossouw (2006) Southern African Birdfinder. Where to find 1 400 bird species in southern Africa and Madagascar. Cape Town, Struik Carmona, L., M. Pola & T. M Gosliner (2014). Review of Baeolidia, the largest genus of Aeolidiidae (Mollusca: Nudibranchia), with the description of five new species. *Zootaxa* 3802, 477–514.

Collins, J.P. (2010). Amphibian decline and extinction: what we know and what we need to learn. Diseases of aquatic organisms, 92(2-3): 93-9.

Cooper, J. A. G. & O. H. Pilkey (2002). The barrier islands of Southern Mozambique. *Journal of Coastal Research* 36: 164-172.

Coppejans E., F. Leliaert & T. Schils (2002). New records of marine benthic algae for the Mozambican coast, collected at Ilha de KaNyaka. *South African Journal of Botany,* 68*:* 342–348.

Costa, A. C. D. (2003.) Avaliação de alguns aspectos ecológicos e efeitos antropogénicos sobre os recifes de coral da Ilha da Inhaca. BSc. Hons. Thesis. 47 pp. Maputo, Departamento de Ciências Biológicas, Universidade Eduardo Mondlane.

Costa, A., M. A. M, Pereira., H. Motta, & M. Schleyer (2005). Status of the coral reefs of Mozambique. In: Souter, D. & O. Linden (eds). Coral reef degradation in the Indian Ocean: Status report 2005. CORDIO, Kalmar, Sweden: 54-60.

Cramer, M. G & M. R. Willig (2005). Habitat heterogeneity, species diversity and null models. OIKOS 108: 209-218.

Critchley, A. T., M. E Aken, S. O. Bandeira & M. Kalk (1997). A revised list of marine algae from Ilha de KaNyaka, Mozambique. *South African Journal of Botany*, 63: 426-435.

Cuamba, P., M. L. Chenene, G. Mahumane, D. Z. Quissico, J. Lovseth & P. O'Keefe (2006). A solar energy resources assessment in Mozambique. Journal of Energy in Southern Africa 17(4): 75-85.

Cumbana, L. da G. G. (2019). Eficácia e Eficiência do Método Directo de Censo de Fauna Usando Veículo na Reserva Especial de Maputo. Pp. 50. Tese de Licenciatura, Universidade Eduardo Mondlane.

da Silva, A. & J. Rafael (2014). Geographical and Socio-Economic Setting of Maputo Bay. In: Bandeira, S. & Paula, J. (eds). The Maputo Bay Ecosystem. 11-20 pp. Zanzibar Town, Wiomsa.

Dalleau, M., S. Ciccione, J. A Mortimer, J. Garnier, S. Benhamou & J. Bourjea (2012). Nesting phenology of marine turtles: insights from a regional comparative analysis on green turtle (*Chelonia mydas*). PLoS ONE 7: e46920. doi: 10.1371/journal.pone.0046920.

Dalleau, M., S. Kramer‐Schadt, Y. Gangat, J. Bourjea, G. Lajoie & V. Grimm (2019). Modeling the emergence of migratory corridors and foraging hot spots of the green sea turtle. Ecology and Evolution, 9: 10317–10342.

Daly, R., C. A. K. Daly, R. H. Bennett, P. D. Cowley, M. A. M. Pereira & J. D. Filmalter (2018). Quantifying the largest aggregation of giant trevally Caranx ignobilis (Carangidae) on record: implications for management. *African Journal of Marine Science*, 40: 315-321.

Daly, R., M. J. Smale, P. D. Cowley & P. W. Froneman (2014). Residency patterns and migration dynamics of adult bull sharks (*Carcharhinus leucas*) on the East coast of southern Africa. *PLoS ONE*, 9 (10): e109357.

Daly, R., P. W. Froneman & M. J. Smale (2013). Comparative feeding ecology of bull sharks (*Carcharhinus leucas*) in the coastal waters of the Southwest Indian Ocean inferred from stable isotope analysis. *PLoS ONE*, 8 (10): e78229.

Darbyshire, I., J. Timberlake, J. Osborne, S. Rokni, H. Matimele C. Langa, C. Datizua, C. de Sousa, T. Alves, A. Massingue, J. Hadj-Hammou, S. Dhanda, T. Shah & B. Wursten (2019). The endemic plants of Mozambique: diversity and conservation status. *PhytoKeys*, 136: 45–96.

Datizua, C. (2018). Efeitos da Intensidade de Queimadas na Estrutura Populacional da *Terminalia sericea* Burch. ex DC. na Reserva Especial de Maputo. Tese de licenciatura. Universidade Eduardo Mondlane.

de Boer, W. F. (2000). Between the tides - the impact of human exploitation on an intertidal ecosystem, Mozambique. PhD Dissertation, 268 pp. Groningen, Groningen University.

de Boer, W. F (2002). The shorebird community structure at an intertidal mudflat in southern Mozambique. *Ardea*, 90: 81-92.

de Boer, W. F. & C. M. Bento (1999). The Birds of Ilha de KaNyaka, Mozambique. 76 pp. Cape Town, Mondi BLSA Guide 22 Birdlife South Africa, Johannesburg and the Avian Demography Unit, University of Cape Town.

de Boer, W. F. & F. Longamane (1996). The exploitation of intertidal food resources in Inhaca Bay, Mozambique, by shorebirds and humans. *Biological conservation*, 78: 295-303.

de Boer, W. F., A. F. Blijdenstein & F. Longamane (2002). Prey choice and habitat use of people exploiting intertidal resources. *Environmental Conservation*, 29: 238-252.

de Boer, W. F., L. Rydberg & V. Saide (2000). Tides, tidal currents and their effects on the intertidal ecosystem of the southern bay, Ilha de KaNyaka, Mozambique. Hydrobiologia, 428(1): 187-196.

de Boer, W. F., T. Pereira & A. Guissamulo (2000). Comparing recent and abandoned shell middens to detect the impact of human exploitation on the intertidal ecosystem. *Aquatic Ecology*, 34: 287-297.

de Boer, W.F. (2002). The rise and fall of the mangrove forests in Maputo Bay, Mozambique. *Wetlands Ecology and Management*, 10: 313-322.

de Koning, J. & K. Balkwill (1995). Terrestrial vegetation. In: M. Kalk (ed). A Natural History of Ilha de KaNyaka, Mozambique, 3rd edition. 281–308 pp. Johannesburg, South Africa Witwatersrand University Press.

de Wet, A. (2012) Factors affecting survivorship of loggerhead (*Caretta caretta*) and leatherback (Dermochelys coriacea) sea turtles of South Africa. Nelson Mandela Metropolitan University, Port Elizabeth, South Africa. 196 pp.

Department of Environmental Affairs (2019) National Environmental Management: Protected Areas Act, 2003. Regulations for the management of the iSimangaliso Marine Protected Area. Act No 57 of 2003. Government Gazette, 23 May 2019.

DNAC - Direcção Nacional para as Áreas de Conservação (2009). Plano de Gestão da Reserva Especial de Maputo 2010-2014, 108 pp. Maputo.

DNAC - Direcção Nacional para as Áreas de Conservação (2011). Ponta do Ouro Partial Marine Reserve Management Plan, First edition, 65 pp, Maputo, ANAC.

DTI (2010) Avitourism in South Africa. Department of Trade and Industry.

du Randt, F. (2018). The Sand Forest of Maputaland. 416 pp. Pretoria, South Africa. SANBI.

Duarte, M. C., S. Bandeira & M. M. Romeiras (2012). Systematics and ecology of a new species of seagrass (Thalassodendron, Cymodoceaceae) from Southeast African coasts. *Novon: A Journal for Botanical Nomenclature*, 22(1): 16-24.

Duncan, C. P. (1970). The Agulhas Current Ph.D. thesis, 76pp. University of Hawaii.

Engelbrecht, C. J. & F. A. Engelbrecht (2015). Shifts in Köppen-Geiger climate zones over southern Africa in relation to key global temperature goals. Theoretical and applied climatology 123(1-2): 247-261.

Esteban, N., J. A Mortimer & G. C Hays. (2017). How numbers of nesting sea turtles can be overestimated by nearly a factor of two. *Proceeding of the Royal Society B: Biological Sciences.* 284(1849), 20162581.

Fairer-Wessels, F. A. (2017). Determining the impact of information on rural livelihoods and sustainable tourism development near protected areas in Kwa-Zulu Natal, South Africa. Journal of Sustainable Tourism, 25(1): 10-25.

Fennessy, S., R. Torres., I. Lichucha, & R. Van der Elst (2004). Idade, crescimento e avaliação preliminar de *Polysteganus coeruleopunctatus* (cachucho ou blueskin) capturado com covos no Sul de Moçambique. Presented at the Third National Conference on Coastal Zone Research. Maputo, 28th-30th July 2004.

Fernandes R. S., J. L Williams., S. Gonzalez-Valladolid., L. Muaves & M.A.M. Pereira (2018). Monitoring, tagging and conservation of marine turtles in Mozambique: Annual report 2017/18. 36 pp. Maputo, CTV.

Fernandes, R. S. & M. A. M. Pereira (2020). Actividades recreativas na Reserva Marinha Parcial da Ponta do Ouro (2010-2014). Resultados do programa de monitoria. Volume 3: Pesca de alto-mar. Relatório de Investigação No 10, 166 pp. Maputo, CTV.

Fernandes, R. S. & M. A. M. Pereira (2015). Actividades recreativas na Reserva Marinha Parcial da Ponta do Ouro (2010-2014). Volume 1: Informação geral.Relatório de Investigação, 11 pp. Mpauto, CTV.

Fernandes, R. S., C Litulo., M A.M. Pereira & T.I.F.C. Pereira (2016). Dossier for nomination of Ponta do Ouro Partial Marine Reserve and Maputo Special Reserve to UNESCO World Heritage Property. Summary literature compilation and analysis report. 9 pp, Maputo, CTV.

Fernandes, R. S., M. A. M. Pereira., M. G Soares. & C. M. M. Louro (2016). Spatio-temporal nesting distribution of the loggerhead turtle (*Caretta caretta*) at the Ponta do Ouro Partial Marine Reserve, Mozambique. *Testudo,* 8(3): 26-40.

Fernandes, R. S., M. A. M Pereira., C. M. M. Louro. & C. Litulo (in prep). Investigação e monitoria de espécies e ecossistemas nas áreas de conservação marinhas em Moçambique: Reserva Marinha Parcial da Ponta do Ouro. Maputo, Centro Terra Viva.

Fernando, S., S. Bandeira & A. Guissamulo (2014). Seagrass grazing by dugongs: can habitat conservation help protect the dugong? In: Bandeira, S & J. Paula (eds.). The Maputo Bay Ecosystem. WIOMSA, Zanzibar Town, pp. 223-227.

Ferreira, M. A. & S. Bandeira (2014). Maputo Bay's coastal habitats. In: Bandeira, S. & J. Paula (eds). The Maputo Bay Ecosystem. 21-24 pp. Zanzibar Town. WIOMSA.

Findlay, K. (2016). Marine mammals. Mini specialist study/perspective. Transfrontier Conservation Initiative. 43 pp. ISimangaliso Wetland Park Authority/Reserva Marinha Parcial da Ponta do Ouro.

Fishpool Lincoln, C. D. & M. I. Evans (2001) Important Bird Areas in Africa and Associated Islands: Priority Sites for Conservation. Pisces Publications and BirdLife International.

Flemming, B. (1981). Factors controlling shelf sediment dispersal along the southeast African continental margin. *Marine Geology* 42(1-4): 259-277.

Floros, C., M. H. Schleyer, J. Q. Maggs & L. Celliers (2012). Baseline assessment of high-latitude coral reef fish communities in southern Africa. *African Journal of Marine Science*, 34: 55-69.

Frazier, J. G. (2005). Marine turtles: the role of flagship species in interactions between people and the sea. Mast.

Froese, R. & D. Pauly (eds) (2009). FishBase. World Wide Web electronic publication: version (06/2009). Retrieved from www.fishbase.org.

Fuentes M. M. P. B., D. A. Pike & A. Dimatteo (2013). Resilience of marine turtle regional management units to climate change. *Global Change Biology* 19: 1399–1406.

Garnier., J, N. Hill., A. Guissamulo., I. Silva., M. Witt & B. Godley (2012). Status and community-based conservation of marine turtles in the northern Quirimbas Islands (Mozambique). *Oryx* 46:359–367.

Gavish Y. & Y. Ziv (2017). Correction: Joint Effect of Habitat Identity and Spatial Distance on Spiders' Community Similarity in a Fragmented Transition Zone. PLOS ONE 12(2): e0173326.

Gibbons., M. J., S. H. D. Haddock, G. I. Matsumoto & C. Foster (2021). Records of ctenophores from South Africa. *PeerJ*, 9: e10697.

GM - Governo de Moçambique (2002). Decreto no 1212002: Aprova o Regulamento da Lei no 10199, de 7 de Julho. Lei de Florestas e Fauna Bravia. BR no22, I Série.

Goldman, B. & F. H. Talbot (1976). Aspects of the ecology of coral reef fishes. In: Jones, O. A. & R. Endean (eds). Biology and Geology of Coral Reefs. Vol. III: Biology 2. New York, Academic Press, pp 125–154.

Gosliner, T. M., D. W. Behrens & Á. Valdés (2008). Indo-Pacific nudibranchs and sea slugs: a field guide to the world's most diverse fauna. California, Sea Challengers Natural History Books, California Academy of Sciences (Sea Challengers Natural History Books).

Gouvello, D. Z. M., L. R. Nel., L. R. Harris., K. Bezuidenhout & S. Woodborne (2017). Identifying potential pathways for turtle-derived nutrients cycling through beach ecosystems. 583: 49–62.

Govender, V. (2007). Patterns of Distribution, Diversity and Endemism of Terrestrial Molluscs in South Africa. Submitted in fulfilment of the academic requirements for the degree of Master of Science in the School of Biological and Conservation Sciences, University of KwaZulu-Natal 2007. South Africa.

Governo da Província de Maputo (2015). Plano estrategico de desenvolvimento da Província de Maputo 2015 - 2024. 31 pp. República de Mocambique.

Grindley, J. R. (1963). A specimen of the asteroid *Acanthaster planci* (Linnaeus) from the Mozambican coast. Durban Museum Novitates, 6: 265-268.

Guissamulo, A. (2014). Marine mammals and other marine megafauna of Maputo Bay. In: Bandeira, S. & J. Paula (eds). The Maputo Bay Ecosystem. 215-222 pp. Zanzibar Town. WIOMSA.

Guissamulo, A. T. & V. G. Cockcroft (1997). Dolphin and dugong occurrence and distribution and fisheries interactions in Maputo and Bazaruto Bays, Mozambique. Paper presented at the 49th meeting of the International Whaling Commission, London September 1998. SC/49/SM24.

Guissamulo, A. T. & V. G. Cockcroft (1997). Dolphin and dugong occurrence and distribution and fisheries interactions in Maputo and Bazaruto Bays, Mozambique. Paper presented at the 49th meeting of the International Whaling Commission, London September 1998. SC/49/SM24.

Guldemond, R. A. R. &. R. J. van Aarde (2010) Forest patch size and isolation as drivers of bird species richness in Maputaland, Mozambique. *Journal of Biogeography* 37(10): 1884-1893.

Halo, I., B. Backeberg., P. Penven., I. Ansorge., C. Reason & J. E. Ullgren (2014). Eddy properties in the Mozambique Channel: A comparison between observations and two numerical ocean circulation models. *Deep-Sea Research II* 100: 38-53.

Halpern, B. S, K. A. Selkoe., F. Micheli & C. V Kappel (2007) Evaluating and ranking the vulnerability of global marine ecosystems to anthropogenic threats. *Conservation Biology* 21: 1301–1315.

Halpin, P. N., A. J Read, E Fujioka, B. D Best, B. Donnelly, L. J Hazen, C. Kot, K. Urian, E. LaBrecque, A. Dimatteo, J. Cleary, C. Good., L.B. Crowder & K.D. Hyrenbach (2009). OBIS-SEAMAP: The World Data Center for Marine Mammal, Sea Bird, and Sea Turtle Distributions. *Oceanography*, 22: 104-115.

Hamann, M., M. Godfrey., J. Seminoff, K. Arthur, P. Barata, K. Bjorndal, A. Bolten, A. Broderick, L. Campbell, C. Carreras, P. Casale, M. Chaloupka, S. Chan, M. Coyne, L. Crowder, C.Diez, P. Dutton, S. Epperly, N. FitzSimmons, A. Formia, M. Girondot, G. Hays, I. Cheng, Y. Kaska, R. Lewison, J. Mortimer, W. Nichols, R. Reina, K. Shanker, J. Spotila, J. Tomás, B. Wallace, T. Work, J. Binden & B. Godley (2010). Global research priorities for sea turtles: informing management and conservation in the 21st century. *Endangered Species Research* 11: 245–269.

Hamilton, C. and Wright, J. 1989. 'Traditions and transformations: The Phongolo-Mzimkhulu region in the late eighteenth and early nineteenth centuries; in Duminy and Guest (eds) *Natal and Zululand from earliest times to 1910: A new history.* University of KwaZulu-Natal Press: Durban.

Hanekom (2019). Aerial census for Maputo Special Reserve, Fúti Corridor & the Sanctuary Area, December 2019. 16 pp. Ezemvelo KZN Wildlife unpublished report.

Hanekom, C. C. & R. Cumbane (2016). Aerial census for Maputo Special Reserve, Fúti Corridor & the Sanctuary Area, November 2016. Ezemvelo KZN Wildlife unpublished report.

Hanekom, C. C. & R. Cumbane (2016). Aerial census for Maputo Special Reserve, Fúti Corridor & the Sanctuary Area, November 2016. Ezemvelo KZN Wildlife unpublished report.

Hanekom, C.C. & R. Cumbane (2015). Aerial census for Maputo Special Reserve, Fúti Corridor & the Sanctuary Area, October 2015. Ezemvelo KZN Wildlife unpublished report.

Hanekom, C. C. & R. Cumbane (2015). Aerial census report for Maputo Special Reserve, Fúti Corridor & the Sanctuary Area. 13pp. Maputo, ANAC.

Hanekom, C. C. & R. Cumbane (2014). Aerial census for Maputo Special Reserve, Fúti Corridor & the Sanctuary Area, October 2014. Ezemvelo KZN Wildlife unpublished report.

Hardi, R., G. Babocsay., D. Tappe., M. Sulyok &, I.B. Lajos Rózsa2017. Armillifer-infected snakes sold at Congolese bushmeat markets represent an emerging zoonotic threat. *EcoHealth.* 14 (3): 743–749.

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

Harris, L., R. Nel & D. Schoeman (2011) Mapping beach morpho dynamics remotely: a novel application tested on South African sandy shores. *Estuarine Coastal and Shelf Science* 92: 78–89

Harris, T. F. W. (1978). Review of coastal currents in southern African waters. 104pp. National Scientific Programmes Unit: CSIR.

Hatton, J., A. Macia, A. Guissamulo, C. Boane, A. Gaspar, D. Gove, V. Jose, M. Couto, F. Barbosa & R. Wamusse (1995). A status quo assessment of the coastal zone, Mozambique. Phase 1: Ponta do Ouro - Xai-Xai. 59 pp. Maputo. MICOA, UEM, IUCN.

Hatton, J., M. Couto & J. Oglethorpe (2001). Biodiversity and war: a case study of Mozambique. *Washington, DC: Biodiversity Support Program.*

Hawkes, L. A., A. C. Broderick., M. H. Godfrey & B. J Godley (2009) Climate change and marine turtles. *Endangered Species Research,* 7: 137–154.

Hays, G. C., S. Fossette., K. A. Katselidis., P. Mariani & G. Schofield (2010). Ontogenetic development of migration: Lagrangian drift trajectories suggest a new paradigm for sea turtles. *Journal of the Royal Society Interface,* 7: 1319–1327.

Hebert, D. G. (1998). Molluscan Conservation in South Africa. Diversity issues and priorities. *Journal of Conchology Special Publication,* 2: 61-76.

Herbert, D. G. & A. Moussalli, (2010). Revision of the Larger Cannibal Snails (Natalina s. l.) of Southern Africa — Natalina s. s., Afrorhytida and Capitina (Mollusca: Gastropoda: Rhytididae). *African Invertebrates,* 51:1-132.

Herbert, D. G. (2000). Natalina wesseliana. The IUCN Red List of Threatened Species 2000: e.T40084A10301576. Retrieved from https://dx.doi.org/10.2305/IUCN.UK.2000.RLTS.T40084A10301576.en on 01 January 2021.

Hillary, A., M. Kokkonen & L. Max (2003). Proceedings of the World Heritage Marine Biodiversity Workshop, Hanoi, Vietnam, February 25 – March.

Hochkirch, A. (2014). *Acrotylus patruelis.* The IUCN Red List of Threatened Species 2014: e.T15431178A47713900. Retrieved from https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T15431178A47713900.en on 02 January 2021.

Hoguane, A. M (1999). Sea level measurement and analysis in the Western Indian Ocean. National Report. Maputo, Intergovernmental Oceanographic Commission of UNESCO (IOC): 31.

Hughes, G (2010). Loggerheads and leatherbacks in the Western Indian Ocean. *Indian Ocean Newsletter.* 11: 24-31.

Hughes, G. R (1971). Preliminary report on the sea turtles and dugongs of Moçambique. *Veterinária Moçambicana* 4 (2): 43-84.

Igbinosa, B., I. Izegaegbe, J. I. F. C. Okafor & D. A. Uhunwangho (2015). Ecological survey of freshwater ecosystems of Ovia, Edo state Nigeria for gastropod molluscs. *Animal Research International*, 12(2), 2171-2177.

INE (Instituto Nacional de Estatística) (1997). Dados do Recenseamento da População de 1997, Maputo.

INE (Instituto Nacional de Estatística) (2019). Anuário estatístico, Província de Maputo: 2019, Maputo.

INE (Instituto Nacional de Estatística) (2017) Anuário estatístico, Província de Maputo: 2017, Maputo.

INE (2016) (Instituto Nacional de Estatística) (2016) Anuário estatístico, Província de Maputo: 2016, Maputo.

INE (Instituto Nacional de Estatística) (2015) Anuário estatístico, Província de Maputo: 2015, Maputo, INE.

INE (Instituto Nacional de Estatística) (2007) Recenseamento geral da população e habitação 2007. Indicadores sócio-demográficos. Maputo Província. 63 pp. Maputo, INE.

iSimangaliso Wetland Park Authority (2011). iSimangaliso Wetland Park Integrated Management Plan 2011–2016.

iSimangaliso Wetland Park Authority. iSimangaliso Wetland Park Integrated Management Plan 2022–2030. In press.

IUCN (1996). A marine turtle conservation strategy and action plan for the Western Indian Ocean. The IUCN species survival commission. 23pp, IUCN East Africa Regional Office and IUCN/SSC Marine turtle specialist group.

Izidine, S. A. (2003). Licuáti Forest Reserve, Mozambique: Flora, utilization and conservation. MSc. Dissertation, 108 pp. Pretoria, University of Pretoria.

Jensen, J. B., & C. D. Camp (2003). Human exploitation of amphibians: direct and indirect impacts. Pages 199-213 in R. D. Semlitsch, (ed). Amphibian Conservation. Smithsonian Institution, Washington.

Jensen, K. R. (2013). Sea slugs – divers' favorites, taxonomists ' problems. *Aquatic Science Management* 1: 100–110.

Jones K. (2012). Examining trends in taste preference, market demand, and annual catch in an indigenous marine turtle fishery in south west Madagascar. Honour thesis. 45pp. Washington State University.

Jörger, K. M., I. Stöger, Y. Kano, H. Fukuda, T. Knebelsberger & M. Schrödl (2010). On the origin of Acochlidia and other enigmatic euthyneuran gastropods, with implications for the systematics of Heterobranchia. *BMC evolutionary biology* 10(1): 1-20.

José, P. L. (2017). Conservation history, hunting policies and practices in the south western Moçambique borderland in the 20th century. PhD Dissertation. 267 pp. Johannesburg, University of the Witwatersrand.

Jury, M.R., P. Cuamba & P. Rubuluza (2011). Development strategies for a coastal resort in Southern Mozambique. *African Journal of Business Management,* 5: 481-504.

Kalk, M. & F. Costa (1995). Conservation and development. In: Kalk, M. (ed.). A Natural History of Ilha de KaNyaka, Mozambique. 362-371 pp. Cape Town. Witwatersrand University Press.

Kalk, M. & F. Costa (1995). Conservation and development. In: Kalk, M. (ed.). A Natural History of Ilha de KaNyaka, Mozambique. 362-371 pp. Cape Town. Witwatersrand University Press.

Kalk, M. (1995). A natural history of Ilha de KaNyaka Mozambique. 395pp. Johannesburg, Witwatersrand University Press.

Kathiresan K., & B. L. Bingham (2001). The biology of mangroves and mangrove ecosystems. Advances in Marine Biology 40: 81-251.

Klopper, S. 1992. *The Art of Zulu-Speakers in Northern Natal-Zululand: An Investigation of the History of Beadwork, Carving and Dress from Shaka to Inkatha*. Unpublished PhD dissertation, University of the Witwatersrand.

Kloppers, R. J. (2001). The utilisation of natural resources in the Matutuíne District of southern Mozambique: implications for transfrontier conservation. Magister Artium (Anthropology) Dissertation. 240 pp. Pretoria. University of Pretoria.

Kloppers, R. J. (2003). The history and representation of the history of the Mabudu-Tembe. Magister Artium (History) Dissertation. 113 pp. Pretoria. University of Pretoria.

Kotze, S. & Guy, J. 1996. *Political power and land distribution in the St Lucia area from the 19th Century*. Unpublished research paper, History Department, University of Natal.

Kuntner, M. & I. Agnarsson (2011). Phylogeography of a successful aerial disperser: the golden orb spider Nephila on Indian Ocean islands. *BMC Evolutionary Biology,* 11(1): 119.

Kuntner, M., C. R. Haddad, G. Aljančič & A. Blejec (2008). Ecology and web allometry of *Clitaetra irenae*, an arboricolous African orb-weaving spider (Araneae, Araneoidea, Nephilidae). *The Journal of Arachnology*, 36(3), 583-594.

Kuntner, M., E. Rudolf & P. Cardoso, (2017). Clitaetra irenae. The IUCN Red List of Threatened Species2017: e.T78592090A78595505. Retrieved from https://dx.doi.org/10.2305/IUCN.UK.2017-1.RLTS.T78592090A78595505.en on 2 January 2021.

Lambert, W. J (1991). Coexistence of hydroid eating nudibranchs: do feeding biology and habitat use matter? *Biological Bulletin,* 181: 248–260.

Lanyon, J. M., C. J. Limpus & H. Marsh (1989). Dugongs and turtles - grazers in the seagrass system. Pages 610-634 in: Larkum, A. W. D., A. J. McComb & S. A. Shepherd (eds.). Biology of seagrasses. Elsevier, New York. 73.

László, G. M. & A. A. Vetina (2019). Contribution to the knowledge of the Nolini of the Maputo Special Reserve in South Mozambique with description of two new species and several taxonomic updates (Lepidoptera, Nolidae, Nolinae). *Zootaxa,* 4571 (2): 225–246.

Lauret-Stepler, M., J. Bourjea, D. Roos, D. Pelletier, P. G. Ryan, & S. Ciccione (2007). Reproductive seasonality and trend of *Chelonia mydas* in the SW Indian Ocean: a 20 year study based on track counts. *Endangered Species Research,* 3: 217–227.

Lichucha, I. (2000). Pesca à linha e com covos no sul de Moçambique. Evolução e avaliação da pescaria: 1986-1999. *Boletim de Divulgação do Instituto de Investigação Pesqueira,* 33: 7-13.

Limpus, C. J., & D. J. Limpus (2001). The loggerhead turtle, *Caretta caretta*, in Queensland: breeding migrations and fidelity to a warm temperate feeding area. *Chelonian Conservation Biology*, 4: 142–153.

Lindsay, T. & Á, Valdés (2016). The model organism *Hermissenda crassicornis* (Gastropoda: Heterobranchia) is a species complex. *PLoS One*, 11: 1–17.

Lindsey, P., W. A. Taylor, V. Nyirenda & J. Barnes (2017). Bushmeat, wildlife-based economies, food security and conservation: Insights into the ecological and social impacts of the bushmeat trade in African savannahs. 58pp. Harare, SULI Report.

LLC (2013) Wildlife, Trafficking and Poaching. The Law Library of Congress, Global Legal Research Centre, January 2013

Lombard, P., E. J. S. Videira., M. A. M Pereira & R. Kyle (2011). Marine turtle tagging in southern Mozambique 1996-2011. Associação para Investigação Costeira e Marinha. Scientific Poster presented at WIOMSA symposium 24-29 October 2011.

Lopes, A.P. 1937. Fauna da Ilha da Inhaca – Peixes. *Separata do Documentário Trimestral Moçambique,* 9: 79-103.

Lopes, S. (2017). Diagnóstico participativo socio-economico as comunidades do Posto Administrativo de Machangulo. 69 pp. Maputo, PPF.

Louro C. M. M., M. A. M. Pereira & A. C. D Costa. (2006). Report on the Conservation Status of Marine Turtles in Mozambique. 45pp. Maputo, CTV.

Lucrezi, S., M. Milanese., V. Markantonatou., C. Cerrano, A. Sar, M. Palma & M. Saayman (2017). Scuba diving tourism systems and sustainability: Perceptions by the scuba diving industry in two Marine Protected Areas. *Tourism Management*, 59: 385-403.

Luschi, P., G. R. Hughes, R. Mencacci, E. de Bernardi, A. Sale, R. Broker, M. Bouwer & F. Papi (2003). Satellite tracking of migrating loggerhead sea turtles (*Caretta caretta*) displaced in the open sea. Marine Biology, 143: 793-801.

Luschi, P., J.R. Lutjeharms, P. Lambardi, R. Menacacci, G.R. Hughes & G. C. Hays (2006). A review of migratory behaviour of sea turtles off southeastern Africa. *South African Journal of Science,* 102: 51–58.

Lutjeharms, J. R. E. & A. J. Da Silva (1988). The Delagoa Bight Eddy. Deep-Sea Research 35: 619-634.

Macamo, C. F. C., H. Balidy, S. O. Bandeira & J. G. Kairo (2015). Mangrove transformation in the Incomáti Estuary, Maputo Bay, Mozambique. *WIO Journal of Marine Science*, 14: 11-22.

Macdonald, A. H. H., M.H. Schleyer & J. Lamb (2009). South east African, high-latitude coral communities, a canary for western Indian Ocean coral reefs? Proceedings of the 11th International Coral Reef Symposium, Ft. Lauderdale, Florida, 7-11 July 2008, pp 434-438.

Macnae, W. & M. Kalk (1958). A natural history of Ilha de KaNyaka, Moçambique. Witwatersrand University Press, Johannesburg, South Africa, 163 pp, Plates I-XI.

Macnae, W.& M. Kalk (eds) (1969) A natural history of Ilha de KaNyaka, Moçambique Witwatersrand University Press.

MAE (Ministério de Administração Estatal) (2014). Perfil do Distrito de Matutuíne, Província de Maputo. 73 pp. Perfis Distritais. Maputo.

Malaquias, M. A. E. & D. G. Reid (2008). Systematic revision of the living species of Bullidae (Mollusca: Gastropoda: Cephalaspidea), with a molecular phylogenetic analysis. *Zoological Journal of the Linnean Society,* 153: 453–543.

Manuel, L. & F. César (2014). Ocupação da terra por emprendimentos económicos no país: relatório da avaliação preliminar das áreas com potencial de conflitos de interesse. Relatório de Investigação No 5, 26 pp. Maputo. CTV.

Marsh, H., T. J. O'Shea, & J. E. Reynolds III (2012). Ecology and conservation of the Sirenia: Dugongs and Manatees. 521 pp. Conservation Biology 18, Cambridge. Cambridge University Press.

Marshall, N., E. S. A. H. Milledg & P. S. Afonso (2001). The sea cucumber fisheries in Mozambique. In: Stormy seas for marine invertebrates – trade in sea cucumbers, seashells and lobsters in Kenya, Tanzania and Mozambique. Trade Review. 70 pp. TRAFFIC- East/ Southern Africa.

Massinga, A. & J. Hatton (1996). Status of the coastal zone of Mozambique. In: Lundin, C. G. & O. Lindén (Eds.), Proceedings of the national workshop on Integrated coastal zone management in Mozambique. 7 - 64 pp. Ilha de KaNyaka and Maputo. The World Bank. SIDA.

Matimele, H. & J. Timberlake (2020). Specialist study: terrestrial plants and vegetation. Ponta do Ouro Partial Marine Reserve and Maputo Special Reserve World Heritage Property Application. 19 pp. Maputo. REM/ RMPPO. PPF. CTV.

Matimele, H. A. (2016). An assessment of the distribution and conservation status of endemic and near endemic plant species in Maputaland. MSc dissertation, 91 pp. South Africa. University of Cape Town.

Matsuda, S. B. & T. M. Gosliner (2017). Molecular phylogeny of Glossodoris (Ehrenberg, 1831) nudibranchs and related genera reveals cryptic and pseudocryptic species complexes. *Cladistics* 0, 1–16.

Matthews, W.S. (2007). Contributions to the ecology of Maputaland, southern Africa, with emphasis on Sand Forest. Ph.D. Thesis. University of Pretoria.

Matthews, W.S. (2008). Fúti Aerial survey: November 2008. Ezemvelo KZN Wildlife unpublished report. 10 pp. Maputo, ANAC.

Matthews, W.S. (2006). Fúti Aerial survey: November 2006. Ezemvelo KZN Wildlife unpublished report. 10 pp. Maputo, ANAC.

Matthews, W. M. & M. Nemane (2006). Aerial Survey Report for Maputo Special Reserve. Ezemvelo KZN Wildlife unpublished report. 20 pp, Maputo, ANAC.

McClanahan, T. R. & N. A. J. Graham (2005). Recovery trajectories of coral reef fish assemblages within Kenyan marine protected areas. *Marine Ecology Progress Series* 294: 241.

Mcfarland, F. K. (1993). Photosynthesis and Retention of Zooxanthellae and Zoochlorellae within the Aeolid Nudibranch *Aeolidia papillosa*. 223–229.

McKeown, K (2015). Tracking Wildlife Conservation in Southern Africa: Histories of Protected Areas in Gorongosa and Maputaland. 281 pp. University of Minnesota.

McKeown, K (2015). Tracking Wildlife Conservation in Southern Africa: Histories of Protected Areas in Gorongosa and Maputaland. 281 pp. University of Minnesota.

McPhail, K. L., M. T. Davies-Coleman & J. Starmer (2001). Sequestered chemistry of the Arminacean nudibranch Leminda millecra in Algoa Bay, South Africa. *Journal of Natural Production* 64: 1183–1190.

Mellet, B. (2015). Ecological Risk Assessment of Fisheries on Sea Turtles in the South Western Indian Ocean. Masters Dissertation, Nelson Mandela Metropolitan University, South Africa.

Metcalf, J., K. Hampson, A. Andriamizava, R. Andrianirina, T. Cairnes, A. Gray, C. Ramiarisoa & H. Sondotra (2007). The importance of north-west Madagascar for marine turtle conservation. *Oryx,* 41:232–238.

MICOA (Ministério para a Coordenação da Acção Ambiental) (2013). Perfil do Distrito de Matutuíne, Província de Maputo. 84 pp. Maputo. Ministério para a Coordenação da Acção Ambiental. República de Moçambique.

MICOA (Ministério para a Coordenação da Acção Ambiental) (2012). Perfil ambiental e mapeamento do uso actual da terra nos distritos da zona costeira de Moçambique: Distrito de Matutuíne, Província de Maputo. 125 pp. MICOA. Maputo.

MIMAIP (Ministério do Mar, Águas Interiores e Pescas) (2018). Relatório de actualização de informação da actividade da Pesca Artesanal na Cidade e Província de Maputo. 25 pp. Maputo.

MIREME & TrimbleLand (2020). Mozambique Mining Cadastre Portal. Retrieved 28 Ocotber 2020, from https://portals.landfolio.com/mozambique/en/.

MINISTRY OF LAND, ENVIRONMENT AND RURAL DEVELOPMENT. (2019). Sixth National Report on the Implementation of Convention on Biological Diversity in Mozambique. MITADER. 152 pp.

MITUR (Ministério do Turismo) (2004). Plano Estratégico para o Desenvolvimento do Turismo em Moçambique. 88 pp. Maputo. República de Moçambique.

MMPATF (Marine Mammal Protected Areas Task Force) (2021). Important Marine Mammal Areas. Retrieved from https://www.marinemammalhabitat.org/imma-eatlas/ on 28 February 2021.

Mogg, A. O. D. (1958). An annotated checklist of flowering plants and ferns of Ilha de KaNyaka, Moçambique (with local names and uses of plants). In: W. Macnae & M. Kalk (eds.). A Natural History of Ilha de KaNyaka. Moçambique, pp. 139–155. Witwatersrand University Press, Johannesburg, South Africa.

Mogg, A. O. D. (1967). Comments on the flora of Ilha de KaNyaka, Moçambique. *Southern Africa Journal of Sciences* 63(10): 440-442.

Moll, E.J. & F. White (1978). The Indian Ocean coastal belt. In: Werger, M. J. A. (ed.). Biogeography and Ecology of Southern Africa, pp. 561-598. The Hague, Netherlands. W. Junk.

Momade, F. & M. Achimo (2004). Dune geomorphology in Maputaland, Mozambique. *Boletim Geologica* 43.

Motta, H., M. A. M. Pereira & M. H. Schleyer (2002). Coral reef degradation in Mozambique, results of monitoring 1999-2000. In: Linden, O., D. Souter., D. Wilhelmsson & D. Obura (eds). Coral reef degradation in the Indian Ocean: Status report 2002. 55-60 pp. Kalmar, Sweden, CORDIO.

Mozbio (in prep). Plano Especial de Ordenamento Territorial de uma parcela do Distrito de Matutuíne e da Ilha de Inhaca (PEOT) e Planos Parciais de Urbanização de Machangulo, Bela Vista e Zitundo (PDMI). Maputo, José Forjaz Arquitecto. Mozbio.

Muita, Z. R. (2017). Influência das queimadas na frequência do chango (*Redunca arundinum*) na Planície dos Changos, Reserva Especial de Maputo. Tese de licenciatura. Universidade Eduardo Mondlane.

Muller, Z., F. Bercovitch, R. Brand, D. Brown, M. Brown, D. Bolger, K Carter, F. Deacon, J.B Doherty, J. Fennessy, S. Fennessy, A. A. Hussein, D. Lee, A. Marais, M. Strauss, A. Tutchings, & T. Wube (2018). *Giraffa camelopardalis* (amended version of 2016 assessment). *The IUCN Red List of Threatened Species* 2018: e.T9194A136266699. Retrieved from https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T9194A136266699.en on 21 May 2020.

Myre, M. (1964). A vegetação do extremo sul da Província de Moçambique. *Estudos, Ensaios e Documentos* 110: 1-145.

Myre, M. (1964). A vegetação do extremo sul da Província de Moçambique. *Estudos, Ensaios e Documentos* 110: 1-145.

Myre, M. (1971). As pastagens da região do Maputo. *Memórias* (3). 181 pp. Maputo, Moçambique. Instituto de Investigação Agronómica de Moçambique.

National Administration of Conservation Areas. 2021. Maputo National Park Management Plan for the Period 2021–2031.

NageL, K. & C. Degerstedt (1999). The marine reserves of Ilha de KaNyaka, Mozambique: An inventory of coral reef associated fish and aspects of possible interactions with the fishery and tourism. Swedmar Working Paper 18/99. Gothenburg, SWEDMAR, 24 pp.

Nel, H., R. Perissinotto & R. Taylor (2015). Effects of salinity on the survival of the Brackwater mussel, Brachidontes virgiliae, in the St Lucia estuarine system, South Africa. *Water Sa,* 41(1): 15-20.

Nel, R. & P. Casale (2015). *Caretta caretta* South West Indian Ocean subpopulation. The IUCN Red List of Threatened Species 2015: e.T84199475A84199755. Retrieved from http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T84199475A84199755.en on 05 March 2019.

Nel, R. (2012). Assessment of the leatherback turtle in the Indian Ocean and South-East Asia: 2012 Update. IOSEA Secretariat. 41pp.

Nel, R. (2014). 50 years of turtle conservation, monitoring and research: A state-of-knowledge report. Report for Ezemvelo KZN Wildlife. 43pp.

Nel, R. (2016). Turtle monitoring and research report 2013/14 and 2014/15 seasons. Report prepared for Ezemvelo KZN Wildlife & iSimangaliso Wetland Park Authority. 62 pp. South Africa.

Nel., R, A.E Punt & G.R. Hughes (2013). Are coastal protected areas always effective in achieving population recovery for nesting sea turtles? PLoS One 8: e63525.

Nelms, S. E., E. M. Duncan, A. C Broderick, T. S. Galloway, M. H. Godfrey, M. Hamann, P.K. Lindeque & B. J Godley (2015) Plastic and marine turtles: a review and call for research. *ICES Journal of Marine Science.*

Nhabinde, S., V. Julien & C. Bento (2014). Main economic evaluation of Maputo Bay. In: Bandeira, S. & J. Paula (eds.). The Maputo Bay Ecosystem. 25-29 pp. Zanzibar Town. WIOMSA.

Nhancale, C. C. (1998). Estudo da ecologia do corvo Indiano (*Corvus splendens*) (Vieillot) e seu impacto sobre a população humana da Ilha da Inhaca. BSc Dissertation, 67 pp. Maputo, Universidade Eduardo Mondlane.

Ntumi, C. (2020). Specialist study: terrestrial mammals. Maputaland World Heritage Property Application. 127 pp. Maputo, MSR, PPMR, ANAC, PPF, CTV.

Palalane, J., M. Larson, H. Hanson & D. Juízo (2016). Coastal erosion in Mozambique: Governing processes and remedial measures. *Journal of Coastal Research*, 32(3): 700-718.

Parker, V. & W. F de Boer. (2000). Birds of the Maputo Special Reserve. Avian Demographic Unit, Cape Town and the Endangered WildLife Trust, Johannsburg, South Africa.

Parker, V. (1999). The atlas of the birds of Sul do Save, Southern Mozambique. Cape Town, Avian Demography Unit and the Endangered Wildlife Trust.

Paula, J., C. Macamo & S. Bandeira (2014). Mangroves of Maputo Bay. In: Bandeira, S. & J. Paula (eds). The Maputo Bay Ecosystem. 109-126 pp. Zanzibar Town. WIOMSA.

Pereira, M.A.M. (2004). Recursos turísticos e pesqueiros da zona costeira do distrito de Matutuíne, Maputo, Relatório submetido ao WWF Mozambique Coordination Office no âmbito do projecto Challenges for conservation on the developments of the Maputo and Libombos Corridors. pp 25. Maputo. WWF.

Pereira, M. A. M. (2003). Recreational SCUBA diving and reef conservation in southern Mozambique. M.Sc. thesis, 109 pp. Durban, University of Natal.

Pereira, M. A. M. (2000). Estudo comparativo das comunidades ictiológicas de dois recifes de coral da Ilha da Inhaca e sua relação com a estrutura do habitat. BSc Hons. Thesis. Maputo, Departamento de Ciências Biológicas, UEM, 68 pp.

Pereira, M. A. M. & M. H. Schleyer (2005). A diver and diving survey in southern Mozambique. Coral reef degradation in the Indian Ocean: status report 2005. In: Souter, D. & O. Lindén (eds.). 184-192 pp. Kalmar, CORDIO.

Pereira, M. A. M. & R. van der Elst (2014). Recreational and sport fishing in Maputo bay. In: Bandeira, S. & J. Paula (eds.). The Maputo bay ecosystem, 341-344 pp. Zanzibar Town, WIOMSA.

Pereira, M. A. M. & E. J. S. Videira (2005). Distribution and community structure of butterflyfishes (Pisces: Chaetodontidae) in southern Mozambique. *Western Indian Ocean Journal of Marine Science* 4: 39-46.

Pereira M. A. M., R. S. Fernandes, E. J. S. Videira, C. M. M. Louro & P. M. B Goncalves (2014). Celebrating 20 years of marine turtle tagging and monitoring in Southern Mozambique. *African Sea Turtle Newsletter,* 2: 31–33.

Pereira, M. A. M., C. Litulo, R. Santos, M. Leal, R. S. Fernandes, Y. Tibiriçá, J. Williams, B. Atanassov, F. Carreira, A. Massingue & I. Marques da Silva (2014a). Mozambique marine ecosystems review. Final report submitted to Fondation Ensemble. 139 pp. Maputo, Biodinâmica/CTV.

Pereira, M. A. M., E. J. S Videira & D. A. Narane (2008). Factores que influenciam a selecção de locais de nidificação por tartarugas marinhas no extremo sul de Moçambique. AICM, Maputo.

Pereira, M. A. M., E. J. S. Videira & A. C. D. Costa (2008). In: Obura, D.O., J. Tamelander & O. Linden (Eds). Ten years after bleaching- facing the consequences of climate change in the Indian Ocean. CORDIO Status Report 2008. 115-119 pp. Mombasa, Coastal Oceans Research and Development in the Indian Ocean/Sida-SAREC.

Pereira, M. A. M., E. J. S. Videira, H. Motta, C. M. M., Louro, K. G. S. Abrantes & M. H. Schleyer (2003). Coral reef monitoring in Mozambique. III: 2002 Report. 16 pp. Maputo, Mozambique Coral Reef Management Programme.

Pereira, M. A. M., K. G. S. Abrantes & E. J. S. Videira (2002). Human impacts on the ecology of Ponta Torres reef (Ilha de KaNyaka). Maputo, Programa de Gestão dos Recifes de Coral de Moçambique. Publicação Especial do PGRCM N° 1: 5 pp.

Pereira. M. A. M., E. J. S Videira., P. M. B. Gonçalves & R. Fernandes (2014b) Post-nesting migration of Loggerhead turtles (*Caretta caretta*) from Southern Mozambique. *African Sea Turtle Newsletter,* 1: 48-51.

Perry, C. T. (2005). Structure and development of detrital reef deposits in turbid nearshore environments, Ilha de KaNyaka, Mozambique. *Marine Geology*, 214: 143-161.

Petranka, J. W. & S. S. Murray. (2001). Effectiveness of removal sampling for determining salamander density and biomass: A case study in an Appalachian streamside community. *Journal of Herpetology*, 35:36-44.

Pietersen, D., R. Jansen & E. Connelly (2019). *Smutsia temminckii*. The IUCN Red List of Threatened Species 2019: e.T12765A123585768. Retrieved from https://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T12765A123585768 on 5 January 2021.

Pillay, D., G. M. Branch & A. T. Forbes (2008). Habitat change in an estuarine embayment: anthropogenic influences and a regime shift in biotic interactions. *Marine Ecology Progress Series*, 370: 19-31.

Poloczanska., E. S., C. J. Limpus & G. C. Hays (2009). Vulnerability of marine turtles to climate change. *Advances in Marine biology*, 56: 151-211.

Porter, S. N. (2009). Biogeography and potential factors regulating shallow subtidal reef communities in the western Indian Ocean. 274 pp. Cape Town. University of Cape Town.

Pretorius, D. (2018). Zoning the Southwestern Indian Ocean to mitigate impacts from ocean-based hydrocarbon exploration and production on sea turtles. Masters thesis. 148pp. Department of Zoology. Nelson Mandela University, Port Elizabeth, South Africa.

Pyron, R. A. (2018). Global amphibian declines have winners and losers. *Proceedings of the National Academy of Sciences*, 115 (15): 3739-3741.

Quartly, G. D. & M. A. Srokosz (2004). Eddies in the southern Mozambique Channel. *Deep-Sea Research II*, 51: 69-83.

Rakotonirina, B. & A. Cooke (1994). Sea turtles of Madagascar - their status, exploitation and conservation. *Oryx,* 28: 51-61.

Ramsay, P. J. (1994). Marine geology of the Sodwana Bay shelf, southeast Africa. *Marine Geology,* 120: 225-247.

Ramsay, P. J. (1996). Quaternary marine geology of the Sodwana Bay continental shelf, Northern KwaZulu-Natal. *Bulletin of the Geological Survey of Southern Africa,* 117: 1-85.

Ramsay, P. J., A. M. Smith & T. R. Mason (1996). Geostrophic sand ridge, dune fields and associated bedforms from the Northern KwaZulu□Natal shelf, south□ east Africa. *Sedimentology*, 43(3): 407-419.

Ramsay, P., J. Cooper, C. Wright & T. Mason (1989). The occurrence and formation of ladderback ripples in subtidal, shallow-marine sands, Zululand, South Africa. *Marine geology*, 86(2-3): 229-235.

Riegl, B. (1995a). A revision of the hard coral genus *Acropora Oken*, 1815 (Scleractinia: Astrocoeniina: Acroporidae) in South East Africa. *Zoological Journal of the Linnean Society* 113: 249-288.

RiegL, B. (1995b). Description of four new species in the hard coral genus Acropora Oken, 1815 (Scleractinia: Astrocoeniina: Acroporidae) from South East Africa. *Zoological Journal of the Linnean Society,* 113: 229-247.

Riegl, B. (1996). Corals of the south-west Indian Ocean IV. The hard coral family Faviidae Gregory, 1900 (Scleractinia: Faviina). Investigational Report, *Oceanographic Research Institute,* 70: 1-47.

Roberts, M., A. Ribbink, T. Morris, M. van den Berg, D. Engelbrecht & R. Harding (2006). Oceanographic environment of the Sodwana Bay coelacanths (Latimeria chalumnae), South Africa: coelacanth research. *South African Journal of Science*, 102: 435-443.

Robertson, D. R. (1998). Do coral-reef fish faunas have a distinctive taxonomic structure? *Coral Reefs,* 17: 179-186.

Robertson, W., M. Schleyer, P. Fielding, B. Tomalin, L. Beckley, S. Fennessy, R. Van der Elst, S. Bandeira, A. Macia & D. Gove (1996). Inshore marine resources and associated opportunities for development of the coast of Southern Mozambique: Ponta do Ouro to Cabo de Santa Maria. Unpublished Report (130).

Robinson, N. J., D. Anders, S. Bachoo, L. Harris, G. R. Hughest, D. Kotze, S. Maduray, S. McCue, M. Meyer, H. Oosthuizen, F. Paladino & P. Luschi (2019). Satellite tracking of leatherback and loggerhead sea turtles on the southeast African coastline. *Indian Ocean Newsletter,* 28: 3-7.

Robinson, N. J., S. J. Morreale, R. Nel & F. V. Paladino (2016). Coastal leatherback turtles reveal conservation hotspot. *Scientific Reports,* 6: 37851.

Robinson, N. J., S. J. Morreale, R. Nel & F. V. Paladino (2017). Movements and diving behaviour of inter-nesting leatherback turtles in an oceanographically dynamic habitat in South Africa. *Marine Ecology Progress Series,* 571: 221-232.

Rodrigues., M. J., H. Motta., M. A. M. Pereira., M. Gonçalves., M. Carvalho & M. Schleyer (1999). Coral reef monitoring in Mozambique. I: The monitoring programme and 1999 report. 57 pp. Maputo, MICOA/ ORI.

RPensar (2020). Estabelecimento de um programa em lixo marinho e micro-plásticos. Relatório Final e Resultados (14 de Dezembro de 2019 a 14 de Dezembro de 2020). 70 pp. Maputo. RPensar.

Ryan, P. G., G. Cole, K. Spiby, R. Nel, A. Osborne & V. Perold (2016) Impacts of plastic ingestion on post-hatchling loggerhead turtles off South Africa. *Marine Pollution Bulletin* 107: 155–160.

Sá, C., M. Leal, A. Silva, S. Nordez, E. André, J. Paula & V. Brotas (2013). Variation of phytoplankton assemblages along the Mozambique coast as revealed by HPLC and microscopy. *Journal of sea research,* 79: 1-11.

SABONET (2002). The grasses of Licuáti Forest and Maputo Elephant Reserves, Mozambique. *SABONET News,* 7(3): 211-213.

SafariNow (2020). SafariNow. Retrieved from https://www.safarinow.com/ on 4 November 2020.

Saide, V. F. (2000). Tides, Circulation and Water Masses in Maputo Bay. PhD Thesis, 40 pp. Department of Oceanography, Gothenburg University, Gothenburg.

Salm, R. V. (1976). The dynamics and management of the Ponta Torres coral reef, Ilha de KaNyaka Moçambique. *Memórias do Instituto de Investigação Científica de Moçambique*, 12A: 25-40.

Sanches, J. G. (1963). Contribuição para o estudo dos peixes teleósteos da Ilha de Inhaca (Moçambique). *Memórias da Junta de Investigação do Ultramar*, 2ª Série, nº 44: 1-207.

Sánchez-Bayoa, F. & K. A. G. Wyckhuys (2019). Worldwide decline of the entomofauna: A review of its drivers. Biological Conservation, 232:8–27.

Scarlet, M. & S. Bandeira (2014). Pollution in Maputo Bay. In: Bandeira, S. & J. Paula (eds.). The Maputo Bay Ecosystem. 347-371 pp. Zanzibar Town. WIOMSA.

Scarlet, M. P. J. (2005). Clams as a resource in Maputo Bay – Mozambique, 31 pp. MSc thesis. Department of Marine Ecology. Göteborg, Göteborg University.

Schleyer, M. H. (1995). South African coral reef communities. In: Cowan, G. I. (ed.) Wetlands of South Africa. Pretoria, Department of Environmental Affairs and Tourism, pp 131-140.

Schleyer, M. H. (1998). Crown of thorns starfish in the Indian Ocean. *Reef Encounter* 23: 25-27.

Schleyer, M. H. (2000). South African coral communities. In: Mcclanahan, T., C. Sheppard & D. Obura (eds). Coral reefs of the Indian Ocean: Their ecology and conservation. Oxford University Press, New York, pp 83-105.

Schleyer, M. H. (2009). Extreme environments: High-latitude reefs – South African coral reefs. Oxford University Press, pp 72-73.

Schleyer, M. H. & Y. Benayahu (2009). Soft coral biodiversity and distribution in East Africa: Gradients, function and significance. Proceedings of the 11th International Coral Reef Symposium, Ft. Lauderdale, Florida, 7-11 July 2008, pp 1388-1391.

Schleyer, M. H. & L. Celliers (2002). A consideration of the biodiversity and future of Southern African coral reefs. In: Linden, O., D. Souter, D. Wilhelmsson & D. Obura (eds). Coral reef degradation in the Indian Ocean: Status report 2002. 83-90 pp. CORDIO, Kalmar, Sweden.

Schleyer, M. H. & L. Celliers (2003a). Coral dominance at the reef-sediment interface in marginal coral communities at Sodwana Bay, South Africa. *Marine and Freshwater Research*, 54: 967-972.

Schleyer, M. H. & L. Celliers (2003b). Biodiversity on the marginal coral reefs of South Africa: what does the future hold? *Zoologische Verhandelingen,* 345: 387-400.

Schleyer, M.H. & L. Celliers, (2005a). The coral reefs of Bazaruto Island, Mozambique, with recommendations for their management. *Western Indian Ocean Journal of Marine Science* 4: 227-236.

Schleyer, M. H. & L. Celliers, (2005b). Modelling reef zonation in the Greater St Lucia Wetland Park, South Africa. *Estuarine and Coastal Shelf Science,* 63: 373-384.

Schleyer, M. H., A. Kruger & L. Celliers (2008). Long-term community changes on high-latitude coral reefs in the Greater St Lucia Wetland Park, South Africa. *Marine Pollution Bulletin* 56: 493-502.

Schleyer, M. H., J.M. Heikoop & M. J. Risk (2006). A benthic survey of Aliwal Shoal and assessment of the effects of a wood pulp effluent on the reef. *Marine Pollution Bulletin* 52: 503-514.

Schleyer, M., D. Obura & M. Rodrigues (1999). A preliminary assessment of coral bleaching in Mozambique. In: Coral degradation in the Indian Ocean: Status reports and project presentations 1999: Lindén, O & N. Sporromg, (Eds.). Stockholm, CORDIO/SAREC, pp. 37-42. South African Association for Marine Biological Research Unpublished Report No 168:12.

Schumann, E. H. (1988). Physical oceanography off Natal. *Coastal Ocean Studies off Natal, South Africa*, 26: 101-130.

Schuyler, Q. A., C. Wilcox, K. A. Townsend, K. R. Wedemeyer Strombel, G. Balazs, E. van Sebille & B. D. Hardesty (2016). Risk analysis reveals global hotspots for marine debris ingestion by sea turtles. Global Change Biology 22(2): 567-576.

Senkoro, A., S Bandeira., & F. Barbosa (2014). Ilha de KaNyaka within Maputaland Centre of Endemism In: Bandeira, S. & J. Paula (eds). The Maputo Bay Ecosystem. 255-257 pp. Zanzibar Town. WIOMSA.

Sete, C., J. Ruby & V. Dove (2002). Seasonal variation of tides, currents, salinity and temperature along the coast of MozAppleton, C.C. 1996. Freshwater mollusk of Southern Africa. University of Natal Press. Pietermaritzberg.ambique. Relatório do Centro Nacional de Dados Oceanográficos Unesco OdinAfrica.

Silva, J. L., J. Simpson, A. Hoguane & J. L. Harcourt-Baldwin (2010). Buoyancy-stirring interactions in a subtropical embayment: a synthesis of measurements and model simulations in Maputo Bay, Mozambique. *African Journal of Marine Science,* 32(1): 95-107.

Smith, J. L. B. (1931). New and little-known fish from the south and east coasts of Africa. *Records of the Albany Museum of Grahamstown,* 4: 145-160.

Smith, J. L. B. (1939). New records and descriptions of marine fishes from Portuguese East Africa. *Transactions of the Royal Society South Africa,* 27: 215–222.

Smith, J. L. B. (1940). Sparid fishes from Portuguese East Africa, with a note on the genus Gymnocranius Klunzinger. *Transactions of the Royal Society of South Africa*, 28: 175-182.

Smith, J. L. B. (1941). The genus Gymnocranius Klunzinger, with notes on certain rare fishes from Portuguese East Africa. *Transactions of the Royal Society of South Africa,* 28: 441-452.

Smith, J. L. B. (1955a). New species and new records of fishes from Moçambique. *Memórias do Museu Dr. Álvaro de Castro,* 3: 3-27.

Smith, J. L. B. (1955b). East African unicorn fishes from Mozambique. *South African Journal of Science,* 51: 169-174.

Smith, J. L. B. (1958). The marine fishes of Inhaca. In: Macnae, W. & M. Kalk (eds). A natural history of Ilha de KaNyaka, Moçambique. 113-116 pp. Johannesburg, Witwatersrand University Press.

Smith, J. L. B. (1962). The moray eels of the western Indian Ocean and the Red Sea. Rhodes University *Ichthyological Bulletin,* 23: 421-444.

Smith, M. M. (1967-1968). *Echidna tritor* (Vaillant & Sauvage, 1875), the large adult of *Echidna polyzona* (Richardson, 1845), and other interesting fishes collected by Dr. R. A. C. Jensen in southern Moçambique waters. *Memórias do Instituto de Investigação Científica de Moçambique, Série A*, 9:293-308.

Smith, M. M. & P. C. Heemstra (1991). Smith's sea fishes. Johannesburg, Southern Book Publishers, 1048 pp.

Smith, R. J. & N. Leader-Williams (2006). The Maputaland Conservation Planning System and Conservation Assessment. Durrell Institute of Conservation and Ecology, University of Kent, Canterbury, UK.

Smith, R. J., J. Easton, B. A. Nhancale, A. J. Armstrong, J. Culverwell, S. D. Dlamini, P. S. Goodman, L. Loffler, W. S. Matthews, A. Monadjem, C. M. Mulqueeny, P. Ngwenya, C. P. Ntumi, B. Soto & N. Leader-Williams (2008). Designing a transfrontier conservation landscape for the Maputaland centre of endemism using biodiversity, economic and threat data. *Biological Conservation*, 141: 2127–2138.

Smith, R., P. Goodman & W. Matthews (2006). Systematic conservation planning: a review of perceived limitations and an illustration of the benefits, using a case study from Maputaland, South Africa. *Oryx,* 40: 400-410.

Soane, J.S. (2017). Efeito das queimadas na distribuição espacial de *Syzygium cordatum* Hochst. ex Krauss, na Reserva Especial de Maputo. 57 pp, Tese de licenciatura. Universidade Eduardo Mondlane, Maputo.

Soto, B. (2009). Protected areas in Mozambique. In: Suich, H., B. Child & A. Spenceley (eds). Evolution and innovation in wildlife conservation: Parks and game ranches to transfrontier conservation areas, 85-100 pp. London, Earthscan.

Spalding, M. D., C. Ravilious, & E. P. Green (2001). World Atlas of coral reefs. UNEP World Conservation Monitoring Centre, University of California Press, Berkeley, USA, 424 pp.

Spalding, M. D., H. E. Fox, G. R. Allen, N. Davidson, Z. A. Ferdaña, M. Finlayson, B. S. Halpern, M. A. Jorge, A. Lombana & S. A. Lourie (2007). Marine ecoregions of the world: a bioregionalization of coastal and shelf areas. *BioScience,* 57(7): 573-583.

Stramma, L. & J. R. Lutjeharms (1997). The flow field of the subtropical gyre of the South Indian Ocean. *Journal of Geophysical Research: Oceans*, 102(C3): 5513-5530.

Stromvoll, J. & G. Jones (2019). *A guide to the sea slugs of Maputoland Coast.* (Castle Graphics Northe (Pty) Ltd.

Suhling, F. (2010). Allocnemis leucosticta. The IUCN Red List of Threatened Species 2010: e.T63201A12627787. Retrieved from https://dx.doi.org/10.2305/IUCN.UK.2010-3.RLTS.T63201A12627787.en on 2 January 2021.

SWOT Scientific Advisory Board (2011). The State of the World's Sea Turtles (SWOT) Minimum Data Standards for Nesting Beach Monitoring, version 1.0. Handbook. 28 pp. SWOT Scientific Advisory Board.

Syliver, B., N. Ribeiro, E. Cavane & M. Salimo (2020). Abundance, distribution and ecological impacts of invasive plant species in Maputo Special Reserve, Mozambique. *International Journal of Biodiversity and Conservation*, 12: 305-315.

Thompson, T. E. & G. H Brown (1984). *Biology of opisthobranch molluscs. Vol. 2.*, 229 pp. Ray Society.

Tibiriçá, Y. & M. A. E. Malaquias (2017). The bubble snails (Gastropoda, Heterobranchia) of Mozambique: an overlooked biodiversity hotspot. *Marine Biodiversity,* 47: 791–811.

Tibiriçá, Y., M. Pola & J. L. Cervera (2017). Astonishing diversity revealed: an annotated and illustrated inventory of Nudipleura (Gastropoda: Heterobranchia) from Mozambique. *Zootaxa* 4359: 1–133.

Tinley, K.L. (1971). Determinants of coastal conservation dynamics and diversity of the environment as exemplified by the Mozambican coast., Proceedings of the Symposium on Nature Conservation as a Form of Land Use, Gorongosa National Park 125-153 pp. Pretoria. SARCUS.

Tokura, W., H. Matimele, J. Smit & M. T. Hoffman (2020). Long-term changes in forest cover in a global biodiversity hotspot in southern Mozambique. *Bothalia*, 50 (1): 1-17.

Tomillo, P. S, V. S. Saba, C. D. Lombard, J. M. Valiulis, N. J. Robinson, F. V. Paladino, J. R. Spotila, C. Fernández, M. L. Rivas, J. Tucek, R. Nel & D. Oro (2015) Global analysis of the effect of local climate on the hatchling output of leatherback turtles. *Scientific Reports* 5:16789:1–12

Trindade, J. C. C. N. (2012). Factores que influenciaram a escolha da praia de nidificação por tartarugas verdes (*Chelonia mydas*) em Vamizi, Moçambique, entre 2003 e 2012. MSc thesis, 58 pp. Lisboa, Universidade de Lisboa.

Troëng, S. & C. Drews (2004). Money Talks: Economic Aspects of Marine Turtle Use and Conservation. 64 pp. Gland, Switzerland, WWF-International.

UNEP (United Nations Environmental Programme) & WIOMSA (Western Indian Ocean Marine Science Association (2008). Marine Litter in the Eastern Africa Region: An Overview Assessment. 60 pp. United Nations Environment Programme.

Valdés, Á. & O. A Campillo (2004). Systematics of pelagic aeolid nudibranchs of the family Glaucidae (Mollusca, Gastropoda). *Bulletin of Marine Sciences,* 75: 381–389.

van Aarde, R., T. Jackson, R. A. R Guldemond & K. Young (2004). Aerial elephant survey of Maputo Elephant Reserve. CERU Internal Report. University of Pretoria.

van der Elst, R. & B. Everett & (eds). (2015). Offshore fisheries of the Southwest Indian Ocean: their status and the impact on vulnerable species (First ed.). Durban: Oceanographic Research Institute, Special Publication, 10. 448pp.

van Rampelbergh, M., D. Fleitmann, S. Verheyden, H. Cheng, L. Edwards, P. De Geest, D. De Vleeschouwer, S. J. Burns, A. Matter, P. Claeys & E. Keppens (2013). Mid- to late Holocene Indian Ocean monsoon variability recorded in four speleothems from Socotra Island, Yemen. *Quaternary Science Reviews,* 65: 129-142.

van Wyk, A. E. & G. F. Smith (2001). Maputaland Centre. In: A.E. Van Wyk & G.F. Smith (eds). Regions of Floristic Endemism in Southern Africa. 86-93 pp. Umdaus Press, Hatfield, South Africa.

van Wyk, A. E. (1996). Biodiversity of the Maputaland Centre. In: L.J.G. van der Maesen, X. M. van der Burgt & J.M. van Medenbach de Rooy (eds.). The Biodiversity of African Plants. 198-207 pp. Kluwer, Dordrecht, The Netherlands.

Vivien, M. L. (1973). Ecology of the fishes of the inner coral reef flat in Tuléar (Madagascar). *Journal of the Marine Biological Association of India,* 15: 20-45.

Walker, C. 2008. *Landmarked - Land claims and land restitution in South Africa*. Ohio University Press/Jacana.

Wallace., B. P., A. D. DiMatteo, B. J. Hurley, E. M. Finkbeiner, A. B. Bolten, M. Y. Chaloupka & J. Bourjea, (2010). Regional management units for marine turtles: a novel framework for prioritizing conservation and research across multiple scales. *Plos one*, 5(12).

Wallace, B. P., M. Tiwari, & M. Girondot, (2013). *Dermochelys coriacea* Southwest Indian Ocean subpopulation. The IUCN Red List of Threatened Species 2013: e.T46967863A46967866. Retrieved from http://dx.doi.org/10.2305/IUCN.UK.2013-2.RLTS.T46967863A46967866.en on 5 March 2019.

Watkeys, M. K., T. R. Mason & P. S. Goodman (1993). The role of geology in the development of Maputaland, South Africa. *Journal of African Earth Sciences* 16: 1-16.

WHC (World Heritage Committee) (1999). Decision of the World Heritage Committee - Greater St. Lucia Wetland Park. Report of the 23rd Session of the World Heritage Committee, 4th December 1999. Paris: World Heritage Centre.

White, F. (1983). The Vegetation of Africa. Natural Resources Research 20. UNESCO, Paris, France.

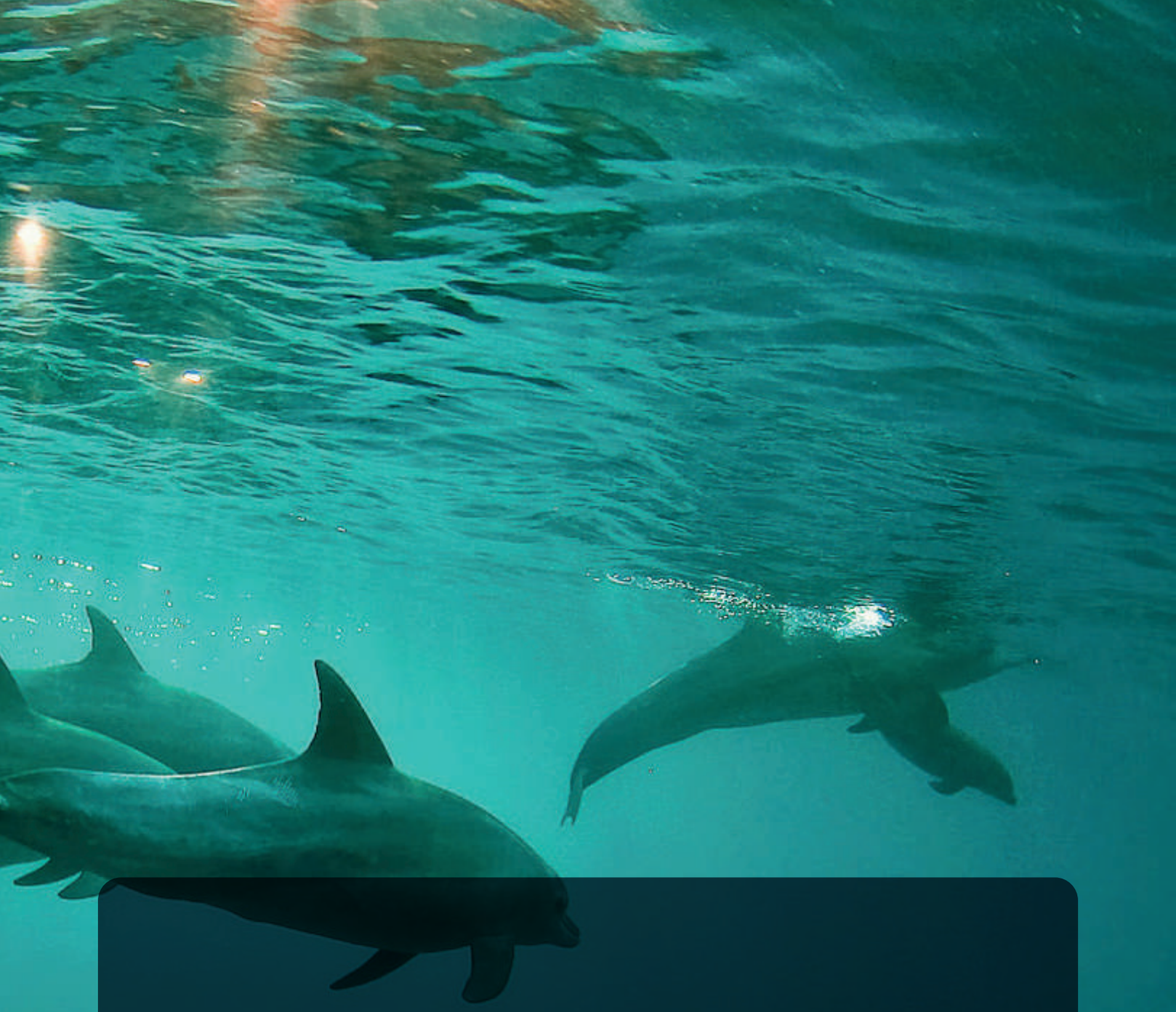
Williams, J. L & N. J. Pilcher (2018). Assessment of the status, scope and trends of the legal and illegal international trade in marine turtles, its conservation impacts, management options and mitigation priorities in Madagascar. Report to the CITES Secretariat Project S-527. SSFA/2018/DKA. 72pp.

Williams, J. L., S. J. Pierce, C. A. Rohner, M. M. P. B. Fuentes & M. Hamann (2017). Spatial Distribution and Residency of Green and Loggerhead Sea Turtles Using Coastal Reef Habitats in Southern Mozambique. *Frontiers Marine Science,* 3:1–16.

Williams J. L., Pierce S. J., M. Hamann & M. M. P. B Fuentes (2019). Using expert opinion to identify and determine the relative impact of threats to sea turtles in Mozambique. Aquatic Conservation: *Marine and Freshwater Ecosystems,* 29 (11): 1936–1948.

Willan, R. C (1981). A new abyssal arminacean nudibranch from New Zealand. *New Zealand journal of Zoology,* 8: 325–330.

Wilson, M. and Thompson, L. 1969. *The Oxford History of South Africa I: South Africa to 1870*. Oxford University Press: London.



# 8. CONTACT INFORMATION OF RESPONSIBLE AUTHORITIES

# 8.a PREPARERS

## CTV

Cristina M. M.  Louro
Raquel dos Santos Fernandes
Marcos A. M. Pereira

Centro Terra Viva - Estudos e Advocacia Ambiental
Address: Bairro da Coop Rua C. 148. Maputo, Mozambique
Tel: +258 21 41 80 79 | +258 82 30 02 496
ctv@ctv.org.mz

## MAPUTO NATIONAL PARK

Miguel Goncalves

Maputo National Park
Mozambique
Cellphone: +258 (82) 7276434 and +258 (84) 7161970
Email: chifununo@yahoo.com

## PEACE PARKS FOUNDATION

Antony Alexander
Johalize Koch
Arlene Herbst
Loraine Bewsher

Peace Parks Foundation
11 Termo Lane
Techno Park
Stellenbosch
South Africa
+27 21 880 5100
ppfcoms@peaceparks.org

## PEOPLE NATURE CONNECT

Bronwyn James
Colleen Crawford Cousins
Mark Mattson

People Nature Connect
Unit 8 Spar Building
18 Hely Hutchinson Rd
Mtunzini
3867
Tel: +27 083 375 4740
info@natureconnect.org.za

## WILD EQUITY

Andrew Zaloumis
apz@worldonline.co.za
+27 82 788 3000

Terri Castis
terri@terricastis.com
+27 83 309 3587

Wild Equity Africa (Pty) Ltd
PO Box 72615, Parkview, Gauteng, 2122, South Africa

# 8.b
# OFFICIAL LOCAL INSTITUTION/AGENCY

The property falls within the Republic of Mozambique and is owned and managed by the State. The MNAP is the responsibility of the Administração Nacional das Áreas de Conservação (ANAC - National Administration for Conservation Areas), a body supervised by the Ministério da Terra e Ambiente (MTA - Ministry for Land and the Environment).

The physical address is as follows:

Ministério da Terra e Ambiente
Administração Nacional para as **Áreas** de Conservação
Address: November 10 Avenue, Praceta 1196, 40
PO BOX 4101
Maputo, Mozambique

# 8.c
# OTHER LOCAL INSTITUTIONS

### Peace Parks Foundation
11 Termo Lane
Techno Park
Stellenbosch
South Africa
+27 21 880 5100
ppfcoms@peaceparks.org

### Universidade Eduardo Mondlane (UEM)
3453 Avenida Julius Nyerere, Maputo, Mozambique
Phone: +258 21 430 239
Email: cecoma@uem.ac.mz

### Centro Terra Viva (CTV)
2HXR+24Q, Maputo, Mozambique/ Bairro da Coop, Rua C, No. 148 – Maputo, Mozambique
Phone: + 258 21 41 80 79/ + 258 82 30 02 496
Email: ctv@ctv.org.mz

### Instituto Nacional de Investigação Pesqueira (IIP)
Address: 389 Av. Mao Tse Tung, Maputo, Mozambique
Phone: +258 21 490 307
Email: iip@iip.gov.mz

### Rare
Business centre Sommerschield 2, 41 Rua Beijo da Mulata, Maputo, Mozambique
www.rare.org

### Mozambique Agricultural Research Institute (IIAM)
Av. of FPLM, No. 2698, Maputo, Mozambique
Phone: +258 21 460190
PO Box 3658
www.iiam.gov.mz/

# 8.d
# OFFICIAL WEBSITE

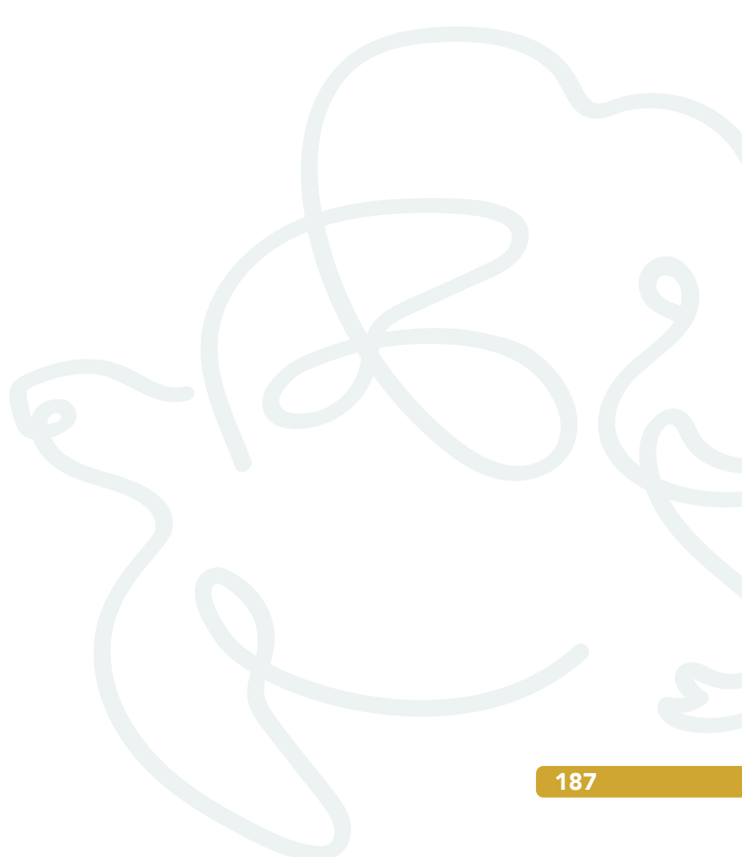
**http://parquemaputo.gov.mz/**

Contact name: Miguel Gonzalves
E-mail: chifununo@yahoo.com
reservas@parquemaputo.gov.mz

# 9. SIGNATURE ON BEHALF OF THE STATE PARTY

# 9. SIGNATURE ON BEHALF OF THE STATE PARTY

To be included once received.

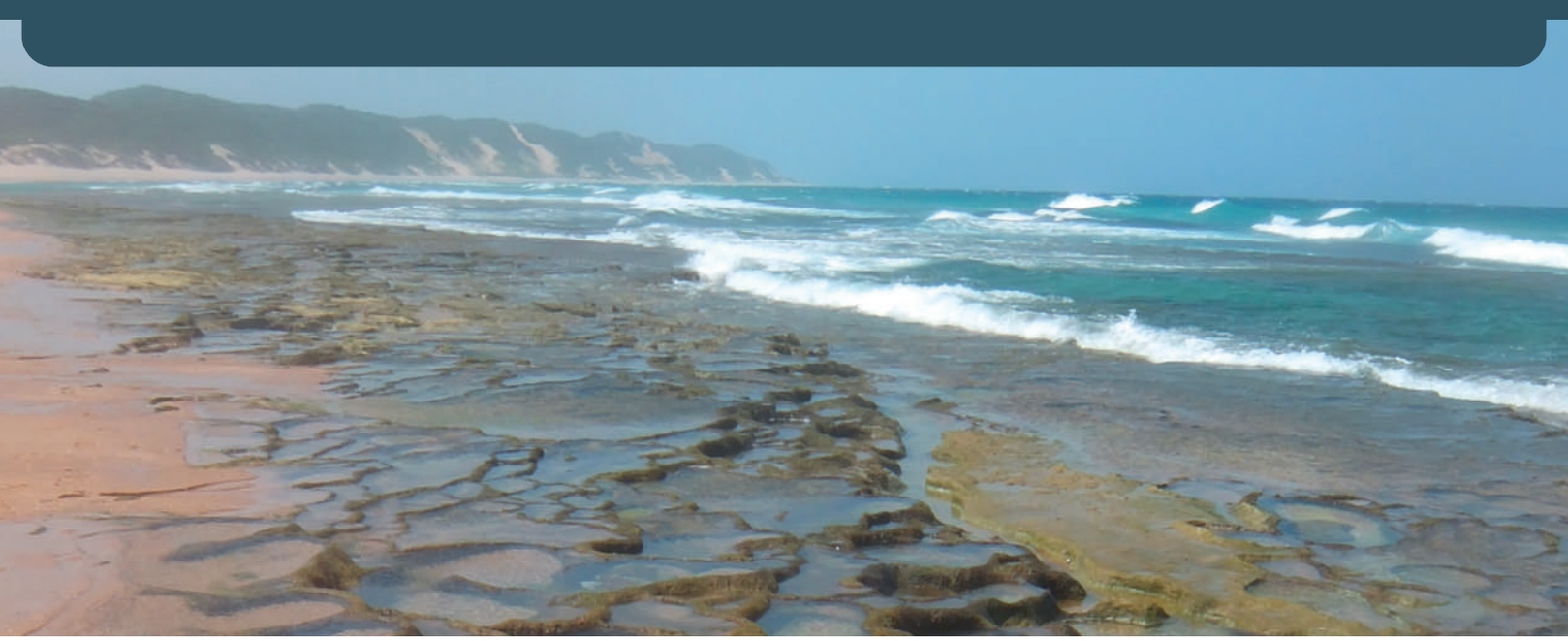


# 10. APPENDICES

## PLEASE SEE THE SEPARATE APPENDICES DOCUMENT INCLUDED WITH SUBMISSION

# PLEASE SEE SEPARATE APPENDICES BOOK

# PARQUE NACIONAL DE MAPUTO



REPÚBLICA DE MOÇAMBIQUE
MINISTÉRIO DA TERRA E AMBIENTE

ANAC
ADMINISTRAÇÃO NACIONAL DAS ÁREAS DE CONSERVAÇÃO

iSimangaliso
Wetland Park