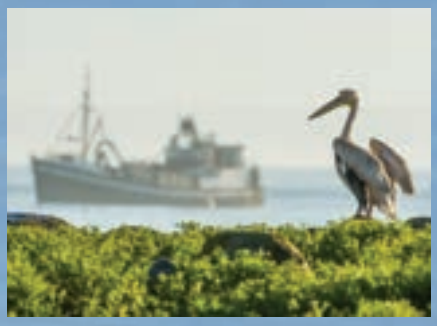
WESTERN INDIAN OCEAN

# MARINE PROTECTED AREAS OUTLOOK

Towards achievement of the Global Biodiversity Framework Targets



UN environment programme

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WESTERN INDIAN OCEAN MARINE SCIENCE ASSOCIATION

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# FOREWORD

It is indeed an honour to launch the *Western Indian Ocean (WIO) Marine Protected Areas (MPA) Outlook* in my capacity as the Minister for Agriculture, Climate Change & Environment in the government of Seychelles. I commend the Contracting Parties to the Convention for this excellent example of regional collaboration in documenting the progress made towards the attainment of the SDG 14.5 Target of 10 percent protected area of each country's EEZ.

The WIO region has a coastline stretching for more than 15 000km, a continental shelf area of some 450 000km$^2$ from Somalia in the north to South Africa in the south and covers ten countries (Comoros, France, Kenya, Madagascar, Republic of Mauritius, Mozambique, Seychelles, Somalia, South Africa and the United Republic of Tanzania) five of which are island States. The combined population for the WIO region is 244 million, and the ten countries in the region are Contracting Parties to the Nairobi Convention for the protection, management and development of the coastal and marine environment of the WIO region.

The combined economic value of the WIO ecosystems goods and services is estimated at over USD 20 billion Gross Marine Product per annum and a total asset base of over USD 333.8 billion. With over 30 percent of the WIO population (about 60 million people) living within 100km of the coastline, the coastal and marine ecosystems provide essential sources of livelihoods and income to coastal communities and significantly contribute to national economies.

However, the WIO is threatened by ecosystem degradation from rapid urbanization, increased population growth, coastal development, land reclamation and conversion. Impacts of climate change and variability have led to coral bleaching, sea-level rise, flooding and other effects. In response to the emerging natural and anthropogenic challenges, Contracting Parties to the Nairobi Convention are adopting an integrated approach in the management of ocean resources to maintain a balance between conservation and development. The approach aligns with the 2030 Global Agenda for Sustainable Development with Sustainable Development Goal (SDG) 14 focusing on the need to mobilize global effort to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

The *MPA Outlook* outlines the significant strides made in the region in promoting the protection of critical coastal and marine resources. The *MPA Outlook* prepared by the Contracting Parties to the Convention documents the progress made in the WIO region towards achieving MPA targets based on the Convention of Biological Diversity (CBD)'s Aichi Target 11/SDG 14.5 and provides a baseline for the post 2020 Global Biodiversity Framework.

The region has established 143 MPAs (or equivalent), covering a total of 555 436.68km$^2$, representing 7 percent of the total combined exclusive economic zone (EEZ) of the nine countries covered in the *MPA Outlook*. Most of the MPAs predominantly protect coastal habitats. Notably, a few MPAs have been proclaimed over very large areas of deep-sea habitats contributing to a larger proportion of the 7 percent.

By March 2020, Seychelles had designated 30 percent of its EEZ as protected marine areas, tripling the UN CBD Target 11 for 10 percent marine protection by 2020, and the UN SDG-14.5 for 10 percent coastal and marine protection. Seychelles with an EEZ of 1 374 000km$^2$ and a land mass area of 455km$^2$ achieved this milestone through the debt for nature swap spearheaded by The Nature Conservancy (TNC). Promising initiatives on transboundary MPAs are being developed between Kenya and Tanzania and between Mozambique and South Africa.

The establishment of MPAs has a long history in the region. South Africa declared the first MPA in 1964, the Tsitsikamma MPA, which was the first MPA in the region and since then South Africa has steadily increased the number and coverage of its marine conservation estate. By 2019, South Africa had 42 MPAs raising the total MPAs cover from <0.5 percent to 5.4 percent of the EEZ.

The *MPA Outlook* comes at a time when the region has embarked on large-scale socio-economic developments that are equally exerting pressure on MPAs. The *MPA Outlook* thus provides some answers and innovative approaches to minimize the scale of negative impacts on MPAs.

The *MPA Outlook* is the best form of experience sharing, and documenting best practices in MPA management across the WIO.

On behalf of the Contracting Parties, I wish to acknowledge and thank the Nairobi Convention Secretariat for the overall coordination of the process; the Western Indian Ocean Marine Sciences Association (WIOMSA) for technical and financial support through the Marine Science for Management (MASMA) Programme and the Global Environment Facility for funding the preparation and production of the *MPA Outlook* under the GEF funded

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# EXECUTIVE SUMMARY

The Western Indian Ocean (WIO) is renowned for the richness of its marine biodiversity, especially that associated with the region's widespread coral reef systems. The mangroves, seagrasses, rocky and sandy shorelines with associated dune systems and coastal forests, and the deep-sea features such as seamounts, ridges and abyssal plains also contribute substantially to the biodiversity of the region. The innumerable islets and atolls scattered across the WIO also support extraordinary biodiversity, including vast numbers of often rare, endemic and endangered marine species.

This rich marine biodiversity supports burgeoning coastal populations both directly, through the provision of a variety of marine resources and vital ecosystem services such as coastal protection, and indirectly, through the opportunities it provides for economic growth through sectors such as fisheries, tourism, infrastructure development and others. However, the marine resources are coming under increasing pressure in the coastal areas through the escalating needs of the local populations, exacerbated by the use of illegal fishing techniques, such as "blast" or dynamite fishing and the use of poisons, and in deeper waters from the legal and illegal harvesting of vast quantities of resources by international commercial fishing fleets. The tourism sector that brings benefits to coastal communities is in many places damaging the very resources the tourists wish to enjoy. In addition, interest in mineral resources including oil and gas reserves, found under the seabed, is exacerbating pressure on coastal ecosystems. Developing coastal nations in the WIO region, particularly those faced with financial constraints, are keen to exploit mineral resources for the benefit of their populations, leading to an exponential increase in the issuing of prospecting and extraction rights.

To these pressures are added increased levels of land and sea-based pollution, sedimentation from silt-laden rivers, and extensive coastal development; together with the increasingly evident impacts of climate change including sea-level rise, ocean warming and acidification, and increased frequency and intensity of storm events. If the twin threat from coastal development and climate-related pressure, is left unmitigated, with no protection afforded to the marine and coastal systems, there is every likelihood that the marine biodiversity of the WIO region would be irreversibly compromised. The consequential impacts on the livelihoods of coastal communities, and the well-being of the populations across the region, are likely to have long-term and negative ramifications on the national economies of the coastal states.

Aware of the global threat from both human-caused and climate change-related stressors, the global community in 2015 committed to achieving the United Nations Sustainable Development Goals (SDG). With particular relevance for the marine environment is SDG 14, "Life below Water".

The SDG 14 has several targets including Targets 14.2 on sustainable management and protection of marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration, to achieve healthy and productive oceans by 2020; and 14.5 that aimed at all countries conserving at least 10 percent of coastal and marine areas, essentially their exclusive economic zones (EEZs), consistent with national and international law and based on the best available scientific information by 2020. Target 14.5 was aligned to the Convention on Biological Diversity (CBD) Strategic Plan for Biodiversity 2011–2020 Aichi Target 11, which encouraged all signatory nations to ensure that:

> "By 2020, at least 17 percent of terrestrial and inland waters, and 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes." (Secretariat of the Convention on Biological Diversity, 2010).

This *MPA Outlook* reviews the commitment by governments to achieve 10 percent protection of important marine and coastal areas through effectively and equitably managed MPAs and other effective area-based management measures (Aichi Target 11 and SDG 14). The review takes into account the formulation of the CBD's post 2020 biodiversity framework, that proposes, among other goals a zero net biodiversity loss by 2030, as well as providing a baseline for the post 2020 framework.

The declaration of marine protected areas (MPAs), has long been considered a key tool in the fight to conserve the world's marine biodiversity, and the WIO countries have played their part, by identifying and declaring MPAs; from Tsitsikamma, the first MPA in Africa, proclaimed by the Government of the Republic of South Africa in 1964, to the MPAs proclaimed in 2019 by the Governments of Seychelles and the Republic of South Africa, and those proposed for imminent declaration by the government of Comoros. It is also evidently clear that the mere proclamation of an MPA is no guarantee of effective protection. An assessment on MPA management effectiveness showed

that many MPAs in the region lack human resources, skills, equipment, and institutional commitment to fulfil their functions adequately. The assessment also revealed serious declines in conservation funding. The COVID-19 pandemic led many countries to adopt lockdown measures, affecting tourism revenues on which many MPAs in the WIO depend to finance MPA operations. Marine conservation in the WIO region needs a post-COVID recovery plan and marine conservation efforts must now be funded not only at the level that they were at before the pandemic but at an even higher amount that reflects the severity of the unprecedented threats to biodiversity and associated economic sectors.

Madagascar has pioneered an interesting approach to protecting marine areas through a rapid increase in the number of Locally Managed Marine Areas (LMMAs), where coastal communities work in collaboration with government and other stakeholders to protect their coastal resources. A similar approach has been recorded under a variety of names in different countries, across the region. Over three hundred LMMAs have been established across the region in the last ten years. While most of these do not, as yet, provide the levels of protection afforded by the more established formal and effectively managed MPAs, they have great potential to increase the coastal areas under conservation management in the region quite substantially.

**Prime targets (prawns and fish) from inshore beach seining off Malindi, Kenya.** © Peter Chadwick

At a transnational scale, the moves to initiate transboundary MPAs, such as between Kenya and mainland Tanzania, and Mozambique and South Africa, must be lauded and supported. Coastal states are also taking a large-scale approach to marine conservation, often within "Blue Economy" initiatives such as the Blue Economy Roadmap developed by the Government of Seychelles and Operation Phakisa in South Africa. In both cases, these initiatives have involved thorough and complex marine spatial planning processes, identifying areas suitable for different uses and activities, including for conservation.

In Seychelles, two new MPAs covering an area of 208 365km$^2$ were declared as a result of this process. In South Africa, 20, mostly offshore MPAs covering an area of 54 214km$^2$, have been proclaimed under Operation Phakisa following an intense consultation process with all stakeholders. The Seychelles and South African experiences provide excellent models for other WIO countries for the planning, identification and declaration of offshore MPAs. These two experiences were underpinned by strong policy support, evidence-based decision making and requisite financing. These are key lessons in any successful MPA establishment and eventual operationalization and management programmes.

The Republic of Mauritius, Kenya, Tanzania, and other countries have embarked on Blue Economy initiatives and adopted the application of area-based planning tools such as marine spatial planning processes, underpinned by scientific information and understanding of the marine environment. The WIO region is fortunate to be home to some highly productive and effective marine science institutions and scientists, all linked to the Western Indian Ocean Marine Science Association (WIOMSA), which has partnered with the Nairobi Convention Secretariat in the production of this *MPA Outlook*. It is the science emanating from these institutions which provides the evidence required firstly to identify and assess the threats to marine ecosystems and species, and then secondly to identify the areas and habitats most in need of protection and the forms of protection most appropriate to them. However, while the scientific understanding of the coastal and inshore environments is solid, this is not necessarily the case with the offshore deep-sea environments, which have only recently been the focus of concerted scientific attention and research. The value of such research is shown in the proclamation of the South African offshore MPAs.

To achieve its prime purpose of assessing progress towards meeting the SDG and Aichi targets, this *MPA Outlook* set out to document and celebrate the

achievements up to 2020 in the establishment of MPAs, or equivalent levels of protection, across the WIO region. It also documents the exciting move towards more community-based coastal conservation initiatives as represented by the LMMAs and other sites managed collaboratively with coastal communities. In addition to this documentation, there are elements of assessment and analysis to guide the expansion and strengthening of marine conservation in the region, particularly towards the achievement of the post-2020 Global Biodiversity Framework (GBF).

More specifically, the body of the *MPA Outlook* is structured as follows:

**Part I**

Outlines the purposes for the development of the publication, the key methodologies employed in gathering and documenting the information, and some of the challenges faced in compiling the *MPA Outlook*. The specific purpose of the *MPA Outlook* was to provide a baseline assessment of existing coastal and marine conservation efforts in the region. This involved not only a quantitative assessment of the areas and habitats under protection, but also a qualitative assessment. In addition to the primary technical purposes of this *MPA Outlook*, it was intended to document and celebrate the achievements of governments in furthering the conservation of their marine and coastal environments. It also provides the opportunity to encourage and motivate governments, supported by the scientific community, in increasing efforts towards long-term conservation of vital marine resources, species and ecosystems, including those in the deep-sea.

**Part II**

Describes the international and regional marine conservation contexts in which the *MPA Outlook* is located. This *MPA Outlook* was not developed in isolation; rather it is embedded in, and is intended to contribute significantly to, the increasing momentum of initiatives aimed at securing the biodiversity and productivity of coastal and marine areas. These initiatives operate from the global to the local levels, with increasing emphasis on the synergies between them as exemplified by the "think globally act locally" environmental mantra.

**Part III**

Provides detailed descriptions of the MPAs (and equivalents) in each WIO country, together with information on proposed MPAs and areas such as LMMAs under less formal forms of protection. The data revealed that there are 143 MPAs (or equivalents) in the WIO region, covering a total of 555 436.68km$^2$, representing 7 percent of the total combined EEZ of the nine countries included in this analysis. The numerical majority of MPAs in the region protect predominantly coastal habitats. However, the few MPAs proclaimed over large areas of deep-sea habitats (by France, Seychelles and South Africa) contribute by far the largest proportion of the total area under protection, and make the greatest quantitative contribution (6.2 percent of the 7 percent) to the percentage of total EEZ protected. To strengthen the emerging LMMAs as an approach to community level protection, an enabling policy environment and capacity building of both communities and their supporting agencies will be key for the effective establishment and management of these community managed areas.

**Part IV**

Provides an assessment of the management effectiveness of MPAs across the region, and makes initial recommendations for improving levels of management effectiveness. The key finding was that legislative and institutional frameworks that support the establishment and management of MPAs exist in every country, suggesting that there is the political will to meet the global and regional marine conservation objectives and targets. However, widespread failure to implement legislation, and in many countries, the ineffective functioning of mandated institutions was observed. Among the challenges identified, those that are cross-cutting throughout the region include shortfalls in financial and personnel capacity, insufficient clarity on MPA boundaries, leading to compliance challenges, and management decision sup¬port systems that are only weakly guided by science.

**Part V**

Draws on the information provided to analyse the current situation regarding marine conservation in the WIO region, in particular in relation to the achievement of the SDG and Aichi targets. Part V also makes initial recommendations on where future marine conservation efforts, particularly the siting of MPAs, might be concentrated as countries work towards the Targets in the post-2020 GBF.

The key findings of this *MPA Outlook* indicate that there are 143 sites across the WIO region that are considered as MPAs or as having equivalent legal status and levels of protection. The vast majority of these are coastal and/or inshore, however the largest, covering by far the greatest extents of the ocean are the few MPAs with considerable offshore deep-sea elements. These include the MPAs

declared in Seychelles and South Africa's 20 MPAs, of which 14 are offshore sites, proclaimed in 2019. Since it is not practically feasible for the SDG or GBF target to be achieved through the declaration of only coastal and inshore MPAs, as this would require the protection of entire national coastlines extending 37km offshore, or equivalent (i.e. half the coastline extending 74km offshore), identification, declaration and management of offshore MPAs by regional countries remains the most viable option of achieving this target.

A further finding is that the majority of existing MPAs across the region are not managed as effectively as they could and should be, due primarily to lack of funding for essential staff, equipment and capacity development, and weak institutional support and commitment. The question is raised whether the immediate priority should be for governments to firstly ensure effective management of their existing MPA estate, before embarking on expansion of this estate. A balance between establishment of new MPAs and effective management of existing sites is a critical decision, which each country will need to continuously consider.

A very positive finding is that there is every indication of the willingness and commitment of the Nairobi Convention contracting parties to strengthen marine conservation in areas within their jurisdiction. This is evidenced by improvements in legislation, including the development of new MPA-specific legislation, such as in Comoros, and the declaration of new MPAs in Mozambique, Seychelles, Comoros and South Africa.

There is also a good reason to be optimistic about the potential for coastal communities, with the support of governments and other stakeholders in LMMAs (or equivalents) to take on the mantle of coastal and inshore conservation, while the governments themselves focus on the offshore areas. Ongoing efforts on the development of the post-2020 GBF provide a basis for the WIO region to work towards a no-net loss of biodiversity by 2030. This may include exploring the immense opportunities for better recognizing and supporting conservation by local communities and private actors and adopting new models for Ocean Stewardship that reward sustainable actions by stakeholders.

The expansion of the MPA estate by 2030 and by 2050 is also among the goals of the post-2020 Framework. From a regional perspective, configuring an effective post-2020 regional network of effectively managed MPAs would require concerted efforts towards implementing the proposed theory of change that assumes transformative actions are taken to (a) put in place tools and solutions for implementation and mainstreaming, (b) reduce the threats to biodiversity and (c) ensure that biodiversity is used sustainably to meet people's needs and that these actions are supported by (i) enabling conditions, and (ii) adequate means of implementation, including financial resources, capacity and technology.

**Lawrence Sisitka**
Co-editor

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# ABBREVIATIONS

| | |
|---|---|
| ABNJ | Areas Beyond National Jurisdiction |
| ACLME | Agulhas Current Large Marine Ecosystem |
| AMA | Associação do Meio Ambiente |
| ANAC | Administração Nacional das Áreas de Conservação |
| ANGAP | National Association for Protected Areas Management |
| AONB | Area of Outstanding Natural Beauty |
| APO | Annual Plan of Operation |
| ASCLME | Agulhas and Somali Current Large Marine Ecosystems |
| BCLME | Benguela Current Large Marine Ecosystem |
| BMU | Beach Management Unit |
| CBD | Convention on Biological Diversity |
| CBO | Community-Based Organization |
| CCAMLR | Commission for the Conservation of Antarctic Marine Living Resources |
| CE | Critically endangered |
| CIDA | Canadian International Development Agency |
| CCA | Community Conservation Area |
| CFMA | Collaborative Fisheries Management Area |
| CHABAMCA | Changuu-Bawe Marine Conservation Area |
| CHICOP | Chumbe Island Coral Park |
| CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| CMA | Collaborative Management Area |
| CMA | Community Managed Area |
| CMP | Coastal Management Programme |
| CMS | Convention on the Conservation of Migratory Species of Wild Animals (also known as Bonn Convention) |
| CNFEREF | Centre National de Formation, d'Etudes et de Recherche en Environnement et Forestier |
| COAP | Code des Aires Protégées |
| CoCT | City of Cape Town |
| COMDEQ | Comité de Desenvolvimento das Quirimbas |
| COP | Conference of the Parties |
| CORDIO | Coastal Oceans Research and Development in the Indian Ocean |
| COS | Comité d'Orientation et de Suivi |
| COTS | Crown of thorn starfish |
| $CO_2$ | Carbon dioxide |
| CRC | Coastal Resources Centre |
| CSP | Centre de Surveillance des Pêches |
| DAF | Directorate of Agriculture and Forestry |
| DAFF | Department of Agriculture, Forestry and Fisheries |
| DCBSAP | Direction de la Conservation de la Biodiversité et du Système des Aires Protégées |
| DEA | Department of Environmental Affairs |
| DEAT | Department of Environmental Affairs and Tourism |
| DEFF | Department of Environment, Forestry and Fisheries |
| DFNR | Department of Forestry and Non-renewable Natural Resources |
| DGEF | Directorate General of Environment and Forestry |
| DHNRC | De Hoop Nature Reserve Complex |
| DMSOI | Directorate of Sea South West Indian Ocean |
| DoFD | Department of Fisheries Development |
| DoT | Department of Tourism |
| DSFA | Deep Sea Fishing Authority |
| EAC | East Africa Community |
| EACC | East African Coastal Current |

| | |
|---|---|
| EAME | Eastern Africa Marine Ecoregion |
| EBSA | Ecologically or Biologically Significant Area |
| ECC | Equatorial Counter Current |
| ECPTA | Eastern Cape Parks and Tourism Agency |
| EEZ | Exclusive Economic Zone |
| EKZNW | Ezemvelo KwaZulu-Natal Wildlife |
| EMA | Educational Marine Area |
| EN | Endangered |
| EoH | Enhancing our Heritage |
| ESIA | Environmental and Social Impact Assessment |
| EU | European Union |
| FAO | Food and Agriculture Organisation |
| FAPBM | Fondation pour les aires protégées et la biodiversité de Madagascar |
| FEC | Fond Environnemental pour les Aires Protégées des Comores |
| FMCS | Fisheries and Marine Consultancy Services |
| GBF | Global Biodiversity Framework |
| GCP | Global Conservation Programme |
| GCRMN | Global Coral Reef Monitoring Network |
| GDP | Gross Domestic Product |
| GEF | Global Environment Facility |
| GELOSE | Gestion Locale Sécurisée |
| GEMPA | Group of Experts for Marine Protected Areas |
| GIS | Geographical Information System |
| GMP | General management plan |
| GMP | Gross Marine Product |
| GN | Guidance Note |
| GR | Gear restriction |
| GRAA | Game Rangers Association of Africa |
| GRNP | Garden Route National Park |
| GRSE | Grand River South East |
| GSHHG | Global Self-consistent Hierarchical High-resolution Geography |
| HWM | High water mark |
| ICAM | integrated coastal area management |
| ICS | Island Conservation Society |
| ICZ | Integrated coastal one |
| IDC | Island Development Company |
| IDZ | Industrial Development Zone |
| IFC | International Finance Corporation |
| IHSM | Institut Halieutique et des Sciences Marines |
| IMS | the Institute of Marine Sciences (University of Dar es Salaam) |
| IOC | Indian Ocean Commission |
| IRF | International Ranger Federation |
| IUCN | World Conservation Union |
| IWP | iSimangaliso Wetland Park |
| IWPA | iSimangaliso Wetland Park Authority |
| JCBNP | Jozani Chwaka Bay National Park |
| KCA | Kiwengwa Controlled Area |
| KCDP | Kenya Coast Development Project |
| KFS | Kenya Forest Service |
| KMFRI | Kenya Marine and Fisheries Research Institute |
| KMMPA | Kisite–Mpunguti Marine Protected Area |
| KMNR | Kiunga Marine National Reserve |
| KNRC | Kogelberg Nature Reserve Complex |
| KOMCA | Kojani Marine Conservation Area |

| | |
|---|---|
| KWS | Kenya Wildlife Services |
| KZN | KwaZulu-Natal |
| LC | Least concern |
| LME | Large Marine Ecosystem |
| LMMA | Locally Managed Marine Areas |
| MAB | Man and Biosphere Reserve |
| MANRLF | Ministry of Agriculture, Natural Resources, Livestock and Fisheries |
| MARPOL | International Convention for the Prevention of Pollution from Ships |
| MASMA | Marine Science for Management programme |
| MATT | Multi-Agency Task Team |
| MBCA | Menai Bay Conservation Area |
| MBREMP | Mnazi Bay Ruvuma Estuary Marine Park |
| MCA | Marine Conservation Area |
| MCM | Marine and Coastal Management |
| MCS | Monitoring, Control and Surveillance |
| MCU | Marine Conservation Unit |
| MDG | Millennium Development Goal |
| MEC | Minister of the Executive Council |
| MEECC | Ministry of Environment, Energy and Climate Change |
| MEEF | Ministère de l'Environnement, de l'Ecologie et des Forêts |
| METT | Management Effectiveness Tracking Tool |
| MICA | Misali Island Conservation Area |
| MICOA | Ministério para a Coordenação da Acção Ambiental |
| MIMCA | Mnemba Island Marine Conservation Area |
| MIMP | Mafia Island Marine Park |
| MITADER | Ministério da Terra, Ambiente e Desenvolvimento Rural |
| MLRA | Marine Living Resource Act |
| MMA | Marine managed area |
| MMNP | Malindi Marine National Park |
| MMNPR | Mombasa Marine National Park and Reserve |
| MMPA | Mombasa Marine Protected Area |
| MMZ | Marambitsy Miahy ny Zava-Boahary |
| MNP | Marine National Park |
| MP | Management Plan |
| MPA | Marine protected area |
| MPRU | Marine Parks and Reserves Unit |
| MOU | Memorandum of Understanding |
| MRHP | Ministère des Ressources Halieutiques et des Pêches |
| MSA | Medium Scale Approach |
| MSP | Marine Spatial Planning |
| MWIOPO | Madagascar and Western Indian Ocean Programme Office |
| MWNR | Malindi–Watamu National Reserve |
| NBA | National Biodiversity Assessment |
| NCG | National Coast Guard |
| NEMC | National Environmental Management Plan |
| NEM:PAA | National Environmental Management: Protected Areas Act |
| NICEMS | National Integrated Coastal Environmental Management Strategy |
| NGO | Non-Governmental Organization |
| NMBM | Nelson Mandela Bay Municipality |
| NPNC | National Parks and Nature Conservancy |
| NOAA | US National Oceanographic and Atmospheric Administration |
| NP | National Park |
| NPAES | National Protected Areas Expansion Strategy |
| NR | National Reserve |

| | |
|---|---|
| NT | No-take |
| NT | Near threatened |
| OECM | Other effective area-based conservation measure |
| PA | Protected Area |
| PAG | Plan d'Aménagement et de Gestion |
| PECCA | Pemba Channel Conservation Area |
| PEI | Prince Edward Islands |
| PFA | Praslin Fishers Association |
| PMM | Parc Marin de Mohéli |
| PNC | Parc National Coelacanthe |
| PNM | Parc National de Mohéli |
| PNM-N | Parc National Mitsamiouli-Ndroudé |
| PNS | Parc National Shisiwani |
| PPA | Privately Protected Area |
| PSEPA | Primeiras and Segundas Environmental Protection Area |
| PSSA | Particularly Sensitive Sea Area |
| PTA | Programme de Travail Annuel |
| RAP | Rapid Assessment Program |
| RAPPAM | Rapid Assessment and Prioritization of Protected Area Management |
| REBIOMA | Réseau de la Biodiversité de Madagascar |
| RECOMAP | Regional Coastal Management Programme |
| RFMO/As | Regional Fisheries Management Organizations and Arrangements |
| RNAP | Reseau National D'aires Protegees |
| RNRC | Robberg Nature Reserve Complex |
| RNRC | Rocherpan Nature Reserve Complex |
| RoM | Republic of Mauritius |
| RSP | Regional Seas Programme |
| RSOCR | Regional State of the Coast Report |
| SAM | Strategic Adaptive Management |
| SAM | Science for Active Management. |
| SANBI | South African National Biodiversity Institute |
| SANParks | South African National Parks |
| SAPM | Système des Aires Protégées de Madagascar |
| SC | Somali Current |
| SDF | Spatial Development Framework |
| SDG | Sustainable Development Goal |
| SEAL | Somerset West Site Environmental Advisory Liaison Group |
| SEC | Southern Equatorial Current |
| SEMPA | South East Marine Protected Area |
| SeyCCAT | Seychelles Conservation and Climate Adaptation Trust |
| SFC | Shehia Fishermen's Committee |
| ShR | Shell Reserves |
| SIDS | Small Island Developing State |
| SMART | Shark-Management-Alert-in-Real-Time |
| SMSP | Seychelles Marine Spatial Planning |
| SNAP | Système National des Aires Protégées |
| SNPA | Seychelles National Parks Authority |
| SR | Special Reserve |
| SSF | Small Scale Fisheries |
| SSP | Social Safeguard Plan |
| TAAF | French Southern and Antarctic Lands |
| TACMP | Tanga Coelacanth Marine Park |
| TANAPA | Tanzania National Parks Authority |
| TBCA | Transboundary Conservation Area |

| | |
|---|---|
| TCZCDP | Tanga Coastal Zone Conservation and Development Programme |
| TFCA | Transfrontier Conservation Area |
| TGRN | transfert de gestion des ressources naturelles |
| TMNP | Table Mountain National Park |
| TNC | The Nature Conservancy |
| TPA | Temporary Protected Area |
| TPDC | Tanzania Petroleum Development Corporation |
| TRANSMAP | Transboundary networks of Marine Protected areas |
| TUMCA | Tumbatu Marine Conservation Area |
| UK | United Kingdom |
| UN | United Nations |
| UNCLOS | United Nations Convention on the Law of the Sea |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNGA | United Nations General Assembly |
| URI | University of Rhode Island |
| URT | United Republic of Tanzania |
| USA | United States of America |
| USAID | United States Agency for International Development |
| USD | United States Dollar |
| UTM | Universal Transverse Mercator |
| VFC | Village Fishing Committee |
| VLMPA | Very large marine protected areas |
| VMA | Voluntarily Managed Area |
| VMCA | Voluntary Marine Conservation Area |
| VME | Vulnerable Marine Ecosystem |
| VMS | Vessel monitoring systems |
| VU | Vulnerable |
| ZOC | Zones d'occupation controlees |
| ZNIEFF | Zone naturelle d'intérêt écologique, faunistique et floristique |
| ZUC | Zones d'utilisation controlees |
| WCMC | World Conservation Monitoring Centre |
| WCNP | West Coast National Park |
| WCPA | World Commission on Protected Areas |
| WCS | Wildlife Conservation Society |
| WDPA | World Database on Protected Areas |
| WHS | World Heritage Site |
| WIO | Western Indian Ocean |
| WIOMER | Western Indian Ocean Islands Marine Ecoregion |
| WIO-COMPAS | Western Indian Ocean Certification of Marine Protected Area Professionals |
| WIOMSA | Western Indian Ocean Marine Science Association |
| WIO-SAP | Western Indian Ocean Strategic Action Programme |
| WMA | Watamu Marine Association |
| WMS | Web Map Service |
| WMNP | Watamu Marine National Park |
| WWF | World Wildlife Fund |
| ZIPA | Zanzibar Investment Promotion Agency |
| ZNP | Zone de Non Prélèvement |
| ZOC | Zone d'occupation contrôlée |
| ZUC | Zone d'utilisation contrôlée |
| ZUD | Zone d'utilisation durable |

# **PART I:** STRUCTURE, PURPOSE, METHODOLOGY AND LIMITATIONS

Lawrence Sisitka

## STRUCTURE

The main body of this *Western Indian Ocean Marine Protected Areas Outlook* (or simply *MPA Outlook*) comprises five Parts:

**Part I: Structure, purpose, methodology and limitations**

Part I (this Part) is intended to provide the justification for the development of this *MPA Outlook*, identifying the reasons for its development and the outcomes it is intended to achieve. This part also outlines the approaches taken in the gathering of the information on MPAs in the region, and on the presentation of this information, particularly in the maps developed specifically for this publication. It concludes with a discussion on some of the challenges faced in accessing critical data in the wide-ranging contexts of MPAs in all nine countries across the region.

**Part II: Context**

Part II locates the *MPA Outlook* within the broader regional and international marine conservation context. It examines the recent history of marine conservation in terms of the global and regional initiatives which have focussed on ensuring adequate protection for marine and coastal ecosystems and species. This Part introduces some initial ideas relating to different means of protection for marine systems, and the importance of networking and connectivity between protected areas.

**Part III: Marine and coastal areas under protection**

Part III is the core of the *MPA Outlook*, where information on all existing MPAs, and areas under equivalent forms of protection, is presented in a variety of forms: text, tables and maps. This information covers aspects including location, area, habitats and species protected, and governance and management frameworks. Areas proposed for declaration as MPAs or equivalent are also included, with calculations made, where possible, of the proportion of each country's exclusive economic zone (EEZ) currently under protection and proposed for protection. Information is also presented on areas under non-formal forms of protection such as the Locally Managed Marine Areas (LMMAs) in Madagascar or the Collaborative Fishery Managed Areas (CFMAs) in Tanzania mainland.

**Part IV: MPA management effectiveness**

In recognition of the importance of effective management of all marine areas under protection a "snap-shot" assessment was made of the majority of the region's MPAs, using a scaled-down version of the internationally recognized Management Effectiveness Tracking Tool (METT). Part IV shares the outcomes of this assessment, and provides recommendations for improving management effectiveness at MPA, national and regional levels.

**Part V: Meeting the targets**

This final Part draws on the information in Parts III and IV to provide an initial analysis of the status of marine protection in the Western Indian Ocean (WIO) region. In particular it examines the progress made by each country in meeting the targets agreed under Sustainable Development Goal (SDG) 14 and Aichi Target 11. Part V also goes further to discuss the representativeness of current coverage in terms of the habitats and species currently protected, and identifying the main gaps in coverage. The different options for increasing areas under protection are identified and initial recommendations made for the strengthening of marine conservation and expansion of areas under protection.

## PURPOSE

The Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region is a partnership between governments, civil society and the private sector, working towards a prosperous WIO region with healthy rivers, coasts and oceans. It pursues this vision by providing a mechanism for regional cooperation, coordination and collaborative actions; it enables the Contracting Parties to harness resources and expertise from a wide range of stakeholders and interest groups; and in this way it helps solve inter-linked problems of the region's coastal and marine environment (UNEP/Nairobi Convention, 2010).

The Nairobi Convention, which was first signed in 1985 and entered into force in 1996, is part of UNEP's Regional Seas Programme. The programme aims to address the accelerating degradation of the world's oceans and coastal areas through the sustainable management and use of the marine and coastal environment. The Nairobi Convention does this by engaging countries that share the WIO in actions to protect their shared marine environment. The Contracting Parties (Comoros, France, Kenya, Madagascar, Republic of Mauritius, Mozambique, Seychelles, Somalia, the Republic of South Africa and the United Republic of Tanzania) to the Convention are part of more than 143 countries that participate in 18 Regional Seas initiatives (UNEP/Nairobi Convention 2010).

The Secretariat of the Convention implements its Work Program through various collaborative projects, which have tremendous impact on capacity building, management, coordination and legal aspects and maintain momentum for the implementation of the Nairobi Convention and its protocols. While the Work Programme focuses on priorities of the WIO region governments, such priorities additionally support the Contracting Parties in delivering towards relevant global commitments e.g. the 2030 Agenda on Sustainable Development.

The Nairobi Convention through its Global Environment Facility (GEF)-funded project, "*Implementation of the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities (WIO-SAP)*", which started in December 2016, is supporting Contracting Parties towards the delivery of the United Nations 2030 Sustainable Development Agenda in general and specifically Goal (SDG) 14 "*Life below Water*" with special focus on Targets 14.2 and 14.5.

Target 14.2 calls for the sustainable management and protection of marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration, to achieve healthy and productive oceans by 2020, while Target 14.5 states that by 2020, countries shall conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on best available scientific information (United Nations, 2015).

The WIO-SAP Project addresses priority conservation issues within the WIO region as agreed on by Contracting Parties through the following components:

- Component A: **Sustainable management of critical habitats** focuses on the protection, restoration and management of critical coastal habitats and ecosystems recognizing the enormous value of healthy critical coastal and marine habitats for the future well-being of people in the WIO region.
- Component B: **Improved water quality** focuses on the need for the WIO region's water quality to attain international standards by the year 2035.
- Component C: **Sustainable management of river flows** aims at promoting wise management of river basins in the region through implementation of a suite of activities aimed at building the capacity for environmental flows assessment and application.
- Component D: **Governance and regional collaboration** focuses on strengthening governance and awareness in the WIO region with a view to facilitating sustainable management of critical coastal ecosystems and habitats.

The production of the *MPA Outlook* was delivered through Component A, which was designed to respond to a number of SDG 14 and related Aichi Biodiversity Targets. The Component promotes various approaches and tools including: ecosystem restoration, management planning and implementation, marine spatial planning, ecosystem valuation and development of various supporting guidelines.

The regional *MPA Outlook* is one of the main outputs of this initiative, and together with the regional *Critical Habitats Outlook* is intended to inform policy-making with regard to enhanced coastal and marine conservation in the region. These two publications feed into a third publication on recommendations for strengthening marine conservation in the WIO region, aimed at supporting contracting parties to meet their obligations under SDG Targets 14.2 and 14.5 and Aichi Target 11, besides other SDGs.

The Nairobi Convention has for many years worked in close partnership with the Western Indian Ocean Marine Science Association (WIOMSA), which in effect has provided the scientific backing for the production of the *MPA Outlook*. WIOMSA was involved from the very inception with the development of the *MPA Outlook*, and with its strong connections across the scientific and MPA communities in the region, played a vital co-ordination and commissioning role in addition to maintaining oversight on the whole development process. Further, WIOMSA contributed financially to this initiative as it is in line with the MASMA Programme, whose main goal is "to establish and operationalise a regional science to policy platform by 2022 that generates knowledge, builds capacity, mobilises resources, and shares scientific and policy-relevant knowledge to assist the WIO region to deliver on the 2030 Agenda for oceans, islands and coasts, and climate change." Under this Programme, WIOMSA is working with the Nairobi Convention and national/regional partners to set up a baseline for at least four SDG 14 targets (including 14.2 and 14.5) and track progress over time.

The development of the *MPA Outlook* drew strongly on an earlier partnership project between the Nairobi Convention and WIOMSA, namely the production, in 2015, of the *Regional State of the Coast Report: Western Indian Ocean* (UNEP, Nairobi Convention and WIOMSA, 2015).

The specific purpose of the *MPA Outlook* is to provide a baseline assessment of existing coastal and marine conservation efforts in the region. This involves not only a quantitative assessment of the areas and habitats currently under protection, but also a qualitative assessment

of the effectiveness of the protection measures in place across the region. Areas considered to be under sufficient levels of protection for inclusion in this assessment are those which have been formally proclaimed, under appropriate legislation as MPAs, and those under forms of protection which conform to the internationally recognized criteria for Other Effective Area-based Conservation Measures (OECMs).

However, in line with the increasing emphasis on community-led conservation initiatives, the *MPA Outlook* also includes a survey of such initiatives in the region. While these may not at present provide adequate protection for inclusion in the areas deemed to be contributing to meeting the SDG targets, they are certainly making a notable contribution to coastal and marine conservation in the region. They also have considerable potential, with the right support, of becoming formally recognized as OECMs in the future, and may well form a viable foundation for increasing the coastal and marine areas under formal protection.

This *MPA Outlook* will contribute to a larger process involving the development of the *Critical Habitats Outlook* for the region, and the final Outlook volume on recommendations for the available future strategic options, including OECMs for countries to achieve the 10 percent target based on the identification of critical habitats that require protection. The *MPA Outlook* captures the spatial extent and management effectiveness of current MPAs, makes recommendations for enhanced management and also documents proposed MPAs as countries make progress towards the "10/20" target. The link between the *MPA Outlook* and the related *Critical Habitats Outlook* is that many habitats are found within these MPAs, although some, in particular the deep-sea habitats are not well represented. Understanding the degree of coverage currently afforded the region's critical habitats will help inform the recommendations for future areas to be brought under protection though the establishment of more MPAs and OECMs.

In addition to the technical purposes of this *MPA Outlook*, it is intended to document, indeed celebrate, the achievements of governments to date in furthering the conservation of their marine and coastal environments. It also provides the opportunity to encourage and motivate governments, supported by the scientific community, in increasing efforts towards long-term conservation of vital marine resources, species and ecosystems, including those in the deep-sea.

## PROCESS AND METHODOLOGIES

### Process

The *MPA Outlook* development process was initiated through a scoping workshop in Victoria, Mahé, Seychelles in June 2017 a few weeks after the conclusion of the first Ocean Conference held in New York. The objectives of this workshop were: to develop and agree on a process to conduct an overview of existing regional MPAs as part of the implementation of the SDG Target 14.5; and a regional critical habitats inventory in the context of biodiversity and existing and emerging economic activities. The workshop proposed a number of key products, which were to be developed or considered under this process (Table 1).

**Table 1: Key products as proposed in the scoping workshop.**

| PRIMARY PRODUCTS | SECONDARY PRODUCTS |
|---|---|
| – Regional Report on critical habitats.<br>– Regional Report on MPAs status & baselines.<br>– Brief syntheses on critical habitats & MPAs.<br>– A Regional Database for MPAs.<br>– A Dashboard of indicators with which states can monitor their progress in meeting the targets.<br>– Contribution to the revision of the Protocol on Protected Fauna and Flora of the Nairobi Convention.<br>– Adoption of the outcomes (products) by the countries.<br>– Contribution to the next Regional State of the Coast Report. | – Templates for national reports on SDG 14.<br>– Identification of information gaps and priority areas for research & conservation.<br>– Policy briefs and other products e.g. summary for policy makers.<br>– Setting up of a regional MPA Network including a Network of Managers.<br>– Reset/revive the Group of Experts for Marine Protected Areas (GEMPA) in the Western Indian Ocean.<br>– Report on what has made governments agree to establish MPAs and the establishment of OECMs, and to identify enabling conditions for creation of additional MPAs and OECMs.<br>– Making the case for the establishment of MPAs with success stories drawn from global experiences e.g. from South America. |

The *MPA Outlook* development and production process aims to achieve the following:

- establish an authoritative database on the most critical habitats and the biodiversity most at risk;
- review MPA coverage (size, maps, and the conservation value of the MPAs from a biodiversity and socio-ecological perspective);
- determine the management effectiveness of MPA including adaptive management processes and requirements;
- determine participating countries' future options for achieving 10 percent MPA coverage;
- communicate to countries on what they need to do to achieve the 10 percent target based on identification of critical habitats that require protection, and on the consequences of failing to meet the target; and
- be a consistent monitoring and reporting framework at national and regional levels.

Definitions and categorisations of key concepts were also agreed at the Scoping Workshop in the Seychelles (Table 2).

**Table 2: Definitions and categorisations.**

| CONCEPT | DEFINITION OR CATEGORISATION |
|---|---|
| "Ideal MPA" | One which: "*...has an existing, current management plan and an appropriate/ adequate level of resources and personnel. It is integrated in its wider environment and supported by other planning processes (catchment plan, integrated coastal zone (ICZ) plan, marine spatial planning (MSP)) and partnerships; it is part of a national/regional protected area system and ecological network; is subject to regular, rigorous (including external) assessment of management effectiveness; ensures equity in its designation and management (participation, benefits sharing, acknowledgement of local and other actors).*"<br>(Nairobi Convention and WIOMSA, 2017) |
| "Critical Habitats" | As used for the identification of IUCN Key Biodiversity Areas (KBAs):<br>"*Critical habitats provide important functions (e.g. species refugia, commercially important species, and uniqueness); they have a representativity of species, processes, functions; and they have connectivity both within the ecosystem and externally.*"<br>(IUCN, 2015)<br><br>It was agreed that the broad habitat classifications as used in the *Regional State of the Coast Report* would be the ones used in the *Outlook* series. |
| Levels of Threat | IUCN Red List of ecosystems categories:<br>• Least concern (LC)<br>• Near threatened (NT)<br>• Vulnerable (VU)<br>• Endangered (EN)<br>• Critically endangered (CE) |

Preparation of the *MPA Outlook* commenced with the selection of the editor followed by selection of the authors. The Nairobi Convention Secretariat and WIOMSA issued a "Call for Expression of Interest" to be authors of the *MPA Outlook*. Over 30 regional scientists from all the countries, except Somalia, expressed interest to be involved. Based on their CVs, their publishing and reporting record, and their availability to fully engage with the process, 17 authors were selected to develop the chapters. A further 16 authors were involved in the writing of case studies.

Following the appointment of the editor and authors for the *MPA Outlook*, a first Authors' Workshop was held in Mombasa, Kenya in January 2018 where authors presented outlines of their chapters based on the framework developed at the scoping workshop, refined and augmented by guidelines from WIOMSA and the editor. Possible topics for case studies and potential authors for these were also identified. An in-depth discussion on the approach to and content of the section on management effectiveness led to agreement on the need for a "snapshot assessment" based on the internationally recognized Management Effectiveness Tracking Tool, to be conducted by authors for each of the MPAs in their countries, who would submit the outcomes to the overall country chapter author.

A second Authors' Workshop was held in Nosy Be, Madagascar, in April 2018 in conjunction with a meeting of the Nairobi Convention Focal Points, to which the *MPA Outlook* editor and authors were invited. This workshop enabled the authors to make presentations on quite advanced versions of their chapters, followed by intense discussions on the challenges being faced and on the final shape and content of these chapters.

There were also discussions on the internal and external review (by at least two reviewers) and validation processes, which was followed up in the meeting with the Focal Points where the *MPA Outlook* development was described in detail, and their roles in the validation process explained. The key role of the Focal Points was to take the draft country chapters for validation by senior government officials in agencies mandated with MPA

management in their respective countries to ensure accuracy and political acceptability of the information being provided. It was stressed at this meeting that such validation was critical to the ultimate acceptance of the *MPA Outlook* and the subsequent associated publications by the contracting parties to the Nairobi Convention. A validation form was developed to support the national validation process and captured important aspects like correctness of proclamation dates and spatial extents for legally gazetted MPAs, protected areas description and whether management recommendations were reflective of the context on the ground in respective countries and correctness of maps, among other criteria.

The development of the product in electronic format was completed over July and August 2018 for the launch at the 9th Conference of the Parties to the Nairobi Convention, hosted by the Government of Kenya in Mombasa on 30–31 August 2018. The launch was put on hold to allow concerned countries to consult over disputed territories in the WIO.

During this intervening period, there were new developments in the region, namely the expansion of the EEZ area under protection in Seychelles and proclaiming of 20 news MPAs by the Republic of South Africa under Operation Phakisa. This necessitated review and updating of country chapters to reflect relevant respective developments.

## Methodology

The principle methodology employed in this assessment required the authors to review, record and document the current situation regarding coastal and marine conservation, primarily through the legal/official proclamation and management of MPAs (or equivalent), for each contracting party to the Nairobi Convention. These included areas designated as Fishery Reserves, or under other designations considered equivalent in protection afforded to that provided by MPAs.

The criteria for inclusion correlate with the IUCN proposed criteria for the identification of OECMs. The definition proposed by IUCN, as referenced in Aichi Biodiversity Target 11 is: "A geographically defined space, not recognised as a protected area, which is governed and managed over the long-term in ways that deliver the effective and enduring in-situ conservation of biodiversity, with associated ecosystem services and cultural and spiritual values" (CBD, 2010). This approach was agreed with all parties at the initial scoping workshop and confirmed at all subsequent meetings.

The documentation of the current situation involved accessing all available information on existing MPAs (or equivalent) in each country including location, size, habitats protected, and on governance and management structures and responsibilities. This information enabled a determination of the current percentage of national EEZs under protection for each country. The process also involved documenting areas proposed as future MPAs (or equivalent), and areas under more informal forms of protection such as CMAs, LMMAs and Voluntarily Managed Areas (VMAs) (Nairobi Convention and WIOMSA, 2017).

The authors were also required to gather information on the effectiveness of the management of each MPA and this information was collated by the specialist author tasked with producing the Management Effectiveness section (Part IV) of the *MPA Outlook*. Here an overview of the management effectiveness across the WIO was developed in order to provide as accurate a picture as possible of the real status of marine and coastal conservation in the region.

A further and vital element of the process was the gathering of accurate spatial information concerning all areas under protection. While this *MPA Outlook* includes some broad-scale maps identifying the locations of many MPAs, these do not provide sufficient spatial accuracy on which to base realistic assessments of the coastal and marine areas under protection at either a country or a regional level. The authors were therefore asked to obtain the best spatially precise maps of all the MPAs (or equivalent) in Geographic Information System (GIS) compatible formats. These were then sent to a specialist to collate and store on a dedicated database. It is from the information on this database that the final assessments of coverage of MPAs and equivalent have been made. The database will also be the repository for the critical habitat maps associated with the *Critical Habitats Outlook*.

## Data compilation and mapping methodology

Spatially referenced information on marine areas under protection were compiled from nine countries in the WIO. The data included information on formal marine protected areas under various titles, on Community Managed Areas (CMAs – also termed as Locally Managed Marine Areas (LMMAs)), and on areas that have been proposed for protection. Data came in various formats and categories. These varied from basic latitude/longitude waypoints (as with most LMMAs) and georeferenced polygons, to scanned maps and map extracts from

various reports and publications. Spatial Information on protected areas were derived from various sources, including the mandated authorities (such as government ministries), and delegated authorities (including national, regional and international NGOs), and online sources (e.g. protectedplanet.org) and the Web Map Service (WMS) server. Coral reefs and mangrove data were downloaded from the UNEP-WCMC website. The diversity of data types and format presented a challenge for compiling the data while maintaining as much information as possible, and maintaining the highest levels of accuracy.

A combination of methods was used to bring all the data into a standard and consistent format. Converting scanned images to geographical data involved onscreen digitizing, freehand feature sketching based on descriptions in existing literature, and use of other resources such as Google Earth for triangulation. Where, as in the case of many of Madagascar's LMMAs, the boundaries of a protected site were not clearly defined but the area was known, it was possible to construct polygons as round buffers, whose radius could be calculated from the area, centred on identified features within the LMMA. These polygons provide therefore indicative rather than definitive spatial images, but they can be refined in the future as more clarity emerges in relation to the precise boundaries.

Spatial data on the EEZ by country was obtained from www.marine.org website. These were projected to an equal area projection (i.e. Africa Albert system for mid-low latitudes, and Universal Transverse Mercator (UTM) for high latitudes). This was necessary for preserving the area of the features and to minimize distortion. To obtain an estimate of the amount of marine areas under protection by each country, the total area for all PAs in each country was calculated as a proportion of the total area of the EEZ. More often than not, area estimates from the MPA spatial features differed from those reported for the MPA. This may be attributable to the gazetted values not being consistent with the actual area, or due to areas being calculated using different spatial reference systems; here we used Albers Equal Area and UTM projections. The peer review process, involving the Nairobi Convention focal points, government officials, and in-country marine specialists, allowed for verification of the features and associated area figures. In the few cases where there were inconsistencies between various datasets and information from different sources, discussions were held to reach a consensus on the data and on the final area calculations.

Processed data were merged into three categories of MPA, LMMA and proposed MPA. The processed data in GIS format for each country were stored in ESRI geodatabase and uploaded onto ESRI Cloud storage hosted at Macquarie University. From these, a Web Application displaying information on marine conservation in the WIO (http://mq.maps.arcgis.com/apps/webappviewerindex.html?id=0931127e2ec14b049478acd8da33e078) and a Story Map (http://arcg.is/0DfSvz) were constructed to enhance the sharing of the information with stakeholders.

## LIMITATIONS

An undertaking on this scale and of this depth was inevitably constrained by certain limitations. These varied in degree from context to context, and country to country, but the main limitations were generally experienced across the region. These included:

- *A paucity of critical information.*
  Much of the information which could have been expected to be available, particularly concerning management planning and effectiveness, was lacking in many cases. There was also considerable divergence in the availability of information between the various sites and countries. In some cases the authors found a wealth of credible information on all aspects of the establishment and management of the MPAs, while in others there was very little available. This posed a considerable challenge in terms of providing a coherent and comparable assessment of coastal and marine conservation efforts in different areas. However, through their persistence and commitment to the process, the authors managed to obtain almost all the critical information required to establish credible baselines for their countries' conservation status.

- *Inaccessibility of information.*
  Despite the authors being provided with a supporting letter by the Nairobi Convention there was some reluctance by some organisations and individuals to release critical information. However, the great majority of organisations contacted in the process of gathering information were extremely helpful, and willingly shared all the information they had available.

- *Questionable accuracy of and conflicting data.*
  Data provided to the authors was shown in some cases to be quite unreliable, with different data sources often providing conflicting information. This applied across many areas, including basic information on location, boundaries and extent

of MPAs. Where possible authors attempted triangulation of data, but often there was only one source. The assessment is therefore based on the best possible information that the authors could obtain, with the caveat that there will undoubtedly be inaccuracies. Also, through the review and validation processes to which all chapters were subjected, it was possible to ensure, as far as possible, the credibility and accuracy of all information presented. As all information gathered by the authors is to be held on a database, there remains the potential for correcting and updating the information in the light of the emergence of new and credible data.

- *Spatial information unavailable in the required formats.* The boundaries of many MPAs, particularly those proclaimed some years ago, were never mapped accurately in any GIS compatible format. Where there were only physical indications (such as "4km west of X headland") of boundary edges or corners these were plotted with as much accuracy as possible, and the lines between these estimated. A similar process was followed where key boundary points were identified by longitude and latitude or GIS co-ordinates. The boundary estimations in such situations were also informed by any indicative maps available for the sites.

- *Some of the Contracting Parties to the Nairobi Convention have yet to resolve a number of territorial disputes.* It is clearly not the mandate of the *MPA Outlook* to address such disputes, nor attempt to reach an agreement with the countries concerned on how to deal with these situations. However, intense consultations between authors and experts at a national level resolved that each country will provide the maps of all MPAs in its territories including disputed territories, with a caveat on any disputed territory.

Despite these inevitable challenges and limitations, the development of this *MPA Outlook* provided a golden opportunity to bring together for the first time an extraordinary amount of information on the current status of coastal and marine conservation in the WIO region. Through this process, the *MPA Outlook* is able to provide a hitherto unparalleled baseline on which to build future coastal and marine conservation initiatives.

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# PART II:
# CONTEXT OF THE MPA OUTLOOK

Lawrence Sisitka

# CONTEXT

This *MPA Outlook* was not developed in isolation; rather it is embedded in, and is intended to contribute significantly to, the increasing momentum of initiatives aimed at securing the biodiversity and productivity of our coastal and marine areas. These initiatives operate from the global to the local levels, with increasing emphasis on the synergies between them as exemplified by the "think globally act locally" environmental mantra. This synergy between the global and local is also reflected in the reasons for seeking to protect and conserve our marine resources, with the first MPAs established very much as fisheries management tools with the conservation of the broader "biodiversity" often only seen as important later. Similarly with coastal communities whose primary concern is often protection of their key resources, but who also subsequently recognise the need for the conservation of the entire systems within which these resources are found.

This recognition of the critical connection between biodiversity and productivity has shifted the understanding of coastal and marine conservation into a new and exciting realm. The *MPA Outlook* was developed in full cognisance of this, and of the need to know as precisely as possible the status of our current conservation efforts in the Western Indian Ocean (WIO) region using various categories of protection as a tool to inform the most effective ways forward for improved management.

## Global context

While the need to protect marine resources has been recognised by coastal communities for centuries, with many imposing seasonal limits and other controls, often through the guise of cultural or spiritual practices, the first major global move to exercise some control over the extraction of marine resources came with the clutch of four conventions under the umbrella Geneva Convention on the Law of the Sea in 1958 (National Academy of Sciences, 2001). This followed considerable declines in catches in the world's major fisheries in the 1940s and 1950s. Then in 1962 the 1st World Conference on National Parks considered the need for protection of coastal and marine areas.

A number of MPAs were established following these events, including the first in Africa at Tsitsikamma in South Africa in 1964. This was followed shortly by the proclamation in Kenya of the Malindi and Watamu MPAs in 1968.

The 1970s saw a veritable avalanche of global initiatives concerned with marine conservation, extending into the 1990s (see Table 1). This raft of international agreements, laws and publications laid the foundation for a massive increase in marine areas under protection globally. According to Wells *et al*., (2016) in 1974 there were an estimated 125 sites on the new world list of marine parks and reserves (Björklund, 1974, in Wells *et al*., 2016), and currently, according to Protect Planet Ocean (2016) there are approximately 5000.

Fast forward to 2000 when the United Nations Millennium Summit declared the eight Millennium Development Goals (MDG) for achievement by 2015. These included Goal 7 "To Ensure Environmental Sustainability" under which Target 7B was intended to reduce biodiversity loss, achieving, by 2010 (in this case), a significant reduction in the rate of loss. This, in terms of marine conservation was to be achieved through increasing the proportion of fish stocks within safe biological limits, and the proportion of terrestrial and marine areas protected. However, no firm targets were set as to what would be considered "significant", and although good progress was made in some areas, especially in the establishment of terrestrial and to a lesser extent, marine protected areas, the proportion of fish stocks considered within safe biological limits declined over the subsequent 15 years.

According to the MDG monitor report in November 2015: "…increased exploitation of marine fisheries is threatening livelihoods, food security, economies, and ecosystems. Between 1974 and 2011, the number of marine fish stocks within safe biological limits dropped by 19 percent, from 90 percent to 71 percent. As a result, fish stocks in 2015 are below the level at which they can maximise sustainable yields. That said, some areas in Europe, Oceania, and North America have successfully rebuilt some of their over-fished stocks" (United Nations, 2015a).

The eight MDGs were replaced in 2015 by the seventeen Sustainable Development Goals (SDG) which include Goal 14 with the specific aim to "Conserve and sustainably use the oceans, seas and marine resources for sustainable development". It could be argued that having a target with such a specific marine conservation focus is an indication of the increased recognition of the importance of the marine environment. As discussed in Part I, the specific aspects of SDG 14 to which this *MPA Outlook* is responding are Targets 14.2 and 14.5. While the former does not provide quantitative targets to be achieved, the latter is very clear on the aim that "…by 2020, countries shall conserve at least 10 percent of coastal and marine areas…" (United Nations, 2015b).

Table 1: Global marine conservation initiatives.

| DATE | INITIATIVE | OUTCOME |
|---|---|---|
| 1971 | The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (known as the Ramsar Convention). | Provided a specific basis for nations to establish MPAs to protect wetlands (although not all Ramsar sites have been afforded legal protection). |
| 1972 | Convention for the Protection of the World Cultural and Natural Heritage (known as the World Heritage Convention).<br>UNEP establishes the Regional Seas Programme. | Provided a regime for protecting marine (and terrestrial) areas of global importance. |
| 1973 | 3rd United Nations Conference of the Law of the Sea. | Provided a legal basis upon which the establishment of MPAs and the conservation of marine resources could be developed for areas beyond territorial seas. |
| 1975 | The International Union for the Conservation of Nature and Natural Resources (IUCN, now the World Conservation Union) conducted a Conference on MPAs in Tokyo. | The conference report called for the establishment of a well-monitored system of MPAs representative of the world's marine ecosystems. |
| 1982 | The IUCN Commission on National Parks and Protected Areas organized a series of workshops on the creation and management of marine and coastal protected areas. | An important outcome of these workshops was publication by IUCN (1984) of *Marine and Coastal Protected Areas: A Guide for Planners and Managers* (Salm and Clark, 1984). |
| 1986 | IUCN's Commission on National Parks and Protected Areas (now World Commission on Protected Areas) created the position of vice chair (marine), with the function of accelerating the establishment and effective management of a global system of MPAs. | The world's seas were divided into 18 regions based mainly on biogeographic criteria, and by 1990, working groups were established in each region. |
| 1987–1988 | The 4th World Wilderness Congress and the 17th General Assembly of the IUCN. | Passed resolutions which adopted a statement of a primary goal; defined "marine protected area"; identified a series of specific objectives to be met in attaining the primary goal; and summarized the conditions necessary for that attainment. |
| 1994 | The United Nations Convention on the Law of the Sea (UNCLOS) and the Convention on Biological Diversity (CBD) came into force. | These two international conventions greatly increased both the obligations of nations to create MPAs in the cause of conservation of biological diversity and productivity and their rights to do so. |
| 1999 | IUCN published *Guidelines for Marine Protected Areas*. | These updated guidelines describe the approaches that had at that time been most successful globally in establishing and managing MPAs. |

Protect Planet Ocean (2016) provides a brief overview of the state of MPAs globally. The summary is as follows:

- Most MPAs are small. The mean (average) size is 544km$^2$, but this is heavily skewed by the ten largest MPAs. The median area is less than 5km$^2$.
- Marine reserves (which are generally areas, often within MPAs, afforded greater protection) tend to be even smaller. Of 124 marine reserves studied by scientists, half of them were less than 3.75km$^2$ in size.
- Scientific recommendations for minimum size of marine reserves and MPAs range from at least 3km$^2$ to 13km$^2$. Only 35–60 percent of existing MPAs meet these minimum size recommendations.
- The vast majority of MPAs are located along or close to the coast. This means that oceanic and deep-water habitats are heavily under-represented.
- Around half of the total MPA area is located in the tropics (from 30 degrees north to 30 degrees south).
- Almost 90 percent of coastal countries have less than 2 percent of their exclusive economic zone (EEZ) protected. This presents a major challenge to countries meeting marine protection targets on time.

Over this same period, a number of different, but mutually reinforcing approaches to the conservation of global marine biodiversity were initiated.

***Particularly Sensitive Sea Areas***

On 1 December 2005 at the 24th session of the International Maritime Organisation, Resolution A.982 (24) on Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas (PSSAs) was adopted (United Nations, 2015a). The original Guidelines had been adopted in 1991, with the revisions intended to "… clarify and, where appropriate, strengthen certain aspects and procedures for the identification and designation of PSSAs and the adoption of certain protective measures" (UN IMO, 2005). The primary purpose of the Guidelines was to "provide guidance to IMO member Governments in the formulation and submission of applications for designation of PSSAs" (UN IMO, 2005).

The PSSA Guidelines outline detailed ecological, socio-economic and cultural criteria, and vulnerability factors for the identification of PSSAs. They also suggest appropriate protective measures, such as designation as a Special Area under International Convention of for the Prevention of Pollution from Ships (MARPOL), listing on the World Heritage list or declaration as a Biosphere Reserve. While not mentioning MPAs specifically, they include reference to "…other measures aimed at protecting specific sea areas against environmental damage from ships, provided that they have an identified legal basis" (*ibid.*). At the time of writing of this *MPA Outlook*, no PSSAs had been designated in the WIO, although there are almost certainly areas which would meet the criteria for such designation, and this may provide another avenue for ensuring protection of marine species and ecosystems in the region.

***Vulnerable Marine Ecosystems***

The Vulnerable Marine Ecosystem (VME) approach was formalised in 2005 by the United Nations General Assembly (UNGA), with Resolution 61/105 on Sustainable Fisheries adopted in 2006. This approach has been led by the UN Food and Agriculture Organisation (FAO), and focuses on deep-sea fisheries in areas beyond national jurisdiction (ABNJs). Following the adoption of the resolution, the FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas were developed. These have the stated aim "…to ensure long-term conservation and sustainable use of marine living resources in the deep sea and to prevent significant adverse impacts on vulnerable marine ecosystems (VMEs)" (United Nations Food and Agriculture Organisation, 2009).

The FAO Guidelines identify criteria for the identification of VMEs, and "…set out a framework for data collection, assessments and monitoring, control, and surveillance. All management measures taken by States or Regional Fisheries Management Organizations and Arrangements (RFMO/As) should be in compliance with other international instruments for the management of deep-sea fisheries, be based on the precautionary approach, and the ecosystem approach to fisheries." Both the precautionary and the ecosystem approaches are common to all global initiatives concerned with the protection of marine biodiversity.

***Ecologically or Biologically Significant Areas***

A programme for the identification of Ecologically or Biologically Significant Areas (EBSAs) was launched at the COP 9 of the CBD in 2008. The scientific criteria to be applied in the identification of these areas were defined as:

1. Uniqueness or Rarity.
2. Special importance for life history stages of species.
3. Importance for threatened, endangered or declining species and/or habitats.
4. Vulnerability, Fragility, Sensitivity, or Slow recovery.
5. Biological Productivity.
6. Biological Diversity.
7. Naturalness.

At COP 10 in 2010 the scientific focus for identification of EBSAs was reinforced, with the recognition that "… areas found to meet the criteria may require enhanced conservation and management measures, and that this can be achieved through a variety of means, including marine protected areas". Further the COP "… emphasised that the identification of EBSAs and the selection of conservation and management measures is a matter for States and competent intergovernmental organizations, in accordance with international law, including the UN Convention on the Law of the Sea". COP 10 also expanded the understanding of the scientific approach to "… integrate the traditional, scientific, technical, and technological knowledge of indigenous and local communities" (United Nations, 2015a). A number of areas in the WIO, including the Mozambique Channel; the Walters Shoals on the southern part of the Madagascar Ridge; the Saya de Malha Bank; the Mahe, Alphonse and Amirantes Plateau; and the Prince Edward Islands, Del Cano Rise and Crozet Islands, have been identified by the CBD as meeting the EBSA criteria (https://www.cbd.int/ebsa/).

***Large Marine Ecosystems***

The world's coastal waters have been divided into 64 Large Marine Ecosystems (LMEs), following an initiative by the University of Rhode Island and the US National Oceanographic and Atmospheric Administration (NOAA) some 30 years ago (NOAA, 2015). These LMEs, three of which (the Somali Current LME, the Agulhas Current

**Low tide shellfish harvesting in Kenya.** © Peter Chadwick

LME and the Arabian Sea LME) fall within the broader WIO region, are responsible for 95 percent of the productivity of the world's oceans. As such they have been the focus of many global marine conservation initiatives, and from 2008 to 2013 the WIO was home to the Agulhas and Somali Current LME (ASCLME) Project, in which all Nairobi Convention contracting parties were involved. A partner project to the ASCLME was the WIO-LaB (Addressing Land Based Activities in the Western Indian Ocean) project, involving many WIO countries in partnership with the Norwegian government, UNEP and the Global Environment Facility (GEF). This was the precursor to the WIO-SAP programme under which this *MPA Outlook* was produced.

This *MPA Outlook* was developed to support the contracting parties to the Nairobi Convention to move towards meeting their SDG targets through a variety of measures, in particular the proclamation of MPAs by capitalising on opportunities to increase respective national MPA spatial extents to 10 percent of coastal and marine areas by 2020. Beyond spatial expansion, improved management is expected to be a key outcome of this initiative including adoption of relevant planning tools e.g. marine spatial planning.

## Regional context

Developed out of the UNEP Regional Seas Programme (1972), the Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region was signed in 1985 and came into force in 1996. The Convention was amended and adopted in April, 2010. The Nairobi Convention area extends from Somalia in the north to the Republic of South Africa in the south, covering ten States, five of which are island States in the WIO and five mainland States. The Contracting Parties are Comoros, France, Kenya, Madagascar, Republic of Mauritius, Mozambique, Seychelles, Somalia, United Republic of Tanzania (URT) and the Republic of South Africa (UNEP-Nairobi Convention, 2010).

The Nairobi Convention has facilitated the production of a number of valuable assessments of the status of coastal and marine conservation in the region, including, among many others:

- 1999 – *Western Indian Ocean Environment Outlook* (UNEP, 1999)
- 2002 – *Assessment of the Eastern Africa Coastal and Marine Environment* (UNEP/Nairobi Convention, 2002)
- 2005 – Section on WIO MPAs in the *Toolkit for Marine Protected Areas in the Western Indian Ocean* (IUCN, 2005)
- 2012 – *Status of birds in the marine and coastal environment of the Nairobi Convention area: Regional Synthesis report* (UNEP/Nairobi Convention, 2012)
- 2015 – *Regional State of the Coast Report Western Indian Ocean* (UNEP, Nairobi Convention and WIOMSA, 2015)

A key partner in many of these assessments has been the Western Indian Ocean Marine Science Association (WIOMSA). WIOMSA has long taken a particular interest in MPAs, especially in relation to developing the capacity of MPA personnel. It has approached this, in addition to facilitating considerable bodies of research

into MPA issues, through both the development of a MPA Management Training Course, first run in Isimangaliso Wetland Park, South Africa in 2004, and instituting a professional certification programme for MPA professionals, WIO-COMPAS, launched in 2008.

## Regional initiatives

MPAs are a relatively new phenomenon in the WIO region with the first being proclaimed in 1964 at Tsitsikamma in South Africa. The establishment of MPAs, while a laudable achievement in itself, is just the starting point, and we need to ensure that they are effectively managed. Fortunately, to that end, there have, over the past 40 years, been a number of initiatives focussing on the conservation of the WIO's marine biodiversity, with many of these emanating from the Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region, developed by the Nairobi Convention in 1985.

This protocol committed contracting parties to taking "… all appropriate measures to maintain essential ecological processes and life support systems, to preserve genetic diversity, and to ensure the sustainable utilization of harvested natural resources under their jurisdiction. In particular, the Contracting Parties shall endeavour to protect and preserve rare or fragile ecosystems as well as rare, depleted, threatened or endangered species of wild fauna and flora and their habitats in the Eastern African region" (UNEP-Nairobi Convention, 1985). This was to be effected through the development of national conservation strategies, co-ordinated within the framework of regional conservation activities (*ibid.*). Two of the most wide-ranging and longest-running initiatives in this regard were Eastern Africa Marine Ecoregion (EAME) and Western Indian Ocean Islands Marine Ecoregion (WIOMER).

***Eastern Africa Marine Ecoregion (EAME)***

This initiative was launched in 2003 by the World Wildlife Fund (WWF) as part of their Global Conservation Programme (GCP). EAME involved a large number of partners from within and outside the region and focused on strengthening the conservation and governance of priority areas within the coastal belt of mainland WIO countries.

The EAME process led to the identification of 21 coastal areas of global, eco-regional and sub-regional importance (WWF-EAME, 2004). Of these, eight were classified as being globally important seascapes with seven considered important at the eco-region level. The sites ranked under the global and eco-regional importance were:

Globally important:

- Lamu Archipelago, Kenya
- Tana River Delta, Kenya
- Rufiji-Mafia Complex, URT mainland
- Mtwara-Quirimbas, URT mainland-Mozambique (Transboundary)
- Zambezi Delta System, Mozambique
- Bazaruto Archipelago, Mozambique
- Maputo Bay - Machangulo Complex, Mozambique
- Greater St. Lucia Wetlands, South Africa

Eco-regionally important:

- Mida Creek-Malindi, Kenya
- Msambweni-Tanga, Kenya-URT mainland (Transboundary)
- Pemba Island, URT Zanzibar
- Unguja Island, URT Zanzibar
- Latham Island, URT mainland
- Nacala-Mossuril, Mozambique
- Ilhas Primeiras e Segundas, Mozambique

***TRANSMAP***

Starting in 2005, the European Union-funded research project TRANSMAP (Transboundary networks of marine protected areas for integrated conservation and sustainable development: biophysical, socio-economic and governance assessment in East Africa) developed a scientific basis for the creation of transboundary protected sites.

The transboundary case study areas constitute important biogeographical units with unique character, identified through and building upon the EAME process (above) as priority areas. These were the boundary area between South Africa and Mozambique which comprises the Greater St. Lucia Wetland Park World Heritage Site, an important centre of marine turtle nesting and also bearing the southern-most coral reefs in the world, and the boundary between Mozambique and the URT, which houses some of the most impressive coral reefs of the WIO.

The project focused on the definition of type, size and location of single reserves, which together, and irrespective of political borders, can maintain ecological functions, sustainable resource-uses and expected future socio-economic development. The final products were options for zonation plans that regulate activities and resource use in the two distinct biogeographical units: one subtropical and one tropical, as described above, which together encompass a significant proportion of the biogeographical range of the Eastern African coastal and marine environment.

***Western Indian Ocean Islands Marine Ecoregion (WIOMER)***

This initiative was launched under the IOC in June 2006, and led by the WWF Madagascar and Western Indian Ocean Programme Office (MWIOPO), with the purpose of developing a strategy for conserving marine ecosystems and fisheries in the WIOMER. It involved Madagascar, Comoros, Republic of Mauritius, Seychelles and France, and included a strong research element looking *inter alia* at the region's biodiversity, habitats, species, oceanography, productivity and marine protected areas.

This research provided the baseline information for the development of a Vision involving:

- at least 30 percent of all coasts benefitting from effective community-based fisheries management;
- a network of coastal and shallow water marine protected areas including at least 10 percent of all habitat types established and effectively managed; and
- diverse and productive pelagic ecosystems sustained through effective fisheries management.

WIOMER also identified 51 priority seascapes and sites, and seven regional initiatives which fed into the regional strategy (WWF MWIOPO, 2011).

## Previous assessments of marine protected areas in the region

A number of assessments of the status of MPAs in the region have been conducted over the past 25 years, starting in 1995 with the presentation of a paper entitled "Overview of MPAs in the Western Indian Ocean", to the IUCN Commission on National Parks and Protected Areas African Regional Working Session at Kruger National Park, South Africa (Salm, 1995). This set the benchmark for subsequent assessments, including in 2002 the publication of "*Marine Protected Areas in the Eastern African Region: How successful are they?*" (Francis *et al*., 2002), which examined issues of governance and management of MPAs in the eastern African Region, with a focus on Comoros, Kenya, Madagascar, Republic of Mauritius, Mozambique, the Seychelles and Tanzania (*ibid*.). A further study of MPA governance: "*Governance of Marine Protected Areas in East Africa: A Comparative Study of Mozambique, South Africa, and Tanzania*", was carried out in 2010 (Chircop *et al*., 2010).

A common thread running through these studies was the vulnerability of MPAs in terms of limited financing options and capacity for effective management. A global study of MPAs: "*Building the future of MPAs – lessons from history*" (Wells *et al*., 2016), which drew considerably on the experiences in the WIO region, recognised the changing role of MPAs, from their initial emphasis on fisheries management to encompassing the conservation of ecosystems, itself requiring a more networked approach to MPA management, and indeed the possible reconfiguration of MPAs to serve this purpose more effectively. The study also highlighted the need for ongoing, rigorous monitoring programmes to assess the effectiveness of the management of MPAs, and where possible to enable documentation of "success stories" (*ibid*.).

## Status of marine and coastal resources in the WIO region

All the research and assessments conducted on the status of the coastal and marine resources of the region paint a similar picture; one of increasing pressures on these resources, many of which are in serious decline. The causes are varied, ranging from growing coastal populations (some 65 percent of Madagascar's 26 million citizens live in coastal areas), increasing coastal development, offshore oil and gas, mineral exploitation, and climate change (see Case Study on forecasting coral bleaching, opposite). One of the critical challenges faced by governments across the region is the achievement of a sustainable balance between meeting the demand for economic development, and the need for conservation of the natural resources.

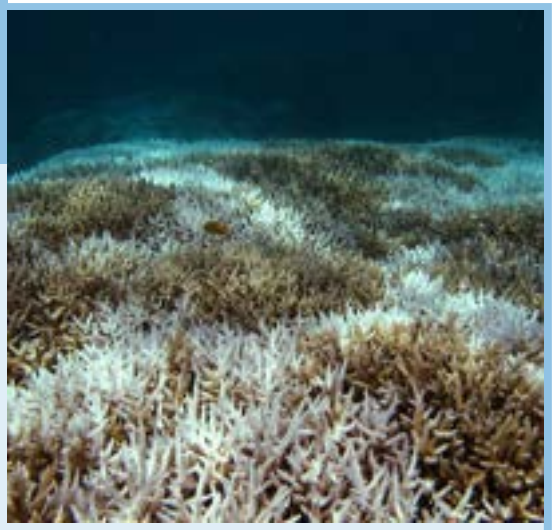
The tensions between these imperatives are particularly evident in the increasing interest shown by different countries in the notion of a "Blue Economy", as epitomised by the Seychelles Marine Spatial Plan developed to frame blue economy activities, and the "Operation Phakisa" blue economy initiative in South Africa. In both situations there is on one hand the desire to maximise the economic benefits from the resources within and under the oceans, and on the other a recognition of the obligations to conserve the coastal and marine environments.

MPAs, as discussed above, have come to be seen as a vital tool for the conservation of natural resources, however, they can also be seen as an impediment to economic development. Both the Seychelles Marine Spatial Plan, with its proposal for a massive increase in areas under protection, and the locations of the 20 newly-proclaimed offshore MPAs, under Operation Phakisa in South Africa, have been developed in full cognisance of these tensions, and recognition of the inevitable compromises inherent in any attempt to increase the area of our oceans under protection.

CASE STUDY

# Forecasting coral bleaching events to improve management of coral reef MPAs

David Obura



**A field of partially bleached staghorn *Acropora*. Colour varies from normal (brown) to bleached (white).** © David Obura

Climate change is an overarching threat to marine ecosystem health and functioning throughout the western Indian Ocean (WIO) region. Coral reefs provide a salient case study of climate impacts and vulnerability. The monitoring of bleaching impacts, and of reef health and resilience to climate change, has been a strong research focus since the first major bleaching of corals in the region in 1998 (McClanahan *et al.*, 2015).

One key challenge is for reef managers and policy makers to understand the dynamics of a coral bleaching event; while local actions can do little to reduce the impact of a bleaching event, communicating with stakeholders builds confidence and engagement (Obura *et al.*, 2006).

To this end, building on global coral bleaching forecasting products prepared by the Coral Reef Watch programme (http://coralreefwatch.noaa.gov/satellite/), a regional coral bleaching alert system has been in operation since 2009 (http://cordioea.net/coral-bleaching/io-coral-bleaching-alert/). The goal is to build capacity in coral reef management systems in preparedness for bleaching events. This includes communicating with stakeholders to share knowledge and strengthen preparedness for the events, monitoring and communicating on them in real time, and implementing actions to improve recovery rates and reduce vulnerability.

The regional forecast is implemented by CORDIO East Africa between January and May each year, targeting the entire WIO region, with outreach to peripheral regions. The forecast is shared with coral reef and MPA practitioners, scientists and policy makers through an email list, and through a website. The impact of a forecast system such as this is hard to monitor (WWRP/WGNE 2017), although feedback from recipients is positive, particularly from MPA and field-project managers. In 2016, during the 3rd global bleaching event, when it became clear that bleaching in the WIO could be severe, the combined efforts of the bleaching forecast and Indian Ocean Commission-supported regional reporting on coral reef health led to an unprecedented 699 observations on the presence and degree, or absence of coral bleaching. These were captured via an online reporting form developed for that purpose (Gudka *et al.*, 2019). It is hoped that this greater focus on the bleaching event will translate into improved management and conservation of coral reefs, and better preparedness for future events.

Forecasts are validated through in situ observations that confirm (or not) their predictions. One challenge to this process is the difficulty of obtaining reports of no bleaching, rather than just confirmations of bleaching. Ensuring the accuracy and reliability of reports from observers is also a challenge. The 2016 bleaching event helped to improve reporting, but further effort is needed to strengthen the process and for it to be incorporated in regional and national climate forecasting services. With the increased threat to reefs from higher temperatures that are certain in coming decades, further investment in improving and institutionalizing this system should be a priority.

## FORMS OF PROTECTION

Protection of the marine resources across the region is afforded in many ways; primarily through the formal legal proclamation of MPAs, but also, and increasingly, through the establishment of Locally Managed Marine Areas (LMMAs), in some countries known as Voluntary Managed Areas (VMAs). LMMAs are essentially areas of coastal waters recognised by local fishing communities as being in need of protection, or containing resources that are under threat of over-exploitation. These communities often partner with non-governmental organisations (NGOs) and others including government departments to develop and enforce rules and regulations for resource use within the areas. There are now over 200 LMMAs in Madagascar alone, with increasing numbers being established in Kenya and Tanzania in particular.

Other Effective Conservation Measures (OECMs), such as Fishery Reserves, also provide considerable protection to the entire marine ecosystem within their boundaries. Indeed many MPAs were essentially established as fishery protection zones, notably in the Republic of Mauritius, where all the earlier MPAs were proclaimed under fisheries legislation. The driving imperative behind the proclamation of many MPAs was in fact the protection of vulnerable fish stocks, with the recognition of their value to broader marine biodiversity only coming later. Less comprehensive protection is also provided by temporary or seasonal fishery closures, often arranged at the local level.

**Vegetated sand dunes, Ponta do Ouro (Mozambique) – Kosi Bay (South Africa) proposed transboundary MPA.**
© Marcos Pereira

## MAKING THE CASE: EXISTING CONNECTIVITY & NETWORKING

Marine conservation in the region, as elsewhere, is primarily conducted as a national competence, under various national laws, and indeed many MPAs within countries are managed as individual, unconnected entities. However there is increasing recognition of the essential transboundary nature of marine ecosystems and associated biodiversity, and therefore of the major benefits of increased connectivity between sites and between countries, and the need for stronger networking between governments and conservation agencies. Perhaps the best and strongest example of such networking in the WIO region in the interest of greater ecological and political connectivity has been the ASCLME project, described in the Global context section above. The evolution of the WIO-SAP programme from the regional WIO-LaB project is further evidence of the effectiveness of such a regional approach.

There is also currently one proposed transboundary MPA under negotiation in the region. Kenya and Tanzania are working towards the collaborative management of a MPA encompassing several MPAs between Diani in southern Kenya and Tanga City in northern URT mainland. This is one example of work in progress, with others are already established, e.g. the Lubombo Transfrontier Conservation Area (TFCA). There is clearly considerable potential for the exploration of more transboundary and collaboratively managed MPAs in the WIO region, and indeed for looking at innovative ways of increasing connectivity and networking between states. In particular it will be vital to establish strong collaborations for ensuring marine conservation in the high seas beyond national jurisdictions. The Nairobi Convention contracting parties are already very well connected and networked which holds great promise for the future of marine conservation in the region.

This is the context in which the *MPA Outlook*, with its aim of providing a comprehensive baseline of the current status of MPAs in the region, is located. From this baseline it is then intended, as discussed in Part I, to provide pragmatic recommendations for increasing the MPA and other protective measure coverage in the region as countries work towards their 10 percent by 2020 target.

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# **PART III:**
# MARINE & COASTAL AREAS UNDER PROTECTION

MARINE & COASTAL AREAS
UNDER PROTECTION

# COMOROS

Housseni Houssoyni

**Sustainable exploitation of resources in Nioumachoua islets, Mwali Island, Comoros.** © Hendrik Sauvignet

# COUNTRY OVERVIEW

The Comoros Archipelago is located at the northern entrance of the Mozambique Channel, extending from latitude 11°20'S to 13°14'S and longitude 43°11'E to 45°19'E, approximately mid-way between East Africa and Madagascar (Figure 1). It consists of four islands: Ngazidja (Grande Comore), Ndzouani (Anjouan), Mwali (Mohéli) and Maoré (Mayotte).[1] The first three belong to the Union of the Comoros, while the last is under French administration. The exclusive economic zone (EEZ) of the Comoros is not defined, as the boundaries between Madagascar and the Comoros have not yet been clarified.

The total population of the three Comoros islands under the administration of the Union of Comoros, is approximately 790 000 inhabitants (World Bank, 2016), with a growth of 2.49 percent (UNDP, 2003) and a density of 300 inhabitants per square kilometre (*ibid.*). In many of the national reports it had been estimated that by 2015 this population would reach a density of 402 inhabitants per square kilometre.

## The Islands of Comoros

All four islands of the Comoros Archipelago come from the same volcanic hot spot, currently occupied by Ngazidja, where Karthala is still a very active volcano. Maoré is the oldest island, followed by Mwali and Ndzouani. The older the islands, the more their landscape is fragmented by erosion and the more coral ecosystem is present. Thus Maoré contains the largest lagoon in the Indian Ocean while the reef formations of the Ngazidja are still embryonic. The four islands of the archipelago are described as follows:

***Ngazidja (Grande Comore)***
The largest island of the Archipelago by surface area at 1025km$^2$, being 65km in length and between 15km and 30km in width. It has a population density of 240 inhabitants per square kilometre, and is the main island of the Archipelago. In the new strategy for the expansion of protected areas in the Comoros, three sites on Ngazidja are identified as potential protected areas, including two marine areas (the Coelacanth National Park and the Mitsamihouli Ndroude National Park) and one terrestrial area (the Karthala National Park).

***Ndzouani (Anjouan)***
The second largest island of the Archipelago, with an area of 424km$^2$. It is also the densest island with 517 inhabitants per square kilometre. In the new protected area expansion strategy, two sites to be protected are identified for Ndzouani: a marine protected area (Shisiwani National Park-Bimbini) and a terrestrial area (Mount Ntringui National Park-Ntringui).

***Maoré (Mayotte)***
With an area of 374km$^2$, it is the third in size and oldest island of the Archipelago with a topography softened through erosion over the centuries. It has remained under French administration since the proclamation of the independence of the Comoros Islands on 6 July 1975. The entire lagoon of Mayotte and its EEZ were classified by decree of the French government on 18 January 2010 as a Marine Natural Park. Covering 68 800km$^2$, it is one of the largest marine protected areas (MPAs) in the Indian Ocean (see chapter French Territories for more details).

***Mwali (Mohéli)***
The smallest island in the Archipelago, with a land surface area of 211km$^2$ and a density of 99 inhabitants per square kilometre. It is on Mwali that the first MPA of the Archipelago was created (in 2001) with an area of 404km$^2$. The former Mohéli Marine Park has seen the integration of its terrestrial component as a protected area to become the current Mohéli National Park with a total area coverage of 449km$^2$ (Decree No. 15-188/PR, dated 27/11/2015).

## Key legislation relating to marine conservation and protection or equivalent proclamation

The Government of the Union of the Comoros has a new law No. 18-005/AU of 05 December 2018, on the Comoros National System of Protected Areas, adopted by the National Assembly and promulgated by presidential decree No. 19-129/PR of 26 November 2019. The protected areas of the Comoros are currently governed by this law. Replacing the framework law on the environment (LCE Law No. 007/AF 1994, rev. 1995, consolidated 1999), this new law defines the types of protected areas (national park and nature reserve), the justification (exceptional interest from the aesthetic, scientific, ecological or cultural points of view), and the formalization process. It also defines the requirements for the creation of decrees (specifying the content of the decree: objectives, delimitation, establishment of a managed peripheral zone, the management plan of the protected area which must be designed primarily for the "maintenance of traditional

[1] The Comorian Government wishes to reiterate that Mayotte is part and parcel of its territory as per resolutions by the United Nations and the African Union.

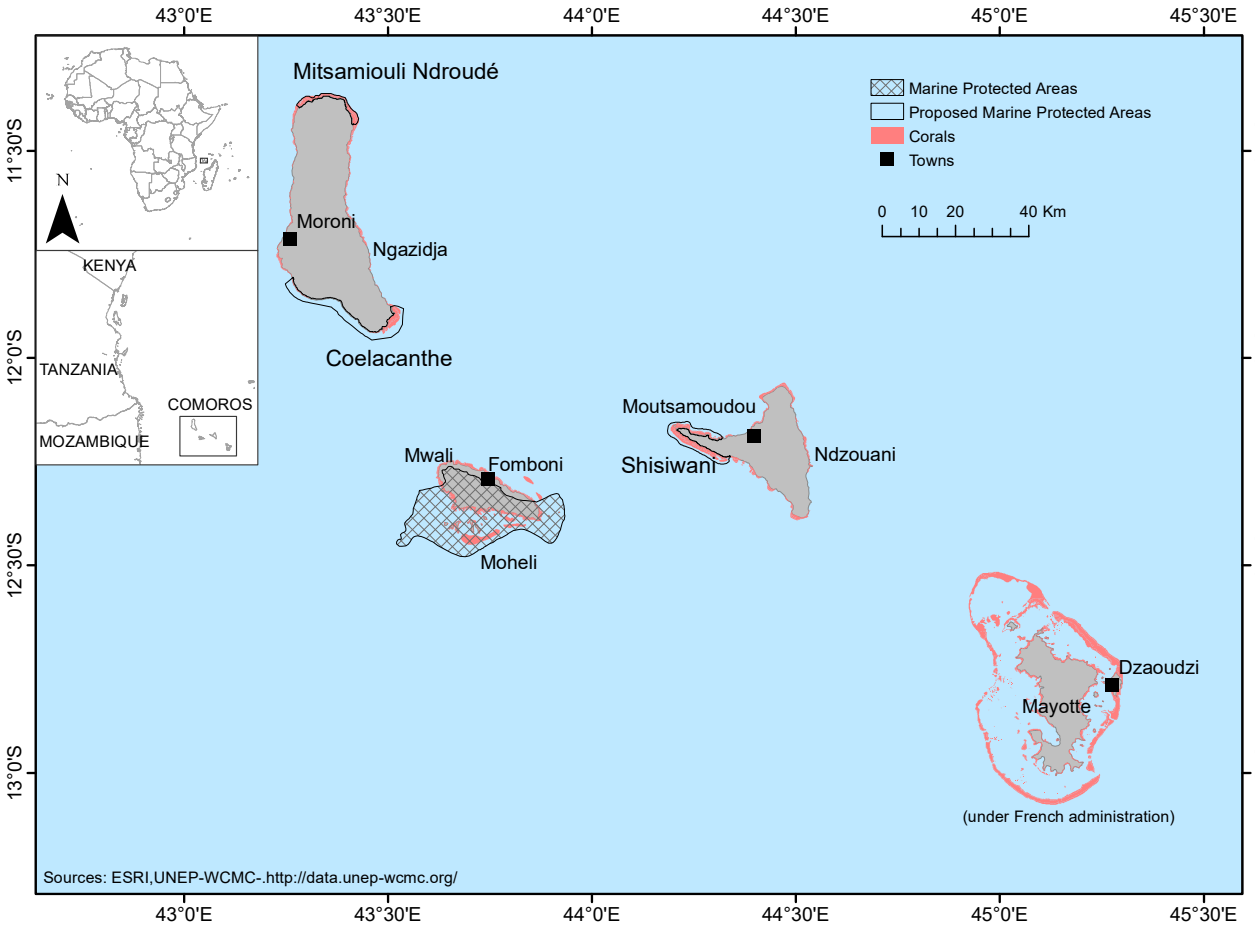


Figure 1: The Comoros Archipelago, showing the three main islands that comprise the Union of the Comoros, with the existing MPA and the proposed MPAs.

land use" which is compatible with the objectives of the establishment of the protected area and the responsibilities and obligations of populations related to protection) and the procedures and conditions for decommissioning.

## Key marine habitats

According to Marex (2016) the main key habitats of the Comoros National Parks are:

- corals and other reefs;
- mangrove;
- beaches;
- the Vailleu Bank;
- pelagic marine area with volcanic shoals and underwater volcanic caves (the habitat of the coelacanth and of other little known species);
- coastal zone with volcanic cliffs extending to considerable depth (a coelacanth habitat when fresh water resurges at depths between 100–500m);
- seagrass beds;
- coastal forests or dry forest zone;
- islets.

## Key marine (or marine dependent) species

According to Marex (2016) the main species of the Comoros National Parks are:

- green turtle (*Chelonia mydas*);
- hawksbill turtle (*Eretmochelys imbricata*);
- the entire biocoenosis of coral reefs including fish and corals, especially groupers and reef sharks;
- sharks;
- cetaceans (dolphins, whales, including Comoros protected species);
- octopus;
- *Turbo marmoratus* (Green turban, a Comoros protected species);
- *Charonia tritonis* (Giant triton, a Comoros protected species).

And, more specifically *Stylophora pistillata* (uncommon in the Comoros region); *Acropora roseni* (almost endemic to the region); Long-nosed lime fish (*Oxymonacanthus longirostris*, status: threatened); Napoleon wrasse (*Cheilinus undulatus*, status: threatened); Black-saddled coral grouper

**Coastal scene at Mwali Island, Comoros.** © Jean Harris

or Mérou sellé (*Plectropomus laevis*, status: threatened); and the coelacanth (*Latimeria chalumnae*). Important seabirds include the Masked Booby (*Sula dactylatra*); a colony of Brown Noddy (*Anous stolidus*); a colony of Frigate birds (both *Fregata ariel* and *Fregata minor*); White-tailed tropicbird (*Phaeton lepturus*); and several species of terns.

## MPA OVERVIEW

The Union of the Comoros declared its first marine protected area in 2001, and this subsequently became Mohéli National Park at the end of 2015, which remains the only official MPA in the Comoros to date. Through sustained efforts, this national park now conserves Mwali's marine and terrestrial biodiversity and serves as an example for the other islands. For the last several years, successive governments have worked to set up new protected areas, and establish an autonomous management agency, with an environmental fund to run the protected areas, and training to strengthen the capacities of the institution's staff. Since 2016, the Government of the Comoros has made it a priority to establish five new national parks and an autonomous agency in charge of the management of these protected areas.

The benefits expected from the classification of the five new sites as protected areas, the five as National Parks, namely: Karthala, Coelacanth, Mitsamiouli-Ndroudé, Mount Ntringui and Shisiwani, are cited as being not only in terms of the protection of biological species, but also on the basis of a community-based approach for sustainable ecological and economic development. The support of local communities remains one of the main pillars for the sustainable management of protected areas in the Comoros (PA Expansion Strategy, 2017).

### Number of formally proclaimed and recognised MPAs

At present the only recognized and formal marine protected area of the Union of the Comoros is the Marine Park of Mohéli (or Parc Marin de Mohéli, PMM), the first protected area of the Comoros (Figure 1). It was created in April 2001 (decree No. 01-053/CE) within the framework of the UNDP-GEF "Conservation of Biodiversity and Sustainable Development in the Comoros" project. The Decree 15/178/PR of 21 November 2015 repealed the Decree No. 01053/CE and added a terrestrial area for the protection of the island's ridge forests to the marine park. The Mohéli Marine Park (or Parc National de Mohéli, PMM) officially became the Mohéli National Park (PNM) at the end of November 2015 (Table 1). This will be integrated into the National Network of Protected Areas by another decree that will repeal the 2015 decree.

Table 1: Mohéli National Park.

| Parc National de Mohéli (Moheli National Park) | |
|---|---|
| TYPE | Coastal and pelagic |
| PROCLAMATION<br>LEGISLATION<br>DATE | Created by Decree No. 01-053/CE of the Head of State, on 19 April 2001, under the name of Marine Park of Mohéli (Parc Marin de Mohéli, PMM), and amended by Decree No. 15-188/PR of 27/11/2015, under the name of Mohéli National Park (Parc National de Mohéli, PNM) |
| LOCATION | The Mohéli National Park is located in the southeastern part of the island (12°23'S, 43°47'E) in the Comoros Archipelago |
| LEGISLATIVE AUTHORITY | Union of the Comoros |
| EXTENT | Zones:<br>– marine: 366.75km$^2$<br>– coast/Islets: 37.25km$^2$<br>– land: 45.22km$^2$<br>– total: 449.22km$^2$ |
| HABITATS | – seagrass beds<br>– several coral facies<br>– mangroves<br>– islets<br>– beaches<br>– deep sea<br>– natural forest |
| SPECIES | – large shells<br>– sea cucumbers (holothurians)<br>– sharks<br>– green turtle (*Chelonia mydas*), threatened<br>– hawksbill turtle (*Eretmochelys imbricata*), threatened<br>– dugong (*Dugong dugon*)<br>– cetaceans, especially whales, including Humpback whale (*Megaptera novaeangliae*)<br>– Brown noddy (*Anous stolidus*)<br>– frigate birds (*Fregata ariel* and *Fregata minor*)<br>– White-tailed tropicbird (*Phaeton lepturus*)<br>– several tern species<br>– Livingstone's fruit bat (*Pteropus livingstonii*) |
| CONNECTIONS WITH OTHER PROTECTED AREAS | The PNM has the character of being both a marine and a land park. The terrestrial boundaries of the originally marine park of Mohéli, extend from the coastline to the ridgeline of the watersheds on the southern coast, and include the high forest and dry forest on the eastern part of the island. |
| INSTITUTIONAL FRAMEWORK | Under the administrative supervision of the Ministry in charge of the Environment in the Union of the Comoros. The Ministry in charge of the environment through the Directorate General of Environment and Forestry has delegated the management of the national park to the park management, mandated to implement the Management Committee's decisions.<br><br>The governance of the PNM remains a mode of governance based on a participatory co-management approach. |

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|---|---|
| COMMUNITY INVOLVEMENT | The PNM is coordinated by a co-management committee that represents the village communities. Routine activities are supervised by an Executive Director (Curator) and carried out by a technical team composed of mission officers, rangers and eco-guards recruited from the local communities.<br><br>The Directorate General of Environment and Forestry (DGEF) and other government departments as well as local communities contribute to the smooth running of the park's activities. The Management Committee may also seek advice from scientists. The members are appointed for three years and they carry out their duties on a voluntary basis.<br><br>The Management Committee meets at least once a year. Decisions are taken by majority vote. The Management Committee also reviews reports prepared by the Executive Director (Curator) in collaboration with the local communities. These include:<br>– activity report for the previous year<br>– programme of activities for the following year<br>– financial report and provisional budget<br><br>The Management Committee may also address other issues related to the management and operation of the park. Among other things, it considers proposals submitted by the village representatives, and it also approves and revises the park's development programme, prepared by the Executive Director and his team in consultation with the local communities, as required. |
| PLANNING FRAMEWORK | There exists a 2012–2017 Management and Development Plan (or *Plan d'Aménagement et de Gestion*, PAG) specifically for the marine park, but now that the park has become a National Park, there is currently no updated PAG. Each year the park management draws up the annual programme of activities (or *Programme de Travail Annuel*, or PTA) adjusted on a quarterly basis through an implementation and intervention calendar for the various stakeholders concerned. |
| RISKS/THREATS | Damage to beaches<br>– the exploitation of coastal materials (beach sand, pebbles, beach rock, gravel and river sediments) creates a risk to the conservation of the coastal zone and species dependent thereon. These are very destructive activities and studies show that between 1950 and 1998, the loss of beaches amounted to 4.69km$^2$, or 54% of Mwali's beaches. The studies carried out showed doubling of the removal rate from 6000m$^3$/year to 12 000m$^3$/year in 1998 and 2003, respectively<br>Sea turtle egg collection<br>– one of the major problems in the park is the collection of sea turtle eggs, despite regulations and monitoring. These practices are said to have developed to compensate for the decline in reef fish resources; some fishers resort to turtle poaching or egg harvesting as complements to income-generating activities<br>Sea turtle poaching<br>– the PNM has 45 sea turtle nesting beaches<br>Removal of shells<br>– either for the supply of mother-of-pearl, or as souvenirs for tourists, such removal is reported but poorly documented. Those shells are: Triton (*Charonia tritonis*), Turbos (*Turbo marmoratus*), Casques (*Cypraecassis rufa, Cassis cornuta*), Seven fingers or Spider conch (*Lambis* sp.), Black coral (*Anthipathes* sp.)<br>Removal of mangrove wood<br>– the need for firewood for domestic use or for production activities (ylang-ylang distillation) in the PNM was estimated at 9000m$^3$ per year in 2003 (PAG of PMM 2012–2017)<br>Dugong poaching<br>Trampling of corals<br>– foot fishing on low tide plains (octopuses, fish, shells) leads to the destruction of corals through trampling or turning over the colonies<br>Household waste pollution<br>Clay sedimentation<br>– loss of vegetation cover in the park's forest zone causes muddy waters to silt up the park's coastal environment |

| | |
|---|---|
| SITE SPECIFIC MANAGEMENT OBJECTIVES | The overall objective for the management of the PNM is to "ensure the biodiversity conservation and to contribute to the development and the improvement of the living conditions of the population while being in harmony with the environmental context which surrounds it, extending its vision to the whole island in order to be labelled as a Biosphere Reserve".<br><br>This overall objective implies several more specific elements:<br>– to conserve the entire PNM biodiversity (ecosystems, species, genetic variability)<br>– to maintain connectivity between the different habitats to allow for the genetic exchanges necessary for the stability of species populations<br>– to maintain ecological services<br>– to ensure biodiversity conservation by involving the surrounding population in the natural resources rational management while contributing to the improvement of their standard of living and conserving their cultural heritage, and ensure the sustainable development of the areas surrounding the MPA in the context of classification as a Biosphere Reserve |
| ZONATION | The marine component of the PNM comprises three distinct zones:<br>Marine Park<br>– outside the reserve areas, the Marine Park corresponds to a general multiple-use protection zone, in which certain restrictions on activities apply. The ten villages involved must work in a coordinated manner.<br>Marine Reserves<br>– there are ten Marine Reserves which occupy 5.5% of the Marine Park surface area (former delimitation), with one reserve per village, in which protection is strict: only ecotourism and research activities are authorised. These reserves comprise 45 sea turtle nesting beaches (*Chelonia mydas*), two islets on which nest thousands of birds: Brown noddy (*Anous stolidus*), Sooty terns (*Sterna fuscata*) and Red-footed and Masked boobies (*Sula sula* and *S. dactylatra*), beneath which lies one of the largest shark dens in the Indian Ocean. Eight tourist islands of great aesthetic and floral value also make the richness of the reserves (Ben Mohadji and Paris, 1999)<br>Peripheral area<br>– this zone includes the terrestrial component of the park. It encompasses the watersheds up to the ridge. In this area is Lake Boundouni (Ramsar site), the largest freshwater body in the Comoros, where several hundred migratory birds nest |
| MANAGEMENT CHALLENGES | Since the end of the project that set up the original marine protected area in 2003, the current park management has faced a number of challenges, summarised by the PMM 2017 PAG, as follows:<br>– lack of funding to effectively manage its biological diversity<br>– lack of qualified personnel to ensure its proper operation<br>– lack of materials and equipment for the implementation of its activities<br>– a heavy reliance on the capacity of the village associations<br>– the need to strengthen its legal framework (creation decree and implementing legal texts)<br>– the requirement for government support to resume its operations<br><br>Within the framework of the National Network of Protected Areas project, the Comoros Government wishes to set up an Environment Trust Fund (or *Fond Environnemental pour les Aires Protégées des Comores*, FEC) which will have to finance all six protected areas in the Comoros. |
| MANAGEMENT OPPORTUNITIES | To ensure the sustainability of the PNM the following are required:<br>– prioritising implementation of National Park Management<br>– mobilization of financial resources for the management and proper running of the Park<br>– promotion of ecotourism, to help local communities diversify their activities<br>– co-operation with research and other institutions |

**Aboard the RV *Angra Pequena* preparing equipment for surveys around Nzouani, Comoros.** © Jean Harris

## Proposed MPAs

The PNM, with the marine component originally established in 2001 and the terrestrial component extended in 2015, remains the only recognized and official national park in the Comoros. When the PNM was established, the Comoros had planned the creation of at least one terrestrial protected area and one marine protected area on each of the islands. In order to conserve its globally important terrestrial and marine biodiversity, the Union of the Comoros is currently in the process of developing an extensive and functional National Protected Areas System (*Système National des Aires Protégées*, SNAP), which is representative of the country's rich biodiversity and offers prospects for a sustainable future.

One challenge, but also an opportunity, is the fact that biodiversity in the Comoros is strongly affected by human activity. In response to this, the Union of the Comoros has a strategic vision that by 2021, the protected area system will rationally manage 25 percent of the national territory on the basis of a community-based approach for sustainable ecological and economic development. Five protected areas, in addition to the PNM, will be created by 2021 with the support of the communities and managed by a functional agency with an improvement in the standard of living of the populations adjoining the protected areas.

Three of these areas currently being created will be marine protected areas, namely the Coelacanth National Park (Table 2), the Mitsamiouli-Ndroudé National Park (Table 3) and the Shisiwani National Park (Table 4). These proposed MPAs are shown in Figure 1.

The other two proposed protected areas will be exclusively terrestrial and together these five new areas in the Comoros, in addition to the Mohéli National Park (PNM), will belong to the future Comoros National Parks (*Parcs Nationaux des Comores*), which will be the managing authority and whose purpose is to administer and manage the SNAP, ensuring the achievement of the objectives for which they were created.

The parks will have the same management objectives, types of governance, and legal and institutional framework. They will be established and managed according to the legislation of the Union of the Comoros and, for the first five years, will be subject to a universally applied monitoring and evaluation programme.

Table 2. Parc National Coelacanthe (Coelacanth National Park), Ngazidja.

| Parc National Coelacanthe | |
|---|---|
| TYPE | Combination of coastal and pelagic |
| DATE | The process to establish all the Comoros National Parks is underway, and expected to be completed by the end of 2021. The park will be proclaimed under the new law No. 18-005/AU of 05 December 2018, on the Comoros National System of Protected Areas adopted by the National Assembly and promulgated by presidential decree No. 19-129/PR of 26 November 2019. |
| LOCATION | The PNC is located to the south of the island, with the following geographical coordinates: latitude 11°48'00"S and 11°57'00"S and longitude 43°14'30"E and 43°32'00"E. |
| EXTENT | Zones<br>– marine: 84.15km$^2$<br>– coast/Islets: 8.61 km$^2$<br>– land: none<br>– total 92.76km$^2$ |
| HABITATS | – reefs and corals including the Vailleu Bank<br>– pelagic marine area<br>– coastal zone<br>– particular volcanic cliffs<br>– beaches |
| SPECIES | – corals<br>– *Turbo marmoratus* (protected species of the Comoros)<br>– *Charonia tritonis* (protected species of the Comoros)<br>– sea Cucumbers (holothurians - protected species of the Comoros)<br>– octopus<br>– lobster<br>– coelacanth<br>– fish species (particularly those associated with the coral habitats)<br>– sharks<br>– green turtle<br>– cetaceans: dolphins, whales |
| INSTITUTIONAL FRAMEWORK | Article 3 of the new law No. 18-005/AU of 05 December 2018 stipulates that Protected Areas in the public land or maritime domain, are under the jurisdiction of the State, represented by the ministry in charge of protected areas.<br><br>Currently, the five protected areas being created in the Comoros come under the authority of the Ministry in Charge of the Environment. But once it will be gazetted by its implementing decree, the Comoros National Parks Agency will be mandated by the Ministry in Charge of the Environment to manage the national parks on the basis of a participatory co-management approach for the sustainable ecological and economic development of the site.<br><br>Protected areas are part of the National Protected Areas System (or the SNAP) and are managed by a single agency. |
| COMMUNITY INVOLVEMENT | The National Parks are co-managed with the local village communities who have the responsibility to be representative, taking into account social and gender equity. |
| RISKS/THREATS | Despite a significant biological richness in terms of the number of species that have been identified, the reef ecosystem as a whole is highly disturbed, both by human pressures and climate change (recurrent coral bleaching phenomenon). According to the study by Marex (2016), the coelacanth area is faced with a number of different threats:<br>– habitat modification<br>– climate change<br>– invasive species<br>– resource over-exploitation<br>– water pollution<br><br>In the PNC, the greatest threat to Vailleu Bank is overfishing and illegal fishing, particularly with dynamite. It was once a unique diving site. Dynamite fishing has seriously damaged the ecosystem. |

| | |
|---|---|
| SITE SPECIFIC MANAGEMENT OBJECTIVES | The strategic objectives of the National Park:<br>– the National Park is created by 2018 with the support of the communities and is managed by the Comoros National Parks Agency<br>– the park contributes to an improvement in the standard of living of the surrounding populations |
| ZONATION | The PNC is made up of the following priority conservation zones and several differentiated-use zones:<br>– marine zones (sanctuaries) of ecological importance afforded complete protection. All activities, entries and movements are restricted and strictly regulated. Marine no-take areas are the priority conservation areas identified by scientists<br>– the sandy beaches and mangroves are coastal no-take areas. Marine no-take zones do not yet exist. Priority conservation areas identified by scientists could gradually become no-take areas in some cases. Another proposal would be to have alternating marine no-take zones. For example, for five years no fishing is carried out north of the village concerned and for the next five years no fishing is carried out south of that village, and so on, which allows for the rebuilding of the fish stock and prevents the disappearance of target species<br>– priority Marine Conservation Areas are scientifically identified areas and should gradually become no-take zones. However, in order to remain realistic, the first step will be to inform fishers and the wider population about these areas (marine, beaches and mangroves) and to gradually establish protection to avoid any social shock<br>– buffer zones are spaces in which activities are regulated to ensure better protection of the no-take zones and guarantee the purpose of each component<br><br>The other zones are: Controlled Occupation Zones (or *zones d'occupation contrôlées*, ZOC) designating land areas located within the PNC and inhabited by populations prior to its creation. These are the villages and their immediate surroundings. The Sustainable Use Zone (or zone d'utilisation durable, ZUD) is an area of land-based economic development where the sustainable use of resources and production activities are regulated and controlled. The marine ZUD covers the entire marine area and excludes ZNPs (*Zones de Non Prélèvement*) where they are defined. |
| MANAGEMENT CHALLENGES | The PNC faces several management challenges, namely:<br>– requiring adequate dedicated funds<br>– requiring a sound legal and regulatory framework<br>– securing the buy-in of the local communities and stakeholders<br>– ensuring the adaptive and sustainable management of the national park |
| MANAGEMENT OPPORTUNITIES | The Comoros National Parks are managed through the following legal and institutional instruments:<br>– 2018 Law on Protected Areas and its implementing decrees (in progress)<br>– the decree establishing the park and any amendments thereto (in progress)<br>– an approved development and management plan<br>– the Environmental Management and Social Safeguard Plan (PGESS)<br>– the Board of Directors of Comoros National Parks<br>– the Comoros National Parks Advisory Committee<br>– the Scientific Committee of Comoros National Parks<br>– the annual external audit of Comoros National Parks<br>– support from the Environmental Fund for the Protected Areas of the Comoros<br>– training support from the University of the Comoros and other institutions<br>– an approved multi-year work plan (with its business plan)<br>– a validated annual work plan, with detailed training plan and monitoring plan<br>– a quarterly validated annual monitoring plan<br>– systematic weekly meetings of the entire staff at all levels<br>– an annual retreat for the entire staff (one to three days)<br>– staff rotation whenever possible<br>– regular staff visits to other parks<br>– annual review of the organizational chart<br>– annual confidential written evaluation of the entire staff |

Table 3. Parc National Mitsamiouli-Ndroudé (Mitsamiouli-Ndroudé National Park), Ngazidja.

| Parc National Mitsamiouli-Ndroudé | |
|---|---|
| TYPE | Combination of coastal and pelagic |
| DATE | By 2021 |
| LOCATION | The Parc National Mitsamiouli-Ndroudé (PNM-N) is located at latitude 11°21'30"S and 11°26'30"S and longitude 43°16'00"E and 43°26'00"E |
| EXTENT | Zones<br>– marine: 18.57 km$^2$<br>– coast/Islets: 4.57 km$^2$<br>– land: none<br>– total: 23.14km$^2$ |
| HABITATS | According to Marex (2016) there are five main marine habitats in the National Park:<br>– outer reef slopes<br>– reef plains<br>– seagrass meadows<br>– basins in the reef plains<br>– basalt slopes |
| SPECIES | The key species in the NPM-N are:<br>– green turtle (Chelonia mydas)<br>– hawksbill turtle (Eretmochelys imbricata)<br>– the entire biocenosis of coral reefs including fish and corals; sharks<br>– cetaceans (dolphins, whales, protected species of the Comoros)<br>– *Turbo marmoratus* (protected species of the Comoros)<br>– *Charonia tritonis* (protected species of the Comoros)<br>– sea cucumbers (holothurians, protected species of the Comoros)<br><br>And more specifically the five following species:<br>– napoleon wrasse *Cheilinus undulatus* (IUCN status, threatened)<br>– *Mérou sellé* (Saddle Grouper) Plectropomus laevis (IUCN status, threatened)<br>– *Mérou patate* (Potato Grouper) Epinephelus tukula (rare at the regional level)<br>– Black teatfish *Holothuria nobilis* (IUCN status, threatened)<br>– the staghorn coral *Acropora roseni* (IUCN status, threatened) |
| INSTITUTIONAL FRAMEWORK | See PNC, same authority |
| RISKS/THREATS | The main risks and threats to the PNM-N are:<br><u>Habitat modification</u><br>– the negative effects of climate change and human pressures, and overexploitation of resources are the main causes of habitat modification<br><u>Climate change</u><br>– rising sea level and coral bleaching<br><u>Invasive species</u><br>– invasion by introduced plants is currently the main threat to the sustainability of indigenous island ecosystems. Invasive alien species have serious effects on the floristic composition, and the structure and the functioning of island ecosystems. Pioneer, pantropical, anthropogenic species introduced for industrial exploitation exist on the study sites. Fruit, medicinal, ornamental species and food or vegetable crops are also found in the environments studied<br><u>Over-exploitation of resources</u><br>– the growing demand for fisheries resources is leading to the over-exploitation of these resources. Owing to a lack of effective control, coral fish such as the parrotfish, for example, are highly coveted by residents and restaurants owners<br><u>Water pollution</u><br>– water is polluted by run-off that carry particles of eroded clay and waste from the towns and villages<br><u>Turtle poaching</u><br>– beaches in the park area that were once marine turtle nesting beaches are no longer so. Turtles are systematically poached (killed and their meat sold) on beaches and even in the open water with the use of gill nets and spear guns. |

| | |
|---|---|
| | Beach destruction<br>– the mining of coastal materials (beach sand, pebbles, stones, gravel, and river sediments) poses a threat to the conservation of the coastal zone and species dependent thereon. The direct impacts are:<br>· disappearance of some turtle nesting beaches<br>· pressure on coastal infrastructure (houses fall into the sea)<br>· increased coastal erosion; destruction of the natural and landscape heritage<br>· loss of tourist potential<br>– beaches are theoretically state property and extraction is prohibited, but national legislation is neither respected nor controlled, giving free rein to the exploitation of a free and easily accessible resource, notably by truck owners; on the island of Ngazidja there is good quality sand being crushed by companies selling building materials;<br>Destructive fishing<br>– many forms of fishing currently practised in the national park represent a serious threat. These are mainly net fishing, explosives (dynamite) fishing, and fishing using the poison from Tephrosia spp. These forms of fishing have almost completely destroyed the coral cover of the area, destroying all the biological potential of the zone. The complete cessation of these forms of fishing will be a significant indicator of good management of the PNM-N<br>Pressure on marine resources (excluding fish)<br>– removal of certain shellfish either for the supply of mother-of-pearl or as souvenirs for tourists is reported but poorly documented<br>Trampling<br>– foot fishing on the low tide plains (for octopus, fish, shellfish) remain very common in the area and leads to the destruction of corals through trampling or turning over the fish colonies<br>Water pollution<br>– several biological indicators of poor water quality have been noted, mainly in the village of Mitsamiouli: localized proliferation of cyanobacteria, seagrass meadows heavily parasitized by epiphytes, fish with skin infections, etc. Improving wastewater treatment is a priority in this area |
| SITE SPECIFIC MANAGEMENT OBJECTIVES | See PNC; the same objectives for the period 2017–2021 |
| ZONATION | There are currently five priority conservation areas identified by scientists in the PNM-N, which could eventually become no-take zones. |
| MANAGEMENT CHALLENGES | See PNC. |
| MANAGEMENT OPPORTUNITIES | See PNC. |

**Table 4. Parc National Shisiwani (Shisiwani National Park), Anjouan.**

| **Parc National Shisiwani** | |
|---|---|
| TYPE | Combination of coastal and pelagic |
| DATE | The process to establish the Parc National Shisiwani (PNS) is underway, and expected to be completed by the end of 2021. The National Park will be proclaimed under the above-mentioned new law No. 18-005/AU of 05 December 2018, on the Comoros National System of Protected Areas adopted by the National Assembly and promulgated by presidential decree No. 19-129/PR of 26 November 2019. |
| LOCATION | The PNS is located at the extreme west of Ndzuwani Island (Anjouan) with the following geographical coordinates: latitude 12°09'30"S and 12°15'30"S and longitude 44°12'00"E and 44°20'00"E. |
| EXTENT | Zones<br>– marine: 65.0km$^2$<br>– coast/Islets: none<br>– land: very small 200m-wide strip of coastal land<br>– total: 65.0km$^2$ |
| HABITATS | Several classes of coastal habitats have been identified on this site. Among the main marine habitats are:<br>– outer reef slopes<br>– reef plains<br>– seagrass meadows<br>– enclosed lagoons<br>– mangroves |

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|---|---|
| SPECIES | The key species of the PNS are:<br>– green turtle (*Chelonia mydas*)<br>– hawksbill turtle (*Eretmochelys imbricata*)<br>– the entire biocoenosis of coral reefs including fish and corals, especially groupers and reef sharks<br>– sharks<br>– cetaceans (dolphins, whales) protected species of the Comoros<br>– octopus<br><br>And more specifically:<br>– *Stylophora pistillata* (an uncommon coral in the Comoros region)<br>– *Acropora roseni* (almost endemic to the Comoros region)<br>– orange-spotted filefish, *Oxymonacanthus longirostris* (IUCN status, threatened)<br>– *Mérou sellé* (Black-saddle grouper) *Plectropomus laevis* (IUCN status, threatened) |
| CONNECTIONS WITH OTHER PROTECTED AREAS | The PNS is the first MPA in Ndzouani. It has no direct link with a terrestrial protected area, the Mount Ntringui National Park being located in another part of the island. |
| INSTITUTIONAL FRAMEWORK | See PNC, same authority for the five parks in the Comoros. |
| RISKS/THREATS | The main threats identified in relation to the PNS are:<br><u>Habitat modification</u><br>– the negative effects of climate change and human pressures, and over-exploitation of resources are the main causes of habitat modification<br><u>Climate change</u><br>– rising sea level and coral bleaching<br><u>Invasive species</u><br>– invasion by introduced plants is currently the main threat to the sustainability of indigenous island ecosystems. Invasive alien species have serious effects on the floristic composition, and the structure and the functioning of island ecosystems. Ruderal, pantropical, anthropogenic species introduced for industrial exploitation exist on the study sites. Fruit, medicinal, ornamental species and food or vegetable crops are also found in the environments studied<br><u>Over-exploitation of resources</u><br>– the growing demand for fisheries resources is leading to the over-exploitation of these resources. Owing to a lack of effective control, coral fish such as the parrotfish, for example, are highly coveted by residents and restaurateurs<br><u>Water pollution</u><br>– water is polluted by run-off that carry particles of eroded clay and waste from the towns and villages<br><u>Sea turtle poaching</u><br>– the National Park area has eight beaches that were once sea turtle nesting beaches. Today, it is very rare for anybody to observe egg-laying even on beaches farthest from human habitations such as those on the Saddle Islet. Turtles are systematically poached (killed and their meat sold) on beaches and even in the open water with the use of gillnets and spearguns. Moreover, the Shisiwani fishers are also known to be poachers of marine turtles in the PNM. The sale of turtle meat is regular and abundant in Bimbini<br><u>Sea turtle egg collection</u><br>– one of the major problems in the park is the collection of sea turtle eggs. These practices are said to have developed to compensate for the decline in reef fish resources, some fishers resorting to turtle poaching or egg harvesting as an activity and income supplement. Such egg collection is a serious threat that has led to turtles not using the beaches for laying eggs. A beach with a high turtle birth rate is also a guarantee of the presence of carnivorous fish in coastal waters and of regular tourism<br><u>Beach destruction</u><br>– the mining of coastal materials (beach sand, pebbles, stones, gravel, and river sediments) poses a threat to the conservation of the coastal zone and species dependent thereon. The direct impacts are:<br>· disappearance of some turtle nesting beaches<br>· pressure on coastal infrastructure (houses fall into the sea)<br>· increased coastal erosion; destruction of the natural and landscape heritage<br>· loss of tourist potential<br>– beaches are theoretically state property and extraction is prohibited, but national legislation is neither respected nor controlled, giving free rein to the exploitation of a free and easily accessible resource, notably by truck owners. The lack of alternative building materials is a brake on compliance with legislation<br><u>Removal of mangrove wood</u><br>– there is almost no need for firewood for domestic use or for production activities (ylang-ylang distillation) in the National Park. Overall, mangroves are little exploited. Trees are used for firewood, construction timber for traditional huts and canoe outriggers |

| | |
|---|---|
| | Destructive fishing practices<br>– the forms of fishing practised in the national park represent a serious threat. These are mainly net fishing (200 nets in the area in 2011, more than 500 in Bimbini nowadays), explosives fishing and fishing using the poison from Tephrosia spp. These forms of fishing have almost completely destroyed the coral cover of the area, severely compromising the biological potential of the zone. The complete cessation of these forms of fishing will be a significant indicator of good management of the PNS<br>Pressure on marine resources (excluding fish)<br>– removal of certain shellfish either for the supply of mother-of-pearl or as souvenirs for tourists is reported but poorly documented<br>Trampling<br>– foot fishing on low tide plains (octopus, fish, shellfish) remains very common in the area and leads to the destruction of corals through trampling or turning over the fish colonies. It is practised by fishers but also by women, children, and young people for whom it is a stage in their learning of fishing practices. Particular attention must be paid to this practice, which endangers the integrity of the reef, in order to achieve acceptable management conditions<br>Household waste pollution<br>– at present, although levels of such pollution is relatively low there is an issue with the absence of household and other macro-waste management systems, and of wastewater treatment and of septic tanks or latrines. The risks of accidental oil pollution are also not negligible because of the significant number of oil tankers passing through the Mozambique Channel off the Comorian coast. Waste is dumped directly onto the beaches, and lands in the mangroves, considerably slowing down their growth<br>Damage to seagrass beds and reefs<br>– this is primarily the result of increases in water turbidity and over-sedimentation linked to soil runoff resulting from deforestation and land clearance. |
| SITE SPECIFIC MANAGEMENT OBJECTIVES | See PNC Park, same objectives for the period 2017–2021. |
| ZONATION | The PNS is made up of four no-take zones and several differentiated-use zones.<br>The national park no-take zones are marine zones of ecological interest in which all activities, entries and movements are restricted and strictly regulated. Sanctuaries are included within the marine component.<br><br>The sandy beaches and mangroves are coastal no-take zones. Marine no-take zones do not yet exist. Priority marine conservation areas are scientifically identified with the intention of them eventually becoming no-take zones. Buffer zones are spaces in which activities are regulated to ensure better protection of the no-take zones and guarantee the purpose of each component.<br><br>These include:<br>– controlled Occupation Zones (ZOC) designating coastal areas located within the national park and inhabited by populations prior to its creation. These are the villages, the village fields and their immediate surroundings<br>– controlled-use zone (ZUC) marks the regulated fishing area on the marine part<br>– the marine ZUD covers the entire marine area and excludes ZNPs where they are defined, either on an alternating basis or the priority conservation areas identified by scientists |
| MANAGEMENT CHALLENGES | Management action to promote the maintenance of biotopes and ecosystems:<br><br>The themes on which the management of the PNS will focus include:<br>– abolition of the most destructive poaching and fishing techniques, including<br>· night capture of turtles in the open sea and on beaches<br>· fishing with nets hung on the reefs;<br>· fishing with mosquito nets<br>– the halting of sand removal from beaches<br>– improvement of water quality<br>– improvement of the resilience of the reefs by reducing sedimentation from coastal erosion<br>– monitoring and control of potentially invasive species<br>– development of the exploitation of new resources<br>– implementation of ecosystem restoration actions<br><br>Four specific objectives are proposed in the Marex (2016) study as part of the recommendations for development related to the restoration of reef ecosystems:<br>– restore degraded natural habitats<br>– support and strengthen biological exchanges between habitats<br>– facilitate access to certain natural resources with still high exploitation potential<br>– increase the production of certain currently over-exploited resources |
| MANAGEMENT OPPORTUNITIES | See PNC, the same management opportunities. |

## Total area currently under protection and proposed for protection

The current situation indicates that only a small proportion of Comoro's potential EEZ is under protection, and even with the addition of the three proposed MPAs the area under protection will still be a very proportion of the potential EEZ (Table 5).

**Table 5: Comoros EEZ under protection and proposed for protection.**

| | |
|---|---|
| Comoros' EEZ | Not defined* |
| EXISTING MPAs | |
| No. of MPAs | 1 |
| MPA area | 449.22km$^2$ |
| % EEZ | Unknown |
| PROPOSED MPAs | |
| No. of proposed MPAs | 3 |
| Proposed MPA area | 180.9km$^2$ |
| Potential % EEZ | Unknown |

* The Comorian EEZ is not defined because there are discussions between Comoros and Madagascar, the delimitation includes the Comorian island of Mayotte which remains under French administration.

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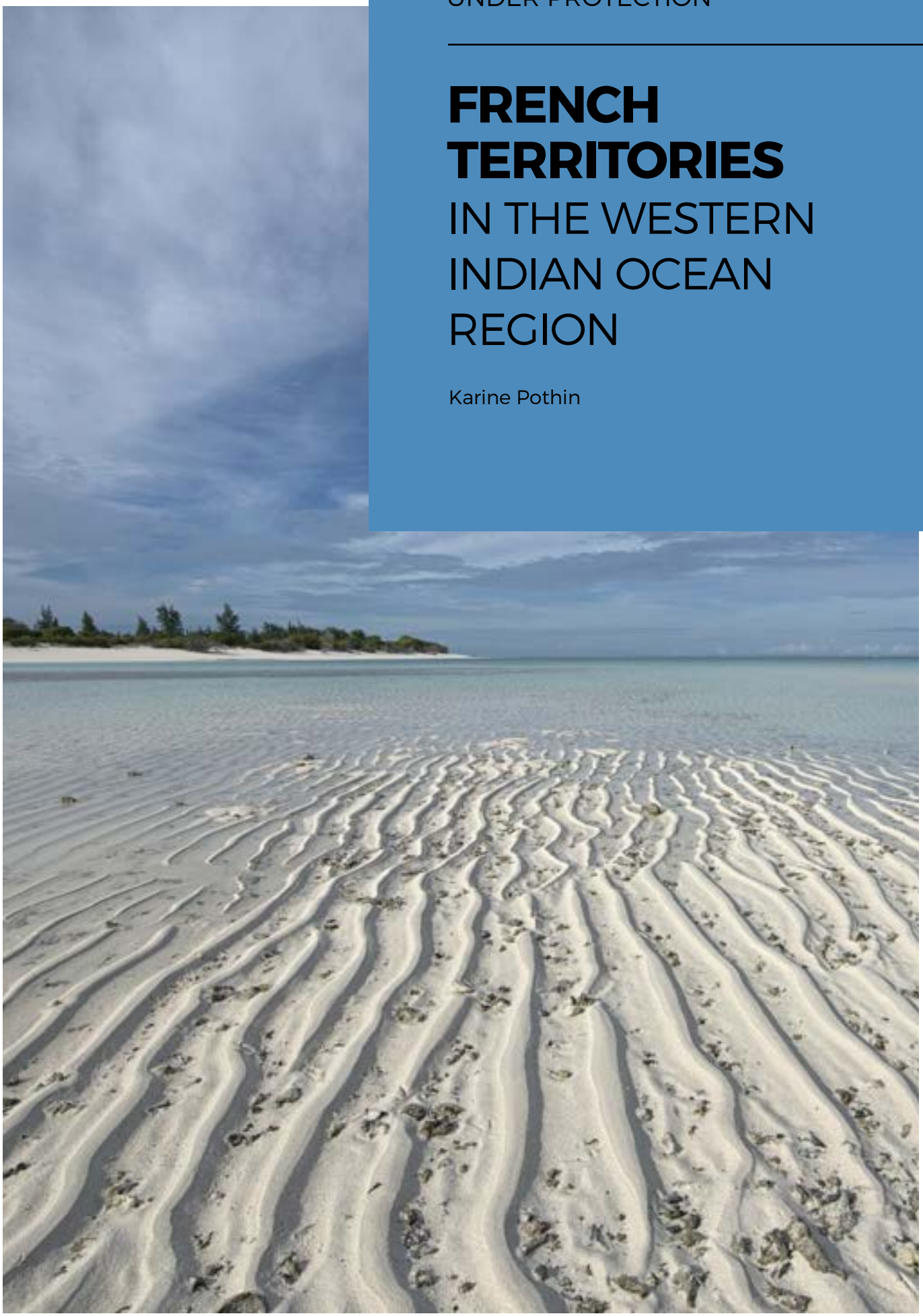
MARINE & COASTAL AREAS
UNDER PROTECTION

# FRENCH TERRITORIES IN THE WESTERN INDIAN OCEAN REGION

Karine Pothin



The lagoon of Grande Glorieuse, a Marine Nature Park. © Bruno Marie

# COUNTRY OVERVIEW

## French territories

In the Western Indian Ocean (WIO), three French territories exist: La Réunion, Mayotte and îles Éparses (Table 1).

**Table 1: French territories in the Western Indian Ocean and areas of land, coral reefs and Economic Exclusive Zone.**

| NAME OF FRENCH TERRITORY | LAND ($km^2$) | LAGOON ($km^2$) | EEZ ($km^2$) |
|---|---|---|---|
| La Réunion | 2512 | 15 | 311 426 |
| Mayotte | 374 | 1500 | 63 176 |
| Îles Éparses (Glorieuses, Tromelin*, Bassas da India, Juan de Nova, Europa)<br><br>* Tromelin is subject to a disputed claim between France and Mauritius. | 42.5 | 752 | 634 853 |

Source: Andréfouët *et al.*, 2009; TAAF, 2018.

**A school of Yellow goatfish over a fringing coral reef at La Réunion.** © Matthew D. Richmond

***La Réunion***

La Réunion (previously *Île Bourbon*) is a department and region of France in the Indian Ocean, east of Madagascar and 175km southwest of Mauritius. The exclusive economic zone (EEZ) covers 311 426$km^2$. The varied terrain and micro-climates of the 2512$km^2$ island create a high diversity of terrestrial habitats and species. The island has been a French "Department" since 1946. The population has grown almost fourfold from 227 000 in 1976 to 850 996 in 2016 due to improved medical facilities and high birth rates.

Marine habitats include coral reefs, and both rocky and sandy geological formations, the later two with poorly-known biological communities. The relative youth of the island, estimated at 3 million years (Smietana, 2011), means that coral reefs are poorly developed, particularly in the east where there is still an active volcano. The main reef development is on the western side of the island. Here, the fringing reef has a total length of 26.5km, and an area of 18.5$km^2$ (Nicet *et al.*, 2016). Reef structures in La Réunion are divided into coral communities growing directly on the volcanic rock, reef platforms where the reef flat extends from the shoreline, and fringing reefs (the most mature reefs on the island). The fringing reef, estimated to be 8500 years old (Montaggioni, 1978) is divided into four complexes: Saint-Gilles/la Saline, Saint-Leu, Etang-Salé and Saint-Pierre. Seagrass beds are rare, and mangroves are totally absent (Obura *et al.*, 2017).

***Mayotte***

Mayotte (French: *Mayotte*; Shimaore: *Maore*) is an insular department and region of France. It consists of a main island, Grande-Terre (or Maore) that is 360$km^2$ in area, a smaller island, Petite-Terre (or Pamandzi), of 14$km^2$, and several islets. The archipelago is located in the northern Mozambique Channel between northwestern Madagascar and northeastern Mozambique. Mayotte, with 256 518 people recorded by the 2017 census (INSEE, 2017), is very densely populated with 686 people/$km^2$. The EEZ covers 63 176$km^2$.

Mayotte is surrounded by a 157km barrier reef interspersed with numerous gaps (Thomassin *et al.*, 1989); internal reefs including a double internal barrier of 18km (Guilcher *et al.*, 1965); and discontinuous fringing reefs covering 195km of coastline (Wickel and Thomassin, 2005). The barrier reef encloses one of the world's largest and deepest lagoons, and is flanked by a fringing reef, interrupted by many areas of mangroves. The reef area, including the lagoon, is four times greater than the land area with 1500$km^2$ compared to 374$km^2$ (Dinhut *et al.*, 2008).

Table 2: The îles Éparses in the Western Indian Ocean.

| ISLAND | EMERGED LAND (km²) | REEF AREA (km²) | EEZ (km²) | LOCATION |
|---|---|---|---|---|
| GLORIEUSES *(Grande Glorieuse, Ile du Lys, Wreck Island, South Rock, Verte Rock, three un-named islets) with Geyser Bank included* | 4.9 | 405 | 46 073 | North Mozambique Channel |
| JUAN DE NOVA | 5.3 | 207 | 62 947 | Central Mozambique Channel |
| BASSAS DA INDIA *(10 un-named islets)* | 0.1 | 87 | 129 126 | South Mozambique Channel |
| EUROPA *(Europa Island and 8 un-named islets)* | 31.2 | 47 | 121 304 | South Mozambique Channel |
| TROMELIN | 1 | 6 | 275 403 | Western Indian Ocean |
| TOTAL | 42.5 | 752 | 634 853 | |

The Mayotte ecosystem is associated with 150km² of coral reefs, extensive mangroves covering some 6.66km² (Cremades, 2010) and seagrass meadows. All Mayotte waters have been proclaimed as a Marine Nature Park, and M'bouzi is designated as a Nature Reserve (IUCN, 2013).

***Îles Éparses***

Îles Éparses (French: *Îles Éparses*). These scattered islands in the WIO are part of the French Southern and Antarctic Lands (TAAF) since February 2007 (Table 2). Juan de Nova (17°03'S, 42°45'E), Europa (22°22'S, 40°22'E), and Bassas da India (21°28'S, 39°42'E) lie in the Mozambique Channel west of Madagascar, while Glorieuses (11°33'S, 47°20'E) lie northwest of Madagascar (Chabanet *et al*., 2015). By extension, Geyser Bank is included within the Glorieuses (Andréfouët *et al*., 2009; TAAF, 2018). Tromelin lies east of Madagascar (15°53′S, 54°31′E). Details on the îles Éparses islands are provided in Table 2.

## Key institutions and legislation related to MPAs or equivalent proclamations

***French Biodiversity Office***

In January 2017, the Marine Protected Areas Agency was subsumed into the French Biodiversity Agency. The French Biodiversity Agency (Agence Française pour la Biodiversité) is a public organization under the auspices of the Ministry for the Ecological and Inclusive Transition (effectively, the ministry in charge of environment) established for the purpose of supporting the implementation of public policies in order to improve knowledge, and to protect, manage and restore terrestrial, aquatic and marine biodiversity. The Office acts in support of the public stakeholders and works in close partnership with the socio-economic actors. The Office is also committed to communicate with the general public and to engage the citizens in support of the conservation of biodiversity (FBA, 2018).

***MPAs in France***

In France, there are several types of MPA:

- Marine sections of National Parks
- Natural Reserves
- Prefectural Order for protection of biotopes or special areas
- Natura 2000 sites
- Sections of the maritime public domains entrusted to Coastline Conservation Agency
- Natural Marine Parks: Mayotte, Cap Corse, Martinique, Iroise, Golfe Normand-Breton, Golfe du Lion, Estuaires Picards, Bassin d'Arcachon, Estuaires de la Gironde
- Glorieuses archipelago natural national reserve
- National wild fauna and hunting reserve with a marine section: Morbihan Gulf
- Categories from international designations (RAMSAR and UNESCO World Heritage sites, or from Regional Seas Convention)

***MPA Managers' Forum***

The French Biodiversity Office stimulates the dynamics of technical exchanges and shared experiences between MPA managers and more widely between organizations involved in the marine environment. Its purpose is to create links and share information on marine environmental protection and MPA issues and objectives.

At a national level, it manages the Marine Protected Area Managers' Forum which meets yearly, bringing together the 80 members representing French MPAs.

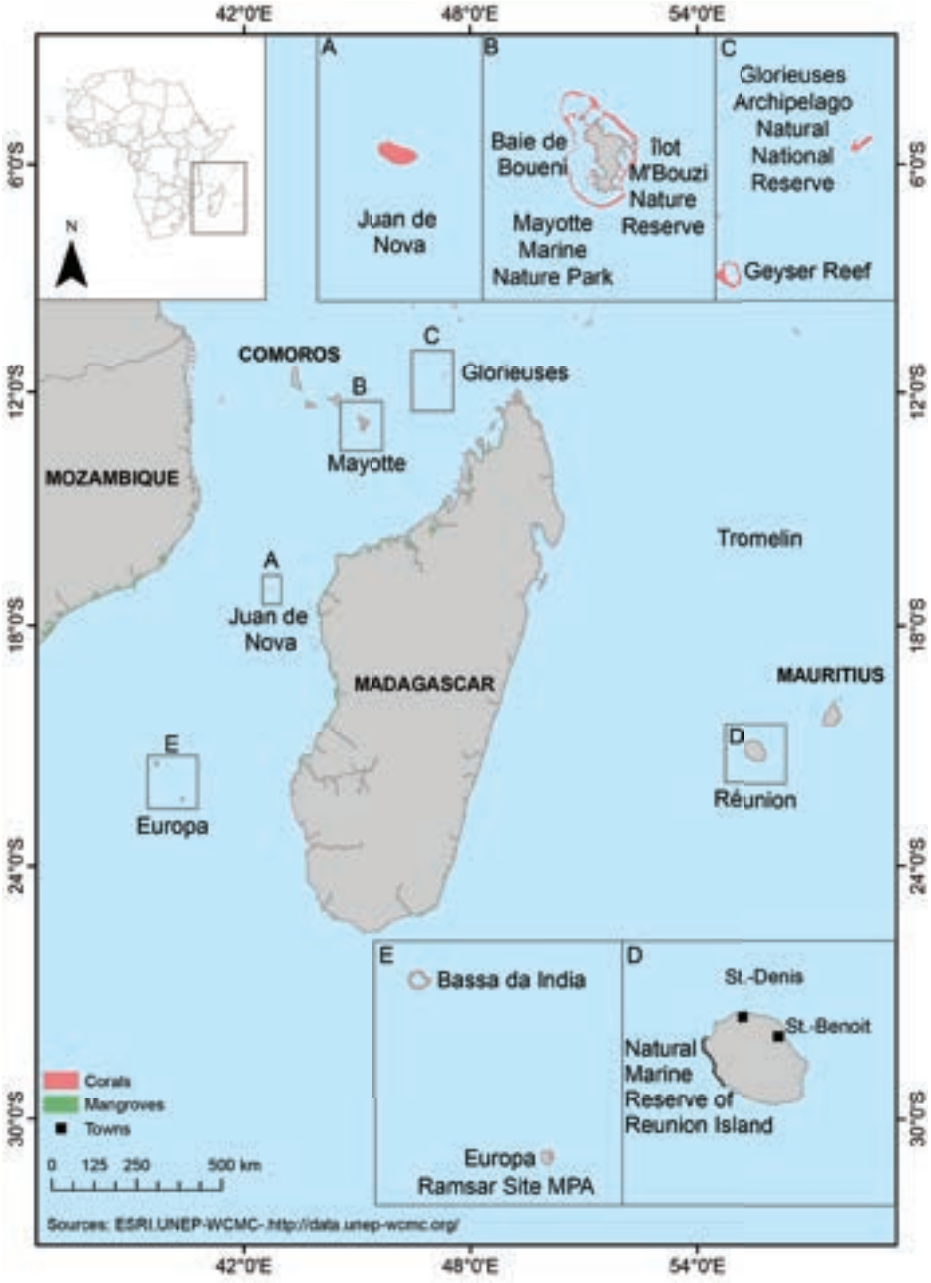



Figure 1: French territories in the Western Indian Ocean with marine protected areas.

## OVERVIEW OF FRENCH MPAs IN THE WESTERN INDIAN OCEAN

In the French Territories of the WIO there are now five distinct MPAs: one in La Réunion, two in Mayotte and two in the îles Éparses. Until recently, there were four individual protected zones on Mayotte, but these are now absorded within the Marine Nature Park of Mayotte, under two prefectoral decrees of 2018 that changed their statutes.

It can be noted that all the îles Éparses are classified as natural reserves at the local level with associated regulations, but only two sites (Glorieuses and Europa) are declared MPAs at the national level with status recognised by IUCN (Figure 1).

These MPAs cover 111 427km$^2$, which represents 11.04 percent of the EEZ of the French territories in the WIO (Table 3). The MPAs protect various habitats such as coral reefs, seagrass beds, mangroves, subtidal rocky subtidal, subtidal sandy-mud, and seamounts (inside the Marine Nature Park of Mayotte).

**Close encounter with a Hawksbill turtle on Juan de Nova.** © Jerome Bourjea

**Table 3: French MPAs in the Western Indian Ocean including the exclusive economic zones of the Territories.**

| MPA | DATE OF CREATION | AREA (km²) | EEZ (km²) | % EEZ |
|---|---|---|---|---|
| MAYOTTE | | | | |
| Marine Nature Park of Mayotte<br>*N.B. in 2018, four small 'protection zones' and one 'biotope protection site' were merged into this MPA* | 2010 | 63 176 | 63 176 | 100 |
| Nature Reserve of M'bouzi | 2007 | 0.6 | | |
| LA RÉUNION | | | | |
| Marine Reserve of La Réunion | 2007 | 35 | 311 426 | 0.01 |
| ÎLES ÉPARSES | | | | |
| Glorieuses Archipelago Natural National Reserve | 2012 | 43 800 | 46 073 | 100 |
| Europa Island Ramsar Site | 2012 | 2142 | 121 304 | 1.76 |
| Other islands | NA | 0 | 467 476 | 0 |
| TOTAL | | 111 427 | 1 009 455 | 10.8 |

# MARINE AREAS UNDER PROTECTION

All areas under protection, whatever their specific designation as described in the previous section, are considered MPAs, as they meet the IUCN criteria for formal protection, unless indicated (Table 4), under Category Ia Strict Nature Reserve. The governance and management frameworks as well the critical habitats and species for each of the MPAs are described here.

## Governance and management frameworks for each MPA

MPAs are presented in Table 4 according to their location from most northerly (Glorieuses) to most southerly (Europa).

Table 4: Governance and management frameworks for the MPAs in the French Territories of the WIO.

| MARINE NATURE PARK OF MAYOTTE | |
|---|---|
| ECOSYSTEM AND LOCATION | Coastal/epipelagic: marine area; Comoros Archipelago, N Mozambique Channel |
| PROCLAMATION YEAR LEGISLATION | Decree No. 2010–71 (18 January 2010). Note: four protection zones (Saziley, N'gouja, Papani and Passe en S/Mayotte) and one biotope protection (Ambato/Mayotte) were recently merged within the Marine Nature Park of Mayotte according to the arrêté 865/DMSOI/2018 of 01/10/2018 and arrêté 2018-DMSOI-601 of 28/06/2018. |
| EXTENT | 63 176km$^2$ (entire EEZ) |
| CONNECTIONS WITH TERRESTRIAL PAs OR OTHER MARINE PAs | Connection with the terrestrial part of the Nature Reserve of M'bouzi (the marine part of the reserve is included in the Marine Nature Park of Mayotte): in terms of sharing of experience, and mutualization of the technical and scientific cooperation, since they continue to ensure the coherence of the management of their MPA.<br>Connections with the Glorieuses Archipelago Natural National Reserve. |
| INSTITUTIONAL FRAMEWORK | The French Ministry for Ecological and Inclusive Transition which delegates managing authority to the French Biodiversity Office. |
| GOVERNANCE STRUCTURE | Management advisory panel: 41 members (Marine Nature Park of Mayotte, 2013a)<br>Advisory: Simple consultation and assent procedure. |
| MANAGEMENT PLAN | Management plan: 2013–2028 (Marine Nature Park of Mayotte, 2013b) plus an Annual Framework. |
| RISKS AND THREATS | Some threats impact the MPA (Marine Nature Park of Mayotte, 2013a):<br>– coral bleaching<br>– mangroves threatened by deforestation and backfilling<br>– agricultural practices cause land erosion leading to silting of the lagoon<br>– sanitary and environmental problems, in particular because of the absence of waste-water purification, management of rainwater runoff, and waste collection<br>– waste frequently abandoned in the natural environment and pulled towards the lagoon by runoff water (vehicle tyres, cans)<br>– population in constant increase, very dependent on the natural resources offered by the lagoon, the fragile resources of reefs diminish<br>– poaching of sea turtles, illegal fishing<br>– anthropogenic disturbance of megafauna (sea turtles, marine mammals) |
| SITE SPECIFIC MANAGEMENT OBJECTIVES | Seven management guidance pillars (Marine Nature Park of Mayotte, 2013b):<br>– knowledge and conservation of marine environment<br>– sustainable fishery<br>– aquaculture<br>– good quality of water<br>– tourism<br>– uses<br>– traditional activities |

| | |
|---|---|
| MONITORING/EVALUATION PROGRAMMES | Monitoring and surveys conducted inside the MPA are (Marine Nature Park of Mayotte, 2013a):<br>– species and habitat surveys (seagrass beds, marine turtles, marine mammals, seabirds)<br>– coral reef observatory (Reef Check, Global Coral Reef Monitoring Network (GCRMN), bleaching)<br>– marine water quality surveys<br>– zone naturelle d'intérêt écologique, faunistique et floristique (ZNIEFF) [or natural zone of ecological, fauna and flora interest]<br>– inventory of species<br>– data collection on fisheries using the Système d'Informations Halieutiques (SIH) [or fisheries information system]<br>– stranding network for marine mammals and sea turtles<br>– scientific programs |
| MANAGEMENT EFFECTIVENESS REVIEWS | Dashboard (French biodiversity office) according to the seven management guidance pillars (Marine Nature Park of Mayotte, 2016b). |
| **NATURE RESERVE OF M'BOUZI** | |
| ECOSYSTEM AND LOCATION | Coastal/epipelagic: marine island; Mayotte |
| PROCLAMATION YEAR LEGISLATION | Decree No. 2007–105 (26 January 2007) |
| EXTENT | Land surface: 0.8km$^2$; marine area: 0.6 km$^2$<br>Total surface: 1.4km$^2$ within which traditional and recreational longline fishing from non-motorized boats is permitted |
| INSTITUTIONAL FRAMEWORK | The French Ministry for Ecological and Inclusive Transition which delegates managing to the Regional directorate of the environment, land planning and housing. |
| GOVERNANCE STRUCTURE | Manager of the MPA: Naturalists of Mayotte Association (convention in 2008)<br>Management advisory committee: 14 members (regional and local authorities, administrations, scientists from public institutions and associations for the protection of the environment).<br>Scientific council: 15 members |
| MANAGEMENT PLAN | Adaptation of the Management Plan: 2013–2028 (Marine Nature Park of Mayotte, 2013b) plus an Annual Framework. |
| RISKS AND THREATS | Some threats impact the MPA (Marine Nature Park of Mbouzi, 2015; IUCN, 2013):<br>– coral bleaching<br>– coral exposure to low tides<br>– *Acanthaster planci* infestation<br>– human pressure<br>– pressure of the watershed (pollution) |
| SITE SPECIFIC MANAGEMENT OBJECTIVES | The site management objectives are (Natural Reserve of Mbouzi, 2015):<br>– natural heritage preservation<br>– socio-economical and scientific enhancement<br>– make sustainable the functioning of Mbouzi |
| MONITORING/EVALUATION PROGRAMMES | GCRMN survey and Reef Check survey |
| MANAGEMENT EFFECTIVENESS REVIEWS | Effectiveness based on percentage of realization of actions. |
| **MARINE RESERVE OF LA RÉUNION** | |
| ECOSYSTEM AND LOCATION | Coastal/epipelagic; La Réunion |
| PROCLAMATION YEAR LEGISLATION | Decree No. 2007–236 (21 February 2007) |
| EXTENT | 35.4km$^2$<br>– General protection zone = 100% (IUCN category IV)<br>– Reinforced protection zone (17.35km$^2$ = 55% of MPA)<br>– (IUCN Category VI)<br>– Integral protection zone where all activities are forbidden: 1.9km$^2$ = 6% (IUCN Category Ia) |
| INSTITUTIONAL FRAMEWORK | The French Ministry for the Ecological and Inclusive Transition |
| GOVERNANCE STRUCTURE | Regional Directorate of the Environment, Land Planning and Housing; Manager;<br>Grouping of Public Interest National Marine Reserve of La Réunion (= management team). |

| | |
|---|---|
| GOVERNANCE STRUCTURE | The governance of the Marine Reserve of La Réunion is organized as follows (Marine Reserve of La Réunion, 2013a):<br>– an administrative board involving other authorities: Sub-Prefect (President), Government representatives (DEAL), Regional Council, Departmental Council, grouping of west territories (municipalities, user representatives)<br>– a scientific council with 15 independent experts (consultative management)<br>– an advisory council (44 members): consultative management with stakeholders (associations of users, sport leagues, environmental protection association, scientists, tourism professionals, elected territorial representatives) |
| MANAGEMENT PLAN | 1st management plan: 2013–2017 (Marine Reserve of La Réunion, 2013b)<br>Review for the first management plan: 2018 (with meetings of dialogue with the users)<br>2nd management plan: 2021–2030 |
| SITE SPECIFIC MANAGEMENT OBJECTIVES | The site management objectives (Marine Reserve of La Réunion, 2013b) are to:<br>– conserve coral reefs and associated ecosystems<br>– ensure sustainable fishing activities and the different uses reconcilable with the marine biodiversity<br>– ensure adequate connection and networking of the La Réunion MPA with a view to good governance and integrated management of the marine environment<br>– develop a sustainable and diversified policy on information, education and communication for all audiences |
| RISKS AND THREATS | The threats which impact the MPA are (Marine Reserve of La Réunion, 2013a):<br>– invasive species<br>– coral disease<br>– cyclones<br>– climate change<br>– heavy rain leading to siltation<br>– urban activities<br>– agricultural activities and industrial activities<br>– pollution<br>– illegal fishing<br>– bad practices in relation to some environment activities such as SCUBA diving and other watersports<br>– high tourism levels<br>– waterfront urbanization |
| MONITORING/EVALUATION PROGRAMMES | Monitoring and evaluation programmes implemented are:<br>– coral reef observatory (GCRMN, Reef check, bleaching survey, study of coral reproduction, the European framework directive on water<br>– survey of traditional fisheries<br>– inventories (molluscs, echinoderms, cniderians, sponges)<br>– water quality monitoring: physical chemistry and chemical substances (DCE European surveys)<br>– species and habitat surveys (seagrass beds, marine turtles)<br>– topographic surveys of beaches<br>– inventory of floristique natural zone of ecological interest, fauna and flora (or ZNIEFF)<br>– national databases for species, habitats and surveys (SIE, SINP, BDRecif)<br>– GIS data on SEXTANT platform<br><br>Outcomes of these monitoring programmes have indicated that:<br>– there has been a chronic increase in the cover of algae, including turf and fleshy algae, and algal growth on dead coral, and a decline in live coral. This shift in the benthic community structure to greater algal abundance has strong implications for the ecology<br>– there is a shift in trophic dominance to greater abundance of herbivores, and a decreasing abundance and biomass of carnivorous and piscivorous fish due to excessive pressure from fishing<br>– initial improvements in reef health as a result of the establishment of the reserve are visible some seven years after its initial establishment |
| MANAGEMENT EFFECTIVENESS REVIEWS | Dashboard (French biodiversity office), while the management effectiveness has been analyzed through the GCRMN coral reef status report in the WIO (Obura *et al.*, 2017). |
| SPECIFIC ACTIONS | Educational Marine Area (EMA) is a French initiative (IFRECOR / French Biodiversity Agency), since 2012 in Marquisas (Pukatai Project)<br>One site in 2016–2017 + four sites in 2017–2018<br>EMA is small marine and coastal zone managed by children |

| GLORIEUSES ARCHIPELAGO NATURAL NATIONAL RESERVE | |
|---|---|
| ECOSYSTEM AND LOCATION | Coastal and pelagic; North Mozambique Channel |
| PROCLAMATION YEAR LEGISLATION | French government Decree No. 2012–245 on the establishment of the Glorieuses Marine Nature Park (22 February 2012), later declared a natural national reserve on the 8th of June 2021 (national decree). The official name is Réserve naturelle nationale de l'archipel des Glorieuses. |
| EXTENT | 46 073km$^2$ (entire EEZ) |
| INSTITUTIONAL FRAMEWORK | French Ministry for Ecological and Inclusive Transition<br>French Biodiversity Office<br>Delegated authority: Management committee |
| GOVERNANCE STRUCTURE | Management committee: 20 members (Marine Nature Park of Glorieuses, 2015a).<br>Advisory: Simple consultation and assent procedure. |
| MANAGEMENT PLAN | First management plan: 2015–2030 |
| RISKS AND THREATS | According to Marine Nature Park of Glorieuses (2015a):<br>– industrial fishing<br>– coral bleaching<br>– illegal artisanal fishing and poaching<br>– vessel pollution<br>– continental derived macro-wastes<br>– oil and gas exploration /exploitation<br>– global changes (cyclones, bleaching)<br>– exotic and invasive species |
| SITE SPECIFIC MANAGEMENT OBJECTIVES | Five guidance pillars of the management plan (Marine Nature Park of Glorieuses, 2015b):<br>– protection of natural heritage<br>– sustainable fishery<br>– ecotourism<br>– governance<br>– scientific observatory |
| MONITORING/EVALUATION PROGRAMMES | The monitoring and survey realized inside the MPA (Marine Nature Park of Glorieuses, 2015b):<br>– species and habitats surveys (coral reefs, seagrass beds, marine turtles)<br>– marine water quality surveys<br>– coral bleaching survey<br>– data collection on fisheries<br>– Global Coral Reef Monitoring Network (GCRMN) |
| MANAGEMENT EFFECTIVENESS REVIEWS | Dashboard (French Biodiversity Office) according to the five management guidance pillars (Marine Nature Park of Glorieuses, 2015c). |
| **EUROPA ISLAND RAMSAR SITE** | |
| ECOSYSTEM AND LOCATION | Coastal and pelagic; South Mozambique Channel |
| PROCLAMATION YEAR LEGISLATION | Ramsar site since 2012. Proclaimed as Natural Reserve at the local level since 1975 (as the other îles Éparses, except Juan de Nova). |
| EXTENT | Land surface: 32km$^2$<br>Marine area: 2142km$^2$<br>EEZ: 121 304km$^2$ |
| INSTITUTIONAL FRAMEWORK | The French Southern and Antarctic Lands (TAAF) |
| RISKS AND THREATS | The threats which impact the MPA are:<br>– climate change<br>– cyclones<br>– coral bleaching<br>– illegal fishing, poaching<br>– illegal pleasure activities<br>– invasive species<br>– pollution<br>– erosion<br>– acidification of the ocean |
| MONITORING/EVALUATION PROGRAMMES | Monitoring and evaluation being implemented include:<br>– species and habitats surveys (coral reefs, seagrass beds, marine turtles)<br>– marine water quality surveys<br>– coral bleaching survey<br>– data collection on fisheries |

CASE STUDY

## Réunion's "shark crisis"

**Karine Pothin**

La Réunion has been afflicted by a "shark crisis" problem since 2011. Indeed, the waters around the island are affected by more and more frequent and very often fatal shark attacks. The majority of attacks, due in part to the location of water-based activities, take place on the perimeter of the marine reserve.


**Front cover of the recent book *Comprendre la crise requins à La Réunion* (Understanding the shark crisis in La Réunion).**

The authorities have come together to try to deal with this new situation through the deployment of safety nets, and the launching of a scientific research initiative, the CHARC Program, aimed at better understanding the current state of knowledge, ecology, habitats and behaviour of the offending Bull (or Zambezi) and Tiger sharks. Initially the Natural Marine Reserve of La Réunion became the target of detractors and was faced with serious accusations in relation to these shark attacks. It was alternately accused of being the food source that attracts sharks closer to shore; attracting sharks with its boundary delineation buoys; excluding some recreational and fishing activities leaving more room for sharks; and just for being the only MPA located in this coastal area. However Tiger and Bull sharks are not usually associated specifically with coral reefs, but with the deeper offshore channels, in the case of the former, and shallow estuaries in the case of the latter.

The CHARC Program as well as a more recent study "*Environmental and anthropogenic factors affecting the increasing occurrence of shark-human interactions around a fast-developing Indian Ocean island*" (Lagabrielle *et al.*, 2018) have shown interesting results in relation to the seasonal behavior of these species and have commenced identification of certain explanatory factors for the attacks, although still underlining the large unknowns and the essentially multifactorial nature of such attacks.

After a very hectic period fueled by media fever, the response to the crisis has moved to a more sober "risk management" phase. This has entailed a shift from an impassioned and irrational discourse, as promoted by various lobbies and personal interests, to a more reasoned and thoughtful discussion on the management of the situation. This has come about partly because of 1) better communication of the MPA's primary mission and its role in shark risk management, and 2) the establishment of a structure dedicated to shark risk management.

Local authorities and the state have provided the necessary human and financial resources to find lasting solutions through working on various fronts: securing water and seaside activities, and deployment of SMART (Shark-Management-Alert-in-Real-Time) baited drumlines (unmanned aquatic traps used to capture sharks) inside the MPA for scientific purposes, research, innovative solutions, prevention and communication. Caught sharks are then released in offshore waters. There is now a real synergy between the structure established to manage shark risk and the Réunion Marine Reserve, each acting in its field of competence but linked in the field of shark risk management. This synergy is apparent in the thematic meetings and workshops (on research, fishing campaign, innovations, etc.) and in the participation in the establishment and improvement of safety nets for people involved in water-based activities.

The Marine Reserve could be part of the solution by also 1) agreeing a relaxation of its regulations to allow deployment of more SMART drumlines, and 2) improving the quality of the coral reefs ecosystems inside the MPA, with the aim of rebalancing the natural environment.

## Critical habitats and species

Although the French MPAs in the WIO include habitats such as coral reefs, mangrove forests and seagrass beds, other habitats are also present (Table 5). These habitats within the MPAs support a wide range of important key species (Table 6).

**Table 5: Habitats protected by the French MPAs in the Western Indian Ocean.**

| | BEACHES AND NEARSHORE | MANGROVES | SEAGRASSES | SALT MARSHES | CORAL AND BIOGENIC REEFS | ROCKY REEFS | DEEP SEA AND OFFSHORE PELAGIC | SEAMOUNTS AND RIDGES | COASTAL FORESTS |
|---|---|---|---|---|---|---|---|---|---|
| **MAYOTTE** *(Marine Nature Park of Mayotte, 2013a; Marine Nature Park of Mayotte, 2016a; Natural Reserve of Mbouzi, 2015; IUCN, 2013)* | | | | | | | | | |
| Marine Nature Park of Mayotte | X | X | X | X | X | X | X | X | X |
| Nature Reserve of M'bouzi | | X | | | X | X | | | X |
| **LA RÉUNION** *(Marine Reserve of La Réunion, 2013a; Nicet et al., 2016)* | | | | | | | | | |
| Marine Reserve of La Réunion | X | | X | | X | X | | | |
| **ÎLES ÉPARSES** *(Marine Nature Park of Glorieuses, 2015a, b; TAAF, 2016, 2018)* | | | | | | | | | |
| Glorieuses Archipelago Natural National Reserve | | | X | | X | X | X | | |
| Europa Island Ramsar Site | | X | X | | X | | X | | |

**Table 6: Biodiversity and key species recorded inside the MPAs of the French Territories in the Western Indian Ocean.**

| BIODIVERSITY | KEY SPECIES |
|---|---|
| **MARINE NATURE PARK OF MAYOTTE**<br>*(Marine Nature Park of Mayotte, 2013a; Marine Nature Park of Mayotte, 2016; IUCN, 2013; Wickel et al., 2014)*<br><br>– 7 spp. of mangrove trees<br>– 10 spp. of seagrass<br>– More than 300 spp. of hard corals<br>– 25 spp. of marine mammals<br>– 5 marine turtles; major spp: *Chelonia mydas, Eretmochelys imbricata*<br>– 24 shark spp.<br>– 13 ray spp. including: *Manta birostris, Urogymnus asperrimus*<br>– More than 765 fish spp. including: *Plectropomus laevis, Epinephelus lanceolatus, Cheilinus undulatus, Bolbometopon muricatum*<br><br>**NATURE RESERVE OF M'BOUZI**<br>*(Natural Reserve of Mbouzi, 2015)*<br><br>– 161 spp. of molluscs<br>– 25 spp. of echinoderms<br>– 190 spp. of fish<br>– 25 crustaceans<br>– 4 spp. of marine mammals<br>– 6 spp. of mangrove trees<br>– 39 spp. hard corals<br>– 2 spp. turtles | Whale:<br>– *Megaptera novaeangliae* LC<br><br>Dolphins:<br>– *Stenella longirostris* LC<br>– *Stenella attenuate* LC<br>– *Tursiops aduncus* DD<br>– *Peponcephala electra* LC<br><br>Dugong:<br>– *Dugong dugon* VU<br><br>Turtles:<br>– *Chelonia mydas* EN<br>– *Eretmochelys imbricata* EN<br>– *Caretta caretta* EN<br><br>Fish:<br>– *Bolbometopon muricatum* VU<br>– *Carcharinus albimargnatus* NT<br>– *Carcharodon carcharias* VU<br>– *Carcharhinus longimanus* VU<br>– *Negaprion acutidens* VU<br>– *Carcharinus amblyrhynchos* NT<br>– *Sphyrna lewini* EN<br>– *Sphyrna mokarran* EN<br>– *Rhinocodon typus* VU<br>– *Nebrius ferrugineus* VU<br>– *Stegostoma fasciatum* VU<br>– *Rhina ancylostoma* VU<br>– *Rhynchobatus djiddensis* VU<br>– *Taeniurops meyeni* VU<br>– *Urogymnus asperrimus* VU<br>– *Aetobatus narinari* NT<br>– *Manta birostris* VU<br>– *Mobula japonica* NT<br>– *Hippocampus jayakari* DD<br>– *Epinephelus coioides* NT<br>– *Epinephelus fuscoguttatus* NT<br>– *Epinephelus lanceolatus* NT<br>– *Epinephelus malabaricus* NT<br>– *Epinephelus polyphekadion* NT<br>– *Plectropomus areolatus* VU<br>– *Plectropomus laevis* VU<br>– *Cheilinus undulatus* N<br>– *Bolbometopon muricatum* VU<br>– *Thunnus obesus* VU<br><br>Seabirds:<br>– *Ardea humbloti*<br>– *Ardeoa idae* EN<br>– *Phaeton lepturus* LC<br>– *Sterna bengalensis* LC<br>– *Anous stolidus* LC<br>– *Onychoprion fuscatus* LC<br>– *Sterna sumatrana* LC<br>– *Butorides striatus rhizoporae*<br>– *Lumnitzera racemosa*<br><br>Plants:<br>– *Lumnitzera racemosa* |

| BIODIVERSITY | KEY SPECIES |
|---|---|
| **MARINE RESERVE OF LA RÉUNION ISLAND**<br>*(Frike et al., 2009; Marine Reserve of La Réunion, 2013a)* | |
| More than 6 433 species listed:<br>– 20 spp. of sponges<br>– 366 spp. of cnidarians<br>– 1305 spp. of mollusks<br>– 200 spp. of crustaceans<br>– 97 spp. of echinoderms<br>– 40 spp. of cartilaginous fish<br>– 984 spp. of bony fish<br>– 2 spp. of reptiles<br>– 11 spp. of seabirds<br>– 3 spp. of marine mammals | 213 species listed under IUCN, CITES, CMS (2017) and Nairobi Convention *(Marine Reserve of La Réunion Island, 2013a)*, including:<br>– 182 cnidarians<br>– *Megaptera novaeangliae* (IUCN, CITES, CMS and Nairobi) VU<br>– *Tursiops aduncus* (IUCN, CMS) EN<br>– *Pterodroma baraui* (IUCN) EN<br>– *Pseudobulweria aterrima* (IUCN) N<br>– *Chelonia mydas* (IUCN, CITES, CMS and Nairobi) EN<br>– *Eretmochelys imbricata* (IUCN, CITES, CMS and Nairobi) EN<br>– *Carcharinus amblyrhynchos (IUCN)*<br>– *Carcharhinus melanopterus* (IUCN)<br>– *Galeocerdi cuvieri* (IUCN)<br>– *Triaenodon obesus* (IUCN)<br>– *Nebrius ferrugineus* (IUCN)<br>– *Rhynchodon typus* (IUCN, CITES, CMS)<br>– *Manta birostris (IUCN)*<br>– *Aetobatus narinari (IUCN)*<br>– *Acanthrurus polyzona* (IUCN) EN<br>– *Abudefdus margariteus* (IUCN) EN<br>– *Amphyprion chrysogaster* (IUCN) EN<br>– *Hyppocampus histrix* (IUCN)<br>– *Hyppocampus whitei* (IUCN)<br>– *Euripegasus draconis* (IUCN)<br>– *Cephalopholis boenak* (IUCN)<br>– *Epinephelus lanceolatus* (IUCN)<br>– *Tridacna maxima* (IUCN, CITES, CMS)<br>– *Tridacna squamosa* (IUCN, CITES, CMS)<br>– *Pinctada imbricata* (Nairobi)<br>– *Pinctada maculata* (Nairobi)<br>– *Pinctada margaritifera* (Nairobi)<br>– *Pinctada nigra* (Nairobi)<br>– *Conus barthelemyi* (IUCN) EN<br>– *Millepora exaesa* (CITES)<br>– *Millepora platyphylla* (CITES)<br>– *Millepora tenera* (CITES)<br>– *Distychopora fisheri* (CITES)<br>– *Distychopora violacera* (CITES) |

| BIODIVERSITY | KEY SPECIES |
|---|---|
| **GLORIEUSES ARCHIPELAGO NATURAL NATIONAL RESERVE**<br>*(Chabanet et al., 2015; Durville and Chabanet, 2009; Conand et al., 2016; Marine Nature Park of Glorieuses, 2015a,b)* | |
| 1435 species listed in Glorieuses (Glo) and 600 species in Geyser (Gey), including:<br>– Bony fish: Glo 349 spp. Gey 88 spp.<br>– Cartilaginous fishes: Glo 14 spp. Gey 14 spp.<br>– Molluscs: Glo 247 spp. Gey 124 spp.<br>– Arthropods: Glo 157 spp. Gey N/A<br>– Echinoderms: Glo 54 spp. Gey 30 spp.<br>– Cnidarians: Glo 110 spp. Gey 37 spp.<br>– Bryozoans: Glo 95 spp. Geyser: NA<br>– Algae: Glo 215 spp. Geyser: N/A<br>– Phanerogams: Glo 6 spp. Gey 2 spp.<br>– Plankton: Glo 179 spp. Gey: N/A<br>– Marine mammals: Glo 5 spp. Gey 5<br>– Sea turtles: Glo 2 spp. Gey: N/A<br>– Seabirds: Glo 3 spp. | 180 species in the Red List of IUCN including:<br>– *Chelonia mydas* EN<br>– *Eretmochelys imbricata* CR<br>– *Papasula abotti* EN<br>– *Bolbometopon muricatum* VU<br>– *Cheilinus undulatus* CR<br>– *Carcharon carcharias* VU<br>– *Nebrius ferrugineus* VU<br>– *Negaprion acutidens* VU<br>– *Rhyncodon typus* VU<br>– *Sphyrna* sp VU<br>– *Manta birostris* VU<br>– *Taenuria meyeni* VU<br>– *Urogymnus asperrimus* VU<br>– *Balaenoptera musculus* EN<br>– *Physeter macrocephalus* VU<br><br>Six species listed under the Nairobi Convention:<br>– *Chelonia mydas*<br>– *Eretmochelys imbricata*<br>– *Megaptera novaeangliae*<br>– *Tridacna squamosa*<br>– *Birgus latro*<br>– *Pinctada margaritifera*<br><br>15 species listed in annex I or II of CITES including:<br>– *Calloplesiops altivelis*<br>– *Cheilinus undulatus*<br>– *Tridacna maxima*<br>– Milleporidae |
| **EUROPA ISLAND RAMSAR SITE**<br>*(Chabanet et al., 2015; Conand et al., 2016; Fricke et al., 2013)* | |
| 2 seabird subspecies endemic to the Indian Ocean:<br>– Audubon's Shearwater *Puffinus lhermiieri bailloni*<br>– Sooty Tern *Sterna fuscata nubilosa*<br><br>– Fin Whale *Balaenoptera physalus*<br>– Hammerhead shark *Sphyrna lewini* | Green Turtle *Chelonia mydas* EN<br>Pond Heron *Ardeola idea*<br><br>Threatened:<br>– *Chelonia mydas*<br>– Fregatidae<br>– *Vidua fischeri* (Straw-tailed whydah) |

(EN: Endangered; DD: Data deficient; LC: Least concern; NT: Near threatened; VU: vulnerable; CR: Critically endangered; N/A: Not applicable; Species: spp.; Glo: Glorieuses; Gey: Geyser Bank)

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MARINE & COASTAL AREAS
UNDER PROTECTION

# KENYA

Arthur O. Tuda and Pascal Thoya


**Malindi Marine Park, Kenya.** © Jennifer O'Leary

## COUNTRY OVERVIEW

Kenya is a coastal State in East Africa bound by latitudes 5°40'N and 4°40'S and longitudes 33°50'E and 41°45'E. It is bordered by Ethiopia to the north, Somalia to the northeast, Tanzania to the south, Uganda to the west, and Sudan to the northwest. The coastline of Kenya extends approximately 536km in a southwesterly direction commencing from the border with Somalia in the north at 1°41'S, to the border with Tanzania in the south at 4°40'S (GoK, 2009). The coastal climate of Kenya is influenced mainly by the large-scale pressure systems of the Western Indian Ocean (WIO) and monsoon winds. There are four oceanic currents influencing Kenya's coastal waters, namely the East African Coastal Current (EACC), the Somali Current (SC), the Southern Equatorial Current (SEC) and the Equatorial Counter Current (ECC) (UNEP, 1998).

The coastal region is dominated by coral reefs, seagrass beds and mangroves with large expanses of sandy substrates and river inputs from Kenya's two largest rivers, the Tana and Athi, which flow into the Indian Ocean (Obura, 2001). Coral reefs, seagrass beds and mangroves in Kenya support a wide range of marine species including fish, birds, marine turtles, dugongs, dolphins, and whales (EAME, 2004). Some of these species, including turtles and dugongs, are listed as protected species under the Wildlife Conservation and Management Act 2013, Laws of Kenya. Coral reefs form the dominant ecosystem along most of the Kenya coast, with more than 209 species of corals already documented (Obura, 2012). Other important reef-building organisms, including soft corals, coralline red algae and calcareous algae, exist but are not well documented. In general, the reef communities are similar to those in other parts of the WIO. They are dominated by *Porites* spp. assemblages in calm waters and *Acropora* spp. assemblages in high energy environments. Seagrass beds are usually associated with reef systems, growing in shallow lagoons, creeks and bays, however, in most areas their coverage has not been estimated.

All the nine mangrove tree species recorded in the WIO region occur in Kenya. The forests are, however, dominated by *Rhizophora mucronata* ("*mkoko*") and *Ceriops tagal* ("*mkandaa*") that occupy more than 70 percent of the coverage. Mangrove coverage in Kenya is estimated to be 61 271ha, representing about 3 percent of the national forest area. The largest coverage of mangrove forests occurs in Lamu County (61 percent) with Mombasa and Tana River counties supporting the least (GoK, 2017). Mangrove forests in Kenya face a number of threats arising from both anthropogenic as well as natural causes. Between 1985 and 2009, the country lost about 20 percent of its mangrove cover or about 4.5km$^2$ per year, and at least 40 percent of mangrove forests are degraded. Loss of mangroves is disproportionately higher close to urban centres than in rural areas (Bosire *et al*., 2014). More recently, climate change factors have impacted on mangroves in Kenya (Kebede *et al*., 2010). During the 1997/98 El Niño event, massive sedimentation due to erosion of terrigenous sediments caused mangrove dieback in many areas along the Kenyan coast. Sea level rise is likely to influence mangroves along Kenya's entire coastline although local impacts are likely to be more varied.

Increasing exploitation of fisheries and observed declines in sharks, turtles and reef fish led to the establishment of a series of Marine Protected Areas (MPAs) along the Kenyan coast beginning in 1968 (McClanahan *et al*., 2005). The first policy paper that was adopted to move forward the idea of protected areas in Kenya, including MPAs, was the Sessional Paper No. 3 of 1975, the "*Statement of Future Wildlife Management in Kenya*," through which the Kenyan government recognized the need to manage and conserve the country's natural resources. Following this sessional paper were the enactment of the Fish Industry Act (1968) and the Wildlife (Conservation and Management) Act (1976). These regulations have undergone several amendments and reviews. Currently, the new Wildlife (Conservation and Management) Act of 2013 makes provision for the establishment of MPAs (Section 31) in order to protect the marine fauna and flora and the physical features on which they depend, and to facilitate fishery management and other resource uses (GoK, 2013).

In addition to the national laws that support the establishment and management of MPAs, Kenya has also declared its commitment to reaching various marine protection targets, including the 2020 target for representative MPAs under the Convention on Biological Diversity (CBD) (UN CBD, 2010). Kenya has already established a fairly unified network of MPAs (Figure 1) that show evidence of ecological connectivity. For example, fish tagged in Malindi were found as far south as Diani (Kaunda-Arara and Rose, 2004).

All six existing MPAs in Kenya were established between 1968 and 1993, and currently protect ecosystems, habitats, and fauna and flora that transcend international borders. Within each MPA, there is typically a small (< 30km$^2$) no-take marine area (called a Marine National Park) which is encompassed in a wider multiple-use area (Marine Reserve). The Kenya Wildlife Service (KWS), a state parastatal body, established in 1990, is responsible for the management of these MPAs, governed by the

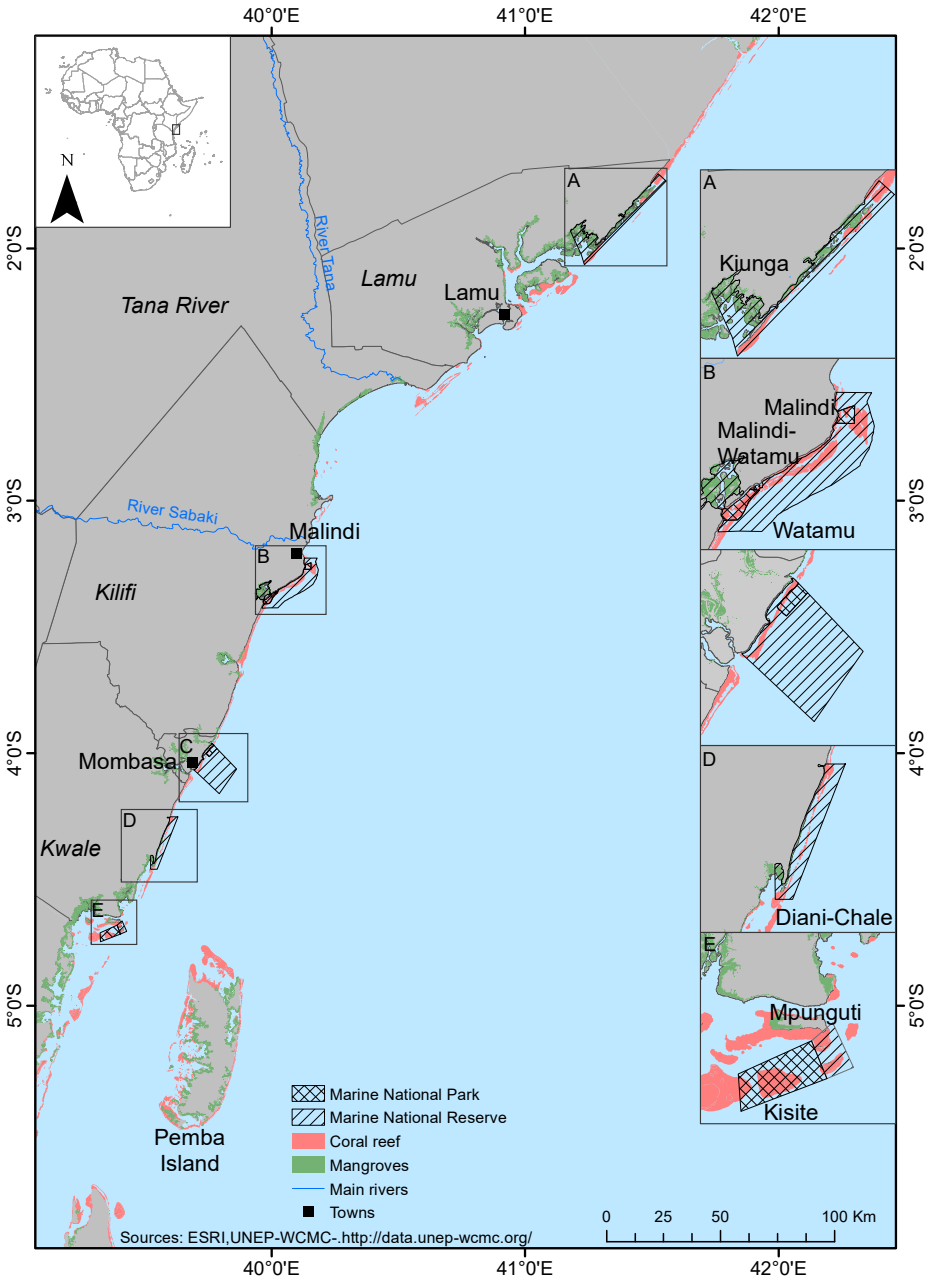


Figure 1: Kenya's coastline, Marine Protected Areas and critical habitats.

Wildlife (Conservation and Management) Act of 2013. There are also other government agencies with roles at certain levels in the management of MPAs in Kenya. For example, the Kenya Forest Service (KFS) is responsible for the mangrove management in the MPAs, since all mangrove forests in Kenya have been declared government forest reserves. Thus where mangrove forests occur in MPAs, KFS and KWS have co-management arrangements. The State Department of Fisheries is also responsible for the licencing of fishers who operate in marine reserves.

## MPA OVERVIEW

The first MPAs in Kenya, the Malindi and Watamu MPAs, were established in 1968. To date four more MPAs have been established bringing the total to six, covering an area of 941.093km$^2$ (Figure 1, Table 1), approximately 0.67 percent of Kenya's exclusive economic zone (EEZ) and 9.9 percent of Kenya's territorial waters. Kenya has an EEZ extent of 200nm (encompassing 142 000km$^2$) and territorial waters of 12nm (encompassing 9500km$^2$). The maritime space over which Kenya exercises sovereignty, sovereign rights and jurisdiction has been determined on the basis of the United Nations Convention on the

Table 1: Kenya's Marine Protected Areas.

| MPA | DESIGNATION | AREA ($km^2$) | IUCN CATEGORY | YEAR ESTABLISHED | STATUS |
|---|---|---|---|---|---|
| Malindi Marine Park | NP & MAB | 6 | II | 1968 | Operational |
| Watamu Marine Park | NP & MAB | 10 | II | 1968 | Operational |
| Malindi Marine Reserve | NR & MAB | 213 | VI | 1968 | Operational |
| Watamu Marine Reserve | NR & MAB | 32 | VI | 1968 | Operational |
| Kisite–Mpunguti Marine Park | NP | 28 | II | 1978 | Operational |
| Kisite–Mpunguti Marine Reserve | NR | 11 | VI | 1978 | Operational |
| Kiunga Marine Reserve | NR & MAB | 250 | VI | 1979 | Operational |
| Mombasa Marine Park | NP | 26.093 | II | 1986 | Operational |
| Mombasa Marine Reserve | NR | 200 | VI | 1986 | Operational |
| Diani-Chale Marine Reserve | NR | 165 | VI | 1993 | Not operational |

DESIGNATION: NP – National Park; NR – National Reserve, MAB – Man and Biosphere Reserve.

Source: Wildlife Conservation and Management Act, 2013 (GoK 2013).

Law of the Sea, as implemented following legislation and proclamations: the Territorial Waters Act, 1972; the Maritime Zones Act, 1989, Cap. 371; and, the Presidential Proclamation of 9 June 2005 published in the Kenya Gazette Notice No. 55 of 22 July 2005 in respect of Kenya's territorial sea and exclusive economic zone (Legal Notice No. 82 [Legislative Supplement No. 34]) (GoK, 2009).

The values of Kenya's MPAs, as described by Weru (2001) are broadly defined as:

- **Natural values** — habitats, species and ecological communities within the MPAs, and the processes that support their connectivity, productivity and function.
- **Cultural values** — living and cultural (indigenous) heritage; recognising local beliefs, places of cultural significance and cultural heritage sites.
- **Heritage values** — non-indigenous heritage that has aesthetic, historic, scientific or social significance.
- **Socio-economic values** — the benefits of MPAs for people, businesses and the economy.

Kenya's MPAs fall under two IUCN categories (IUCN, 1994), which incorporate a range of types of management areas or zones. Marine parks are classified under IUCN category II, while the marine reserves fall under IUCN category VI. The Wildlife Conservation and Management Act (2013) defines a "marine park" as a protected marine area where no fishing, construction work or any disturbance is allowed unless with permission while a "marine reserve" is a marine protected area where subsistence fishing is permitted.

MPA designation in Kenya also includes four sites that are also declared Man and Biosphere Reserves (MAB) (Table 1).

Marine parks are designed to protect areas considered of high ecological importance. Within the marine parks, removal or harm to plants or animals is prohibited. However, marine parks are open to recreation activities such as snorkelling and diving. Kenya's marine parks are arguably some of the most effective MPAs in the WIO and have well-documented ecological and economic benefits, such as high reef fish biomass (McClanahan *et al*., 2009), revenues and income for local tour operators and fishermen (McClanahan, 2010).

The marine reserves are areas set aside for the purpose of maintaining and sustaining controlled sustainable artisanal fishing activities, which take precedence over any other use in this zone. The reserves are also open to recreation activities that are compatible with artisanal fishing practices. However, reserves are generally not as effectively managed as parks (Muthiga, 2009). Activities not permitted in the marine reserves (although not illegal in other Kenyan waters) include any form of commercial fishing such as bottom trawling. Destructive fishing methods such as beach seining are also prohibited in the marine reserves. An overview of the governance of Kenya's MPAs is provided in the Case Study opposite.

CASE STUDY

## MPA Governance in Kenya

**Arthur O. Tuda**

**Illegal beach seine catch, Malindi Marine Park, Kenya.** © Peter Chadwick

Formal MPAs in Kenya are primarily managed by the government (management is government-led) guided by the Wildlife Conservation and Management Act 2013. The Act sets out restrictions on different uses, the jurisdictions and responsibilities of the managing authority (Kenya Wildlife Service), and the rights and obligations of the public. Legal incentives are the key drivers in most MPA-related processes, ensuring that the statutory conservation objectives are fulfilled in MPA decision-making. However, the Wildlife Act also provides a basis for community participation, which is guided by specific legal provisions as a means of promoting transparency, equity and compliance in achieving statutory MPA objectives. Present MPA governance challenges include the lack of regulations specific to MPAs, and some shortfalls in the Act in respect of provision for management interventions that address emerging challenges such as the impacts of climate change. Barriers to adaptive governance also exist including low adaptive management capacity among MPA staff.

Despite some weaknesses in governance, MPAs in Kenya generally meet their main objectives of biodiversity conservation, in particular in the marine parks. Some of the oldest marine parks e.g. the Malindi and Kisite–Mpunguti Marine National Parks, have productive coral reef fish communities with reported fish biomass ranging from 700–1600kg/ha (Cinner *et al.*, 2013). Fishers income have over the years improved from stable fisheries yields in marine parks e.g. in Mombasa (McClanahan 2010; McClanahan *et al.*, 2008). However weak fisheries governance in the marine reserves still hinders the ability of MPAs to meet the objective of sustaining fishers' livelihoods adequately.

Informal MPAs, in Kenya called Locally Managed Marine Areas (LMMAs), are characterized by local communities taking a lead in the conservation and sustainable use of marine resources, which is essential for the long-term social and economic well-being of communities. The governance system of LMMAs is based on the devolution of regulatory powers concerning resource access and use to traditional institutions. The Beach Management Units (BMUs), the community institutions established to co-manage stretches of coastline in Kenya, are granted a significant level of autonomy by the Fisheries Act to decide the rules governing LMMA management collectively. External organisations, including government departments and conservation NGOs, play an important role in enabling and reinforcing such community initiatives, and ensuring that such community efforts are consistent with existing legal and policy frameworks, including the fulfilment of fisheries and biodiversity conservation objectives and obligations.

As the concept of LMMAs is still relatively new in Kenya, weak governance remains a challenge to their effectiveness. Reported compliance with LMMAs by-laws in most BMUs is relatively low. More than half of the LMMAs have not defined their resource limitations, they don't have clearly delineated boundaries of management and some BMUs are clearly still open access. The capacity to address conflicts remains low in all BMUs and like the formal MPAs the capacity to manage LMMAs for resilience in the face of emerging challenges remains low. Some LMMAs e.g. Kuruwitu, have however recorded marked progress in adaptive co-management that has enhanced social learning and response to environmental change (Kawaka *et al.*, 2017).

## MARINE AREAS UNDER PROTECTION

The following sections describe the principle MPAs in Kenya, including details on the institutional frameworks in place, status of the management plans, management goals and objectives, and the current risks and opportunities that exist for each site.

### Kiunga Marine National Reserve

Kiunga Marine National Reserve (KMNR) was gazetted as an MPA in June 1979. The reserve covers 250km$^2$ south of the Kenya/Somali border, in Lamu County (Figure 1). The terrestrial boundaries are defined by a line 30 metres above high water mark. Approximately 51 islands occur within the reserve boundaries. The reserve was established as a large area to protect coral reefs, seagrass beds and mangroves and the designation as a reserve was to allow traditional resource use.

Mangroves are the main coastal habitat in the reserve while dugongs and turtles are the key mega-fauna protected in the reserve. As previously mentioned, mangroves in KMNR, as with all MPAs, are managed under a co-management arrangement between KWS and the KFS.

According to the KWS (2013), the resource use zones in the reserve include:

- a high use zone which accommodates a broad range of opportunities for recreation and related facilities for visitors' enjoyment;
- a low use zone for tourism but only allowing a low number of visitors;
- a wilderness zone which provides high quality experience in a pristine environment;
- a restricted use zone which is designed to protect and conserve biologically significant habitats; and
- an influence zone which supports multiple uses of resources for community livelihood.

The KMNR zonation scheme provides a dual framework aimed at supporting both the decentralized management and promotion of various resource uses across the MPA.

***Institutional framework***

KMNR is legally gazetted and managed by the KWS. A co-management approach has been adopted where multiple stakeholders work together in planning, implementation and monitoring has been adopted.

Management partners include government agencies, NGOs, local communities and the private sector.

***Management plan***

Co-management is guided by the Kiunga-Boni-Dodori Conservation Area management plan (2013–2023).

***Management objectives***

The management plan outlines the following four management programmes with a set of objectives under each:

- Ecological Management
- Tourism Development and Management
- Community Partnership and Conservation Education
- Protected Area Operations and Security

***Risks and threats***

These include illegal logging, turtle poaching, fishing pressure, insecurity, multiple land uses bordering the MPA, tourism development pressure and climate change. Port and oil pipeline developments may result in increased population and hence increased pressure on the natural resources within the KMNR. There is also increased risk from oil spills.

***Management opportunities***

The introduction of adaptive co-management as a management approach to improve the resilience of KMNR.

### Malindi and Watamu Marine Protected Areas

The first marine protected areas established in Kenya were in Malindi and Watamu in 1968. The Malindi and Watamu MPAs are situated 120km north of Mombasa in Kilifi County (Figure 1). They consist of a contiguous complex starting with the Malindi Marine National Park (MMNP) to the north, the Malindi–Watamu National Reserve (MWNR) in the middle and the Watamu Marine National Park (WMNP) and Mida Creek Reserve to the south.

The purpose of creating Malindi and Watamu MPAs was to protect biodiversity, manage resources in a sustainable way to protect the livelihoods of coastal communities, and manage tourism. The MMNP covers an area of 6km$^2$, while the WMNP covers 10km$^2$. Enclosing the two parks is the MWNR that covers a total area of 245km$^2$. The MWMR was recognized and designated as a Biosphere Reserve in 1979. The Watamu MPA has an extensive area of mangroves and the MWNR also includes Mida Creek which is a tidal inlet that extends across an area of 32km$^2$ (KWS, 2017). The Malindi and Watamu Marine Parks have over the years improved and maintained coral

reef fish communities with fish biomass up to 1600kg/ha (Cinner *et al*., 2013).

***Institutional framework***
The Malindi and Watamu MPAs are under the jurisdiction of the KWS who are responsible for planning and management decisions. Within the Malindi and Watamu MPAs there are also a number of non-governmental organizations (NGOs) that support the management of the MPAs. These include the Watamu Marine Association (WMA), a local NGO whose members are drawn from the community, tourism and environment sectors. WMA supports the MPA through different activities including education and awareness programmes, waste management and advocacy. The Local Ocean Trust and Watamu Turtle Watch support the MPA in activities related to the protection of turtles and turtle nesting areas. Community groups including community boat operators, also undertake tourism and visitor management activities in the MPA.

***Management plan***
Although Malindi and Watamu were established and designated as one MPA in 1968, administratively they are managed as two separate entities. This separation was meant to improve administrative efficiency and effectiveness in addressing challenges that are unique to the each MPA. Each MPA currently has a 10-year management plan from 2016 to 2026.

***Management objectives***
The management plans outline four broad management goals / programmes:
- Ecological Management
- Tourism Development and Management
- Community Partnership and Conservation Education
- Protected Area Operations and Security

However, each MPA has specific management objectives with specified targets for each objective. These objectives focus mainly on enhancing or maintaining coral reefs, seagrass beds, sandy beaches, mangroves, sea turtles, shorebirds (particularly waders) and marine mammals (dolphins and whales).

***Risks and threats***
These include threats to coral reefs such as sedimentation and destructive fishing, beach erosion from increasing developments on the beach, turtle poaching and increased mangrove logging.

***Management opportunities***
Support from a wide range of partners conducting research on mangroves, coral reefs, birds and turtles.

**Local residents operating evening canoe trips for visitors in Watamu MPA.** © Arthur O. Tuda

## Mombasa Marine National Park and Reserve

Mombasa Marine National Park and Reserve (MMNPR) is located in Mombasa and gazetted in 1986. Prior to the gazettement the area currently covered by the MPA had faced considerable over-exploitation, especially through uncontrolled fishing, shell and coral collection and general degradation of the environment. The park is 10km$^2$ in area and the reserve is 200km$^2$, encompassing the MPA.

The MPA is endowed with a variety of both hard and soft coral species and other highly productive systems such as seagrass beds (UNEP/FAO/PAP/CDA, 2000; Dahdouh-Guebas *et al*., 1999) that attract and support many marine organisms including crustaceans, molluscs, coelenterates, sponges, reef fishes and sea turtles. Part of the fringing reef, which extends along almost the entire Kenyan coast, protects the MPA from severe wave action by dissipating wave energy. The Mombasa MPA supports a wide range of socio-economic activities with over 200 local resource users, including fishermen, boat operators, kiosk operators and curio sellers, depending directly or indirectly on the MPA (Tuda *et al*., 2014).

***Institutional framework***
The Mombasa MPA is under the jurisdiction of the KWS, responsible for planning and management decisions.

***Management plan***
There is no current management plan.

***Management objectives***
The previous management plan outlines the key management goals as aiming to:
- protect a representative sample of the coral reef and seagrass ecosystems;

- restore and rehabilitate the damaged marine ecosystems;
- provide for ecological sustainable use of the marine resources for cultural and economic benefits;
- ensure that activities within the marine protected areas are controlled and conform to the management regulations for ecological sustainability;
- enable the stakeholders to participate in a wide range of eco-friendly recreational activities;
- implement zonation as a management tool in the marine protected area in order to eliminate conflicts between user groups; and
- promote applied research, educational awareness programmes, for community participation, and for capacity building.

***Risks and threats***

Threats to the coral reefs include from destructive fishing (mainly beach seining), beach erosion from increasing developments on the beach and climate change. The single most significant impact on the MPA, and one most well-documented, was the El-Niño linked mass-bleaching and mortality of coral in 1998. Since 1998 there have been at least two minor bleaching events (in 2005 and 2013) and with increasing ocean temperatures the future of corals in MMPA and elsewhere is under threat (Obura, 2005; McClanahan *et al*., 2007).

***Management opportunities***

There are a wide range of partners who support the MPA in terms of resources and research, and there are increased opportunities for managing the marine reserve using co-management as an alternative approach to address current threats from destructive fishing.

**Mangrove crab for sale at a street market.** © Peter Chadwick

## Diani–Chale Marine National Park and Reserve

Diani–Chale Marine National Park and Reserve is located in Diani, 26km south of Mombasa (Figure 1), 165km$^2$ in extent. The reserve was legally designated in 1995, but active management of the MPA failed because of intense conflict between the KWS and local communities over benefit sharing (IUCN, 2003). The reserve was established to safeguard coral reefs and improve local fisheries and as a tourist attraction. Although Diani–Chale is gazetted as a marine reserve, no tangible conservation work has been done in the area. Currently no personnel, infrastructure or equipment are assigned to this site. Mistrust between communities and KWS still persists. Different options are being pursued to find ways of making the reserve operational. For example, KWS undertook a number of community-targeted resource management programmes and training sessions through the KWS/Netherlands Wetland Conservation and Training Programme (McClanahan *et al*., 2000). There have also been several conservation initiatives and activities under the integrated coastal area management (ICAM) programme, being conducted jointly by a number of stakeholders and institutions. The County Government of Kwale has also expressed their desire to see the marine reserve brought into active management but under a co-management systems that offers direct benefits to local communities. The proposed transboundary marine conservation area between Kenya and Tanzania also provides an opportunity to revitalize conservation activities in the reserve (MPRU/KWS, 2015).

## Kisite–Mpunguti Marine Park and Reserve

The Kisite–Mpunguti Marine Park and Reserve (or MPA, thus KMMPA in short) is located near the Tanzanian border on the southernmost part of the Kenyan coastline (Figure 1). Both park and reserve were gazetted in 1978. The park covers an area of 28km$^2$ while the reserve covers 11km$^2$. The KMMPA and adjacent areas have exceptional resource values in terms of biodiversity such as sea turtles, whales, dolphins, dugongs, coral reefs, coconut crabs and the mangrove ecosystem. Features including sandy beaches and the islands provide important scenic areas for tourism. The cultural values of KMMPA include the Shimoni Slave Caves, and the Wasini historical ruins and war graves (KWS, 2015c).

***Institutional framework***

The KMMPA is under the jurisdiction of the KWS, responsible for planning and management decisions.

***Management plan***
The MPA has a current management plan that provides guidance for management for the period 2016–2025.

***Management objectives***
The sets goals and objectives of the MPA include: enhancing biodiversity conservation through participatory approaches; providing suitable breeding and feeding habitats for marine organisms; and promoting sustainable nature tourism. A set of specific objectives with targets has also been defined to operationalize the goals. The specific objectives are:

- maintaining coral cover above 40 percent during the period of the plan;
- maintaining seagrass density above 600 plants/$m^2$;
- maintaining fish biomass above 1000kg/ha total (snappers, triggerfish, parrotfish, surgeonfish, butterflyfish and rabbitfish);
- reducing violations in the MPA; and
- improving participation of local fishers in conservation and the benefits they draw from the MPA.

***Risks and threats***
These include threats to coral reefs including from bleaching, overfishing in the marine reserve and destructive fishing (beach seines and use of small mesh-sized nets), mainly from migrant fishers.

***Management opportunities***
The increasing number of locally managed marine areas (LMMAs) adjacent to KMMPA can potentially improve connectivity between this MPA and other MPAs. A proposed transboundary marine conservation areas between Kenya and Tanzania offers the opportunity to implement the concept of MPA networks.

## PROPOSED MPAs

Kenya and Tanzania have proposed a Transboundary Marine Conservation Area (TBCA) as a management strategy to address marine environmental problems across the Kenya-Tanzania border. The proposed TBCA is situated at the southernmost part of Kenya's coast bordering Tanzania and the northernmost part of the coast of mainland Tanzania bordering Kenya (Tanga Region) (Figure 2). It is proposed that the TBCA extend from the northern boundary of the Diani-Chale Marine Reserve in Kenya to the southern boundary of Mkinga District in Tanzania between Ulenge and Kwale Islands Marine Reserves. The landward boundary would be the inland jurisdiction limits of the coastal wards in both countries while the seaward boundary would correspond with the 200m depth contour. The latter roughly equates to a distance of 5 nautical miles offshore (MPRU/KWS, 2015).


**Tourists and dolphins, Watamu MPA.** © Arthur O. Tuda / Watamu Marine Association

The area between Diani in Kenya and Pangani in Tanzania was earlier identified as a seascape of eco-regional importance and identified as the Msambweni-Tanga ecoregion (WWF-EAME, 2004). The coastline between Diani and Tanzania includes important biodiversity sites such as the mangrove stands and seagrass beds of Gazi and Funzi Bay, and the Ramisi River Estuary and is an important tourist destination with many sandy beaches, providing good revenues since the 1970s. The proposed TBCA encompasses existing MPAs and several LMMAs. Under the proposed transboundary conservation initiative, it is envisioned that systems of co-management will play an important role in adaptive governance of the transboundary-marine ecosystem.

Other initiatives aimed at increasing the marine area under effective conservation include a Wildlife Conservation Society (WCS) initiative supported by KWS and the State Department of Fisheries to establish a large marine conservation area in Kenya under a marine spatial planning (MSP) framework. The target area is the coastal and marine waters of Malindi-Watamu, stretching from north of the Sabaki River to south of Mida Creek. The area was selected because it supports high coastal and marine biodiversity and has productive fisheries, and hence will benefit from protection and improved management with associated economic and livelihood benefits. The project has the potential to increase Kenya's area of MPA coverage from 941$km^2$ to 1758$km^2$. MSP is a relatively new concept and its application in marine conservation planning in Kenya will also offer an important learning platform for a future proposed National Maritime Spatial Plan and for generating experiences to support the concept of a "Blue Economy". In Lamu County, KWS and the County Government of Lamu are exploring ways to operationalize the proposed Ras Tenewi MPA.

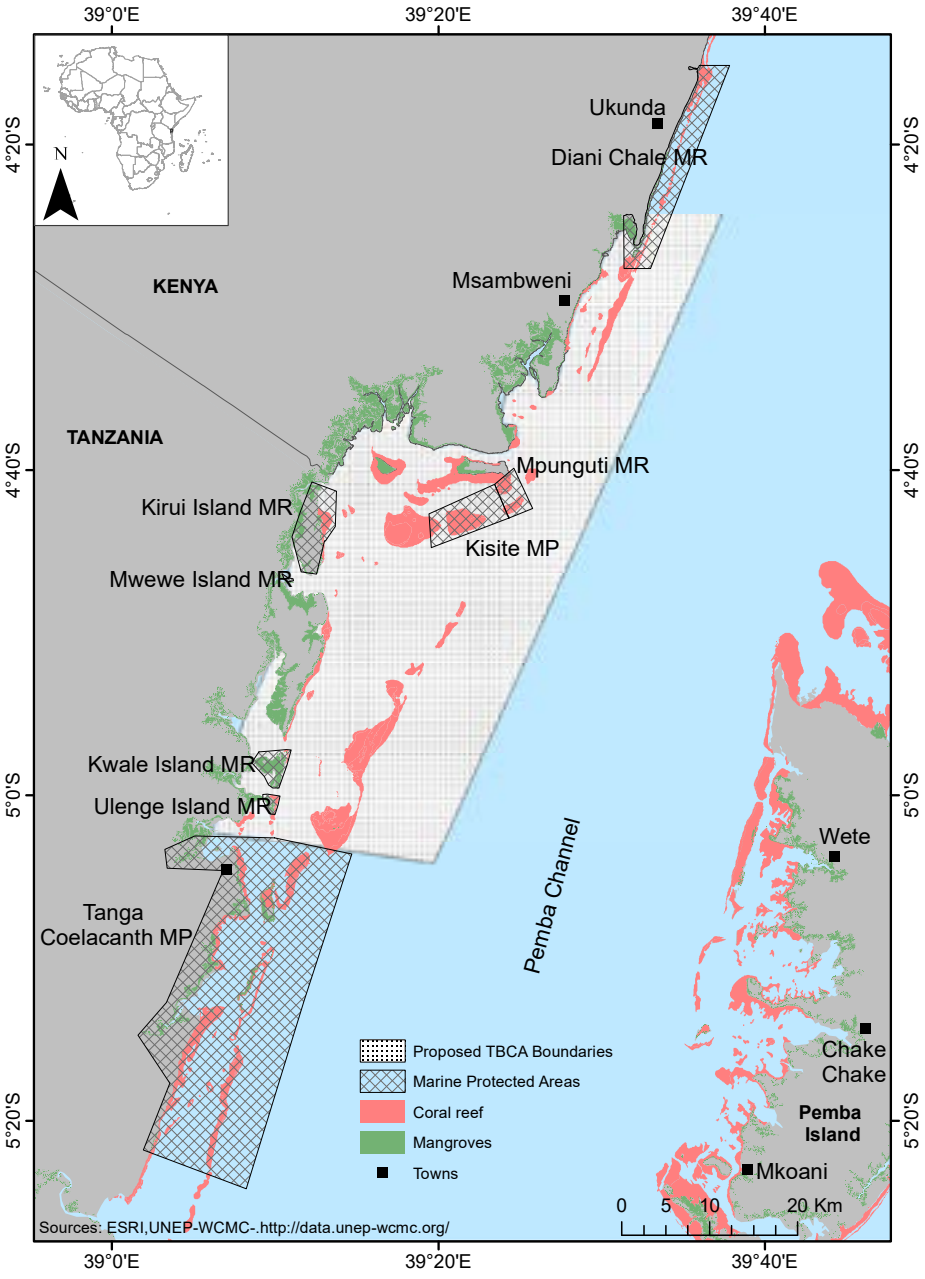


Figure 2: Proposed Kenya-Tanzania transboundary marine conservation area.

## Summary of existing MPA and proposed MPA coverage

Table 2 summarises the areas covered by both existing MPAs and proposed MPAs, and indicates the proportion of EEZ that these represent. There is currently no certainty about the extent of the proposed MPAs.

Table 2. Summary of existing and proposed Kenyan MPAs.

| | |
|---|---|
| Kenya's Exclusive Economic Zone (EEZ) | 142 000km$^2$ |
| EXISTING MPAs | |
| No. of MPAs (combine Parks and Reserves) | 6 |
| MPA area | 941.093km$^2$ |
| % EEZ | 0.67 |
| PROPOSED MPAs | |
| No. of proposed MPAs | 3 |
| Proposed MPA area | Unknown |
| Potential % EEZ | Unknown |

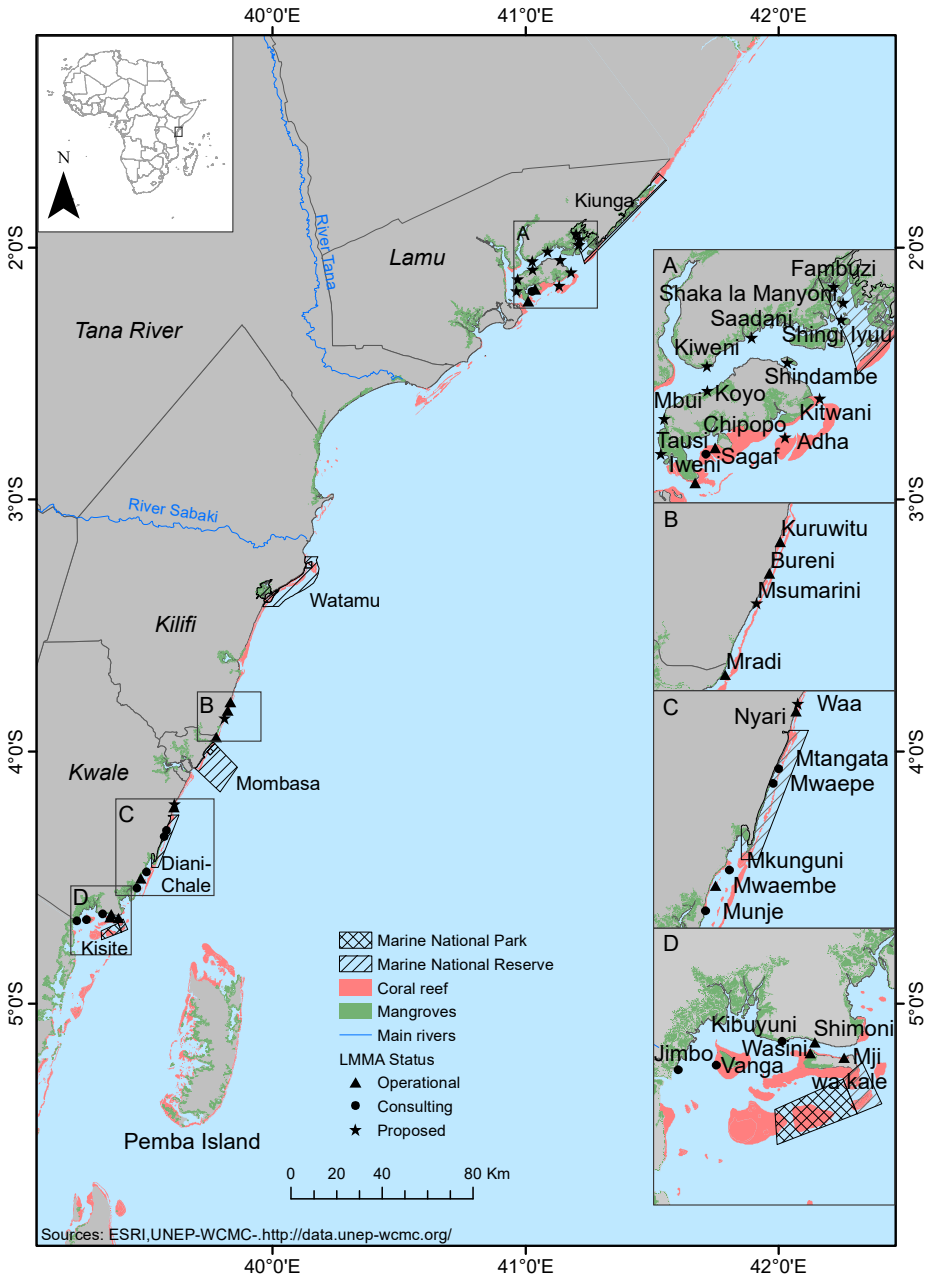


Figure 3: Kenya's Marine Protected Areas and informal conservation areas.

## INFORMAL PROTECTED AREAS

Kenya also applies other effective area-based conservation measures (OECMs) for marine conservation that have been integrated into the wider seascapes. It has been suggested that definition of "OECMs" should refer only to those sites that meet the intent of the IUCN definition of a protected area, but are not currently listed on the World Database on Protected Areas (WDPA). Such areas include some private protected areas, company reserves and indigenous and community conserved areas (Woodley *et al*., 2012). In Kenya, OECMs could include community conservation areas (CCAs), community fisheries closures (tengefu) or LMMAs – the nomenclature is not standardized.

The concept of informal community managed areas is a relatively recent initiative in Kenya and has been evolving over the last six years (Rocliffe *et al*., 2014; McClanahan *et al*., 2016; Kawaka *et al*., 2017). There have also been a number of legislative reviews that aim to give such efforts legal backing and promoting their enforcement e.g. the Fisheries Act, and the Wildlife Conservation and Management Act, 2013. Several LMMAs have been established by coastal fishing communities along the coast as tools for protecting coral reefs and its resources while increasing the social and

ecological benefits. Kenya has seen a rapid rise in the number of LMMAs since 2010 (Kawaka *et al*., 2017). Coastal communities in Kenya are increasingly adopting LMMAs and by 2015, 24 had been established (Figure 2). Coastal communities perceive the objectives of these are to primarily conserve fisheries and marine resources and secure alternative sources of income (*ibid*.). The establishment of LMMAs, commonly known as "*Tengefus*" in Kenya, which include both no-take areas and areas of specific use (McClanahan *et al*., 2016) is intended to strengthen ecosystem management of resources within a co-management framework, the Fisheries Management and Development Act No.35 of 2016, as well as the Fisheries (Beach Management Unit Regulations, 2007 allow BMUs to establish management areas for protection of habitats and species. BMUs are the primary organs for the implementation of co-management processes and they usually comprise fishers, fish traders, boat owners, fish processors and other beach stakeholders who traditionally depend on fisheries activities for their livelihoods (GoK, 2016). Between 2006 and 2018 a total of 42 LMMAs have been documented each being at different stages of establishment: Proposed, Consulting, Planning, Operational (McClanahan *et al*., 2016) (Figure 3 and Table 3).

Although the informal community managed areas are currently not "legal" there is a legal process through the BMU regulations. BMUs with *tengefus* within their fishing grounds can undertake a co-management planning process, draft management plans that upon formal approval by the State Department of Fisheries can become legally co-managed areas hence entrenching them as OECMs e.g. Kuruwitu in Kilifi County.

**Table 3: Informal community managed areas in Kenya.**

| NAME | STATUS | DESIGNATION | YEAR ESTABLISHED | COUNTY | AREA (km²) | CO-MANAGEMENT AREA |
|---|---|---|---|---|---|---|
| Kuruwitu | Operational | NT | 2006 | Kilifi | 0.29 | Kuruwitu |
| Nyari-Kikadini | Consulting | NT | 2006 | Kwale | 0.13 | Nyari |
| Wasini | Operational | NT | 2008 | Kwale | 0.5 | Shimoni-Vanga |
| Tradewinds/Mkwakwani | Consulting | NT | 2009 | Kwale | 0.12 | Tradewinds |
| Jimbo | Consulting | GR | 2009 | Kwale | 0.1 | Shimoni-Vanga |
| Vanga | Consulting | GR | 2010 | Kwale | 0.34 | Shimoni-Vanga |
| Shimoni | Consulting | GR | 2010 | Kwale | 0.11 | Shimoni-Vanga |
| Majoreni | Consulting | GR | 2010 | Kwale | Unknown | Shimoni-Vanga |
| Kibuyuni | Operational | NT | 2010 | Kwale | 0.28 | Shimoni-Vanga |
| Kanamai-Mradi | Operational | NT | 2011 | Kilifi | 0.22 | Kanamai |
| Bureni | Operational | NT | 2013 | Kilifi | 0.52 | Kuruwitu |
| Mkwiro/Mji wa kale | Operational | GR | 2014 | Kwale | 0.16 | Shimoni-Vanga |
| Mwaembe | Proposed | NT | 2014 | Kwale | 0.46 | Mwaembe |
| Munje | Consulting | Unknown | 2015 | Kwale | 0.7 | Munje |
| Mkunguni | Consulting | NT | 2015 | Kwale | 0.27 | Mkunguni |
| Majunguni* | Proposed | Unknown | 2015 | Lamu | 10.7 | Majunguni |
| Chipopo | Operational | NT | 2015 | Lamu | 17.3 | Chipopo |
| Rewa & Kivonga * | Proposed | GR | 2015 | Lamu | 2.37 | Chundwa |
| Iweni | Operational | NT | 2017 | Lamu | 3.64 | Joint Pate-Rubu-Ishakani |
| Mwaepe | Consulting | NT | Proposed | Kwale | 0.87 | Mwaepe |
| Mayungu* | Planning | Unknown | Proposed | Kilifi | Unknown | Mayungu |
| Marereni* | Planning | Unknown | Proposed | Kilifi | Unknown | Marereni |
| Kivuko-Chambani* | Planning | No-take lobster | Proposed | Lamu | 2.21 | Kizingitini |
| Kitwani * | Proposed | Seasonal closure | Proposed | Lamu | 1.34 | Kizingitini |

| NAME | STATUS | DESIGNATION | YEAR ESTABLISHED | COUNTY | AREA (km²) | CO-MANAGEMENT AREA |
|---|---|---|---|---|---|---|
| Adha * | Proposed | GR | Proposed | Lamu | 1.13 | Chundwa |
| Kadhikia-Fawachu * | Proposed | GR | Proposed | Lamu | 2.0 | Chundwa |
| Kijiwe cha Nyuni * | Proposed | GR | Proposed | Lamu | 2.05 | Chundwa |
| Mtanga wa Bandari * | Proposed | Seasonal closure | Proposed | Lamu | 1.33 | Joint Pate-Rubu-Ishakani |
| Tausi* | Proposed | NT | Proposed | Lamu | 2.61 | Mtangawanda |
| Mbui* | Proposed | NT | Proposed | Lamu | 0.39 | Mtangawanda |
| Koyo* | Proposed | GR | Proposed | Lamu | 8.48 | Joint Faza-Siyu-Mbwajumwali |
| Upulu wa Punda* | Proposed | GR | Proposed | Lamu | 4.02 | Joint Faza-Siyu-Mbwajumwali |
| Kiweni* | Proposed | GR | Proposed | Lamu | 3.11 | Joint Faza-Siyu-Mbwajumwali |
| Saadani* | Proposed | GR | Proposed | Lamu | 3.77 | Joint Faza-Siyu-Mbwajumwali |
| Mfunda Wamba* | Proposed | NT | Proposed | Lamu | 0.45 | Joint Faza-Siyu-Mbwajumwali |
| Shindambe* | Proposed | NT | Proposed | Lamu | 3.62 | Joint Faza-Siyu-Mbwajumwali |
| Shingi Iyuu* | Proposed | GR | Proposed | Lamu | 1.81 | Ndau |
| Shaka la Manyoni* | Proposed | GR | Proposed | Lamu | 2.23 | Ndau |
| Fambuzi* | Proposed | GR | Proposed | Lamu | 0.68 | Ndau |
| Msumarini* | Proposed | NT | Proposed | Kilifi | 0.92 | Msumarini |
| Waa* | Proposed | NT | Proposed | Kwale | 0.10 | Waa |

DESIGNATION: NT – no-take; GR – gear restriction.
* – denotes "Tengefus" that are not currently operational.

Modified from McClanahan *et al.*, 2016; Kawaka *et al.*, 2017. The Nature Conservancy (TNC) provided data for Pate Island fisheries Beach Management Units (BMU) fisheries co-management areas use zones / LMMAs (Maina *et al.*, 2017).

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MARINE & COASTAL AREAS
UNDER PROTECTION

# MADAGASCAR

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**Sarodramo village, Madagasca.** © Matthew D. Richmond

## COUNTRY OVERVIEW

Madagascar is the biggest island in the Western Indian Ocean (WIO) region and the fourth largest in the world. It is located off the east coast of Africa, separated by the Mozambique Channel (Figure 1). It has a coastline extending over 4500km (Office National pour l'Environnement, 2006) and presents a wide variety of marine and coastal habitats including coral reefs, islands, seagrass meadows and mangroves. Madagascar's economic exclusive zone (EEZ) was proclaimed in 1985 and covers approximately 1 147 712km$^2$ according to *Réseau de la Biodiversité de Madagascar* (REBIOMA). The continental shelf rarely exceeds 60m depth and is narrow (up to 8km) on the east coast, extending up to 100km on the west coast (Office National pour l'Environnement, 2006). The islands of Glorieuses, Juan de Nova, Europa and Bassas da India and surrounding waters are the subject of an on-going dispute between France and Madagascar (see Annex).

In the late 1980s, the Government of Madagascar developed the country's National Environmental Action Plan, where protected areas were the key feature (Patullo and Linton, 2013). The National Association for Protected Areas Management (ANGAP) was then created, later becoming Madagascar National Parks. Sustainable management of marine and coastal zones started to develop from 1997 during Phase II of the National Environmental Action Plan and went on through Phase III from 2002 (Ranaivoson, 2009). In 2003, during the IUCN World Parks Congress in Durban, the Malagasy government committed to increase Madagascar's protected areas from 17 000km$^2$ to 60 000 km$^2$, including both terrestrial and marine areas. This led to the creation of the Durban Vision Group, which through its Environment and Fisheries Commission, identified, created and formalized new marine protected areas (MPAs) (see Ranaivoson, 2009). At the time of the World Parks Congress, only two MPAs existed in Madagascar. Since then, 20 MPAs have been created alongside more than 200 Locally Managed Marine Areas (LMMAs). Currently, approximately 22 000 km$^2$ of coastal and marine areas are formally protected.

The *Système des Aires Protégées de Madagascar* (SAPM) Commission, an advisory body within the *Ministère de l'Environnement, de l'Ecologie et des Forêts* (MEEF), comprises all gazetted protected areas of Madagascar that were created by a MEEF decree. These include terrestrial and marine protected areas, managed by Madagascar National Parks, non-governmental organisations (NGOs), local communities and the private sector. In addition to gathering and managing information about the protected areas of Madagascar, the Commission also provides policies and guidelines for the creation and management of protected areas as well as exploring innovative governance systems for protected areas inspired by IUCN categories (Patullo and Linton, 2013).

All protected areas in Madagascar, including MPAs, are managed according to the *Code des Aires Protégées* (COAP) which was revised in 2015 to address the limited provisions of the 2003 Code. The latest COAP considers principles developed by IUCN to:

- allow modern management of protected areas considering the rights and needs of neighbouring communities;
- include other types of actors as well as new management modes; and
- promote the sustainable use of natural resources.

### Key marine habitats and key marine (or marine dependent) species found in Malagasy waters

The main coastal and marine habitats found in the WIO are coral reefs, seagrass beds and mangrove forests (Richmond, 2011). In Madagascar, coastal areas constitute about 51 percent of its whole territory and present major ecological as well as economic interests for a coastal population that represents 65 percent of the Malagasy population (Ranaivoson, 2009). Coastal areas include the terrestrial component of the shorelines and humid zones in contact with the sea (Razafindrainibe *et al*., 2012).

The surface area of Madagascar coral reefs are about 223km$^2$ (Spalding *et al*., 2001). By area, they constitute 24.83 percent of the coral reefs of the WIO, second only to the Seychelles (Razafindrainibe *et al*., 2012). Results from Conservation International Rapid Assessment Program (RAP) in 2002 and 2007 in the northwest and northeast, and bio-ecological assessments in 2006 and 2009 in the southwest recorded 788 reef fish species (similar to neighbouring islands), and 380 coral species (the highest in the WIO and Red Sea) (Razafindrainibe *et al*., 2012).

Northern and northwestern Madagascar have been found to be areas of high coral diversity within the Indian Ocean (Obura, 2012; Veron, *et al*., 2015). Madagascar presents a high coral endemism with the genus *Horastrea* and at least eight species not found anywhere else (Razafindrainibe *et al*., 2012). Coral reefs support the livelihoods of the majority of coastal people through small scale fisheries (Le Manach *et al*., 2012). Fishery products from coral reefs constitute also an important source of protein for the Madagascar population.

**Fishers with their daily catch, Madagascar.** © Tony Rakoto

Seagrass meadows are important habitats for a number of marine organisms including fish and shellfish of commercial interest (Gullström *et al*., 2002). They also constitute feeding areas for sea turtles and marine mammals such as the dugongs. Though they are poorly studied, the following ten species found commonly in the southwest Indian Ocean have been identified: *Thalassodendron ciliatum*, *Thalassia hemprichii*, *Syringodium isoetifolium*, *Cymodocea rotundata*, *C. serrulata*, *Halodule uninervis*, *H. wrightii*, *Halophila ovalis*, *H. stipulacea* and *Zostera capensis* (Razafindrainibe *et al*., 2012). Mangroves are mostly located on the west coast with eight species belonging to six families, out of nine species found in the WIO (Razafindrainibe *et al*., 2012). The surface area of Madagascar mangrove forests has been estimated by several authors and the figures vary from 2991km$^2$ to 4530km$^2$ (Rakotomavo and Fromard, 2010; Razafindrainibe *et al*., 2012; Richmond, 2011). Mangroves provide to the local communities important ecological services such as protection of shorelines as well as nursery grounds and refuge for fish, crabs and shrimps, and societal goods such as wood used for building and cooking (Giri and Muhlhausen, 2008).

Marine and coastal habitats in Madagascar are mostly threatened by hyper-sedimentation, destructive fishing practices, and overfishing, as well as climate-change threats such as the rise of seawater temperature and extreme weather events.

Key species that are found in Madagascar waters include marine mammals such as dolphins, whales and dugongs, turtles (mainly Green, Hawksbill and Loggerhead), sharks and rays, and reef and pelagic fishes. Madagascar waters are crucial migration routes as well as breeding grounds for marine mammals, particularly Humpback whales (*Megaptera novaeangliae*). In addition, the submarine canyons in southwestern Madagascar are likely to support a coelacanth population (Green *et al*., 2009). Lemurs and endemic birds such as the Madagascar Fish Eagle ("ankoay" *Haliaeetus vociferoides*) are also found in coastal forests.

## MPA OVERVIEW

Formal MPAs in Madagascar are identified in Figure 1. Formal MPAs were created by a MEEF decree and their boundaries should be marked by buoys. There are 22 MPAs in Madagascar according to the SAPM database, covering 14 451km$^2$ of the national waters which represents about 1.26 percent of the EEZ. Some MPAs protect solely marine and coastal habitats, such as at Soariake MPA in the southwest, but they can also be extensions of terrestrial protected areas, as in the case of Kirindy Mite National Park in Menabe Region, west coast. Through the formal gazetting process, the national

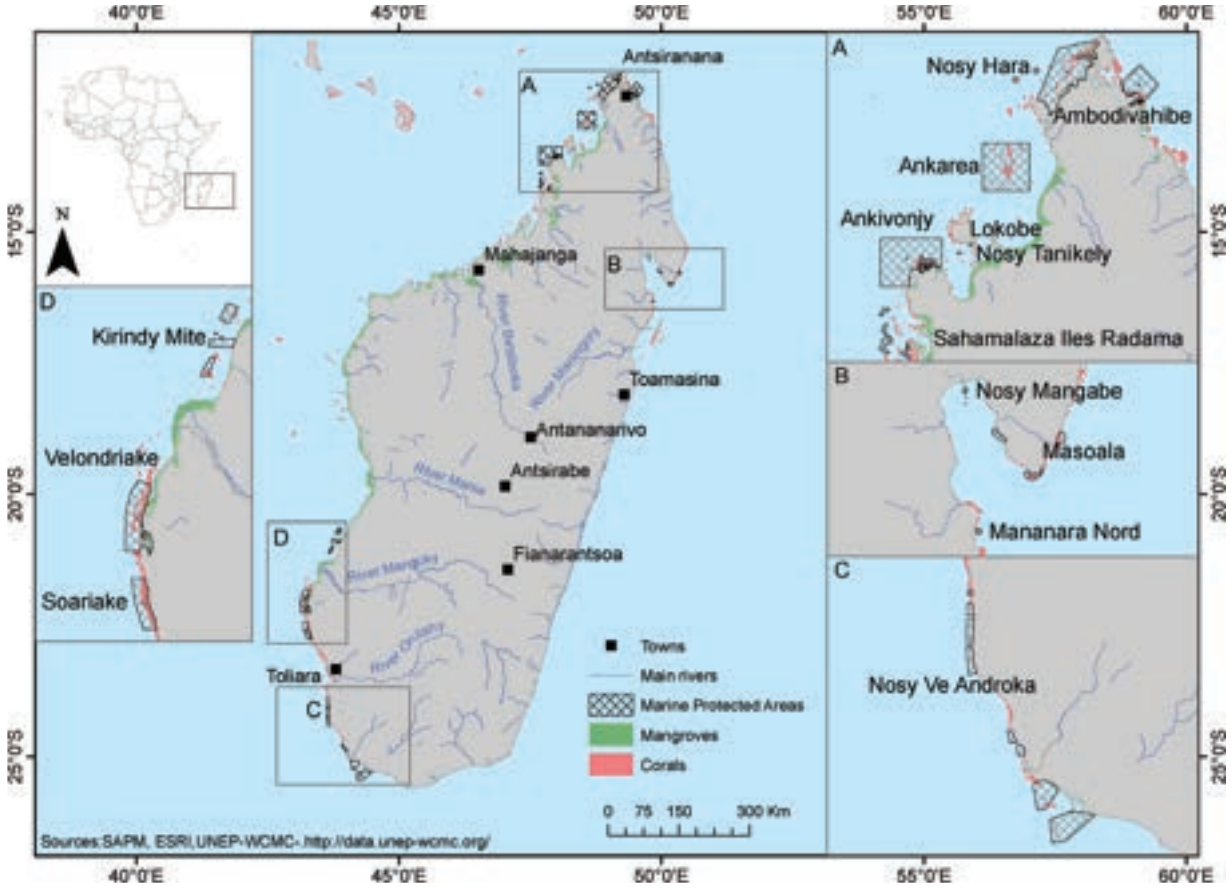


Figure 1: Madagascar's formal Marine Protected Areas.

decrees designate them as simply "protected areas", and not *marine* protected areas.

There are three modes for the management of MPAs in Madagascar:

- **State management:** Madagascar National Parks, a parastatal organisation, is the main agency responsible for MPA management (nine MPAs).
- **Co-management:** multiple stakeholders such as local communities, NGOs, national associations, research institutions, private sector, etc. share responsibility for the MPA (12 MPAs).
- **Private management:** the MPA is declared by a private entity (one MPA).

There can, however, be a mix of these management modes within one MPA. For example, in the Menabe Antimena Protected Area (west coast) where the terrestrial component is managed by the Fanamby Association and the marine component (mangrove forests) is managed by local communities supported by WWF.

Protected areas within SAPM are required to have a management plan detailing the conservation targets, threats that they are subjected to, the conservation strategies addressing these threats and the MPA zoning. However, some MPAs are still in the process of developing their management plans. Protected areas should also provide thorough information about the ecosystems and biodiversity found within their borders as well as socio-economic information about the local communities living within or around them.

Habitats protected through MPAs are mostly located nearshore or on the continental shelf. There are currently no MPAs protecting deep-sea areas in Madagascar probably due to surveillance challenges. Patrolling activities are undertaken by park rangers in collaboration with the local park committees (in cases of collaborative state-management), or by local surveillance committees (in cases of co-management). The MPA rules are enforced locally by the *dina* committee composed of elders and local authorities (if the tribunal has approved the local by-law), and/or by sworn agents of the MEEF for coastal forests and mangroves or the *Centre de Surveillance des Pêches* (CSP) in collaboration with the National Police or the National *Gendarmerie*.Some protected areas which include both terrestrial and marine components do not have specific information about the marine and coastal habitats and species and thus it is not always possible

to calculate the surface area of the marine component or identify the specific threats or conservation objectives.

Nevertheless, Madagascar's MPAs make a substantial contribution towards protecting coastal and marine habitats, mainly coral reefs, seagrass beds, mangroves and islands, although management performance was found to be quite low in areas with high coral biodiversity, a common feature across the Indo-Pacific region (Mora *et al*., 2006). Thus, a number of challenges still need to be addressed by MPA managers as well as governmental agencies in order for them to be fully effective. These include finding sustainable funding sources, establishing good relationships with all stakeholders through more inclusive creation and management processes, and implementing clear monitoring strategies (Lundquist and Granek, 2005).

## MARINE AREAS UNDER PROTECTION

Detailed information on each MPA in Madagascar is presented in Table 1, below. Most MPAs were granted definitive protection status in 2011 and 2015. The first MPA, Mananara Nord National Park in Analanjirofo Region (northeast) was created on 25 July 1989 and the most recent, Ranobe Bay in Atsimo Andrefana Region (southwest), was created on 5 May 2015. The creation decree does not usually specify that the protected area is a *marine* protected area except in the case of Ambodivahibe MPA which was created on 28 April 2015. All protected areas are state properties but the management is delegated to partners such as NGOs, national associations or private companies. MPAs are under the guardianship of two Ministries, the MEEF and the *Ministère des Ressources Halieutiques et des Pêches* (MRHP). Regional authorities and regional Ministry representatives are involved in the management of the protected areas within a region through the *Comité d'Orientation et de Suivi* (COS).

Since 2003, fishing communities have been heavily involved in the process of creation and management of MPAs in Madagascar. They can either have full responsibility for the management or can be responsible for managing parts of the MPA or bordering areas. They are involved in patrolling activities and recording of illegal activities as well as biodiversity monitoring activities. Each protected area also has a Social Safeguard Plan (SSP) to ensure that local communities, whose income may have decreased due to the existence of the protected area, are provided with assistance in developing alternative livelihoods.

Usually, MPAs are divided into the following three zones (Patullo and Linton, 2013) though some variations could occur:

- **The core area** or no-take zone where no fishing is permitted although research (with a permit), tourism and passage of boats can be possible.

- **The buffer zone** where the temporary marine reserves can be created. Buffer zones can also contain human habitations established prior to the park creation, with regulated traditional economic activities, and the park infrastructure (management building, ecotourism trails, camping sites).

- **The protection zone**, which is just outside the park boundaries, where any non-traditional activity needs to be discussed in a concerted way

MPAs in Madagascar are mainly funded by international donors such as the World Bank and the MacArthur Foundation, and by national donors such as Tany Meva Foundation and *Fondation pour les aires protégées et la biodiversité de Madagascar* (FAPBM). Only two MPAs are financially self-sustaining, mainly from ecotourism activities: Nosy Antsoha, which is privately-managed and Nosy Tanikely National Park which is co-managed by Madagascar National Parks, Nosy Be Urban Commune and Nosy Be Tourism Office.

Most MPAs in Madagascar are starting to implement systems to monitor management effectiveness although the indicators provided by the MEEF are difficult to apply to MPAs as they apply more to terrestrial protected areas. Madagascar National Parks and the Wildlife Conservation Society have been using the World Commission on Protected Areas (WCPA) Management Effectiveness Tracking Tool (METT) methodology since 2013 and 2017 respectively.

**Local community gathering mangrove propagules for re-planting in Madagascar.** © Tony Rakoto

Table 1: Formal MPAs in Madagascar.

| DESIGNATION<br>TYPE<br>HABITATS / KEY SPECIES<br>LOCATION | EXTENT<br>PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE / ZONED | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN: STATUS and DATES<br>SPECIFIC OBJECTIVES |
|---|---|---|---|---|
| **NOSY HARA NATIONAL PARK** | | | | |
| Coastal and pelagic MPA<br>Coastal dry forest<br>Beaches<br>Mangroves<br>Seagrasses<br>Coral reefs<br>Islands (30)<br><br>Turtles: *Eretmochelys imbricata (*CR), *Chelonia mydas* (EN)<br>Fish Eagle (*Haliaeetus vociferoides*) (CR)<br>Seabirds (terns)<br><br>Antsiranana II, Diana Region (northwest) | 1257km$^2$<br><br>MEEF decree no. 2011/497 of 6 July 2011<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category II<br><br>Core area: 300km$^2$<br><br>Component 1: 1228km$^2$<br>Component 2: 14km$^2$<br>Component 3: 12km$^2$ | Managed by Madagascar National Parks<br><br>Collaborative management with COSAP (Protected Area Orientation and Monitoring Committee) and CLP (Park Local Committee) | Management plan 2017–2021<br><br>Management objectives:<br>– maintain current coral cover<br>– maintain current mangroves density<br>– maintain current seagrasses surface area<br>– no poaching of turtles<br>– no poaching of birds eggs<br>– protect nests |
| **AMBODIVAHIBE MPA** | | | | |
| Coastal MPA<br><br>Coastal forests<br>Beaches<br>Mangroves<br>Seagrasses<br>Coral reefs<br>Islands<br><br>Antsiranana II, Diana Region (northwest) | 466km$^2$<br><br>MEEF decree no. 2015/753 of 28 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category V<br><br>Core zone: 39km$^2$<br><br>Buffer zone: 348km$^2$ | Collaborative management between the local community association and Conservation International | Management plan 2015–2020<br><br>Four strategic focus areas:<br>– fisheries zones sustainably managed in participatory and transparent ways<br>– marine biodiversity efficiently conserved using scientific tools research and knowledge<br>– community tourism developed<br>– alternative source of revenue developed and well managed to insure socio-economic development |

Sources: SAPM, Madagascar National Parks, Conservation International, WWF, Wildlife Conservation Society, Asity, Fanamby, Blue Ventures, Reef Doctor.

IUCN Red List categories: EN – endangered, CR – critically endangered.

| DESIGNATION<br>TYPE<br>HABITATS / KEY SPECIES<br>LOCATION | EXTENT<br>PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE / ZONED | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN: STATUS and DATES<br>SPECIFIC OBJECTIVES |
|---|---|---|---|---|
| **ANKAREA MPA** | | | | |
| Coastal MPA<br>Beaches<br>Seagrasses<br>Coral reefs<br>Islands<br><br>Marine mammals: *Megaptera novaeangliae, Eubalaena australis, Stenella longirostris, Dugong dugon*<br>Birds: *Haliaeetus vociferoides*<br>Turtles: *Chelonia mydas, Eretmochelys imbricata, Caretta caretta, Dermochelys coriacea*<br>Molluscs: *Turbo* sp, *Charonia tritonis*<br>Whale shark, manta ray, sawfish<br><br>Ambilobe, Diana Region (northwest) | 1355km$^2$<br><br>MEEF decree no. 2015/721 of 21 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category V<br><br>Core area: 137km$^2$<br><br>Buffer zone<br><br>Controlled Occupation zone: 29.35km$^2$<br><br>Controlled Use Zone: 1189km$^2$ | Collaborative management between the local community association and Wildlife Conservation Society | Management plan 2013–2017<br><br>Specific objectives:<br>– maintain ecological integrity<br>– improve local communities' living conditions<br>– implement a sustainable management system |
| **LOKOBE NATIONAL PARK** | | | | |
| Terrestrial and coastal protected area<br><br>Coastal humid forest to 430m<br>Mangroves<br>Seagrasses<br>Coral reefs<br><br>Nosy Be, Diana Region (northwest) | 1.22km$^2$ marine component<br>7.40km$^2$ terrestrial component<br><br>MEEF decree no. 2011/500 of 6 September 2011<br>Extension to marine portion<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category II<br><br>Buffer zone: terrestrial and marine<br><br>Protection zone: terrestrial and marine | Managed by Madagascar National Parks<br><br>Collaborative management with COSAP (Protected Area Orientation and Monitoring Committee) and CLP (Park Local Committee) | Management plan 2012–2016, to be updated in 2018<br><br>Specific objectives :<br>– biodiversity conservation<br>– park co-managed within a clear and formal framework<br>– competent and efficient staff |

| DESIGNATION<br>TYPE<br>HABITATS / KEY SPECIES<br>LOCATION | EXTENT<br>PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE / ZONED | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN: STATUS and DATES<br>SPECIFIC OBJECTIVES |
|---|---|---|---|---|
| **NOSY TANIKELY NATIONAL PARK** | | | | |
| Terrestrial and coastal protected area<br><br>Island forest<br>Beaches<br>Seagrasses<br>Coral reefs<br><br>Turtles: *Eretmochelys imbricata, Chelonia mydas*<br>Reef fishes: *Lutjanus kasmira, L. fulviflamma, Plectorhinchus gaterinus, Plectorhinchus playfairi, Cephalopholus argus, Epinephelus lanceolatus*<br><br>Nosy Be, Diana Region (northwest) | 1.71km$^2$ marine component<br>0.09km$^2$ terrestrial component<br><br>MEEF decree no. 2011/499 of 6 September 2011<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category II<br><br>Core area:<br>marine 0.38km$^2$<br>terrestrial 0.056km$^2$<br><br>Buffer zone :<br>marine 1.33km$^2$<br>terrestrial 0.034km$^2$<br><br>Protection zone: 1.6km$^2$<br><br>Service zone | Managed by Madagascar National Parks, Nosy Be Commune and Nosy Be Tourism Office | Management plan 2016–2020<br><br>Specific objectives:<br>– ecotourism<br>– conservation<br>– research on the biodiversity and habitats<br>– environmental education<br>– community development |
| **NOSY ANTSOHA MPA** | | | | |
| Coastal MPA<br><br>Island forest<br>Beaches<br>Coral reefs<br><br>Ambanja, Diana Region (northwest) | 0.285km$^2$<br><br>MEEF decree no 2015/764 of 28 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category V<br><br>Buffer zone: terrestrial and marine | Managed by Lemuria Land (private tourism operator) | No information |

| DESIGNATION<br>TYPE<br>HABITATS / KEY SPECIES<br>LOCATION | EXTENT<br>PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE / ZONED | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN: STATUS and DATES<br>SPECIFIC OBJECTIVES |
|---|---|---|---|---|
| **ANKIVONJY MPA** | | | | |
| Coastal MPA<br><br>Mangroves<br>Coral reefs<br>Islands<br><br>Marine mammals<br>Birds<br>Turtles<br>Molluscs: *Turbo sp., Charonia tritonis*<br>Sharks and rays: whale shark, manta ray<br><br>Ambanja, Diana Region (northwest) | 1394 km$^2$<br><br>MEEF decree no. 2015/722 of 21 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category V<br><br>Core area: 143km$^2$<br><br>Buffer zone:<br><br>Controlled occupation zone 1.84km$^2$<br>Controlled use zone 1249km$^2$ | Collaborative management between the local community association and Wildlife Conservation Society | Management plan 2013–2017<br><br>Specific objectives:<br>– maintain ecological integrity<br>– improve local communities' living conditions<br>– implement a sustainable management system |
| **SAHAMALAZA ILES RADAMA NATIONAL PARK** | | | | |
| Terrestrial, coastal and pelagic protected area<br><br>Mangroves<br>Seagrasses<br>Coral reefs<br>Islands<br><br>Maromandia, Sofia Region (northwest) | 240.27km$^2$<br><br>MEEF decree no. 2007/247 of 19 March 2007<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category II | Managed by Madagascar National Parks<br><br>Collaborative management with COSAP (Protected Area Orientation and Monitoring Committee) and CLP (Park Local Committee) | Management plan 2012–2016<br><br>Specific objectives:<br>– biodiversity conservation through science-based tools<br>– co-management with the COSAP and the CLP<br>– ecotourism development<br>– realization of alternative community micro-projects to reduce and limit pressure and threats to the Park<br>– improvement of the Park management capacity |

| DESIGNATION<br>TYPE<br>HABITATS / KEY SPECIES<br>LOCATION | EXTENT<br>PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE / ZONED | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN: STATUS and DATES<br>SPECIFIC OBJECTIVES |
|---|---|---|---|---|
| **LOKY MANAMBATO MPA** | | | | |
| Terrestrial and coastal protected area<br><br>Beach<br>Mangrove forests<br>Coral reefs<br>Islands<br><br>Vohémar, Sava Region (northeast) | 2484km$^2$<br><br>MEEF decree no. 2015/759 of 28 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category V<br><br>Core area: 40.36km$^2$<br><br>Buffer zone: 2459.64km$^2$ | Co-management between national association Fanamby and communities<br><br>COS (Orientation and Monitoring Committee) composed by authorities and representatives of stakeholders | Management plan 2014–2018<br><br>Specific objectives:<br>– richness and originality of natural habitats and biodiversity reinforced<br>– partnership culture developed<br>– value of natural and cultural heritage with adapted human activities linked<br>– ecotourism potentiality promoted<br>– sustainable financing insured |
| **NOSY MANGABE NATIONAL PARK** | | | | |
| Terrestrial and coastal protected area<br><br>Lowland humid dense forests<br>Coral reefs<br>Islands<br><br>Maroantsetra, Analanjirofo Region (northeast) | 5.95 km$^2$<br><br>MEEF decree no. 2015/775 of 28 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category II | Managed by Madagascar National Parks<br><br>Collaborative management with COSAP (Protected Area Orientation and Monitoring Committee) and CLP (Park Local Committee) | Five-year management plan<br><br>Specific objectives:<br>– biodiversity conservation through science-based tools<br>– co-management with the COSAP and the CLP<br>– ecotourism development<br>– realization of alternative community micro-projects to reduce and limit pressure and threats on the Park<br>– improvement of the Park management capacity |

| DESIGNATION<br>TYPE<br>HABITATS / KEY SPECIES<br>LOCATION | EXTENT<br>PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE / ZONED | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN: STATUS and DATES<br>SPECIFIC OBJECTIVES |
|---|---|---|---|---|
| **MASOALA NATIONAL PARK** | | | | |
| Terrestrial and coastal protected area<br><br>Humid dense forests<br>Coastal eastern forest<br>Mangroves<br>Coral reefs<br><br>Turtles<br><br>Maroantsetra/Antalaha, Analanjirofo/Sava Region (northeast) | 2405km$^2$<br>Marine parcels: 107km$^2$<br><br>MEEF decree no. 97/141 of 2 March 1997 | Category II<br><br>Three marine components: Tampolo, Masoala, Tanjona<br><br>Marine core area: 100km$^2$<br>Buffer zone: Controlled Occupation Zone, Controlled Use Zone, Service Zone<br>Protection zone | Managed by Madagascar National Parks<br><br>Collaborative management with COSAP (Protected Area Orientation and Monitoring Committee) and CLP (Park Local Committee) | Management plan 2012–2016<br><br>Specific objectives:<br>– biodiversity conservation through science-based tools<br>– co-management with the COSAP and the CLP<br>– priority markets development<br>– improvement of the Park management capacity |
| **MANANARA NORD NATIONAL PARK** | | | | |
| Terrestrial, coastal and pelagic protected area<br><br>Coastal forest<br>Beaches<br>Mangroves<br>Seagrasses<br>Coral reefs<br>Sandy bottom to 20m<br><br>Mananara, Analanjirofo Region (northeast) | 241.56km$^2$<br>marine part: 11km$^2$<br><br>MEEF decree no. 89/216 of 25 July 1989 | Category II | Managed by Madagascar National Parks<br><br>Collaborative management with COSAP (Protected Area Orientation and Monitoring Committee) and CLP (Park Local Committee) | Five-year management plan<br><br>Specific objectives:<br>– biodiversity conservation through science-based tools<br>– co-management with the COSAP and the CLP<br>– ecotourism development<br>– realization of alternative community micro-projects to reduce and limit pressure and threats on the Park<br>– improvement of the Park management capacity |

| DESIGNATION<br>TYPE<br>HABITATS / KEY SPECIES<br>LOCATION | EXTENT<br>PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE / ZONED | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN: STATUS and DATES<br>SPECIFIC OBJECTIVES |
|---|---|---|---|---|
| **ANTREMA** | | | | |
| Terrestrial and coastal protected area<br><br>Mitsinjo, Boeny Region (mid-west) | 204km$^2$<br><br>MEEF decree no. 2015/712 of 21 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category VI | No information | No information |
| **MAHAVAVY KINKONY** | | | | |
| Terrestrial and coastal protected area<br><br>Mangroves<br><br>Mitsinjo, Boeny Region (mid-west) | 351km$^2$<br><br>MEEF decree no. 2015/718 of 21 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category V<br><br>Marine area: 175km$^2$ of marine and coastal zone, 182km$^2$ of mangroves<br><br>Core area: 230.68km$^2$ with mangroves<br><br>Buffer zone: 2789.32km$^2$ | Co-managed between national association Asity, and community association platform Marambitsy Miahy ny Zava-Boahary (MMZ)<br><br>Orientation and Monitoring Committee composed of stakeholder representatives and directed by regional authorities | Management plan 2015–2019<br><br>Specific objectives:<br>– identifying and implementing a process to assure sustainability of the protected area<br>– sssuring long-term viability of the biodiversity and reducing threats<br>– promoting sustainable use of resources to assure community wellbeing and conservation<br>– instituting good governance<br>– promoting ecotourism to insure regional economic development |

| DESIGNATION<br>TYPE<br>HABITATS / KEY SPECIES<br>LOCATION | EXTENT<br>PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE / ZONED | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN: STATUS and DATES<br>SPECIFIC OBJECTIVES |
|---|---|---|---|---|
| **TSIMEMBO MANAMBOLOMATY** | | | | |
| Terrestrial and coastal protected area<br><br>Mangroves<br>Lakes<br>Madagascar endemic Fish Eagle (*Haliaeetus vociferoides*)<br>Madagascar endemic big-headed turtle *Erymnochelys madagascariensis*<br>Duck *Anas bernieri*<br><br>Antsalova/Maintirano/ Morafenobe, Melaky Region (west) | 626km²<br><br>MEEF decree no. 2015/715 of 21 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category V<br><br>Core area 7km²<br>Buffer zone, tourist zone, research zone, utilization zone, controlled occupation zone, cultural zone, restoration and reforestation zone<br>Protection zone: 2.5km distance from buffer zone | Managed by a participatory management committee composed by NGOs, The Peregrine Fund, Durrell Wildlife Trust and ten local community associations<br><br>Supervised by a COE (Orientation and Evaluation Committee) composed by administrative authorities and representatives of the Ministry of Environment and of the Defense, and NGOs | Management plan 2015–2019<br><br>Specific objectives:<br>– maintaining biodiversity and habitats of aquatic birds, turtles, bats<br>– reducing threats to species and mangroves<br>– maintaining fish stock by respecting fisheries regulations |
| **MENABE ANTIMENA PROTECTED AREA** | | | | |
| Terrestrial and coastal protected area<br><br>Coastal zone<br>Mangroves<br>Lake<br><br>Madagascan endemic big-headed turtle: *Erymnochelys madagascariensis*<br>Aquatic birds living in mangroves: *Anas bernieri* (EN), H*aliaeetus vociferoides* (CR), *Ardea humbloti* (EN), *Threskiornis bernieri* (EN)<br><br>Morondava/Belo sur Tsiribihina, Menabe Region (west) | 2019km²<br><br>MEEF decree no. 2015/762 of 28 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category V<br><br>Core zone: 436.76km²<br><br>Buffer zone: 1382.56km²<br>Areas with particular status:<br>– Andranomena Forest Special Reserve (81.7km²)<br>– private shrimp farming AQUAMEN (38.68km²)<br>– state forest concession (125km²)<br>– private forest concession Delhormes (120km²) | Large landscape co-managed by private entity from state.<br><br>Main managing institution in charge of coordination is Fanamby Association.<br><br>Different management units per zone and ecosystem: WWF for mangroves, Madagascar National Parks for Andranomena forest reserve, 20 communities for forests and saline habitats, private concessions managed privately, Centre National de Formation, d'Etudes et de Recherche en Environnement et Forestier (CNFEREF) for state forest.<br><br>Orientation Committee composed by Ministry of Environment and administrative authorities, private sectors and financial partners. | Management plan 2014–2019<br><br>Specific objectives:<br>– identifying and implementing a process to insure sustainability of the protected area<br>– insuring long-term viability of the biodiversity<br>– promoting sustainable use of resources to assure community well-being and conservation<br>– instituting good governance<br>– developing concerted management plan and integrating protected area management into regional development |

| DESIGNATION<br>TYPE<br>HABITATS / KEY SPECIES<br>LOCATION | EXTENT<br>PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE / ZONED | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN: STATUS and DATES<br>SPECIFIC OBJECTIVES |
|---|---|---|---|---|
| **KIRINDY MITE NATIONAL PARK** | | | | |
| Terrestrial, coastal and pelagic protected area<br><br>Coastal lakes<br>Dunes<br>Beaches<br>Mangroves<br>Seagrasses<br>Coral reefs<br>Islands<br><br>Manja/Morondava, Menabe Region (west) | 1562km$^2$<br><br>MEEF decree no. 2015/735 of 21 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category II<br><br>Core area: 29%<br><br>Buffer zone: 71% | Managed by Madagascar National Parks<br><br>Collaborative management with COSAP (Protected Area Orientation and Monitoring Committee) and CLP (Park Local Committee) | Five-year management plan<br><br>Specific objectives:<br>– biodiversity conservation<br>– co-management and community participation<br>– marketing of the MPA (ecotourism, research)<br>– management |
| **VELONDRIAKE MPA** | | | | |
| Coastal MPA<br>Beaches<br>Mangroves<br>Seagrasses<br>Coral reefs<br>Islands<br><br>Morombe, Atsimo Andrefana Region (southwest) | 688km$^2$<br><br>MEEF decree no. 2015/752 of 28 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category V<br><br>Core area: permanent fishing reserves<br><br>Buffer zone: temporary fishing reserves | Legally mandated management committee: Velondriake Association and Blue Ventures (co-management)<br><br>Steering committee (Comité d'Orientation et de Suivi): Region, District, Communes, Technical Services, NGOs, Institut Halieutique et des Sciences Marines (IHSM), tourism operators, aquaculture operators, Velondriake Association | Five-year management plan<br><br>Specific objective:<br>– the unity of the community and the cooperation with the local associations lead towards the sustainable management of natural resources, sustainable livelihoods and the local community well-being |
| **SOARIAKE MPA** | | | | |
| Coastal MPA<br><br>Seagrasses<br>Coral reefs<br><br>Marine mammals: whales, dolphins<br>Turtles<br><br>Toliara II, Atsimo Andrefana Region (southwest) | 383km$^2$<br><br>MEEF decree no. 2015–723 of 21 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category VI<br><br>Core area: 6 permanent fishing reserves 0.35km$^2$<br><br>Buffer zone: Controlled Use Zone 382km$^2$ | Collaborative management between the local community association and Wildlife Conservation Society | Management plan 2013–2017<br><br>Specific objectives:<br>– maintain ecological integrity<br>– improve local communities' living conditions<br>– implement a sustainable management system |

| DESIGNATION<br>TYPE<br>HABITATS / KEY SPECIES<br>LOCATION | EXTENT<br>PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE / ZONED | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN: STATUS and DATES<br>SPECIFIC OBJECTIVES |
|---|---|---|---|---|
| **RANOBE BAY MPA** | | | | |
| Coastal MPA<br><br>Coral reefs<br><br>Toliara II, Atsimo Andrefana Region (southwest) | 376km$^2$<br><br>MEEF decree no. 2015/808 of 5 May 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Not defined<br><br>Core areas: permanent fishery reserves<br><br>Buffer zone | MEEF in collaboration with Reef Doctor, IHSM and the local community association FIMIHARA | No management plan |
| **NOSY VE ANDROKA MARINE NATIONAL PARK** | | | | |
| Coastal, pelagic and offshore MPA<br>Seagrasses<br>Coral reefs<br><br>Toliara II/Ampanihy, Atsimo Andrefana Region (southwest) | 912km$^2$<br><br>MEEF decree no. 2015–717 of 21 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category II<br><br>Core area: 25%,<br><br>Buffer zone: 75% | Managed by Madagascar National Parks<br><br>Collaborative management with COSAP (Protected Area Orientation and Monitoring Committee) and CLP (Park Local Committee) | Five-year management plan<br><br>Specific objectives:<br>– biodiversity conservation<br>– co-management and community participation<br>– marketing of the MPA (ecotourism, research)<br>– management |
| **AMBATOATSINANANA** | | | | |
| Terrestrial and coastal protected area<br><br>Thin coastal zone<br>Band of beach and dunes<br>Small marine reserve<br><br>Tolagnaro, Anosy Region (southeast) | 7km$^2$<br><br>MEEF decree no. 2015–778 of 28 April 2015<br><br>SAPM objectives:<br>– conserve the unique biodiversity of Madagascar<br>– conserve cultural heritage<br>– maintain ecological services<br>– promote sustainable use of natural resources | Category V<br><br>Core area: 4.7km$^2$<br><br>Buffer zone: utilization zones (7.93km$^2$)<br>occupation zone | Managed collaboratively by Qit Madagascar Minerals (a mining company) and the local association FIMPIAA (Fikambanan'ny mpiara mitanantana ny ala Ambatotsinanana)<br><br>Orientation Committee (COS) presided by the administrative authorities of Anosy Region, the Ministry of Environment and the Ministry of Fisheries | Management plan with no specific objective for the marine reserve<br><br>Generic objectives:<br>– conserving ecosystem and genetic diversity<br>– preserving ecosystem services<br>– building capacity of community to be involved into protected area management<br>– offering different tourism activities<br>– promote science and education<br>– promote restoration |

## PROPOSED MPAS

Communities in the Barren Islands, located off the west coast are working with Blue Ventures (a UK-based NGO) towards recognition as a MPA. The islands are under temporary protection according to an inter-ministry *arrêté* proclaimed on 10 October 2014, for two years with the possibility of one renewal. Blue Ventures is currently working towards achieving definitive protection through a MPA creation decree. This requires the finalisation of the MPA management plan that is accepted by all stakeholders as well as the management tools such as local management committees and the *dina*.

All preliminary scientific studies regarding the biodiversity and socio-economic aspects were undertaken as well as community organisations established to involve the fishers' communities in the MPA management. The Barren Islands present habitats such as coral reefs and mangroves that are crucial for at least 50 species of fauna on the IUCN Red List including sea turtles, sharks, marine mammals, the coelacanth, and birds (Blue Ventures, unpublished).

Detailed information about this proposed MPA is presented in Table 2.

In 2014, at the IUCN World Parks Congress in Sydney, the Madagascar government promised to grant definitive protection status to all protected areas created under the Durban Vision, to triple the number of the country's MPAs by 2025 and to insure the sustainable financing of Madagascar protected areas (Rajaonarimampianina, 2014). A marine spatial planning project is currently under way bringing together experts from Direction de la Conservation de la Biodiversité et du Système des Aires Protégées (DCBSAP) and from MEEF, REBIOMA and different national organisations to identify potential sites for formal protection.

Additional potential areas for marine conservation were identified on a map using data from different partners and the MARXAN programme. Further work is still to be done to describe these sites.

**Table 2: Proposed MPAs in Madagascar.**

| BARREN ISLANDS MPA | |
|---|---|
| Type | Terrestrial and coastal MPA |
| Likely date of proclamation | No information |
| Legislation under which it is to be proclaimed | Temporary protection<br>Inter Ministry *arrêté* no. 52005/2010 |
| Location | Maintirano/Antsalov, Melaky Region (mid-west) |
| Extent (area) | 4321km² |
| Habitats | Coastal forests, mangroves, seagrasses, coral reefs, islands |

Sources: SAPM, Blue Ventures.

## Summary of existing MPA and proposed MPA coverage

Table 3 summarises the areas covered by both existing MPAs and proposed MPAs, and indicates the proportion of EEZ that these represent.

In Madagascar's case, the LMMAs described in the following section, many of which are being formalized, and which cover approximately 14 000km², have the potential to add considerably to the areas meeting IUCN criteria for protection, and therefore to almost double the percentage of EEZ covered by formal MPAs.

**Table 3: Existing and proposed Madagascar MPAs.**

| Madagascar's EEZ | 1 147 712km² |
|---|---|
| EXISTING MPAs | |
| No. of MPAs | 22 |
| MPA area | 14 451km² |
| % EEZ | 1.26 |
| PROPOSED MPAs | |
| No. of proposed MPAs | 1 |
| Proposed MPA area | 4321km² |
| Potential % EEZ | 1.64 |

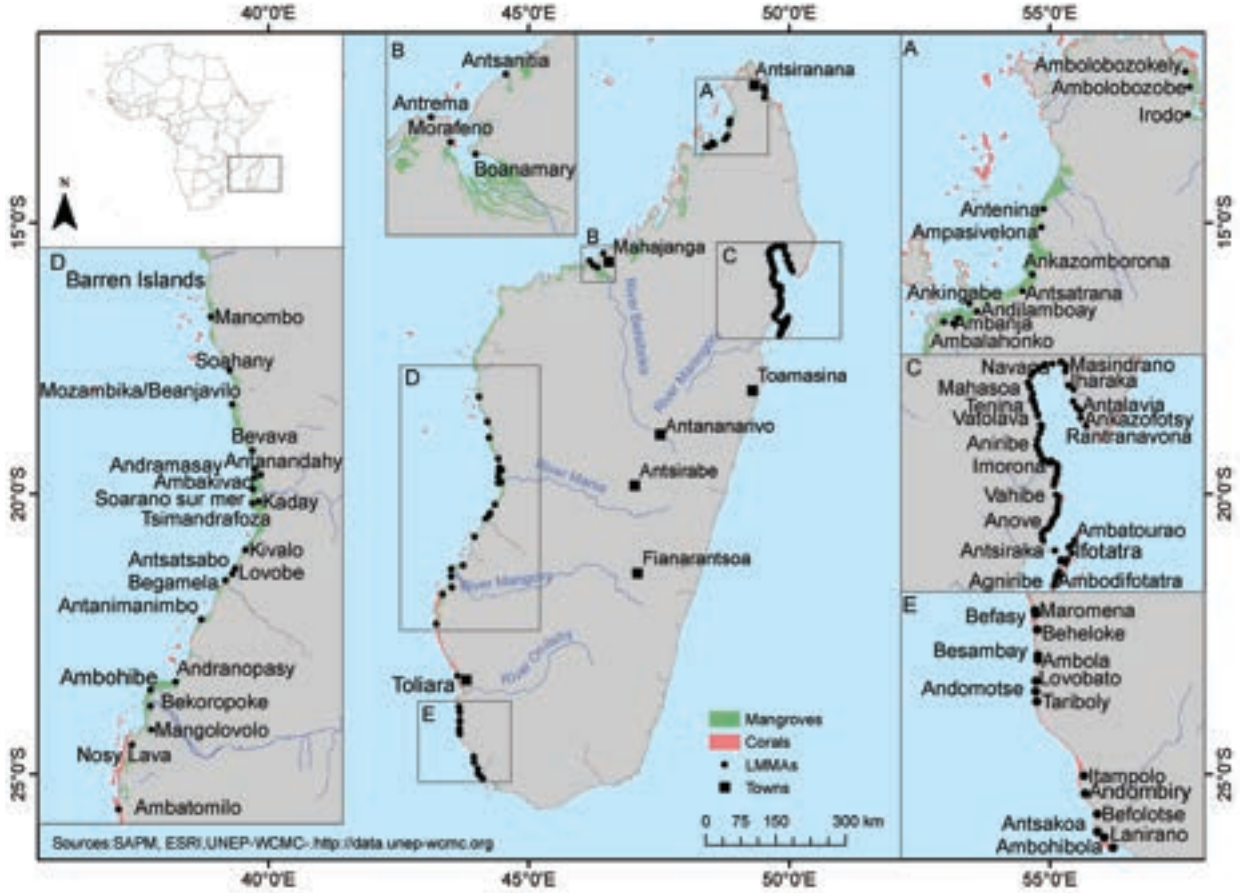


Figure 2: Madagascar Locally Managed Marine Areas.

## LOCALLY MANAGED MARINE AREAS

From 2003 onwards, to achieve the Durban Vision, the creation of Locally Managed Marine Areas (LMMAs) in Madagascar soared (Figure 2). This started with the local communities of Andavadoaka in the southwest and Blue Ventures implementing community-managed marine reserves with permanent and temporary closures to manage small-scale fisheries in a more sustainable way. This model was then replicated by other NGOs in other parts of Madagascar. According to the MIHARI Network, an LMMA is an area of nearshore waters that is actively managed in a local practitioner context by resident or neighbouring communities, or is being collaboratively managed by both resident communities and local government representatives based in the immediate vicinity of the LMMA. The MIHARI Network was initiated by Blue Ventures in 2012 and aims to bring together all LMMAs in Madagascar in order for local communities involved in marine and coastal resources management to share best practices, explore shared issues and advocate for better policies (see Case Study on following page). MPAs that are managed by or co-managed with local communities are part of the MIHARI Network which groups more than 200 LMMAs around Madagascar. LMMAs can protect a range of coastal and marine habitats such as coastal forests, mangroves, seagrass beds, coral reefs and islands. The common objectives for LMMAs are to sustainably manage the fishing grounds and fisheries, and to protect natural habitats from illegal activities by applying local by-laws or *dina*. Note: Where several *dina* are merged to cover more than one village, the by-law is called a *dinabe*.

LMMAs can be either legally recognized MPAs, for example, Ambodivahibe MPA in the north, Velondriake MPA in the southwest, or marine and coastal areas managed by local communities through other legal processes which are based on local bylaws that are elaborated and enforced by the local communities. The *dina* has to be approved by the tribunal of the District where it is going to be used and is implemented according to *Loi* no. 2001/004 of 25 October 2001.

CASE STUDY

# Madagascar LMMAs and the MIHARI Network: from local fisheries management to marine conservation

**A MIHARI network representative networks with authorities.** © MIHARI

**Heritiana Raharitsimba Rahagalala**

Established in 2012, the MIHARI (local marine resources management) Network was established to provide a framework for community exchange and dialogue to share local experiences on community-based fisheries management and conservation. Network members include all LMMA communities and the non-governmental organizations that support them. In 2014, at the IUCN World Parks Congress, Hery Rajaonarimampianina, the Madagascar president, pledged to triple marine protected areas with explicit inclusion of a community-based management model. This set the stage for innovation in LMMAs, and the MIHARI Network represents a key milestone and opportunity for more effective community-based marine conservation. In 2018 the network comprised more than 196 community associations and NGOs and manages 14 000km² of coastal and marine areas, and mangrove forests around the Madagascar coastline (MIHARI, 2018, unpublished data). In total, the marine area covered by LMMAs in Madagascar surpasses that of the national parks network, all of which are managed by Madagascar National Parks service (Rakotondrazafy, 2015).

The MIHARI Network was created to support LMMAs development and management in Madagascar. Its efforts to link local leaders, civil society, and policy makers are valuable. The Network coordination efforts also benefited from the partner NGOs and Ministry (Environment and Fisheries) recognition. At the local level, organisation of exchange meetings, peer to peer trainings for fishers and lobbying at the Ministry level, in order to address LMMAs concerns, account for increased local stakeholder buy-in. However, both MIHARI and LMMAs communities' ownership along with effective local governance remain a challenge. Additional work will require strengthening not only the existing internal functioning of LMMAs, but also the coordination efforts of MIHARI. Despite the many challenges, MIHARI has shown promise at addressing coastal poverty and issues of food security by mitigating overfishing, and generating alternative sources of revenue (Samoilys *et al.*, 2017).

Neither the MIHARI Network nor the LMMA concept have specific legal definitions thus far. In order to obtain legal recognition, an LMMA uses one of the following three existing legal marine management frameworks:

- MPA-type LMMA: the community association co-manages the area with a MPA management agency.
- Management transfer or TGRN*-type LMMA: the community directly manages the area, using a transfer contract.
- Local convention or Dina-type LMMA: the community uses local convention for the management of the area and has no other legal tools in place.

Such diverse definitions of LMMA make comparison of different sites and management structures difficult, and assessment of the impacts on marine conservation and communities remains a challenge. To address these challenges, MIHARI is developing criteria to support LMMAs to meet recognised standards concerning organizational structure and governance mechanisms, sustainable management of resources and the environment, and community-led decision making (MIHARI, *2019*).

* *transfert de gestion des ressources naturelles (TGRN) de l'État aux populations*

In Madagascar, there are three different processes that communities go through to manage their natural resources:

1. *Gestion Locale Sécurisée* (GELOSE) for managing renewable natural resources. For example, the mangrove forests in Ambaro Bay (northwest) and northern Morondava (mid-west).
2. MRHP *Arrêté* within a fisheries participatory management plan. For example, in Antongil Bay (northeast).
3. Tribunal approved *dina* for managing marine and coastal areas. For example, in southern Toliara (southwest).

The GELOSE is a management contract between the local communities of a locality and the MEEF to manage a forest area, often around a protected area, and associated resources (terrestrial and coastal). Its legal framework is the *Loi* 96–025 of 30 September 1996. The contract lasts for three years, and is renewable for ten years if the management evaluation is positive. Since all three management processes use *dina* as a management tool and are all formally recognized, communities and their supporting organisations can choose the process that best suits their resources and possibilities. Though used around Madagascar for community-based management of natural resources, there are challenges in enforcing the *dina* when the traditional cohesion of the local communities is no longer strong due to the existence of a large number of migrants in the villages and also when there is not enough collaboration between the communities, the traditional leaders and the administrative authorities.

There are however examples where the *dina* is successful in managing natural resources locally, for example, in Anjà village south of Ambalavao town where the community manages a forest and receive additional income from ecotourism. However the local communities' patrolling capacities and legal powers are limited as they cannot make arrests. They therefore need to work with the administrative authorities such as the Fokontany Chief and the Mayor in order to stop illegal activities and poachers. Regular support from the Forests Service and the Fisheries Service is also sought whenever possible. Table 4 presents 132 LMMAs that are managed through either one of the legal processes above. They were chosen among the 200 LMMAs within MIHARI Network as their creation process was either completed or well advanced. The table shows that the process for the *dina* to be approved by the tribunal can be lengthy and take several years, sometimes more than five years which definitely has a negative impact on the resource management activities according to LMMA managers.

Marine conservation in Madagascar has made tremendous progress since 2003 thanks to the strong collaboration between MEEF through SAPM, MRHP, NGOs and local stakeholders, particularly the fishers' communities. This was triggered by the presidential declaration in Durban in 2003 and hopefully the presidential declaration in Sydney in 2014 will help implement even stronger policies for the management of existing MPAs and LMMAs as well as the creation of new ones. There are still challenges to be addressed in order to have fully effective MPAs and LMMAs, including ensuring sustainable financing, establishing scientific and participatory monitoring programmes, and strengthening the *dina* and the local management committees.

**Table 4: Locally Managed Marine Areas in Madagascar.**

| | NAME<br>DESIGNATION<br>TYPE | DATE OF ESTABLISHMENT<br>ASSOCIATED LEGISLATION | LOCATION | EXTENT ($km^2$)<br>HABITATS | GOVERNANCE STRUCTURE |
|---|---|---|---|---|---|
| 1 | Mivoatre | 2005<br>GELOSE, *dina* being updated | Ankilimare, Morombe, Atsimo Andrefana | 25.46<br>Mangroves | Community managed with technical and financial support from Asity (a national association for bird conservation, working with Birdlife International) |
| 2 | Mandroso | 2005<br>GELOSE, *dina* being updated | Ampasimena, Morombe, Atsimo Andrefana | 34.39<br>Mangroves | Community managed with technical and financial support from Asity |
| 3 | Lovasoa | 2005<br>GELOSE, *dina* being updated | Ambohibe, Morombe, Atsimo Andrefana | 23.60<br>Mangroves | Community managed with technical and financial support from Asity |
| 4 | Andranopasy Miasa (AMI) | 2005<br>GELOSE, *dina* being updated | Andranopasy, Manja, Menabe | 71.92<br>Mangroves | Community managed with technical and financial support from Asity |

| | NAME<br>DESIGNATION<br>TYPE | DATE OF ESTABLISHMENT<br>ASSOCIATED LEGISLATION | LOCATION | EXTENT ($km^2$)<br>HABITATS | GOVERNANCE STRUCTURE |
|---|---|---|---|---|---|
| 5 | VOI Saint Joseph | GELOSE, *dina* being approved at tribunal | Saint-Joseph, Sainte-Marie, Analanjirofo | In prep.<br>Corals, mangroves | Community managed with technical and financial support from the Groupe de Recherches et D'Echanges (GRET) |
| 6 | Mamelo Honko | GELOSE, *dina* approved by the tribunal, being updated | Ambondrolava, Toliara II, Atsimo Andrefana | 3.79<br>Mangroves, reeds | Community managed with technical and financial support from Reef Doctor |
| 7 | Manombo | 2017<br>GELOSE, *dina* validated at District level | Manombo, Maintirano, Menabe | 81.26<br>Mangroves | Community managed with technical and financial support from WWF |
| 8 | Soahany | 2017<br>GELOSE, *dina* validated at District level | Soahany, Maintirano, Menabe | 210.77<br>Mangroves | Community managed with technical and financial support from WWF |
| 9 | Mozambika/ Beanjavilo | 2005<br>GELOSE, *dina* validated at District level | Mozambika/ Beanjavilo, Antsalova, Menabe | 56.82<br>Mangroves | Community managed with technical and financial support from WWF |
| 10 | Soarano sur mer | 2017<br>GELOSE, *dina* validated at District level | Soarano sur Mer, Belo sur Tsiribihina, Menabe | 32.95<br>Mangroves | Community managed with technical and financial support from WWF |
| 11 | Tsimandrafoza | 2017<br>GELOSE, *dina* validated at District level | Tsimandrafoza, Belo sur Tsiribihina, Menabe | 62.05<br>Mangroves | Community managed with technical and financial support from WWF |
| 12 | Kaday | 2005<br>GELOSE, *dina* validated at District level | Kaday, Belo sur Tsiribihina, Menabe | 56.72<br>Mangroves | Community managed with technical and financial support from WWF |
| 13 | Bevava | 2005<br>GELOSE, *dina* validated at District level | Bevava, Belo sur Tsiribihina, Menabe | 29.52<br>Mangroves | Community managed with technical and financial support from WWF |
| 14 | Andramasay | 2012<br>GELOSE, *dina* validated at District level | Andramasay, Belo sur Tsiribihina, Menabe | 29.56<br>Mangroves | Community managed with technical and financial support from WWF |
| 15 | Antanandahy | 2012<br>GELOSE, *dina* validated at District level | Antanandahy, Belo sur Tsiribihina, Menabe | 15.25<br>Mangroves | Community managed with technical and financial support from WWF |
| 16 | Ambakivao | 2012<br>GELOSE, *dina* validated at District level | Ambakivao, Belo sur Tsiribihina, Menabe | 29.35<br>Mangroves | Community managed with technical and financial support from WWF |
| 17 | Kivalo | 2005<br>GELOSE, *dina* validated at District level | Kivalo, Morondava, Menabe | 50.02<br>Mangroves | Community managed with technical and financial support from WWF |
| 18 | Antenina | 2000<br>GELOSE, *dina* approved by the tribunal | Antenina, Ambilobe, Diana | 11.71<br>Mangroves | Community managed with technical and financial support from WWF |

| | NAME<br>DESIGNATION<br>TYPE | DATE OF ESTABLISHMENT<br>ASSOCIATED LEGISLATION | LOCATION | EXTENT ($km^2$)<br>HABITATS | GOVERNANCE STRUCTURE |
|---|---|---|---|---|---|
| 19 | Ampasivelona | 2001<br>GELOSE, *dina* approved by the tribunal | Ampasivelona, Ambilobe, Diana | 16.49<br>Mangroves | Community managed with technical and financial support from WWF |
| 20 | Ankazomborona | GELOSE, *dina* approved by the tribunal | Ankazomborona, Ambilobe, Diana | 9.26<br>Mangroves | Community managed with technical and financial support from WWF |
| 21 | Antsatrana | 2001<br>GELOSE, *dina* approved by the tribunal | Antsatrana, Ambilobe, Diana | 23.06<br>Mangroves | Community managed with technical and financial support from WWF |
| 22 | FMMH (Fikambanan'ny Mpanjono Miray Hina) | 2016<br>Common *dinabe*, being elaborated | Ambararata, Antsiranana II, Diana | In prep.<br>Corals, mangroves | Community managed with technical and financial support from Conservation International (CI) |
| 23 | FPV (Fikambanan'ny Mpanjono Vonona) | 2016<br>Common *dinabe*, being elaborated | Angengato, Antsiranana II, Diana | In prep.<br>Corals, mangroves | Community managed with technical and financial support from CI |
| 24 | FIMPAMA (FIkambanan'ny Mpanjono Madio Amboaboaka) | 2016<br>Common *dinabe*, being elaborated | Amboaboaka, Antsiranana II, Diana | In prep.<br>Corals, mangroves | Community managed with technical and financial support from CI |
| 25 | Sarimbatavo | 2016<br>Common *dinabe*, being elaborated | Sarimbatavo, Antsiranana II, Diana | In prep.<br>Corals, mangroves | Community managed with technical and financial support from CI |
| 26 | FMTFI (Fikambanan'ny Mpanjono Tia Fivoarana Irodo) | 2016<br>Common *dinabe*, being elaborated | Irodo, Antsiranana II, Diana | In prep.<br>Mangroves | Community managed with technical and financial support from CI |
| 27 | Association MANDRESY | 2016<br>Common *dinabe*, being elaborated | Ankorera, Antsiranana II, Diana | In prep.<br>Corals, mangroves | Community managed with technical and financial support from CI |
| 28 | Association VORONTSARADIA | 2016<br>Common *dinabe*, being elaborated | Tanambaon'Ankeriky, Antsiranana II, Diana | In prep.<br>Corals, mangroves | Community managed with technical and financial support from CI |
| 29 | FPA (Fikambanan'ny Mpanjono Ambolobozobe) | 2016<br>Common *dinabe*, being elaborated | Ambolobozobe, Antsiranana II, Diana | In prep.<br>Corals, mangroves | Community managed with technical and financial support from CI |
| 30 | FIMIZA (Fikambanana Mitantana Zava-boaary Andranomasina) | 2016<br>Common *dinabe*, being elaborated | Ambolobozokely, Antsiranana II, Diana | In prep.<br>Corals, mangroves | Community managed with technical and financial support from CI |
| 31 | ALA MAITSO | 2011<br>MRHP Ordinance, *dina* approved by the tribunal | Ambodiforaha, Maroantsetra, Analanjirofo | 4.58<br>Corals, mangroves | Community managed with technical and financial support from the Wildlife and Conservation Society (WCS) |
| 32 | FIMIARO | 2011<br>MRHP Ordinance, *dina* being approved at tribunal | Masindrano, Maroantsetra, Analanjirofo | 4.67<br>Corals | Community managed with technical and financial support from WCS |
| 33 | FITIAVANA | 2011<br>MRHP Ordinance, *dina* being approved at tribunal | Navana, Maroantsetra, Analanjirofo | 3.32<br>Corals | Community managed with technical and financial support from WCS |

| | NAME<br>DESIGNATION<br>TYPE | DATE OF ESTABLISHMENT<br>ASSOCIATED LEGISLATION | LOCATION | EXTENT ($km^2$)<br>HABITATS | GOVERNANCE STRUCTURE |
|---|---|---|---|---|---|
| 34 | VATOMANITRA | 2009<br>MRHP Ordinance, *dina* approved by the tribunal | Rantohely, Maroantsetra, Analanjirofo | 1.70<br>Corals | Community managed with technical and financial support from WCS |
| 35 | TTM | 2012<br>MRHP Ordinance, *dina* approved by the tribunal | Mahasoa, Maroantsetra, Analanjirofo | 3.34<br>Corals | Community managed with technical and financial support from WCS |
| 36 | TARATRA AMBATORINGENY | 2009<br>MRHP Ordinance, *dina* approved by the tribunal | Maintimbato, Maroantsetra, Analanjirofo | 1.10<br>Corals, seagrass | Community managed with technical and financial support from WCS |
| 37 | TDV | 2012<br>MRHP Ordinance, *dina* approved by the tribunal | Vatolava, Maroantsetra, Analanjirofo | 0.43<br>Corals | Community managed with technical and financial support from WCS |
| 38 | TSITARA | 2006<br>MRHP Ordinance, *dina* approved by the tribunal | Complexe Andreba, Mananara Nord, Analanjirofo | 1.86<br>Mangroves | Community managed with technical and financial support from WCS |
| 39 | MIRAY HINA | 2014<br>MRHP Ordinance, *dina* being approved at tribunal | Ambodimangamaro, Mananara Nord, Analanjirofo | 4.10<br>Corals | Community managed with technical and financial support from WCS |
| 40 | FMFII | 2014<br>MRHP Ordinance, *dina* being approved at tribunal | Fahambahy, Mananara Nord, Analanjirofo | 2.55<br>Corals | Community managed with technical and financial support from WCS |
| 41 | MIARO | 2012<br>MRHP Ordinance, *dina* being approved at tribunal | Aniribe, Mananara Nord, Analanjirofo | 1.29<br>Corals | Community managed with technical and financial support from WCS |
| 42 | MITAIZA | 2012<br>MRHP Ordinance, *dina* being approved at tribunal | Tampolo, Mananara Nord, Analanjirofo | 1.16<br>Corals | Community managed with technical and financial support from WCS |
| 43 | MIARADIA | 2012<br>MRHP Ordinance, *dina* being approved at tribunal | Antanandava, Mananara Nord, Analanjirofo | 1.06<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 44 | FMMA | 2012<br>MRHP Ordinance, *dina* being approved at tribunal | Analanjahana, Mananara Nord, Analanjirofo | 4.15<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 45 | MIARAMITA | 2009<br>MRHP Ordinance, *dina* approved by the tribunal | Amboditangena, Mananara Nord, Analanjirofo | 2.12<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 46 | MAMPANIRY | 2009<br>MRHP Ordinance, *dina* approved by the tribunal | Antsirakivolo, Mananara Nord, Analanjirofo | 2.38<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 47 | MITSINJO NY HOAVY | 2009<br>MRHP Ordinance, *dina* approved by the tribunal | Imorona, Mananara Nord, Analanjirofo | 3.69<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |

| | NAME<br>DESIGNATION<br>TYPE | DATE OF ESTABLISHMENT<br>ASSOCIATED LEGISLATION | LOCATION | EXTENT ($km^2$)<br>HABITATS | GOVERNANCE STRUCTURE |
|---|---|---|---|---|---|
| 48 | VMAV | 2009<br>MRHP Ordinance, *dina* approved by the tribunal | Vohitralanana, Mananara Nord, Analanjirofo | 1.42<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 49 | MAEVARANO | 2014<br>MRHP Ordinance, *dina* being approved at tribunal | Hoalampano, Mananara Nord, Analanjirofo | 16.20<br>Corals, seagrass | Community managed with technical and financial support from WCS |
| 50 | FMMTA | 2012<br>MRHP Ordinance, *dina* being approved at tribunal | Antanambe, Mananara Nord, Analanjirofo | 9.84<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 51 | FIMPATOMA | 2012<br>MRHP Ordinance, *dina* being approved at tribunal | Mandrisy, Mananara Nord, Analanjirofo | 2.29<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 52 | TSIVERIZARA | 2012<br>MRHP Ordinance, *dina* being approved at tribunal | Antanambaomandrisy, Mananara Nord, Analanjirofo | 1.76<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 53 | ANDRENDRANO | 2014<br>MRHP Ordinance, *dina* being approved at tribunal | Manambato, Mananara Nord, Analanjirofo | 2.79<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 54 | TSARAMANDROSO | 2014<br>MRHP Ordinance, *dina* being approved at tribunal | Ambatoharanana, Mananara Nord, Analanjirofo | 3.42<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 55 | ZOMPONA | 2014<br>MRHP Ordinance, *dina* being approved at tribunal | Malotrandro, Mananara Nord, Analanjirofo | 1.54<br>Corals, seagrass, mangroves | Community managed with technical and financial support from WCS |
| 56 | MAHAFAKONJA | 2016<br>MRHP Ordinance, *dina* being approved at tribunal | Anove, Mananara Nord, Analanjirofo | 0.35<br>Corals, seagrass | Community managed with technical and financial support from WCS |
| 57 | FMF | 2016<br>MRHP Ordinance, *dina* being approved at tribunal | Fontsimaro, Mananara Nord, Analanjirofo | 4.65<br>Mangroves | Community managed with technical and financial support from WCS |
| 58 | CLB Miavotra | 2011<br>*Dina* being approved at tribunal | Ambalahonko, Ambanja, Diana | 2.23<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 59 | CLB Miezaka | 2011<br>*Dina* being approved at tribunal | Ambolikapiky, Ambalahonko, Ambanja, Diana | 7.20<br>Mangroves, seagrass | Community managed with technical and financial support from Blue Ventures |
| 60 | CLB Miara-miasa | 2011<br>*Dina* being approved at tribunal | Andimakafito, Ambalahonko, Ambanja, Diana | 2.71<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 61 | CLB Mitsinjo | 2011<br>*Dina* being approved at tribunal | Ampondrabe, Antsakoamanondro, Ambanja, Diana | 4.66<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 62 | CLB MAMISOA | 2011<br>*Dina* being approved at tribunal | Ampanakana, Ambalahonko, Ambanja, Diana | 1.59<br>Mangroves | Community managed with technical and financial support from Blue Ventures |

| | NAME<br>DESIGNATION<br>TYPE | DATE OF ESTABLISHMENT<br>ASSOCIATED LEGISLATION | LOCATION | EXTENT ($km^2$)<br>HABITATS | GOVERNANCE STRUCTURE |
|---|---|---|---|---|---|
| 63 | CLB Mandroso | 2011<br>*Dina* being approved at tribunal | Ankingabe, Antsakoamanondro, Ambanja, Diana | 0.85<br>Mangroves, seagrass | Community managed with technical and financial support from Blue Ventures |
| 64 | CLB Ampijoroa | 2011<br>*Dina* being approved at tribunal | Andilamboay, Maherivaratra, Ambanja, Diana | 3.14<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 65 | CLB Tsaratantana | 2011<br>*Dina* being approved at tribunal | Ampampana, Antsakoamanondro, Ambanja, Diana | 7.95<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 66 | CLB Tsaralaza | 2011<br>*Dina* being approved at tribunal | Andrahibo, Antsakoamanondro, Ambanja, Diana | 3.51<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 67 | CLB Miray Hina | 2011<br>*Dina* being approved at tribunal | Ambiky, Ambalahonko, Ambanja, Diana | 5.85<br>Mangroves, seagrass | Community managed with technical and financial support from Blue Ventures |
| 68 | CLB FIZAMITI | 2000<br>*Dina* approved by the tribunal | Antsahampano, Ambanja, Diana | 4.00<br>Mangroves, seagrass | Community managed with technical and financial support from Blue Ventures |
| 69 | FIZAMIFA | 2011<br>*Dina* being approved at tribunal | Andranonangozy, Maroantsetra, Analanjirofo | 4.86 | Community managed with technical and financial support from the Development and Environmental Law Center (DELC) |
| 70 | VILOVARI | 2011<br>*Dina* being approved at tribunal | Varingohitra, Maroantsetra, Analanjirofo | 8.92 | Community managed with technical and financial support from DELC |
| 71 | FENOSOA | 2011<br>*Dina* being approved at tribunal | Anjahana, Maroantsetra, Analanjirofo | 4.28 | Community managed with technical and financial support from DELC |
| 72 | ORANDAVA | 2012<br>*Dina* being approved at tribunal | Navana, Maroantsetra, Analanjirofo | 4.86 | Community managed with technical and financial support from DELC |
| 73 | FTMHM | 2012<br>*Dina* being approved at tribunal | Masindrano, Maroantsetra, Analanjirofo | 2.40 | Community managed with technical and financial support from DELC |
| 74 | ALAMAITSO | 2012<br>*Dina* being approved at tribunal | Iharaka, Maroantsetra, Analanjirofo | 0.56 | Community managed with technical and financial support from DELC |
| 75 | SAMINA | 2012<br>*Dina* being approved at tribunal | Nandrasana, Maroantsetra, Analanjirofo | 3.26 | Community managed with technical and financial support from DELC |
| 76 | RANOMADIO | 2011<br>*Dina* being approved at tribunal | Tanambao'i Nandrasana, Maroantsetra, Analanjirofo | 1.86 | Community managed with technical and financial support from DELC |
| 77 | VOI Tanantsara | 2011<br>*Dina* being approved at tribunal | Tanantsara, Maroantsetra, Analanjirofo | 1.62 | Community managed with technical and financial support from DELC |
| 78 | TVM | 2011<br>*Dina* being approved at tribunal | Voloina, Maroantsetra, Analanjirofo | 6.42 | Community managed with technical and financial support from DELC |
| 79 | VOI Ambodipaka | 2012<br>*Dina* being approved at tribunal | Ambodipaka, Maroantsetra, Analanjirofo | 6.24 | Community managed with technical and financial support from DELC |

| | NAME<br>DESIGNATION<br>TYPE | DATE OF ESTABLISHMENT<br>ASSOCIATED LEGISLATION | LOCATION | EXTENT ($km^2$)<br>HABITATS | GOVERNANCE STRUCTURE |
|---|---|---|---|---|---|
| 80 | FMHMR | 2012<br>*Dina* being approved at tribunal | Rantabe, Maroantsetra, Analanjirofo | 7.42 | Community managed with technical and financial support from DELC |
| 81 | FTAR | 2011<br>*Dina* being approved at tribunal | Ambodisira, Maroantsetra, Analanjirofo | 1.42 | Community managed with technical and financial support from DELC |
| 82 | FMI | 2012<br>*Dina* being approved at tribunal | Tenina, Maroantsetra, Analanjirofo | 1.50 | Community managed with technical and financial support from DELC |
| 83 | Fédération des pêcheurs de Sainte Marie | 2016<br>*Dina* being approved at tribunal | Sainte-Marie, Analanjirofo | In prep. | Community managed with technical and financial support from GRET |
| 84 | Cellule GIZC Vohilava | 2016<br>*Dina* being approved at tribunal | Vohilava, Sainte-Marie, Analanjirofo | In prep.<br>Corals, seagrass, mangroves | Community managed with technical and financial support from GRET |
| 85 | Cellule GIZC Mahavelou | 2016<br>*Dina* being approved at tribunal | Mahavelou, Sainte-Marie, Analanjirofo | In prep.<br>Corals | Community managed with technical and financial support from GRET |
| 86 | Cellule GIZC Agnalaradzy | 2016<br>*Dina* being approved at tribunal | Agnalaradzy, Sainte-Marie, Analanjirofo | In prep.<br>Corals, seagrass, mangroves | Community managed with technical and financial support from GRET |
| 87 | Cellule GIZC Ambodifotatra | 2016<br>*Dina* being approved at tribunal | Ambodifotatra, Sainte-Marie, Analanjirofo | In prep.<br>Mangroves, seagrass | Community managed with technical and financial support from GRET |
| 88 | Cellule GIZC Ambodiforaha | 2016<br>*Dina* being approved at tribunal | Ambodiforaha, Sainte-Marie, Analanjirofo | In prep.<br>Corals, seagrass, mangroves | Community managed with technical and financial support from GRET |
| 89 | Cellule GIZC Ankobahoba | 2016<br>*Dina* being approved at tribunal | Ankobahoba, Sainte-Marie, Analanjirofo | In prep.<br>Corals, seagrass, mangroves | Community managed with technical and financial support from GRET |
| 90 | Cellule GIZC Agnafiafy | 2016<br>*Dina* being approved at tribunal | Agnafiafy, Sainte-Marie, Analanjirofo | In prep.<br>Corals, mangroves | Community managed with technical and financial support from GRET |
| 91 | Cellule GIZC Sahasifotra | 2016<br>*Dina* being approved at tribunal | Sahasifotra, Sainte-Marie, Analanjirofo | In prep.<br>Corals, mangroves | Community managed with technical and financial support from GRET |
| 92 | Cellule GIZC Maromandia | 2016<br>*Dina* being approved at tribunal | Maromandia, Sainte-Marie, Analanjirofo | In prep.<br>Corals | Community managed with technical and financial support from GRET |
| 93 | Cellule GIZC Lounkitsy | 2016<br>*Dina* being approved at tribunal | Loukintsy, Sainte-Marie, Analanjirofo | In prep.<br>Corals, seagrass, mangroves | Community managed with technical and financial support from GRET |
| 94 | Cellule GIZC Agnivorano | 2016<br>*Dina* being approved at tribunal | Agnivorano, Sainte-Marie, Analanjirofo | In prep.<br>Corals | Community managed with technical and financial support from GRET |
| 95 | Cellule GIZC Ifotatra | 2016<br>*Dina* being approved at tribunal | Ifotatra, Sainte-Marie, Analanjirofo | In prep.<br>Corals, seagrass, mangroves | Community managed with technical and financial support from GRET |

| | NAME<br>DESIGNATION<br>TYPE | DATE OF ESTABLISHMENT<br>ASSOCIATED LEGISLATION | LOCATION | EXTENT ($km^2$)<br>HABITATS | GOVERNANCE STRUCTURE |
|---|---|---|---|---|---|
| 96 | Cellule GIZC Ambatourao | 2016<br>*Dina* being approved at tribunal | Ambatourao, Sainte-Marie, Analanjirofo | In prep.<br>Corals, seagrass, mangroves | Community managed with technical and financial support from GRET |
| 97 | Cellule GIZC Ambodiatafana | 2016<br>*Dina* being approved at tribunal | Ambodiatafana, Sainte-Marie, Analanjirofo | In prep.<br>Corals | Community managed with technical and financial support from GRET |
| 98 | Agniribe mihetsika | 2016<br>*Dina* being approved at tribunal | Agniribe, Sainte-Marie, Analanjirofo | In prep.<br>Corals, seagrass, mangroves | Community managed with technical and financial support from GRET |
| 99 | Mitingy soa | 2005<br>*Dina* being elaborated | Mangolovolo, Morombe, Atsimo Andrefana | 20.27<br>Mangroves | Community managed with technical and financial support from Asity |
| 100 | Fasoa | 2005<br>*Dina* being elaborated | Andombiry, Morombe, Atsimo Andrefana | 12.63<br>Mangroves | Community managed with technical and financial support from Asity |
| 101 | Bekoropoke Miray | 2005<br>*Dina* being elaborated | Bekoropoke, Morombe, Atsimo Andrefana | 41.59<br>Mangroves | Community managed with technical and financial support from Asity |
| 102 | Manjaboaka | 2010<br>*Dina* being elaborated | Ambatomilo, Antsepoke, Bevohitse, Ambohibao,Ampadrivotse, Ambohitsabo, Morombe, Atsimo Andrefana | Corals | Community managed with technical and financial support from Blue Ventures |
| 103 | Teariake | 2011<br>*Dina* approved by the tribunal | Nosy Lava, Nosy Tompoy, Andevitse, Tsihake, Avaradrova, Ambohitse, Morombe, Atsimo Andrefana | Corals | Community managed with technical and financial support from Blue Ventures |
| 104 | Vezo Mitsinjo ny Hoaviny | 2008<br>*Dina* approved by the tribunal | Beheloke, Toliara II, Atsimo Andrefana | 5.30<br>Corals | Community managed with technical and financial support from WWF |
| 105 | Riake Mahavelo | 2008<br>*Dina* approved by the tribunal | Befasy, Toliara II, Atsimo Andrefana | 0.32<br>Corals | Community managed with technical and financial support from WWF |
| 106 | Vatoharasoa | 2008<br>*Dina* approved by the tribunal | Maromena, Toliara II, Atsimo Andrefana | 16.80<br>Corals | Community managed with technical and financial support from WWF |
| 107 | Vonehara | 2012<br>*Dina* approved by the tribunal | Besambay, Toliara II, Atsimo Andrefana | 17.70<br>Corals | Community managed with technical and financial support from WWF |
| 108 | Miharisoa | 2012<br>*Dina* approved by the tribunal | Ambola, Toliara II, Atsimo Andrefana | 0.12<br>Corals | Community managed with technical and financial support from WWF |
| 109 | Tombosoa | 2015<br>*Dina* being approved at tribunal | Lovobato, Toliara II, Atsimo Andrefana | 1.45<br>Corals | Community managed with technical and financial support from WWF |
| 110 | Velonirike | 2015<br>*Dina* being approved at tribunal | Ampasimahanoro, Toliara II, Atsimo Andrefana | 4.91<br>Corals | Community managed with technical and financial support from WWF |
| 111 | Manajariake | 2007<br>*Dina* approved by the tribunal | Ambohibola, Ampanihy, Atsimo Andrefana | 156.40<br>Corals | Community managed with technical and financial support from WWF |

| | NAME<br>DESIGNATION<br>TYPE | DATE OF ESTABLISHMENT<br>ASSOCIATED LEGISLATION | LOCATION | EXTENT ($km^2$)<br>HABITATS | GOVERNANCE STRUCTURE |
|---|---|---|---|---|---|
| 112 | Antsiva | 2007<br>*Dina* approved by the tribunal | Itampolo, Ampanihy, Atsimo Andrefana | 109.11<br>Corals | Community managed with technical and financial support from WWF |
| 113 | Mitsinjo Riake | 2015<br>*Dina* approved by the tribunal | Tariboly, Ampanihy, Atsimo Andrefana | 39.20<br>Corals | Community managed with technical and financial support from WWF |
| 114 | Hery mitambatra | 2015<br>*Dina* approved by the tribunal | Lanirano, Ampanihy, Atsimo Andrefana | 11.12<br>Corals | Community managed with technical and financial support from WWF |
| 115 | FIMIHARITA | 2015<br>*Dina* approved by the tribunal | Antsakoa, Ampanihy, Atsimo Andrefana | 21.38<br>Corals | Community managed with technical and financial support from WWF |
| 116 | Vatohara | 2008<br>*Dina* approved by the tribunal | Befolotse, Ampanihy, Atsimo Andrefana | 5.90<br>Corals | Community managed with technical and financial support from WWF |
| 117 | Fano | 2008<br>*Dina* approved by the tribunal | Leimbeitake, Ampanihy, Atsimo Andrefana | 4.34<br>Corals | Community managed with technical and financial support from WWF |
| 118 | Mahafeno riake | 2015<br>*Dina* approved by the tribunal | Andomotse, Ampanihy, Atsimo Andrefana | Corals | Community managed with technical and financial support from WWF |
| 119 | Ala vao | 2011<br>*Dina* being approved at tribunal | Lovobe, Morondava, Menabe | 0.10<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 120 | Antsatsabo Miray | 2011<br>*Dina* being approved at tribunal | Antsatsabo, Morondava, Menabe | 0.35<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 121 | Magnaja Fikambana Miray Fo (MFMF) | 2011<br>*Dina* being approved at tribunal | Andika sur Mer, Morondava, Menabe | 0.31<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 122 | Mahavelo | 2011<br>*Dina* being approved at tribunal | Begamela, Morondava, Menabe | 0.70<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 123 | Mitsinjosoa | 2011<br>*Dina* being approved at tribunal | Belalanda, Morondava, Menabe | 0.45<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 124 | FA.BE.MI | 2011<br>*Dina* being approved at tribunal | Andranolava, Morondava, Menabe | 1.35<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 125 | Zana-bezo Mitambatsy | 2011<br>*Dina* being approved at tribunal | Belanora, Morondava, Menabe | 1.35<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 126 | Mbahosoahoavy Miray | 2011<br>*Dina* being approved at tribunal | Antanimanimbo, Morondava, Menabe | 0.44<br>Mangroves | Community managed with technical and financial support from Blue Ventures |
| 127 | TAM | 2009<br>*Dina* being approved at tribunal | Antrema, Mitsinjo, Boeny | 9.20 | Community managed with technical and financial support from DELC |
| 128 | EZAKA | 2009<br>*Dina* being approved at tribunal | Antsanitia, Mahajanga II, Boeny | 6.46 | Community managed with technical and financial support from DELC |
| 129 | AVD | 2009<br>*Dina* being approved at tribunal | Boanamary, Mahajanga II, Boeny | 6.42 | Community managed with technical and financial support from DELC |

| | NAME<br>DESIGNATION<br>TYPE | DATE OF ESTABLISHMENT<br>ASSOCIATED LEGISLATION | LOCATION | EXTENT ($km^2$)<br>HABITATS | GOVERNANCE STRUCTURE |
|---|---|---|---|---|---|
| 130 | VONONA | 2009<br>*Dina* being approved at tribunal | Amboanio, Mahajanga II, Boeny | 5.20 | Community managed with technical and financial support from DELC |
| 131 | TSY MANAVAKA | 2009<br>*Dina* being approved at tribunal | Matahitromby, Mitsinjo, Boeny | 7.24 | Community managed with technical and financial support from DELC |
| 132 | EZAKA MIRAY | 2009<br>*Dina* being approved at tribunal | Morafeno, Mitsinjo, Boeny | 8.22 | Community managed with technical and financial support from DELC |

Sources: MIHARI, Asity, GRET, WWF, WCS, Conservation International, Blue Ventures, DELC

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## ANNEX

**Opposition to the inscription of the Malagasy Islands Glorieuses, Juan de Nova, Europa et Bassas da India into the "France chapter" in Marine Protected Areas Outlook of the Western Indian Ocean region**

1. Madagascar wishes to put on record its strong opposition to the inclusion of the Malagasy islands Glorieuses, Juan de Nova, Europa and Bassas da India into the submission of France regarding its Marine Protected Areas in the Western Indian Ocean, under the so-called "Iles Eparses".

2. The question of the islands of Glorieuses, Juan de Nova, Europa and Bassas da India has been for many years the subject of a dispute between France and Madagascar relating to the confiscation by France of these Malagasy territories, in violation of the right to territorial integrity of a non-self-governing territory and of international law on decolonization in general. The question has been debated in the United Nations General Assembly at its Thirty-fourth (1979) and Thirty-fifth (1980) sessions. In support of the legitimate claims of Madagascar, the United Nations General Assembly adopted in its Thirty-fourth session resolution 34/91, which requests France, among others:

a) *"to initiate negotiations without further delay with the Government of Madagascar for the reintegration of the above-mentioned islands, which were arbitrarily separated from Madagascar" (UNGA Res. 34/91, paragraph 3);*

b) *"to repeal the measures which infringe the sovereignty and territorial integrity of Madagascar and to refrain from taking other measures that would have the same effect and could hinder the search for a just solution to the present dispute" (UNGA Res. 34/91, paragraph 4).*

Consequently, France is under an obligation to:

i. repeal all measures that infringe the sovereignty and territorial integrity of Madagascar;

ii. refrain from taking other measures that would have the same effect and could hinder the search for a just solution to the present dispute.

3. Subsequently, at its Thirty-fifth session in 1980 the United Nations General Assembly adopted resolution 35/123, which reaffirmed the provisions of resolution 34/91 and invited France to initiate with Madagascar, as a matter of urgency, the negotiations provided for in its resolution, with a view to settling the dispute in accordance with the purposes and principles of the Charter of the United Nations. Nonetheless, the French Government has not yet taken the necessary measures to implement these resolutions.

4. Moreover, in its Advisory Opinion delivered on 25 February 2019 on the *Legal Consequences of the Separation of the Chagos Archipelago from Mauritius in 1965,* the International Court of Justice underlined that the "United Nations General Assembly has consistently called upon administering Powers to respect the territorial integrity of non-self-governing territories, especially after the adoption of resolution 1514 (XV) of 14 December 1960". In so doing, the Court expressly referred to resolution "34/91 of 12 December 1979 (Question of the islands of Glorieuses, Juan de Nova, Europa and Bassas da India)", among other related situations (paragraph 168 of the Advisory Opinion).

5. To date, the two parties have met on 25 September1990 and 17 June 2016 to exchange explanations on their respective positions without reaching real negotiations.

6. Notwithstanding the foregoing, Madagascar has been constantly confronted with the fait accompli triggered by the Government of the French Republic's adoption of laws and regulations establishing Marine Natural Parks, Natural Reserves and Ramsar Site, including "Key Institutions and Legislation related to Marine Protected Areas (MPAs) or Equivalent Proclamations", without the consent of, or consultations with, the Government of Madagascar. The application of these French laws and regulations to the islands of Glorieuses, Juan de Nova, Europa and Bassas da India is a flagrant breach of the relevant provisions of United Nations General Assembly resolutions 34/91 and 35/123, and constitutes "measures which infringe the sovereignty and territorial integrity of Madagascar [...] and could hinder the search for a just solution to the solution of present dispute" (UNGARes.34/91, paragraph 4) between Madagascar and France. As a member of the United Nations Organization, France is under an obligation to respect the acts of that Organization. The continuing administration of these Malagasy Islands (Glorieuses, Juan de Nova, Europa and Bassas da India) by the Government of the French Republic constitutes an internationally wrongful act, of continuous nature, which entails the international responsibility of France.

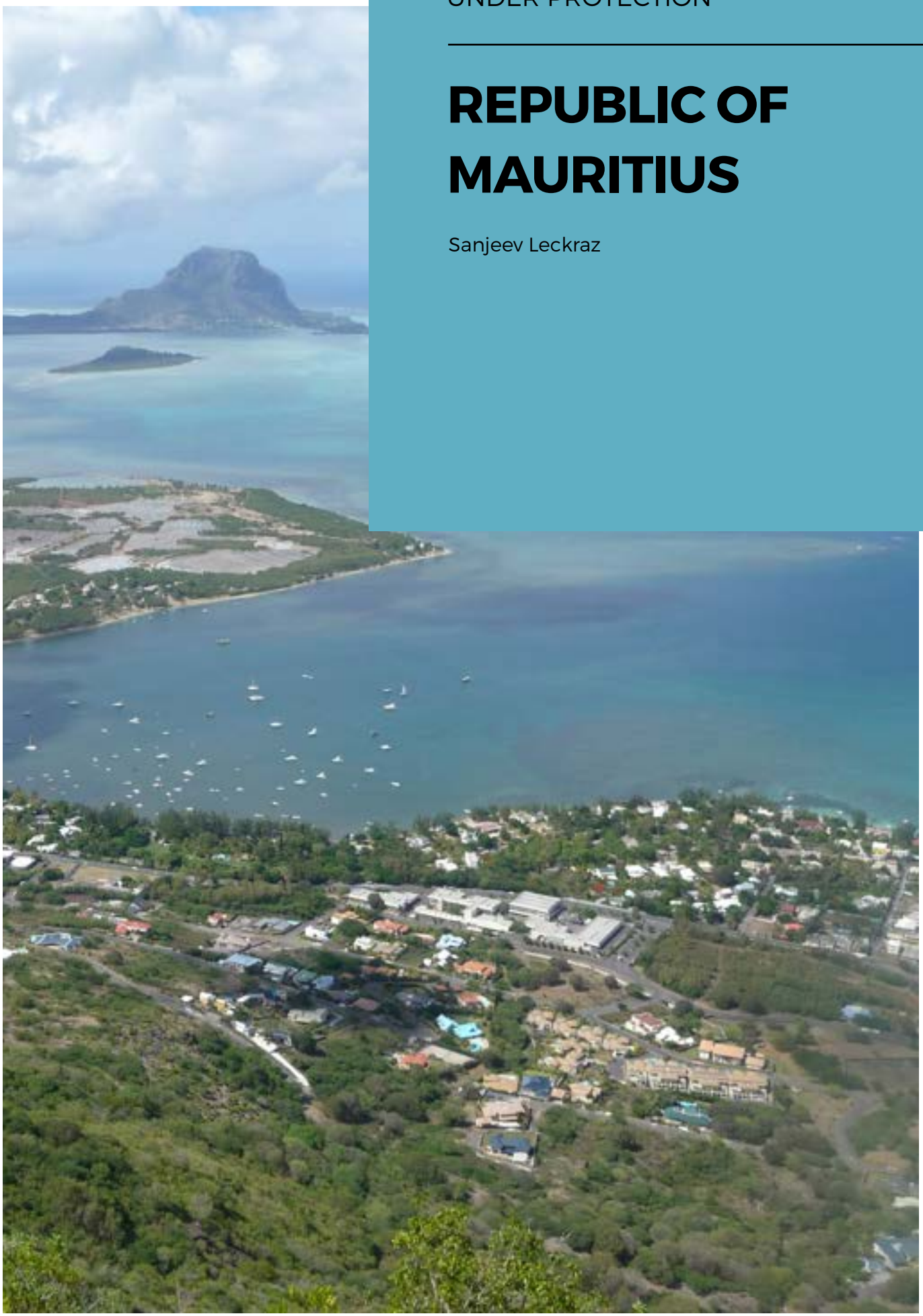
7. In addition, pursuant to United Nations General Assembly resolutions 34/91 and 35/123, Madagascar is entitled to claim areas under its national jurisdiction around the islands of Glorieuses, Juan de Nova, Europa and Bassas da India and to establish, in accordance with its laws and regulations, MPAs and other area-based management tools in the vicinity of those islands for the conservation and sustainable use of marine biodiversity as well as the protection of fragile ecosystems. Madagascar also is the sole State legally entitled to submit the inscription of these four islands in the framework of the WIOSAP programme on *Marine Protected Areas Outlook*.

8. Consequently, the Government of Madagascar expresses its strong reservation to the inclusion of those Islands in the French submission on MPAs as part of French Western Indian Ocean (WIO) Territories to be included in the *Marine Protected Areas Outlook for the WIO region* under WIOSAP programme.

MARINE & COASTAL AREAS
UNDER PROTECTION

# REPUBLIC OF MAURITIUS

Sanjeev Leckraz



Black River/Le Morne, southwest Mauritius. © Jim Anderson

## COUNTRY OVERVIEW

The Republic of Mauritius (RoM), situated in the south-western part of the Indian Ocean, consists of two main islands, Mauritius (1865km$^2$) and Rodrigues (109km$^2$) and its ocean territory extends from these islands and a group of outer islands, namely Saint Brandon (Cargados Carajos Shoals), Agalega, the Chagos Archipelago including Diego Garcia, and Tromelin (Mauritius Constitution, 1968; RoM, 2013). Forty-nine nearshore islets surround Mauritius while eighteen islets lie in the lagoon of Rodrigues. The main island Mauritius, at latitude 20°17"S and longitude 57°33"E, is situated 800km east of Madagascar, and forms part of the volcanic chain of Mascarene Islands.

With a population of 1.3 million, Mauritius has a total land area of 2040km$^2$ and claims an exclusive economic zone (EEZ) of 2.3 million km$^2$ (Figure 1). An additional expanse of extended continental shelf area of approximately 400 000 km$^2$ is co-managed with the Seychelles, following a joint submission made by the two countries to the United Nations in 2011. The Maritime Zones of Mauritius is largely unexplored.

Mainland Mauritius has a coastline of 322km and is surrounded by 150km of protective coral reefs which occupy an area of about 300km$^2$ and enclose a lagoon area of around 243km$^2$. The volcanic origin of the main island, surrounded by fringing coral reefs and some 44 main rivers and streams discharging into the lagoon, contribute to the diversity of its habitats and marine flora and fauna. The coastal zone consists of sandy beaches, coastal dunes, rocky shores, nearshore wetlands and mangroves, lagoon corals, coral reefs and all their associated marine life. All these marine ecosystem components are interconnected. The main critical ecosystems include mangroves, seagrass beds and coral reefs. This rich marine and coastal biodiversity provides Mauritians with a multitude of valuable goods and services.

Located some 650km east of Mauritius at latitude 19°43"S and longitude 63°25"E, Rodrigues has a land area of 109km$^2$ and a population of less than 40 000. Rodrigues has a coral reef platform that forms an almost continuous rim, 90km long and varying enormously in width from 50m in the east to 10km in the west. Rodrigues is the smallest of the Mascarene Islands and is surrounded by the largest lagoon in the Indian Ocean which is 13km wide and covers an area of 240km$^2$ (Chapman, 2000).

Mauritius faces multi-fold challenges in the ocean sector. Habitat loss and degradation are the major threats to marine ecosystems of Mauritius. Despite their significance to these islands, marine and coastal ecosystems such as mangroves, seagrass beds and coral reefs face a wide array of threats – mainly due to human causes (overexploitation of resources, erosion, siltation and pollution, coastal development) and invasive alien species. In addition, the impacts of climate change are heavily affecting these ecosystems. To conserve marine biodiversity, the Government has established a system of Marine Protected Areas (MPAs) comprising fishing reserves, marine parks and marine reserves in the waters around Mauritius and Rodrigues.

The delimitation of our territorial waters dates back to 1970s. Our Exclusive Economic Zone (EEZ) was first defined in the Maritime Zone Act of 1st August 1977 which later was repealed to become the Maritime Zone Act 2005 (Sinatambou, 1995). The Republic of Mauritius is a signatory to the United Nations Convention on the Law on the Sea (UNCLOS) and in relation to the co-ordinates for its Exclusive Economic Zone, these are set out in the Maritime Zones Act.

Mauritius has enacted several key laws for the protection and conservation of its marine environment; namely the Maritime Zones Act of 2005, the Environmental Protection Act of 2002 and the Fisheries and Marine Resources Act of 2007. The Maritime Zones Act provides for the preservation and protection of the marine environment and the prevention and control of marine pollution in the territorial waters, including the continental shelf, the EEZ and the historic waters of Mauritius. The Environment Protection Act provides the legal framework for environmental protection and management in Mauritius, while the Fisheries and Marine Resources Act provides for the proclamation and management of marine protected areas (MPAs).

The mandate for the protection and management of the Marine Protected Areas falls under the responsibility of the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping. There are some active NGOs which work closely with the Ministry to raise community awareness on MPAs.

The protection of coastal and marine ecosystems within the EEZ of the RoM is dispersed over several laws and regulations since these resources are of diverse origins and exploited at different levels. The current main legislation for the protection of marine flora and fauna is the Fisheries and Marine Resources Act 2007 which provides for the proclamation of MPAs and the Environmental Protection Act 2002 provides for the protection of the coastal and marine environment from pollution sources. The RoM is also a signatory of several Conventions

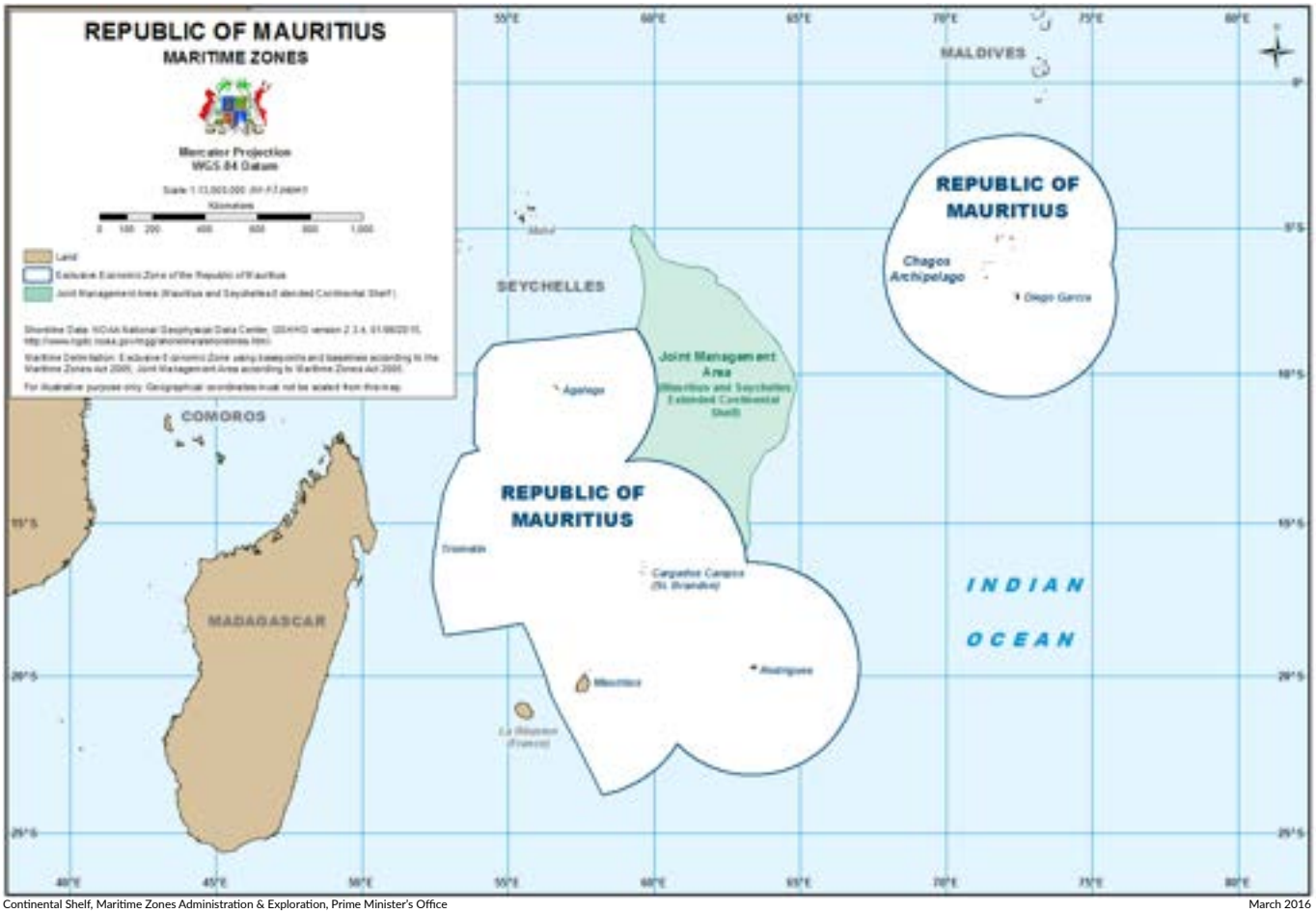



Figure 1: Map of EEZ of the Republic of Mauritius (Source: Department of Continental Shelf, Maritime Zones Administration and Exploration).

for the marine ecosystems and resources including the Convention on the Territorial Sea and Contiguous Zone (1958), Ramsar Convention (1971), United Nations Convention on Law of the Sea (1982), Convention on the Protection, Management and Development of the marine and coastal environment of the Eastern African Region and related protocols (Nairobi Convention 1985), Convention on Biological Diversity 1992, amongst others.

## MARINE PROTECTED AREAS OVERVIEW

The concept of having MPAs around Mauritius has been the subject of discussion since the late 1940s to the extent that the Fisheries Ordinance of 1948, subsequently replaced by the Fisheries Act No. 22 of 1970 and the Fisheries Act No. 5 of 1980 all included provisions for marine reserved areas i.e. Fishing Reserves. However, the first six Fishing Reserves in Mauritius Island were only described for the first time in the Sixth Schedule of Government Notice No. 18 of 1983 (Boyramboli, 1995), one in each coastal district.

The underlying objective behind designating a Fishing Reserve in each coastal district of Mauritius was to protect and conserve the fisheries resources of the designated areas to ensure that fish would be available in case of crisis such as the possibility of the outbreak of war. The Fishing Reserves were, in those days, abundant in fish, crustaceans, oysters and other seafood. They also contained healthy mangrove forests, dense seagrass meadows and thriving coral reefs which acted as important nursery grounds for the juveniles and larvae, as well as feeding grounds for fish and crustaceans.

Recognizing the importance of protection and conservation of the marine ecosystems, some studies were carried out to establish Marine Parks in Mauritius (Procter and Salm, 1974; Robertson, 1994). Unfortunately, these studies did not result directly in the establishment of Marine Parks and MPAs since at that time the country was facing economic and social problems. Nonetheless, some of

the management measures prescribed in these reports were implemented, namely bans on the use of explosives, underwater spear fishing, live corals to produce lime, sardine nets, and prohibition of removal of shells and coral, capture of turtles and marine mammals, use of large nets and gill-nets in reserve areas and also declaring mangroves as protected species. Subsequently, another study carried out by the Canadian International Development Agency (CIDA) (Boyramboli, 1995) resulted in the establishment of two marine parks under the Wildlife and National Parks Act 1993 in 1997.

The establishment of Marine Parks in Rodrigues was planned for a later stage, once both Marine Parks of Mauritius were operational and the management techniques mastered. However, in the waters around Rodrigues Island, five Fishing Reserves areas were already promulgated under the Government Notice No. 128 of 1984 (Rathacharen, 2001).

MPAs are managed by the Government of Mauritius, through the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping (Fisheries Division). The total area occupied by these MPAs is about 80km$^2$ which represents about 29.5 percent of the lagoon of Mauritius. However, on the vast scale of the EEZ, at a claimed 2.3 million km$^2$, all the RoM MPAs, inclusive of those associated with Rodrigues Island, and the Fishing Reserves in Mauritius (but not the small Fishing Reserves on Rodrigues, for which areas are not defined), represents approximately 0.009 percent.

**Coastal landscape of Mauritius' North Coast.** © José Paula

## MARINE AREAS UNDER PROTECTION

The RoM has to date proclaimed eighteen MPAs under its Fisheries and Marine Resources laws and the Rodrigues Regional Assembly Act. The MPAs are categorised into three types, namely Fishing Reserves, Marine Parks and Marine Reserves. In Mauritius, eight MPAs have been proclaimed (Figure 2) with ten in Rodrigues (Figure 3). The following sections describe the main features of the three types of MPA.

### Fishing Reserves

Areas of the sea that are reserved by law with the objectives to protect the fish and fisheries resources as well as the critical habitats, namely the seagrass beds, the mangrove forests, the macro-algae fields and the coral reefs found therein. Fishing methods are controlled and fishing gears are limited in Fishing Reserves where only basket trap and line fishing are allowed. Fishing Reserves are bounded by the high water mark on the shore to the reef crest of the fringing reefs.

### Marine Parks

Areas of the sea that are reserved by law mainly for conservation, education and research, controlled recreation, awareness creation and limited extractive use in specific zones.

The objectives of Marine Parks are for the:

- protection of the marine fauna and flora;
- conservation of the marine life in a pristine condition for future generations;
- provision of a living laboratory for conducting scientific research;
- allowing for controlled uses of the different resources at a sustainable level;
- conservation of the brood stock of marine biota for seeding neighbouring areas;
- allowing for education, appreciation and enjoyment of the sea and its creatures; and
- creation of awareness towards marine conservation.

The boundaries of marine parks extend from the high water mark on the shore to the reefs and extend one kilometre offshore from the fringing reefs.

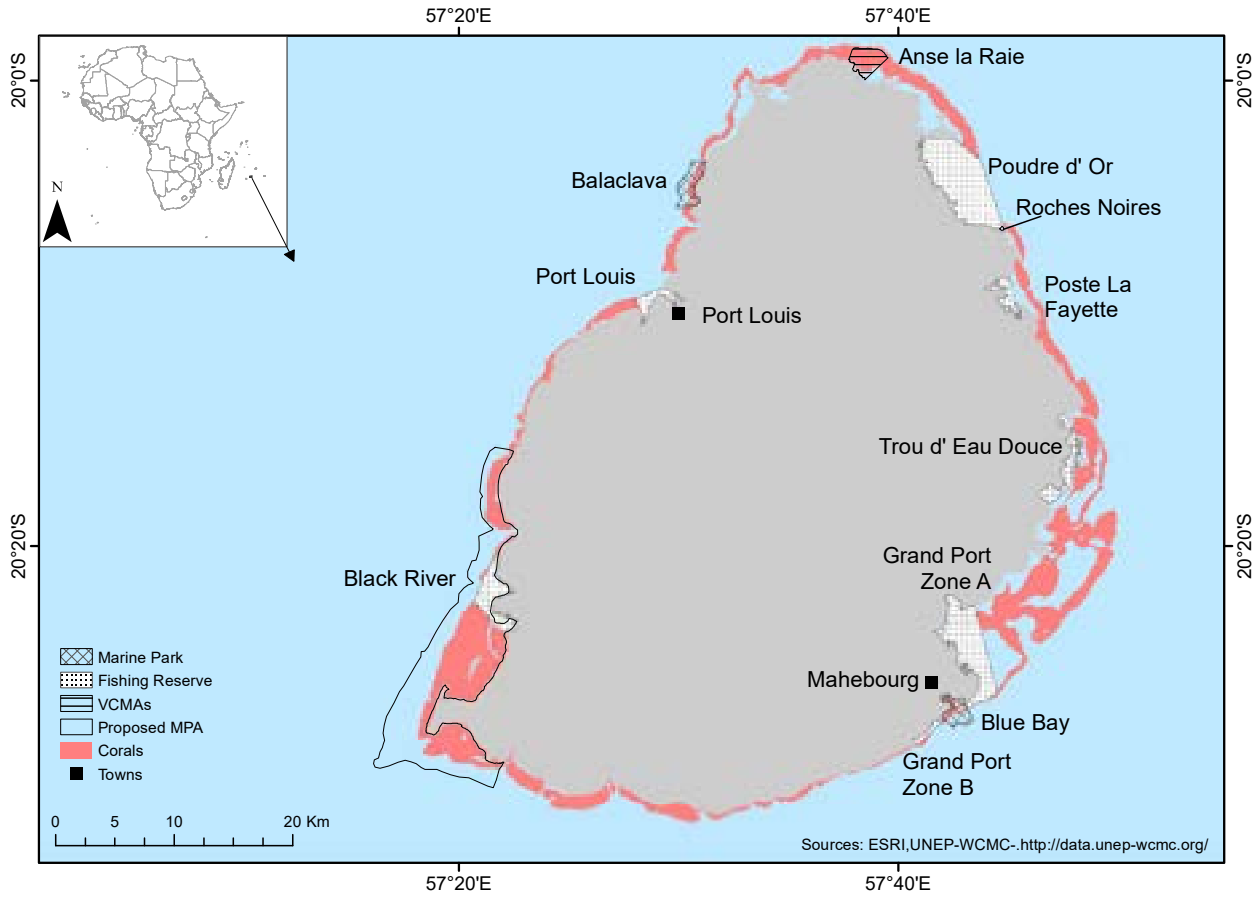



Figure 2: Marine Areas under Protection in Mauritius.

## Marine Reserves

Meant only for conservation, education, research, recreational use and awareness creation. Extractive uses are not permitted therein except with the written authorization of the responsible authority. Marine Reserves are found in Rodrigues Island only.

# MARINE PROTECTED AREAS OF MAURITIUS ISLAND

Under Section 7 of the Fisheries and Marine Resources Act, 1998, eight MPAs have been proclaimed in Mauritius, with two designated as Marine Parks and six as Fishing Reserves (Figure 2). The Marine Parks are the Blue Bay and the Balaclava Marine Parks while the Fishing Reserves are the Port Louis, Black River, Trou D'Eau Douce, Poste Lafayette, Poudre D'Or and the Grand Port. The Grand Port Fishing Reserve is divided into two zones, namely the Grand Port Fishing Reserve Zone A and Fish-ing Reserve Zone B. The MPAs may be categorized as coastal/pelagic including the lagoon and the coral reefs, that extend to some extent beyond the reef.

## Marine Parks

***Blue Bay Marine Park***

Located in the southeast of Mauritius, the Blue Bay Marine Park extends over an area of 3.53km$^2$ seaward, starting from Pointe Corps de Garde as its northernmost point to Pointe Vacoas, its southernmost point. Blue Bay has been declared a Marine Park because it harbours a marine ecosystem of rare beauty in terms of diverse and rich communities of marine flora and fauna, especially the coral reefs which have been preserved for years in good condition. Apart from the coral reefs, the Blue Bay Marine Park also comprises open sea, mangroves, seagrass beds, sandy beaches and shoreline to the high-water mark. Blue Bay Marine Park is bordered to the east and west by the much larger Grand Port (Mahébourg) Fishing Reserve (18.28km$^2$).

Blue Bay Marine Park was first proclaimed as a National Park in 1997, then declared a MPA and subsequently a Marine Park in June 2000 under the Fisheries and Marine Resources Act, 1998. In 2008, Blue Bay Marine Park was also listed as a Ramsar site (see Table 1). Blue Bay Marine Park is classified as an IUCN Category II Marine Protected Area and is of coastal/pelagic type. A biological

inventory of the marine park carried out in 2012 under the "Partnership for MPAs in the Republic of Mauritius" project, funded by GEF, UNDP and the Government of Mauritius (PARETO, 2012) revealed the presence of 108 species of coral, 233 fish species, 201 species of shellfish, 30 species of echinoderms and 38 species of macro-algae, amongst others.

**Table 1: Summary table for Blue Bay Marine Park.**

| **Blue Bay Marine Park** |
|---|
| TYPE/IUCN CATEGORY |
| Coastal/Pelagic/Category II |
| PROCLAMATION LEGISLATION DATE |
| First designated as a National Park in October 1997 under the National Parks and Wildlife Act, 1993. Designated as Marine Park in June 2000 under the Fisheries and Marine Resources Act, 1998. This Act was repealed and replaced with the current Fisheries and Marine Resources Act (Act No. 27 of 2007). Listed as Ramsar site in January 2008 |
| EXTENT |
| 3.5km$^2$ |
| INSTITUTIONAL FRAMEWORK |
| – legally mandated authority: Government of the Republic of Mauritius<br>– managed by Ministry of Blue Economy, Marine Resources, Fisheries and Shipping (Fisheries Division) |
| MANAGEMENT PLAN |
| 5 year plan, 2012–2016, in need of review and update |
| HABITATS |
| Beaches and nearshore, mangrove, seagrass, coral and biogenic reefs, rocky reefs, shelf sediments, deep sea and offshore pelagic |
| RISKS/THREATS |
| – terrestrial inputs (nutrients, organic matter, mud from agricultural land use and flash floods)<br>– physical damage due to increasing aquatic activities from tourism<br>– climate change resulting in successive bleaching events due to increase in sea surface temperature |
| MANAGEMENT OPPORTUNITIES |
| – review and implementation of the existing Management Plan<br>– opportunity to collaborate with local NGOs, operators and other stakeholders including owners of the adjacent lands and sugar estate bordering the park<br>– local capacity building in MPA management Opportunity to collaborate with local NGOs, operators and other stakeholders including owners of the adjacent lands and sugar estate bordering the park<br>– local capacity building in MPA management |

The Blue Bay Marine Park has been demarcated into different specific zones with specific coloured buoys in order to provide protection to critical habitats, ecosystems and ecological processes; to conserve biological diversity, to cater for various permissible activities; and to separate conflicting human activities.

***Balaclava Marine Park***

Located in the northwest of Mauritius, the Balaclava Marine Park extends over an area of 4.85km$^2$ seaward, starting from Petite Pointe aux Piments as its northernmost point down to Batteries des Mortiers, its southernmost point. Balaclava Marine Park was first proclaimed as a National Park in 1997 and declared a Marine Park in 2000 under the Fisheries and Marine Resources Act, 1998 (see Table 2).

The Balaclava Marine Park is managed through application of the Fisheries and the Marine Resources (Marine Protected Areas) Regulations which came into force in 2001 and subsequently amended in 2007. The regulations provide the different tools for the management of the park; namely: (a) Zoning system, (b) Permit system and (c) law enforcement and patrol. Awareness campaigns and monitoring of the marine ecosystems, namely the coral reefs, the seagrass beds and the macro-algae assemblages are also carried out along with monitoring of fish and other marine invertebrates.

The Balaclava Marine Park has been divided into different specific zones, to provide protection to critical habitats, ecosystems and ecological processes; to conserve biological diversity, to cater for various permissible activities; and to separate conflicting human activities. However, the permit system associated with the zonation is only partly being implemented. Awareness campaigns and monitoring of the marine ecosystems, namely the coral reefs, the seagrass beds and the macro-algae assemblages are also conducted, along with visual population surveys of fish and marine invertebrates.

When the MPA was first proclaimed in 1997, 48 species of coral and 137 fish species were recorded during field surveys. Subsequently, an inventory of the marine park carried out in 2009 revealed the presence of 118 species of coral, 289 fish species, and 219 species of molluscs (Nicet *et al*., 2009).

Table 2: Summary table for Balaclava Marine Park.

| Balaclava Marine Park |
|---|
| TYPE/IUCN CATEGORY |
| Coastal/Pelagic/Category II |
| PROCLAMATION LEGISLATION DATE |
| First designated as a National Park in October 1997 under the National Parks and Wildlife Act, 1993. Then declared a MPA and subsequently designated as Marine Park in June 2000 under the Fisheries and Marine Resources Act, 1998 |
| EXTENT |
| 4.85km$^2$ |
| INSTITUTIONAL FRAMEWORK |
| – legally mandated authority: Government of the Republic of Mauritius<br>– managed by the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping (Fisheries Division) |
| MANAGEMENT PLAN |
| 5 year plan, 2012–2016, in need of review and update |
| HABITATS |
| Beaches and nearshore, estuaries, seagrass, coral and biogenic reefs, rocky reefs, shelf sediments, deep sea and offshore pelagic |
| RISKS/THREATS |
| – terrestrial inputs (nutrients, organic matter, mud from agricultural land use and flash floods)<br>– physical damage due to increasing aquatic activities from tourism<br>– climate change resulting in successive bleaching events due to increase in sea surface temperature |
| MANAGEMENT OPPORTUNITIES |
| – review and implementation of the existing Management Plan<br>– opportunity to collaborate with local NGOs, hotel operators and other stakeholders including owners of the adjacent lands and sugar estate bordering the park<br>– local capacity building in MPA management |

## Fishing Reserves of Mauritius

Six "marine reserved areas" in Mauritius Island were first described in the Sixth Schedule of Government Notice No. 18 of 1983 (Boyramboli, 1995). However, these marine reserved areas were formally declared as Marine Protected Areas and designated as Fishing Reserves under section 7(2) of the Fisheries and Marine Resources Act 1998 in 2000. All the Fishing Reserves are of coastal type and are of IUCN Category IV (Table 3). The objectives of the Fishing Reserves are for the protection of critical habitats, namely the coral reefs, mangrove forests, and the seagrass and macroalgal beds.

Currently, the Fishing Reserves are not physically demarcated by marker buoys and management is carried out only through enforcement of the law by the Fisheries Protection Service and the National Coast Guard (NCG) through sea patrols. Moreover, the permit system is only partly applied, especially for specific projects such as construction of jetties, demarcation of swimming zones, delimitation of mooring zones and fireworks displays.

Under the project UNDP/GEF/Government of Mauritius "*Mainstreaming biodiversity into the management of the coastal zone in the Republic of Mauritius*", which is currently being implemented, activities such as the development of a management plan for each Fishing Reserve, their physical demarcation with marker buoys and their biological inventories are earmarked for the future. The six Fishing Reserves are:

***Poudre D'Or***

The reserve covers an area of 25.42km$^2$ and encloses that part of the sea that extends from Ile D'Ambre up to Pointe Roche Noire. Its boundary starts on the mainland at a point having coordinates 20°2'23.11"S, 57°41'9.73"E and runs in a southeasterly direction to a point with coordinates 20°2'29.27"S, 57°41'26.56"E at Pte Courant on the shore of Ile D'Ambre. It then runs along the shore of Ile D'Ambre up to a point having coordinates 20°2'29.96"S, 57°42'31.19"E at Pte Dejeuner. Thereafter, it runs in a southeasterly direction up to a point with coordinates 20°3'22.87"S, 57°43'40.63"E located at the southern side of Passe St. Geran, thence along the reef up to Pointe Roche Noire having coordinates 20°6'30.01"S, 57°44'50.17"E.

Poudre D'Or Fishing Reserve includes a range of habitats, namely mangroves, the Riviere du Rempart (north) estuary, seagrass, beaches and nearshore, coral reefs and shelf sediments. Control of activities, surveillance and enforcement are carried out by the Fisheries Protection Service based at the Poudre D'Or Fisheries Post with the assistance of the Poudre D'Or NCG.

***Poste Lafayette***

The reserve occupies an area of 2.8km$^2$ and is that part of the sea that stretches from Pointe La Brise to Pointe de Flacq. The boundary extends from a point behind the Fisheries Poste at Pointe Labrise having coordinates 20°8'30.38"S, 57°45'2.70"E and runs south up to a point lying on the eastern extremity of Malno Islet having coordinates 20°8'58.40"S, 57°45'11.35"E. From there, the boundary runs again southerly up to Pointe de Flacq at a point having coordinates 20°9'34.63"S, 57°47'33.78"E. Post Lafayette Fishing Reserve presents several different habitat types, namely beaches and nearshore, mangroves,

seagrass, coral reefs, rocky reefs and shelf sediments. Control of activities, surveillance and enforcement are carried out by the Fisheries Protection Service based at the Post Lafayette Fisheries Post with the assistance of the Poste Lafayette NCG.

***Trou D'Eau Douce***

The Trou D'Eau Douce Fishing Reserve occupies an area of 5.74km$^2$ and comprises that part of the sea that stretches from Trou D'Eau Douce village up to Quatre Soeurs village. Its boundary starts from a point behind the old lime kiln at Trou D'Eau Douce having coordinates 20°14'21.44"S, 57°47'33.78"E and runs south easterly to include the inner lagoons of Ilot Lievres at a point having coordinates 20°14'59.60"S, 57°47'54.73"E, Ilot Mangenie at a point with coordinates 20°15'21.76"S, 57°48'7.76"E, Ile aux Cerfs at a point having coordinates 20°15'49.55"S, 57°48'14.56"E. From this point the limit follows the high water mark along the westerly coastline of Ile aux Cerfs up to a point which has 20°16'47.95"S, 57°47'56.23"E as coordinates. From this point, the limit follows a south-southwesterly direction up to a point being the eastern extremity of Ile Camisard and having coordinates 20°17'30.24"S, 57°47'46.86"E and from this point the limit runs in a south westerly direction up to a point at Point St Lain which has 20°18'13.96"S, 57°46'50.99"E as coordinates.

The habitat types present within the Trou D'Eau Douce Fishing Reserve include the Grand River South East (GRSE) river estuary, beaches and nearshore, coral reefs, rocky reefs, shelf sediments, seagrass and dense mangroves. Control of activities, surveillance and enforcement are carried out by the Fisheries Protection Service based at the Trou D'Eau Douce and GRSE Fisheries Post with the assistance of the NCG of the Trou D'Eau Douce and Deux Freres NCG Posts.

***Grand Port***

The Grand Port Fishing Reserve is found in the Grand Port district in the southeast of Mauritius, and covers an area of 18.28km$^2$, comprised of two zones, namely Zone A and Zone B. Zone A is located at the eastern side of the Blue Bay Marine Park while Zone B is situated at the western side of the marine park.

Zone A: Having an extent of 17.16km$^2$, the Grand Port Fishing Reserve Zone A encloses that part of the sea which stretches from Old Grand Port up to Blue Bay. Its boundary starts at the high water mark at a point having coordinates 20°22'31.19"S, 57°43'25.03"E behind the Roman Catholic Church at Old Grand Port and runs up to another point on the eastern extremity of Ile aux Aigrettes having coordinates 20°25'12.39"S, 57°44'10.60"E. From there the boundary extends to a point on the reef having coordinates 20°26'17.64"S, 57°44'29.04"E. From the last mentioned point, the limit follows the reef crest to a point on the reef having coordinates 20°26'59.14"S, 57°43'7.58"E which then follows the reef crest up to the northern limit of the Blue Bay Marine Park at Pte Corps de Garde having coordinates 20°26'44.53"S, 57°42'59.73"E.

The habitat types present within the Grand Port Zone A Fishing Reserve include the Ferney and La Chaux rivers estuaries, sub-tidal sandy-mud beach, sub-tidal mud beach, macro-algal beds, outer reef channel, rocky shoreline, back reef, fore reef slope, inter-reef soft substrate, inter-reef rubble substrate, seagrass beds and mangroves. Control of activities, surveillance and enforcement are carried out by the Fisheries Protection Service based at the Mahebourg Fisheries Post and Blue Bay Marine Park Centre with the assistance of the NCG of the Mahebourg NCG Post and the Blue Bay Emergency Rescue Centre.

Zone B: Covering an area of 1.12km$^2$, the Grand Port Fishing Reserve Zone B encloses that part of the sea which extends from Pointe Vacoas at La Cambuse up to Ilot Brochus at Le Bouchon. Its limit starts at a point at Pointe Vacoas (the southern limit of the Blue Bay Marine Park) having coordinates 20°27'24.55"S, 57°42'3.95"E, and runs up to a point on the reef having coordinates 20°27'25.20"S, 57°42'4.65"E and from this point the limit follows the reef crest up to a point on the reef having coordinates 20°28'28.55"S, 57°40'56.02"E. From this point the limit runs in a southwesterly direction up to point at Le Bouchon having coordinates 20°28'29.88"S, 57°40'49.67"E.

The habitat types present within the Grand Port Zone B Fishing Reserve include beaches and nearshore, coral reefs, rocky reefs, shelf sediments, seagrass beds and mangroves. Control of activities, surveillance and enforcement are carried out by the Fisheries Protection Service based at the Mahebourg Fisheries Post and Blue Bay Marine Park Centre with the assistance of the NCG of the Blue Bay Emergency Rescue Centre.

***Black River***

Located in the west, in the Black River District, the Black River Fishing Reserve covers an area of 7.97km$^2$. It is that part of the sea which stretches from Petite Case Noyale up to Tamarin and it extends from Pointe des Requins having coordinates 20°23'47.79"S, 57°22'2.61"E and runs up to a point on the reef at Grande Pointe having coordinates 20°22'17.98"S, 57°20'35.87"E. From Grande Pointe the limit runs in a north-northeasterly direction up to a point called Pointe Lascars having coordinates 20°21'19.29"S, 57°21'8.42"E and from there the limit follows the reef

crest up to a point having coordinates 20°21'19.94"S, 57°21'43.41"E. From the last mentioned point, the limit runs in an easterly direction up to a point on the high water mark having coordinates 20°20'24.76"S, 57°21'47.13"E.

The habitat types present within the Black River Fishing Reserve include the Riviere du Rempart (west) and Riviere Tamarin estuaries, beaches and nearshore, coral reefs, shelf sediments, seagrass beds and mangroves. Control of activities, surveillance and enforcement are undertaken by the Fisheries Protection Service based at the La Preneuse Fisheries Post and the NCG of the Black River NCG Post.

***Port Louis***

Having an area of 3.31km$^2$, the Port Louis Fishing Reserve is located in the west-northwest of Mauritius in the district of Port Louis. It is that part of the sea stretching from Martello Tower at Pointe aux Sables having latitude 20°10'3.11"S and longitude 57°28'20.04"E to a place called Pointe Tortue with latitude 20°9'24.86"S and longitude 57°28'0.22"E to Fort George having GPS coordinates 20° 8'52.79"S, 57°29'21.01"E, and includes the Port Louis Harbour.

The main habitats protected include Riviere Latanier estuary, beaches and nearshore, coral reefs, shelf sediments, seagrass beds and mangroves. Being a restricted area, strict control of activities and surveillance of the Port Louis Fishing Reserve is carried out by the Fisheries Protection Service and the NCG posted at the Port Louis Harbour under the supervision of the Mauritius Ports Authority.

**Table 3: Summary table for Fishing Reserves of Mauritius.**

| Fishing Reserves of Mauritius Island |
|---|
| TYPE/IUCN CATEGORY |
| Coastal/Category IV |
| PROCLAMATION LEGISLATION DATE |
| Section 7(2) of the Fisheries and Marine Resources Act 1998 in 2000 |
| EXTENT |
| Total area of approximately 63km$^2$ |
| INSTITUTIONAL FRAMEWORK |
| – legally mandated authority: Government of the Republic of Mauritius<br>– managed by the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping (Fisheries Division) |
| MANAGEMENT PLAN |
| No management plans exist currently |
| HABITATS |
| Beaches and nearshore, coral reefs, rocky reefs, seagrass beds, mangroves, shelf sediments and estuaries |
| RISKS/THREATS |
| – terrestrial inputs (nutrients, organic matter, mud from agricultural land use and flash floods)<br>– illegal activities such as poaching<br>– climate change resulting in successive bleaching events due to increase in sea surface temperature |
| MANAGEMENT OPPORTUNITIES |
| – development of a Management Plan for each Fishing Reserve<br>– local capacity building in MPA management |

## MARINE PROTECTED AREAS OF RODRIGUES ISLAND

Ten MPAs have been declared and proclaimed in Rodrigues Island (Figure 3), out of which five are classified as Fishing Reserves, four as Marine Reserves and one as a multiple-use MPA.The fundamental roles of the MPAs of Rodrigues Island are for biodiversity conservation, fish stock enhancement, research, education and recreation and tourism. In all the Marine Protected Areas of Rodrigues Island some degree of extractive use is allowed at designated locations subject to a written authorization from the Departmental Head of the Commission for Agriculture, Environment, Forestry, Fisheries and Marine Parks. However, the fishing methods and gears are subject to strict control. Excluding the Fishing Reserves, the other MPAs of Rodrigues occupy a total area of approximately 67.3km$^2$ which represents about 28 percent of the lagoon area.

***South East Marine Protected Area (SEMPA)***

This multiple-use MPA was proclaimed in 2009 (Table 4) and originally identified in consultation with the local communities from ten villages bordering it. SEMPA is not only the largest MPA of Rodrigues but also that of the Republic of Mauritius covering a marine area of 43km$^2$. It stretches from the shoreline to the 20m isobath and is composed of a variety of habitats including the lagoon, off-lagoon waters, reef slopes, reef flats, channel reefs, back reef areas and seagrass beds. Sand is the dominant substrate in the lagoon, with large patches of seagrass beds, macro-algae fields and dead coral rubble. The dominant substrate on the reef flat is rubble with small to medium coral colonies. However, big patches of coral colonies occur, namely at Couzoupa. The reef slope is a gently sloping spur and groove formation, with the spurs dominated by branching coral colonies.

The SEMPA is managed by the principles of co-management or participatory approach to management through

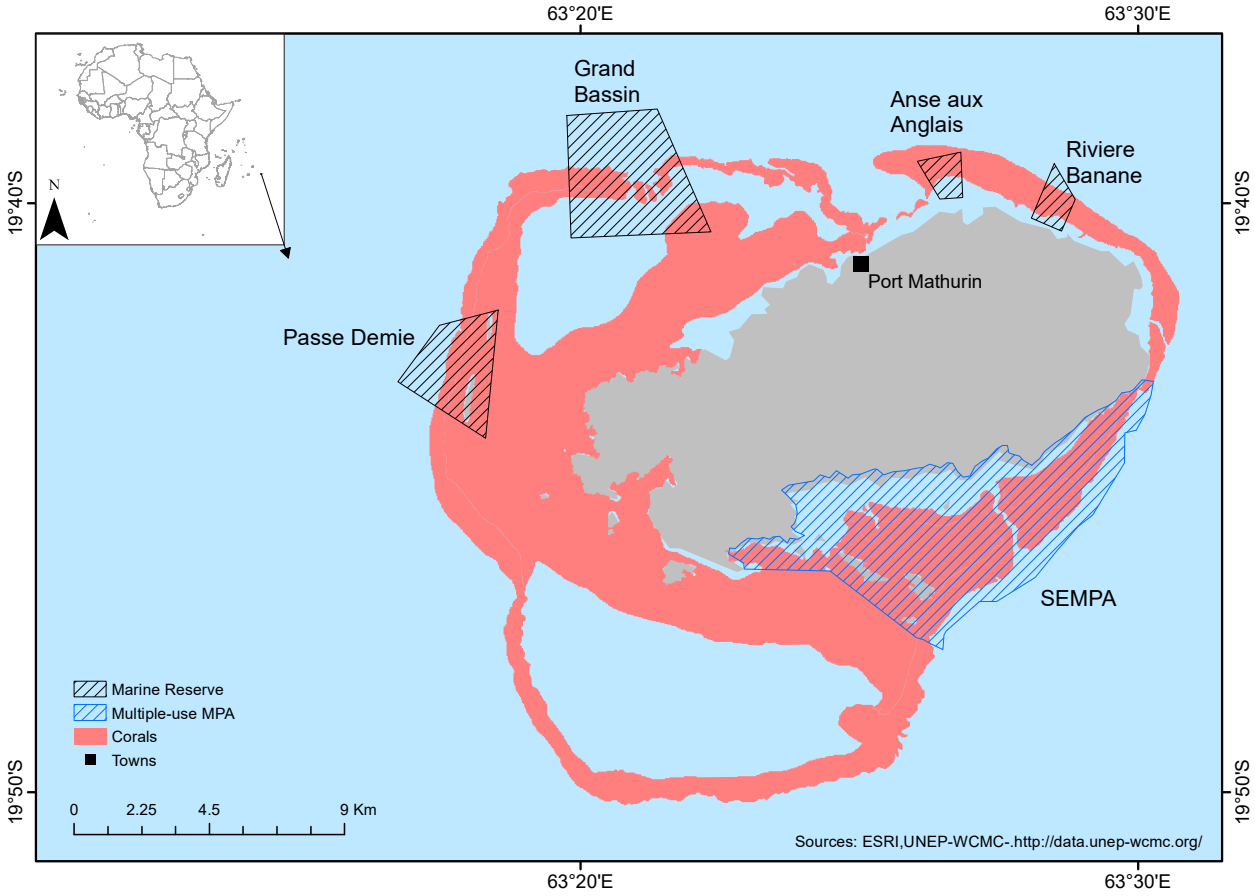



**Figure 3: Marine Areas under Protection in Rodrigues, excluding the five Fishing Reserves (not currently geo-referenced).**

the application of the Rodrigues Regional Assembly (Fisheries and Marine Resources – South East Marine Protected Area SEMPA) Regulations of 2011. The SEMPA has been demarcated into fourteen different specific zones in order to provide protection to critical habitats, ecosystems and ecological processes; to conserve biological diversity, to cater for various permissible activities; and to separate conflicting human activities.

**Table 4: Summary table for South East Marine Protected Area.**

| **South East Marine Protected Area (SEMPA)** |
|---|
| TYPE/IUCN CATEGORY |
| Coastal/Category IV |
| PROCLAMATION LEGISLATION DATE |
| – proclaimed in 2009 under the Rodrigues Regional Assembly (Fisheries and Marine Resources: Marine Protected Areas) Regulations of 2009<br>– Rodrigues Regional Assembly (Fisheries and Marine Resources: South East Marine Protected Area SEMPA) Regulations of 2011 |
| EXTENT |
| 43km$^2$ |
| INSTITUTIONAL FRAMEWORK |
| – legislative area/region/province: Rodrigues<br>– legally mandated authority: Rodrigues Regional Assembly<br>– managed by the Commission for Agriculture, Environment, Forestry, Fisheries and Marine Parks |
| MANAGEMENT PLAN |
| 5 year plan, 2012–2016, in need of review and update |
| HABITATS |
| Beaches and nearshore, seagrass, coral and biogenic reefs and shelf sediments |
| RISKS/THREATS |
| – terrestrial inputs (nutrients, organic matter, and mud from<br>– agricultural land use<br>– climate change resulting in successive bleaching events due to increase in sea surface temperature<br>– Inability to control activities within the watershed of the MPA |
| MANAGEMENT OPPORTUNITIES |
| – review and implementation of the existing Management Plan<br>– opportunity to collaborate with local NGOs, hotel operators and other stakeholders operating in the MPA<br>– local capacity building in MPA management |

## Marine Reserves

The population in Rodrigues is heavily dependent on fishing for their livelihoods. Fishing around Rodrigues is concentrated inside the lagoon and the techniques used include hook and line, basket trap and seine net fishing. Declines in fish stocks over the past decades have prompted the introduction of different protection measures. In 2007, the Rodrigues Regional Assembly gazetted four Marine Reserves (no-take zones) in the north of the island (Figure 3) covering 24.3km$^2$ and representing about 10 percent of the lagoon (Hardman *et al*., 2010).

The Marine Reserves were identified through a participatory process with the support of Shoals Rodrigues, a local marine non-governmental organization (NGO). Fishermen from 17 villages were consulted and asked to identify appropriate locations for the marine reserves with a view to promote sustainable fisheries and to improve conservation status of the marine environment. From the five areas identified by the fishers, four were put forward for legal gazetting by the local government (Pasnin *et al*., 2016). To date only limited management of the areas has been implemented and seine net, hook and line and basket trap fishing still occurs (Hardman *et al*., 2010).

All four Marine Reserves were demarcated with buoys in 2009 and 2010; however, all demarcation buoys are presently lost, due to equipment failure, bad weather, lack of maintenance and vandalism. A management plan for the Marine Reserves was drafted by a Technical Sub-Committee composed of various stakeholders including fishers, NGO officers, tour operators, MPA officers and fisheries protection officers and compiled by a team of international scientists. However, the management plan could not be implemented due to lack of local capacity and labour.

The Marine Reserves, of coastal/pelagic type, have been promulgated under the Rodrigues Regional Assembly (Fisheries and Marine Resources: Marine Reserves) Regulations of 2007 (see Table 5). The Marine Reserves are Riviere Banane, Anse aux Anglais, Grand Bassin and Passe Demie, as described below.

***Passe Demie***
Includes an area of 7.2km$^2$ of the lagoon, extending out towards the reef flat and the shallow fore-reef slope to a depth of 25m. In general, the lagoon habitat is composed of sand and dead coral substrate interspersed with live coral colonies. The reef slope has high habitat complexity and abundant massive corals.

The Passe Demie Marine Reserve is bounded as follows: Inside lagoon: 19°41.814 S, 63°18.521 E and 19°43.995 S, 63°18.293 E; Outside lagoon: 19°42.072 S, 63°17.471 E and 19°43.037 S, 63°16.721 E.

***Grand Bassin***
Covers an area of the lagoon of 14.1km$^2$, extending out towards the reef flat and the shallow fore-reef slope to a depth of 30m. Sand is the dominant substrate in the lagoon, with macro-algae and rubble. The dominant substrate on the reef flat is rubble with small coral colonies and sand. The reef slope is a gently sloping spur and groove formation, with the spurs dominated by branching coral colonies. The Grand Bassin Marine Reserve is bounded as follows: Inside lagoon: 19°40.589 S, 63°19.827 E and 19°40.485 S, 63°22.340 E; Outside lagoon: 19°38.401 S, 63°21.372 E and 19°38.505 S, 63°19.777 E.

***Anse aux Anglais***
Covers an area of 1.5km$^2$ in the lagoon, extending out towards the reef flat and the shallow fore-reef slope to a depth of 20m. Two main habitats occur within the lagoon. The east side of the lagoon consists of continuous limestone pavement whilst the majority of the substrate in the west side of the marine reserve is dominated by consolidated rubble. The reef flat is characterized by a limestone pavement. The reef slope has a gently sloping spur and groove structure. The grooves are approximately 5m wide and filled with coarse rubble and sand; the spurs are dominated by branching coral colonies (Jacobs, 2005).

The four boundaries of Anse aux Anglais Marine Reserve have the following GPS coordinates: Inside lagoon: 19°39.932 S, 63°26.443 E and 19°39.904 S, 63°26.858 E; Outside lagoon: 19°39.286 S, 63°26.040E and19°39.136 S, 63°26.821 E.

***Riviere Banane***
Includes an area of 1.5km$^2$ of the lagoon extending out towards the reef flat and the shallow fore-reef slope to a depth of 20m. The lagoon habitat is composed mostly of sand and coral rubble, overlying a coralline platform. The reef flat consists of a coralline platform covered with turf algae and small compact coral colonies. The reef slope is a gently sloping spur and groove formation, with the spurs dominated by branching coral colonies. Shoals Rodrigues, a local NGO, has been mandated to manage the Riviere Banane Marine Reserve, for which a four-year management plan was developed (2008–2011). The four boundaries of Riviere Banane Marine Reserve have the following GPS coordinates: Inside lagoon: 19°40.257 S, 63°28.085 E and 19°40.473 S, 63°28.628 E; Outside lagoon: 19°39.936 S, 63°28.874 E and 9°39.328 S, 63°28.500 E.

Table 5: Summary table for Marine Reserves of Rodrigues.

| Marine Reserves of Rodrigues Island |
|---|
| TYPE |
| Coastal/Pelagic |
| PROCLAMATION LEGISLATION DATE |
| – proclaimed in 2009 under the Rodrigues Regional Assembly (Fisheries and Marine Resources: Marine Protected Areas) Regulations of 2009<br>– Rodrigues Regional Assembly (Fisheries and Marine Resources: South East Marine Protected Area SEMPA) Regulations of 2011 |
| EXTENT |
| Total of approximately 24.3km$^2$ |
| INSTITUTIONAL FRAMEWORK |
| – legally mandated authority: Rodrigues Regional Assembly<br>– governance structure and management under Shoals Rodrigues, responsible for Riviere Banane Marine Reserve), with Rodrigues Regional Assembly responsible for the other Marine Reserves |
| MANAGEMENT PLAN |
| A four-year management plan (2008-2011) was developed for River Banane Marine Reserve, but needs to be reviewed and updated |
| HABITATS |
| Beaches and nearshore, seagrass beds, coral reefs, rocky reefs and shelf sediments |
| RISKS/THREATS |
| – terrestrial inputs (nutrients, organic matter, and mud) from agricultural land use<br>– physical damages due to destructive fishing methods<br>– illegal activities such as poaching<br>– climate change resulting in successive bleaching events due to increase in sea surface temperature |
| MANAGEMENT OPPORTUNITIES |
| – review and implementation of the existing Management Plan for River Banane, and development of plans for the other marine reserves<br>– local capacity building in MPA management |

Mangrove growing on basalt shoreline in Mauritius.
© José Paula

## Fishing Reserves

The Fishing Reserves have been declared under Sections 2 and 38 of the Fisheries Act, 1980 where specific regulations known as the Fisheries (Reserved Areas) (Rodrigues) Regulations 1984 of the Act were promulgated (Table 6). The boundaries of the Fishing Reserves have been so far described using specific points on land and at sea, though their GPS coordinates have not been recorded and their areas not calculated. Moreover, there is no formal management being undertaken in the Fishing Reserves except for sea patrolling by the Fisheries Protection Service. The five Fishing Reserves are described as follows:

***Pointe La Gueule to Pointe Venus***

The area bounded in the west by an imaginary straight line drawn from Pointe La Gueule to the eastern limit of the reef at Passe Batage on the east by an imaginary straight line running roughly north from Mont Venus to the reef opposite and the coast.

***Anse Quitor (within SEMPA)***

The area bounded by an imaginary line joining Pointe Corail through Domingue, Gombrani to Pointe Caverne or Pointe Vingt Tours and the coast. The main habitat types found within the Anse Quitor Fishing Reserve are the beaches and nearshore, coral reefs, shelf sediments

and seagrass beds. Control of activities, surveillance and enforcement are carried out by the Fisheries Protection Service based at the SEMPA Interpretation Centre.

***Manioc to Pointe La Gueule***
The area bounded by an imaginary line running from Pointe Manioc to Diamant and the coast.

***Baie Topaze***
The area bounded by an imaginary line running from Pointe Palmiste through Fregate to Pointe L'Herbe and the coast.

***Grande Passe (within SEMPA)***
The area forming the Pass of Port Sud Est and within 91.4m (100 yards) at each side of the pass. Habitat types therein include coral reefs and shelf sediments. Control of activities, surveillance and enforcement are carried out by the Fisheries Protection Service based at the SEMPA Interpretation Centre.

**Table 6: Summary table for Fishing Reserves of Rodrigues.**

| **Fishing Reserves of Rodrigues Island** |
|---|
| TYPE |
| Coastal |
| PROCLAMATION LEGISLATION DATE |
| Fisheries Act, 1980 and 1984 regulations |
| EXTENT |
| Approximately 20km$^2$ |
| INSTITUTIONAL FRAMEWORK |
| – legally mandated authority: Rodrigues Regional Assembly<br>– managed by the Commission for Agriculture, Forestry, Fisheries and Marine Parks<br>– planning framework currently managed by the implementation of the Fisheries (Reserved Areas) (Rodrigues) Regulations 1984 of the Fisheries Act of 1980 |
| MANAGEMENT PLAN |
| No management plans currently exist |
| HABITATS |
| Beaches and nearshore, seagrass, shelf sediments and coral reefs |
| RISKS/THREATS |
| – terrestrial inputs (nutrients, organic matter, and mud) from<br>– agricultural land use<br>– physical damages due to destructive fishing methods<br>– climate change resulting in successive bleaching events due to increase in sea surface temperature |
| MANAGEMENT OPPORTUNITIES |
| – development of a Management Plan for each Fishing Reserve<br>– local capacity building in MPA management |

## Total area currently under protection and proposed for protection

The current situation indicates that only a very small proportion of Mauritius' claimed EEZ is under protection, and even with the addition of the proposed MPA the area under protection will be just 0.01 percent of the EEZ (Table 7).

**Table 7: Mauritius EEZ under protection and proposed for protection.**

| | |
|---|---|
| Mauritius' EEZ | 2 300 000km$^2$ |
| EXISTING MPAs | |
| No. of MPAs | 18 |
| MPA area | 139.2km$^2$ |
| % EEZ | 0.009 |
| PROPOSED MPAs | |
| No. of proposed MPAs | 1 |
| Proposed MPA area | 97km$^2$ |
| Potential % EEZ | 0.012 |

## PROPOSED MARINE PROTECTED AREAS IN MAURITIUS

The Mauritius Marine Conservation Society, a local NGO and other partners carried out a feasibility study for the creation of one or more MPAs in the southwest coast of Mauritius. The area of study covered a coastline of about 40km and stretched from the village of Pointe Moyenne, Flic en Flac to the village of Le Morne. The coast in this area supports a diverse and rich marine biodiversity with many habitat types such as the lagoon, offshore open waters, coral reefs, mangroves, seagrass beds, macro-algal fields and estuaries. Moreover, the area is well known as a site for dolphin and other cetacean watching. The study was carried out through a collaborative approach with the participation of other stakeholders, namely the fisher communities, the tourist operators and the local users (see Thomassin, 2011).

A key outcome of the study was a proposal for the creation of a unique MPA starting from the village of Flic en Flac up to southernmost extremity of Le Morne village to include the buffer zone of the Morne Brabant World Heritage site and Fourneau Islet. The proposed area includes the lagoon, the coral reefs to the 20m isobaths and the habitats comprise seagrass beds, macro-algal

fields, coral reefs, mangroves, and estuaries amongst others (Figure 2).

The proposed MPA of multiple-use type is planned to be demarcated into several zones, namely fishing, nautical activities, mooring and swimming and sanctuary/no-take zones. The area also included the Black River Fishing Reserve. In addition to corals, fishes and seagrasses, the species of significant importance found within the area includes ten species of cetaceans (dolphins and whales) and two species of marine turtles.

## NON-FORMAL PROTECTED AREAS – VOLUNTARY MARINE CONSERVATION AREAS

The concept of designating Voluntary Marine Conservation Areas (VMCAs) is relatively new in Mauritius and was introduced for the first time by Reef Conservation, an NGO based in the northern area of the island where it is engaged in conservation of coastal and marine environments. VMCAs are selected sites in the lagoon where resource users and coastal communities agree that no extractive or destructive activities are carried out. The main objectives are to protect marine biodiversity and help marine life regenerate within these VMCAs and the surrounding lagoon. VMCAs in Mauritius are community conservation sites and are not legally designated, therefore they have no legal status to date.

Following feasibility studies, two VMCAs were established in the north of Mauritius (see Figure 2), the first one being the Roches Noires VMCA in 2011 and the other the Anse La Raie VMCA in 2013 (Table 8). The VMCAs were set up through a participatory approach and at each site a VMCA committee consisting of boat operators, fishers, village representatives and volunteers was also established for management purposes. Management activities include long-term and consistent monitoring of the marine ecosystem, carrying out sensitization activities and monitoring compliance with agreed rules. Other activities include training of members of local communities as eco-guides, in marine resource management and marine ecology and conservation. An underwater trail and two fixed mooring buoys were also installed at the Anse La Raie VMCA to promote sustainable tourism at this site.

The main habitats of the Anse La Raie VMCA consist of the beach and nearshore, coral reefs and shelf sediments while those of Roches Noires VMCA are beach and nearshore, seagrass beds, coral reefs, rocky reefs and shelf sediments. More details of the VMCAs, the challenges they faced, activities and benefits are described in the Case Study on the following page.

**Table 8: Summary table for the VMCAs of Mauritius.**

| **Fishing Reserves of Rodrigues Island** | |
|---|---|
| TYPE | |
| Coastal | |
| NAME OF VMCA | |
| **Roches Noires** | **Anse La Raie** |
| DATE OF ESTABLISHMENT | |
| 2011 | 2013 |
| EXTENT | |
| 0.1km$^2$ | 0.5km$^2$ |
| HABITATS | |
| Beach and nearshore, seagrass, coral reefs, rocky reefs and shelf sediments | Beach and nearshore, coral reefs and shelf sediments |
| COMMUNITY INVOLVEMENT | |
| The local communities within the VMCAs are fully involved in their management, surveillance and maintenance | |
| RISKS/THREATS | |
| – terrestrial inputs (nutrients, organic matter, mud from agricultural land use and flash floods)<br>– illegal activities such as poaching<br>– climate change resulting in successive bleaching events due to increase in sea surface temperature | |
| MANAGEMENT CHALLENGES | |
| – lack of expertise in management of VMCA<br>– inability to control activities within the watershed of the reserves | |
| MANAGEMENT OPPORTUNITIES | |
| – development and implementation of a Management Plan<br>– opportunity to collaborate with local NGOs, hotel operators and other stakeholders of the region<br>– local capacity building in MPA management | |

CASE STUDY

# Voluntary Managed Conservation Areas

**Kathy Young, Celine Miternique, Emeline Bouvelle and Marine Françoise**

**Anse La Raie VMCA corals (*Galaxea sp.),* and fish (Red-Cheek wrasse *Thalassoma genivittatum* and Sixbar wrasse *Thalassoma hardwicke).***
© Emeline Bouvelle

Coastal lagoons in Mauritius play an important economic, social and cultural role. Tourism is mainly focused in coastal regions, with many activities in the lagoons and sea. Local communities fish in the lagoons for subsistence and recreation and beaches are an important leisure pastime for Mauritian families. Despite existing conservation measures and legislation, coral reefs in Mauritius are still on the decline due to increasing human pressures, destructive actions and now climate change effects. Voluntary Marine Conservation Areas (VMCAs) promote community involvement and stewardship towards marine resources.

VMCAs are an alternative concept to the traditional MPA being established by Reef Conservation (a local Mauritian NGO). These are community conservation sites, which encourage an inclusive and bottom-up approach for the protection of marine habitats and promote sustainable use of marine resources with stakeholders (coastal inhabitants, fishers, boat operators and hotels etc). These selected sites in the lagoons are where users voluntarily agree that no extractive or destructive activities should take place. A participatory approach is used to engage stakeholders in resource mapping, training, sensitisation, scientific research, monitoring, communication, visibility, sustainable actions and management. Two VMCAs have been created, the first in Roches Noires (0.16km$^2$) in 2011, with successful replication in Anse la Raie (0.69km$^2$) in 2013. Initial funding was from the Indian Ocean Commission: Regional Coastal Management Programme (RECOMAP) in 2008 with further funding in 2012 and 2016 from the GEF Small Grants Programme of the UNDP and local private sector partners.

For both VMCAs, the marine habitats have been monitored for over six years and hard coral and seagrass cover is stable. Both areas have established VMCA community committees. The Anse La Raie VMCA is in a snorkel area used by boat operators, where two fixed mooring buoys and a snorkel trail have been established in the site and operators trained to use these tools. Over 40 persons, including boat operators, have received training about coastal and marine habitats or as marine eco-guides. In Anse La Raie the VMCA is promoted by local boat operators to visitors.

Today the direct users and coastal communities who have engaged in establishing their VMCAs are advocates of the programme. Establishing successful sites, however, is not a short-term project and cannot be approached in this way. Time is needed to make VMCAs a success along with a well-structured programme that allows stakeholders to participate fully. These voluntary sites do have their drawbacks as there is no legal standing for the areas and the code of conduct established with direct users may not always be upheld by others from outside the area. Currently, these established sites are small and limited in their ability to provide the ecosystem services of a larger MPA. However, more or larger VMCA sites are envisioned as communities become engaged and see the benefits of conservation.

VMCAs can provide a number of positive outcomes for communities and conservation including; the expansion of protected areas through a network of sites, developing or including restoration initiatives for sites, developing new eco-tourism opportunities and the promotion of co-management arrangements with local communities, NGOs and government, thereby sharing the responsibility for managing and maintaining marine resources.

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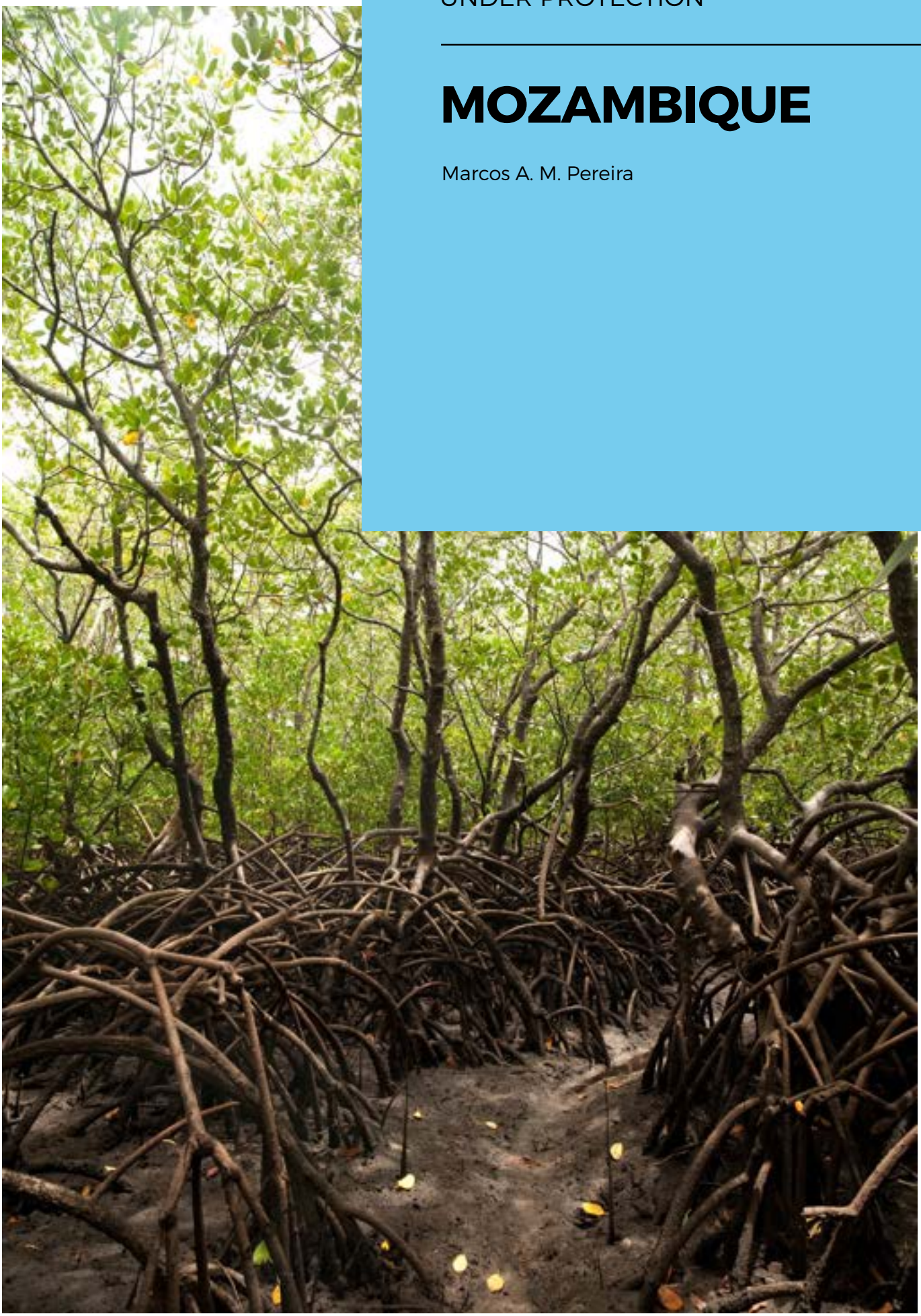
MARINE & COASTAL AREAS
UNDER PROTECTION

# MOZAMBIQUE

Marcos A. M. Pereira



Thriving mangroves in northern Mozambique. © José Paula

## COUNTRY OVERVIEW

Mozambique is located along the southeastern coast of Africa between 12°30'S and 26°51'S. The 2470km long coastline and a diverse and productive continental shelf area of about 104 300km$^2$ are of paramount importance for the country (Pereira *et al*., 2014). The coastline is characterized by a wide diversity of habitats including sandy and rocky beaches, coastal dunes, coral reefs, estuaries, bays, seagrass beds, mangrove forests and offshore islands, which support pristine ecosystems, high biological diversity and productivity, as well as endangered species (Hoguane and Pereira, 2003; Pereira *et al*., 2014).

Following Tinley (1971), the coastline can broadly be classified into three regions from north to south, each supporting a variety of marine ecosystems:

- coral coast
- swamp coast
- parabolic dune coast

In addition to these three main coastal regions, the deep-water pelagic and seabed ecosystems contribute to the majority of the country's exclusive economic zone (EEZ), which covers about 571 452km$^2$ (Doherty *et al*., 2015). The tides of the coast of Mozambique are semi-diurnal (i.e. the two highs and the two lows are about the same height), with a tidal range of about 2m in the south, 3.1m in the north and about 6.4m in the central part of the country.

Pereira *et al*. (2014), have recently reviewed the marine ecosystems of Mozambique and highlighted its biodiversity: almost 900 species of reef-associated fishes have been recorded; 122 species of sharks and rays; 400 species of molluscs; 27 species of marine mammals, including arguably the last viable population of dugongs in the western Indian Ocean (WIO); five species of marine turtles; 270 species of hard and soft corals; 13 species of seagrasses; and nine species of mangroves.

### Legal framework

Mozambique has a comprehensive legal framework for fisheries and environmental management, and is signatory to a number of international conventions and agreements, which are widely recognized as sufficient and progressive. The most relevant legislation pertaining to marine conservation includes the recently gazetted Law for the Protection, Conservation and Sustainable Use of Biological Diversity (known as the Conservation Law, Law 5/2017 of 11 May) and the Fisheries Law (Law 22/2013 of 1 November), which deals specifically with fisheries conservation areas and closed seasons. These provide the general framework in terms of categories of conservation areas, function and articulation of different agencies as well as biodiversity conservation in general. The actual proclamation of individual conservation areas in the country is achieved through specific decrees sanctioned by the Council of Ministers. Within each specific decree, the overarching reason for the proclamation and general restrictions to be imposed on fisheries and marine resources-related activities are stated, although these are further detailed in the specific management plans.

## MPA OVERVIEW

The current network of marine protected areas (MPAs) is comprised of seven conservation areas: two national parks, three reserves, one total protection zone, and one environmental protection area. The Inhaca and Portuguese Islands reserves represent the first MPA in Mozambique. Proclaimed in 1965, this constituted the second MPA in the WIO region, after the Tsitsikama National Park in South Africa, which was proclaimed in 1964. In 1971 the first marine national park was proclaimed, and included three of the five islands of the Bazaruto Archipelago. More than 30 years later, the Quirimbas National Park was proclaimed as the "People's Park", in what was claimed to be a bottom-up driven process. This marked the beginning of a new era in marine conservation in Mozambique with a few more MPAs proclaimed in recent years as well as more interest and investment in MPAs, and the introduction of different co-management agreements.

Currently, formally proclaimed conservation areas, which include both marine and terrestrial environments cover a total area of about 23 695km$^2$, of which about 11 999km$^2$ encompass marine ecosystems. This represents approximately 2 percent of the country's EEZ. One further area has been proposed for protection (Bilene Special Reserve – documentation submitted in 2008), but few advance have been made in realizing this. Another mainly terrestrial reserve (Marromeu National Reserve), encompasses a relatively large area of coastal ecosystems (mangroves, dunes, estuaries) along its circa 30km coastline, and has thus been included in the calculation of the percentage coverage of conservation areas within the EEZ.

Conservation areas in general and MPAs in particular, are inadequately resourced in terms of staff, infrastructure and financing (Louro *et al*., 2017). Also lacking in most MPAs, are management procedures and tools (including

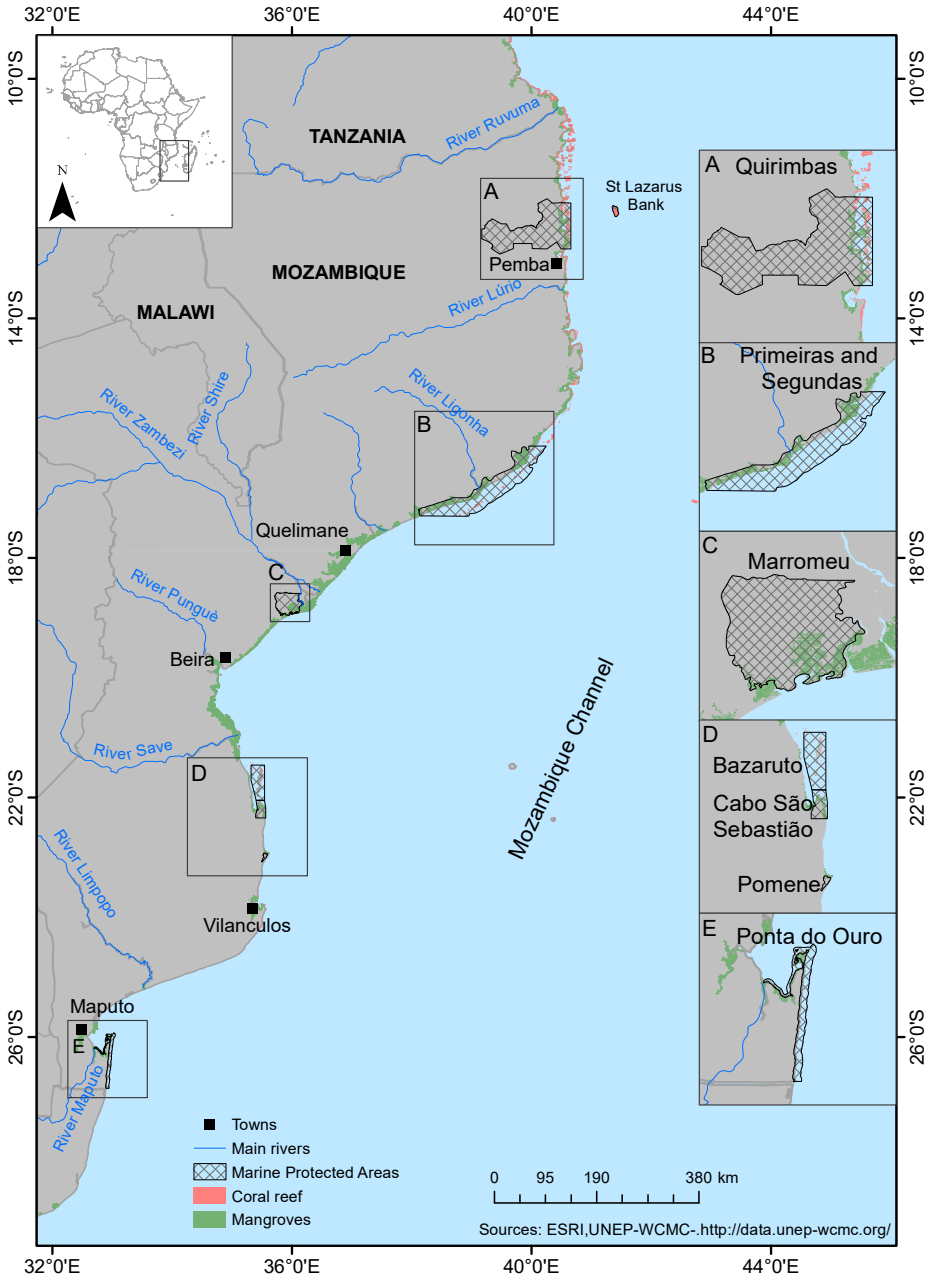



Figure 1: Mozambique Marine Protected Areas.

management, monitoring and research, communications and business plans), as well as adequate science to support them (Pereira and Fernandes, 2014). Several ecosystems and species (e.g. seagrass beds, mangroves, dugongs, manta rays and whale sharks) are still poorly represented and protected under the current MPA network in Mozambique.

The concept and implementation of non-formal protection of marine areas, by local communities and/or authorities is still in its infancy in Mozambique (Rocliffe *et al*., 2014). Only very recently, a conducive and appropriate legal and institutional framework was put in place (which includes the Biodiversity and Fisheries Laws as well as the Sea Policy), and as a result of decreasing catches and habitat degradation at local level, about 17 locally managed areas have being established in Cabo Delgado, Nampula and Inhambane Provinces. These are generally very small areas and incorporate either temporary or permanent zones (sometimes both) and in total cover an approximate area of 79km$^2$ and aim at replenishing stocks and habitat restoration through closed seasons, gear and effort restriction, and protecting endangered marine resources (Marques da Silva *et al*., 2015).

## MARINE AREAS UNDER PROTECTION

There are six recognized MPAs in Mozambique (Figure 1). These are: Ponta do Ouro Partial Marine Reserve, Pomene National Reserve, Cabo de São Sebastião Total Protection Zone, Bazaruto Archipelago National Park, Primeiras and Segundas Islands Environmental Protection Area and Quirimbas National Park. The Marromeu National Reserve has been included in the description, given its coastal location with mangroves, estuaries and coastal dunes, however, this conservation area is widely regarded in the country as a terrestrial reserve.

### Quirimbas National Park

The Quirimbas National Park is located in the Cabo Delgado Province, about 150km from the border with Tanzania. The park has a diverse array of habitats including sandy beaches, mangroves, seagrass beds, coral and biogenic reefs, rocky shores, deep sea and offshore pelagic, estuaries, seamounts and ridges, coastal forests, and islands and atolls (11 islands). The most iconic species are marine mammals (dolphins, whales and the regionally highly threatened dugong), turtles, the coconut crab and seabirds. Proclaimed in 2002 (Decree 14/2002 of 6 June) and with an IUCN Category V, it has multiple zones which include: total protection, specific use, community development and a buffer zone. The park was designated in July 2018 as a Biosphere Reserve by UNESCO, the first in the country. Covering a total area of 9130km$^2$, the park is largely terrestrial (7945km$^2$), but also includes coastal and epipelagic components. The marine environment covers 1185km$^2$. The park was created to protect and conserve natural resources, ensure the maintenance of ecological processes and preservation of natural values.

***Legally mandated institution***

Management is undertaken by the *Ministério da Terra, Ambiente e Desenvolvimento Rural* (MITADER), [or Ministry of Land, Environment and Rural Development] through its *Administração Nacional das Áreas de Conservação* (ANAC) [or National Administration of Conservation Areas]. There is an advisory management committee, *Comité de Desenvolvimento das Quirimbas* (COMDEQ) [or Quirimbas Development Committee], which includes district administrators, representatives of the provincial government, local communities and civil society.

***Management partners***

These include government agencies (e.g. Fisheries, Police), NGOs [notably WWF, Oikos – *Cooperação e Desenvolvimento* (a Portuguese NGO), AMA – *Associação do Meio Ambiente* (a Mozambican NGO)], local communities and private sector. The daily management of the park is conducted by ANAC, and given the technical, operational and financial interventions from partners and stakeholders, the park is considered to be under "consultative co-management", as described in the management plan.

***Management plan***

Currently (2012–2021), that includes a tourism development plan.

***Management objectives***

- Protect and conserve the park's biodiversity.
- Promote the sustainable development of the resident population.
- Ensure and improve the collaboration of all stakeholders in the management of the park.
- Harmonize the plans and management actions from the park and district governments.
- Ensure the implementations of instruments for the proper management of the park.
- Stimulate tourism growth in the park.
- Improve the economic and financial capacity of the park.
- Share the park's potentialities at local, national and international levels.

***Risks and threats***

The most significant risks and threats to the marine environment are overfishing and use of illegal and/or destructive fishing gear, poaching, and climate change (sea level rise).

### Primeiras and Segundas Islands Environmental Protection Area

The Primeiras and Segundas Islands Environmental Protection Area is partially located in Zambezia and Nampula provinces. Several habitats are included within the area: sandy beaches and coastal dunes; mangroves; seagrass beds; coral and biogenic reefs; deep sea and offshore pelagic; estuaries; seamounts and ridges; coastal forests; islands and atolls (12 islands). The most iconic species are marine mammals (dolphins, whales and the regionally highly threatened dugong), turtles and seabirds. It was proclaimed in 2012 (Decree 42/2012 of 12 December) under the umbrella of the Environmental Law (Law 20/97 of 1 October) and currently it is classified as IUCN Category V. It has multiple zones which include: marine nature reserves, sanctuaries, community conservation areas, tourism investment zones and marine multiple use zones. Covering a total area of 10 409.3km$^2$,

Primeiras and Segundas includes terrestrial, coastal and epipelagic components. The marine environment covers 8357.3km$^2$. The area was proclaimed to preserve and protect marine and coastal species and their habitats, as well as to contribute to the restoration of ecological processes and fishery resources and to maintain biological diversity in the Primeiras and Segundas Islands.

***Legally mandated institution***
MITADER, through ANAC, however no management staff/structure has been appointed, apart from a warden who was appointed in early 2019.

***Management partners***
Although lacking management staff, local partners including government agencies (e.g. Fisheries, Police), NGOs (notably CARE International and WWF), local communities and artisanal fishers, have been working towards the establishment of locally managed reserves, mangrove restoration and other conservation issues.

***Management plan***
Current plan (2017–2027), but its implementation has yet to begin.

***Management objectives***
- Ensure the protection and preservation of environmental components, as well as the maintenance and improvement of ecosystems of recognized ecological and socio-economic value.
- Maintain a harmonious relationship between nature and culture, protect the landscape and ensure traditional land uses and settlements, as well as the expression of socio-cultural values and sustainable socio-economic activities.
- Maintain the landscape and habitat diversity, as well as associated species and ecosystems, ensuring the continuity of key ecosystems.
- Promote compatibility between economic interests of different stakeholders, by preventing and eliminating land uses and incompatible activities that by their dimension can jeopardize the conservation objectives.
- Provide outdoor and leisure spaces to citizens, while respecting the essential qualities of the conservation area.
- Ensure the sustainability of the reserve, by appropriate funding mechanisms, efficient management operational systems, and development of partnerships with other stakeholders and relevant research institutions.
- Undertake research and monitoring of ecosystems and key ecological processes and ensure their conservation.
- Regulate the different exploitation uses of economic sectors within the reserve, or that might cause environmental impacts on key ecosystems, in order to guarantee economic, environmental and social sustainability.
- Ensure the balanced access of local communities to the resources, especially marine and fishery resources, and their involvement in conservation activities.

***Risks and threats***
The most significant risks and threats to the marine environment are overfishing, deforestation and unsustainable use of coastal forest and mangrove resources, and poaching of protected species.

## Marromeu National Reserve

As stated above, the Marromeu National Reserve located in Sofala Province, is primarily a terrestrial reserve, with a coastal component. The coast is relatively short (*circa* 30km), and includes the following habitats: mangroves, seagrass beds, estuaries and coastal forests. It was initially proclaimed in 1959 (Portaria 13:186 of 20 June), to protect the African buffalo (*Syncerus caffer*) and other wildlife. Its limits were, however, extended in 1961 (Legislative Decree 2070 of 4 March) and the area has been proclaimed a Ramsar site, ratified in 2003 (Resolution 43/2003 of 5 November), in order to include vulnerable wetlands and mangroves as part of the larger Zambezi Delta. It is currently classified as IUCN Category II and has been zoned into a total protection zone, tourism amenities zone and a community development zone. The reserve covers a total area of 1558.8km$^2$ of which, 170.3km$^2$ include coastal ecosystems (mangroves, estuaries and coastal dunes).

***Legally mandated institution***
MITADER, through ANAC.

***Management partners***
The reserve is solely managed by ANAC, with no partners apart from local government agencies or local communities identified.

***Management plan***
Current plan (2016–2025).

***Management objectives***
- Conserve the plant diversity and wetlands.
- Protect and conserve the wildlife populations and their habitats.
- Stimulate the development of sustainable tourism.

- Promote and improve the livelihoods of the resident population.
- Ensure decentralized management and collaboration of all stakeholders for improved governance and management.

***Risks and threats***
The most significant risks and threats to the coastal environment are degraded hydrology and inundation cycle, and climate change (droughts, sea level rise, floods).

## Bazaruto Archipelago National Park

The Bazaruto Archipelago National Park is located in the Inhambane Province, adjacent to the Cabo de São Sebastião Total Protection Zone, and is primarily coastal and epipelagic. Habitats include sandy beaches, coastal dunes and coastal lakes, mangroves, seagrass beds, coral and biogenic reefs, deep sea and offshore pelagic (including deep-sea canyons), and five islands. The most iconic species is the dugong, arguably the only viable population in the WIO (Findlay *et al*., 2011), marine turtles, whales and dolphins, billfish, and the sand oyster (*Pinctada* spp.). Initially proclaimed in 1971 (Legislative Decree 46/71 of 25 May), it was extended to its current limits in 2001 (Decree 39/2001 of 25 May). Classified as IUCN Category V, the National Park has multiple zones, which include: total protection zones, local communities use only, multiple use zones and a buffer zone. Covering a total area of 1430km$^2$, the park was proclaimed to protect endangered species such as the dugong and marine turtles.

***Legally mandated institution***
MITADER, through ANAC.

***Management partners***
A management agreement as recently been signed with African Parks, an international non-profit conservation organisation (effective March 2018), which will manage the park for 25 years.

***Management plan***
Current plan (2016–2025), with further plans to be determined under the new management agreement.

***Management objectives***
- Protect critical and species-rich habitats.
- Ensure the use and benefit sharing of natural resources within the park.
- Develop the park as a vibrant tourism destination.
- Improve the livelihoods of the local communities.

***Risks and threats***
Although the Management Plan does identify threats and/or risk, some of the most important issues have been identified as overfishing, illegal/unregulated/unreported fishing, poaching of protected species and climate change (sea level rise, erosion).

## Cabo de São Sebastião Total Protection Zone

Located in Inhambane Province, adjacent to the Bazaruto Archipelago National Park, Cabo de São Sebastião Total Protection Zone has terrestrial, coastal and epipelagic components which include the following habitats: sandy beaches and coastal dunes, mangroves, seagrass beds, coral and biogenic reefs, deep sea and offshore pelagic (including deep-sea canyons), coastal forests, and three islands. The most iconic species is the dugong, marine turtles, whales and dolphins and billfish.

The area was proclaimed in 2003 (Decree 18/2003 of 18 April) and is currently classified as IUCN Category VI. The zoning includes two no-take zones, where fishing and other extractive uses are not allowed. It covers a total area of 439.3km$^2$, of which 175.7km$^2$ incorporate marine ecosystems and 263.6km$^2$ cover the terrestrial component. The area was proclaimed to ensure the integrated management and conservation of natural resources of the São Sebastião Peninsula, as well as expand the network of marine protected areas in the country.

***Legally mandated institution***
MITADER, through ANAC.

***Management partners***
The area is solely managed by a private entity (Sanctuário Bravio de Vilanculos Limited). Legally however, this entity has a concession for only 300km$^2$, valid for 25 years until 2028.

***Management plan***
Current plan (2015–2020).

***Management objectives***
- Provide efficient and strategic protection of threatened species and the promotion of adequate and sustainable use of marine and terrestrial resources.
- Initiate restoration of marine and terrestrial biodiversity as well as ecological processes.
- Ensure the active involvement of local communities in the management of and benefit from, the natural resources and biodiversity.

- Promote development of low impact ecotourism infrastructures, and activities to finance the management of the area and community development.

***Risks and threats***
Those identified include: increased fishing pressure from migrant fishers from the mainland; conflicts between local fishers and those from the mainland; night fishing and use of destructive gear; and climate change (erosion, sea level rise).

## Ponta do Ouro Partial Marine Reserve

Ponta do Ouro is located at the border with South Africa, in Maputo Province. This coastal and epipelagic MPA, incorporates the marine reserves at Inhaca and Portuguese Islands that were proclaimed in 1965, and encompasses the following habitats: sandy beaches, coastal dunes, mangroves, seagrass beds, rocky reefs and estuaries. Key species include marine mammals (whales, dolphins and dugong), marine turtles, sharks, the Potato grouper (*Epinephelus tukula*) and Brindle grouper (*E. lanceolatus*), as well as the largest aggregation of the Giant trevally (*Caranx ignobilis*) ever reported (Daly *et al*., in press). Adjacent to the Maputo Special Reserve (terrestrial) and to the iSimangaliso Wetland Park (marine and terrestrial), in South Africa, the reserve was proclaimed in 2009 (Decree 42/2009 of 21 August) and is currently classified as IUCN Category V. With a total area of 678km$^2$, the reserve has a zoning plan that includes sanctuary zones, restricted use zone and multiple use zones.

***Legally mandated institution***
The MITADER, through ANAC.

***Management partners***
The reserve is solely managed by the government. The Peace Parks Foundation has been providing technical and financial support since the proclamation of the reserve, in addition to a warden who was appointed in early 2019.

***Management plan***
The current plan (2011–2016) has expired but is still in use. A coastal and marine resources use plan is currently being finalized and should be approved soon. A tourism development plan is also being drafted.

***Management objectives***
- Ensure the protection, conservation, management and control of marine ecosystems and marine species.
- Promote sustainable ecotourism opportunities.
- Ensure benefits to the region and its people and that the value of conservation of the reserve is understood by all stakeholders.
- Ensure through appropriate institutional and financial management arrangements and legal framework the effective and efficient conservation of the reserve.

***Risks and threats***
Those identified include a dramatic increase in coastal development in the area, often within the primary dunes, impacting turtle nesting and the integrity of the dune system. A deep-water port development at Ponta Techobanine, has been proposed and constitutes the single most serious threat to the integrity and functioning of the reserve. Other threats include illegal commercial fishing, uncontrolled recreational activities (SCUBA diving, fishing), unsustainable extractive use by the local communities, and climate change (erosion, sea level rise).

**Young shellfish harvesters on the tidal flats.** © José Paula

CASE STUDY

# Transboundary MPAs in the Western Indian Ocean: The Ponta do Ouro-Kosi Bay Transfrontier Conservation Area

**Aerial view of Ponta Dobela and Lake Piti, Ponta do Ouro Partial Marine Reserve and Maputo Especial Reserve – a typical landscape within the Ponta do Ouro-Kosi Bay TFCA.** © Thomas Peschak

**Marcos A. M. Pereira**

The Ponta do Ouro-Kosi Bay TFCA, established in June 2000, is the first marine TFCA in Africa, and integrates the Ponta do Ouro Partial Marine Reserve and the iSimangaliso Wetland Park. It forms part of the larger Lubombo TFCA, which encompasses a complex system of conservation areas between Mozambique, South Africa and Swaziland, covering a total area of 11 169km$^2$. The marine area encompasses regionally important nesting grounds for loggerhead and leatherback turtles, some of the most southerly coral communities, incredible marine life, and along with their adjacent terrestrial conservation areas, highly diverse ecosystems (vegetated parabolic dunes, grasslands, floodplains, coastal barrier lakes), with biodiversity and endemism. More than 600 000 people benefit directly or indirectly from opportunities arising from the TCFA, either through involvement in the tourism and associated industries, community-based development projects or sustainable use of natural resources.

Several activities have been developed to streamline integration and the achievement of the TFCA objectives, including constant communication at all levels, training, harmonization of rules and regulations, patrol and enforcement, community-based development projects, and data sharing, advocacy and research and monitoring. The collaborative marine turtle monitoring and conservation program has been very successful and a good example of the critical issues that the TFCA is addressing. Joint fundraising initiatives and mutual support are other collaborative activities. While this has been essentially a governmental led initiative, the Peace Parks Foundation has been instrumental in their support, working closely with the managing authorities, local governments, partners from the civil society and academia, donors and local communities.

All these activities have inspired the two governments to pursue the nomination of the Ponta do Ouro Partial Marine Reserve and the adjacent Maputo Special Reserve, as a UNESCO World Heritage Site, thus extending the iSimangaliso Wetland Park World Heritage Site, and strengthening the protection and conservation of the whole system. This represents an exciting opportunity, which will certainly enhance marine and coastal conservation, as well as cementing the relationship between the two countries. The main challenges include sovereignty issues especially pertaining to enforcement. Coastal and high-seas hot pursuits across national boundaries need proper permitting and communication. Lack of these have on several occasions hindered proper prosecution and imposition of penalties. Future collaborations will include joint tourism planning and operations and marketing, border and migration procedures as well as addressing safety, security and immigration issues. While these may present considerable challenges, the political will and commitment, as well as the passionate and collaborative work of the people on the ground will be paramount to its success.

The establishment and operation of the Ponta do Ouro-Kosi Bay TFCA has brought out important lessons and experiences to share in terms of marine and coastal conservation in the region. Several aspects (including political and cultural differences and availability of and access to resources) need to come together and this takes time to materialize. Perhaps one of the most important lessons is that such collaboration does not happen overnight.

***Management opportunities***
The main opportunity identified for the reserve is the partnership agreement with the Peace Parks Foundation signed in June 2018, which constitutes a valuable opportunity for improved fund-raising and management. Additionally, a dossier for submission to the UNESCO World Heritage Site List is being prepared as an extension of the iSimangaliso Wetland Park. This will increase the marketing and conservation "value" of the reserve and validate the biodiversity rationale for its protection.

## Pomene National Reserve

The Pomene National Reserve is located in Inhambane Province and is mainly terrestrial with a very small coastal component, which includes the following habitats: coastal forests, estuaries and mangroves. No iconic marine species have been identified.

The reserve was proclaimed in 1972 (Legislative Decree 109/72 of 16 November) and is currently classified as IUCN Category V. The proposed zoning includes a special protection zone, resource management zone, community use zone, tourism development zone and a buffer zone. The reserve was initially proclaimed as a hunting concession although no game was introduced. Pomene is the smallest conservation area in the country covering only 50km$^2$ in total area of which about 1.6km$^2$ incorporates mangroves, estuaries and coastal forests.

***Legally mandated institution***
MITADER, through ANAC.

***Management partners***
The reserve is solely managed by ANAC. No partners apart from local government agencies or local communities have been identified.

***Management plan***
The plan was drafted as part of the extension process of the reserve (see section on Areas Under Consideration), but has not been approved.

***Management objectives***
To conserve and maintain the ecological integrity of the terrestrial, estuarine and marine ecosystems, in order to provide opportunities for sustainable development of ecotourism in Inhambane Province.

***Risks and threats***
Those identified include: human settlement and unregulated subsistence activities; disregard for the value of critical habitats; and arbitrary attribution of land.

***Management opportunities***
The area as been identified as a premium tourism development area, but no significant conservation opportunities have been identified. Very recently however, in July 2018, a 12-month Memorandum of Understanding (MoU) with a private company (Farquhar LCC) was signed and included activities such as co-funding, ecotourism development, as well as infrastructural development of the reserve, and monitoring and research.

## PROPOSED MPAs

Several areas have been proposed for some sort of protection throughout the years in Mozambique. Tinley (1971), recommended several areas, with many later proclaimed as either national parks or national reserves (Table 1).

**Table 1: Proposed areas for conservation in Mozambique and their current status.**

| AREA PROPOSED BY TINLEY (1971) | CURRENT STATUS |
|---|---|
| Primeiras and Segundas Archipelago and mainland | Primeiras and Segundas Islands Environmental Protection Area |
| Between Ibo Island and Pemba point | Partially protected within the Quirimbas National Park |
| Between Nacala and Mossuril | Not protected |
| Between Missangage River and Ponta Mituasi | Not protected |
| Zambezi Delta and Cheringoma coast | Partially protected within the Marromeu National Reserve |
| São Sebastião Peninsula | Cabo de São Sebastião Total Protected Zone |
| Bazaruto Archipelago | Bazaruto Archipelago National Park |
| Between Cabo das Correntes and Limpopo River | Not protected |
| Maputo coast | Ponta do Ouro Partial Marine Reserve |

The Eastern African Marine Ecoregion program spearheaded by the WWF listed several areas already suggested by Tinley (1971) as important at global, regional and sub-regional levels (Horrill, 2001), including the Sofala Bank, which was not previously identified. Other areas have also been suggested for some sort of protection, but no documentation and formal submission has been put forward. These include the Tofo (Inhambane Province; Obura *et al*., 2012), and the Benguelene Island (within the Incomáti estuary, Maputo Province – Sitoe *et al*., 1994).

Presently, only one area has been proposed with supporting documentation submitted, the Bilene Special Reserve (Table 2). The effort was spearheaded by the then *Ministério para a Coordenação da Acção Ambiental* (MICOA) [or Co-ordination of Environmental Affairs Ministry], now MITADER, with strong support from the local private sector and operators. The main reason was the protection of coastal dunes and nesting marine turtles.

**Table 2: Details of the proposed Bilene Marine Protected Area**

| BILENE SPECIAL RESERVE | |
|---|---|
| Type | Terrestrial, coastal and epipelagic |
| Likely date of proclamation/ establishment | Unknown (initial proposal was submitted in June 2008) |
| Umbrella legislation under which it is to be proclaimed/established | Biodiversity Conservation Law (Law 5/2017 of 11 May) |
| Legislative area/ region/province | Gaza Province, southern Mozambique |
| Extent (area) | 140.2km$^2$ |
| Habitats | Sandy beaches, rocky shores, coastal dunes and barrier lakes, rocky reefs, coastal forests |

## Summary of existing MPA and proposed MPA coverage

Table 3, below, summarises the areas covered by both existing MPAs and proposed MPAs, and indicates the proportion of EEZ that these represent.

**Table 3: Summary of existing and proposed Mozambique MPAs**

| | |
|---|---|
| Mozambique's EEZ | 571 452km$^2$ |
| EXISTING MPAs | |
| No. of MPAs | 7 |
| MPA area | 11 998.9km$^2$ |
| % EEZ | 2.10 |
| PROPOSED MPAs | |
| No. of proposed MPAs | 1 |
| Proposed MPA area | 140.2km$^2$ |
| Potential % EEZ | 2.12 |

## NON-FORMAL PROTECTED AREAS

Non-formal protected areas (Figure 2) are established either as temporary or permanent zones (in certain cases these are established side by side), essentially to protect breeding stocks, replenish collapsed stocks and protect key habitats. The areas are usually management by community fishing councils in collaboration with the *Direcção Provincial do Mar, Águas Interiores e Pescas* [Provincial Directorate for Sea, Inland Waters and Fisheries], with technical support from local NGOs. No formal designation has been used and they are usually called "community sanctuaries" or similar terminology with the same effect. These suffer from poor financing, limited skilled human resources and lack of equipment.

An experimental reef sanctuary area was established in Tofo (Inhambane Province from 11 November 2016 to 11 May 2017) and deemed highly successful (Marine Megafauna Foundation, n.d.). It is uncertain if a more permanent area will be established. Two areas in the Nampula Province have been negotiated with the local communities, and closed: one in 2008 promoted by the Nuarro Lodge in Memba (I. Marques da Silva, *pers. comm.*) and another in 2012 in Nacala-Porto, promoted by Dive Libélula (n.d.). No further information is available for these areas.

With few exception, general information regarding management and governance, funding, mapping and other details, is poorly documented, as highlighted by Rocliffe *et al*. (2014). Table 4 summarises the information available for the non-formal protected areas.

**Loggerhead turtle.** © Marcos Pereira

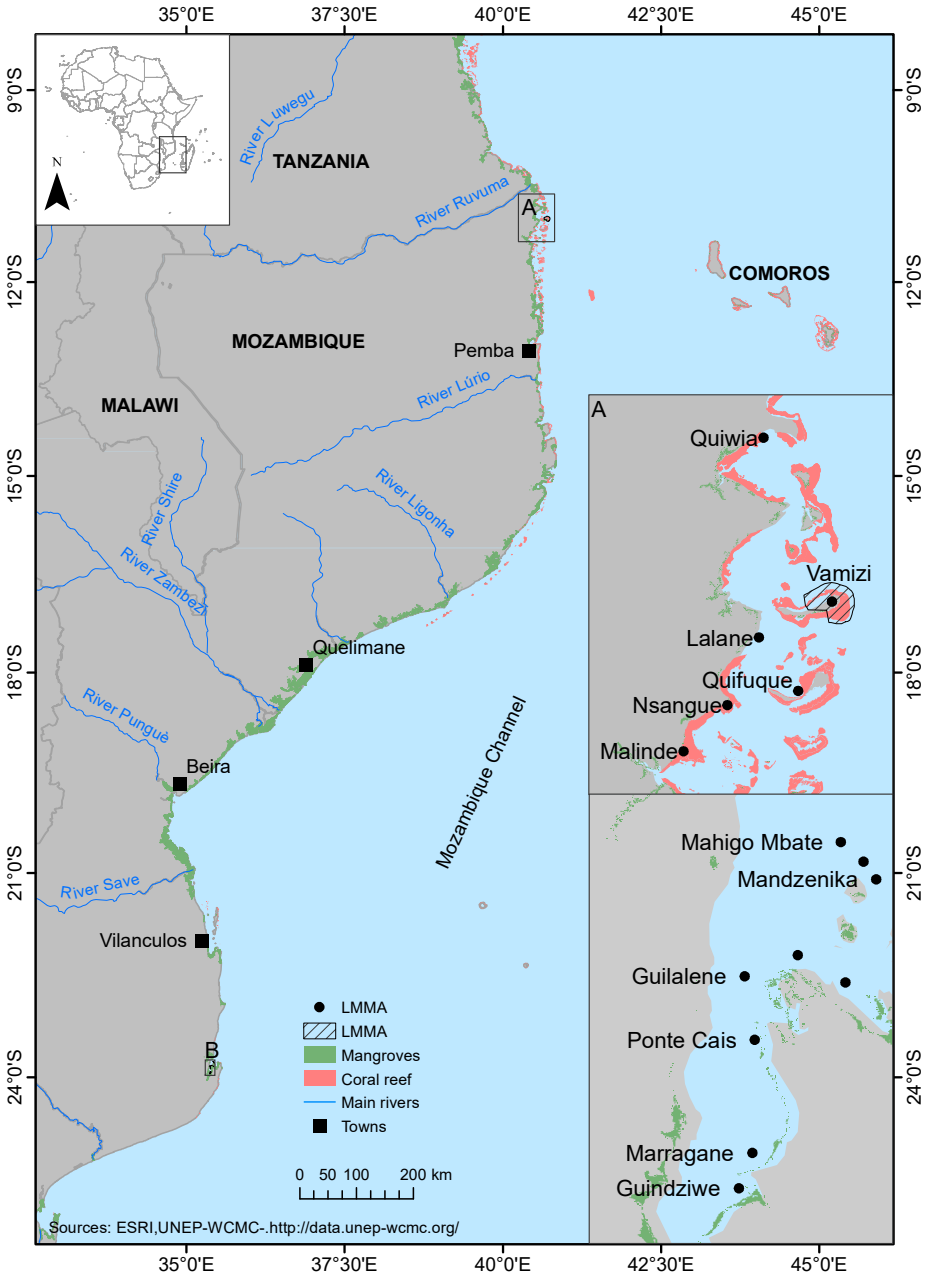



Figure 2: Mozambique non-formal protected areas.

Table 4: Mozambique non-formal protected areas.

| **NORTHERN CABO DELGADO**<br>(group of five small community sanctuaries: Nsangue, Quifuque, Lalane, Malinde, Quiwia) | |
|---|---|
| TYPE | Coastal, epipelagic |
| DATE OF ESTABLISHMENT | Nsangue (2017)<br>Quifuque (2017)<br>Lalane (2017)<br>Malinde (2017)<br>Quiwia (2016) |
| LEGISLATION UNDER WHICH ESTABLISHED | Not gazetted |
| LEGISLATIVE AREA/REGION/PROVINCE | Cabo Delgado Province, northern Mozambique |

| | |
|---|---|
| EXTENT (km²) | Nsangue (temporary: 2.1; permanent: 17.3), Quifuque (temporary: 8.0; permanent: 1.9), Lalane (temporary: 2.1; permanent: 1.6), Malinde (temporary: 21.3; permanent: 0.3), Quiwia (temporary: not available) |
| HABITATS | Sandy beaches, mangroves, seagrass beds, coral and biogenic reefs |
| GOVERNANCE STRUCTURE | Managed by local fishing community councils supported by AMA (national NGO) and CORDIO |
| **VAMIZI ISLAND** | |
| TYPE | Coastal, epipelagic |
| DATE OF ESTABLISHMENT | 2006 |
| LEGISLATION UNDER WHICH ESTABLISHED | Not gazetted |
| LEGISLATIVE AREA/REGION/PROVINCE | Cabo Delgado Province, northern Mozambique |
| EXTENT (km²) | 18 |
| HABITATS | Sandy beaches, seagrass beds, coral and biogenic reefs |
| GOVERNANCE STRUCTURE | Managed by local fishing community councils supported by WWF |
| **INHAMBANE BAY** (group of nine small community sanctuaries: Marragane, Guindziwe, Ponte Cais, Guilalene, Guidzivane, Marambone, Mahigo Mbate, Mandzenika, Nha Dzi Sectori) | |
| TYPE | Coastal |
| DATE OF ESTABLISHMENT | 2017 |
| LEGISLATION UNDER WHICH ESTABLISHED | In the process of being gazetted under the Fisheries Law (Law 22/2013 of 1 November) and Conservation Biodiversity Law (Law 5/2017 of 11 May) |
| LEGISLATIVE AREA/REGION/PROVINCE | Inhambane Province, southern Mozambique |
| EXTENT (km²) | Marragane (3.40), Guindziwe (1.01), Ponte Cais (0.85), Guilalene (0.89), Guidzivane (0.32), Marambone (0.02), Mahigo Mbate (0.07), Mandzenika (0.10), Nha Dzi Sectori (0.04) |
| HABITATS | Seagrass beds, mangroves, estuaries |
| GOVERNANCE STRUCTURE | Co-management involving the Community Council for Fisheries Management, the Community Fisheries Council with technical support from Bitonga Divers and Ocean Revolution (local NGOs) |

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MARINE & COASTAL AREAS
UNDER PROTECTION

# REPUBLIC OF SOUTH AFRICA

Pete Fielding

**Bottlenose dolphins, Alexandria Dunefield, Algoa Bay, South Africa.** © Lloyd Edwards

## COUNTRY OVERVIEW

South Africa is located at the southern tip of the African continent, with a 3113km long coast that stretches from Ponta do Ouro on the Mozambique border to the Orange River on the Namibia border. Of South Africa's coastline, 38 percent is sandy, 32 percent comprises mixed shores and 29 percent is rocky (Harris *et al*., 2011). The remaining fraction is made up of estuary and river mouths, and harbours (National Biodiversity Assessment (NBA) 2011). The mainland exclusive economic zone (EEZ) stretches 370km offshore and includes 1 072 716km$^2$ of ocean. The Prince Edward Islands (PEI) were annexed as part of the Union (now Republic) of South Africa in 1948 and thus form part of South African territory. The PEI have been accorded an EEZ of 370km offshore which comprises a total of 474 897km$^2$ of ocean. Note: the latest South African National Biodiversity Institute (SANBI) estimates for EEZ differ very slightly from those used in the National Protected Areas Expansion Strategy (NPAES 2016), both for mainland and offshore EEZs.

The marine environment of South Africa is unique in that the coasts of the country are greatly influenced by two boundary currents that have completely different properties. The west coast of South Africa is washed by the slow, cold, northward flowing Benguela Current of the Atlantic Ocean, while the east coast is washed by the huge, fast, warm, Agulhas Current flowing from north to south in the Western Indian Ocean (WIO). These two currents are major drivers of the inshore and offshore marine ecosystems of South Africa, and the areas under their influence are respectively described as the Benguela Current Large Marine Ecosystem (BCLME) and Agulhas Current Large Marine Ecosystem (ACLME). Other important drivers of marine biodiversity patterns in the South African marine environment are: terrestrial and benthic-pelagic connectivity, substrate, depth and slope, geology, sediment grain size, wave exposure and biogeography (NBA, 2011).

Major anthropogenic impacts on the marine environment are coastal and offshore diamond mining and industrial fishing, and oil and gas extraction on the west and east coast, extractive resource activities and coastal development on the south, west and east coast of South Africa, and aquaculture along the entire coast.

The wide range of sub-tropical, warm temperate and cool temperate eco-regions provide many resources to industrial and small-scale fishers. Resources include large pelagic species (tuna, swordfish, snoek, sharks) and small pelagic species (sardines, mackerels, anchovies), a very large range of demersal fish species, crustaceans (deep and shallow water rock lobsters, shrimps and crabs), sea cucumbers and a very wide range of mollusc species including squid and octopus. In the southern part of South Africa, the Agulhas Bank provides rich fishing grounds for commercially important species such as hake, sole, monk, skates, carcharhinid sharks, gurnards, sea breams, sciaenids, chimaeras, horse mackerel and kingklip. Of the inshore resources, seabreams, abalone and West Coast rock lobster are over-fished and some of the carcharinids and sciaenids are over-fished offshore.

South Africa has signed and ratified most of the international agreements relevant to conservation, including the Convention on Biological Diversity (CBD), the United Nations Convention on Law of the Sea (UNCLOS), and the Ramsar Convention on Wetlands of International Importance. Nationally, the following legislation is the most relevant to marine conservation in South Africa:

- Marine Living Resources Act (1998 as amended 2014)
- National Environmental Management: Integrated Coastal Management Act (2008 as amended 2014)
- National Environmental Management: Biodiversity Act (2004 as amended in 2014)
- National Environmental Management: Protected Areas Act (2003 as amended in 2014)
- National Protected Areas Expansion Strategy (2008; Revised 2016)
- National Environmental Management Act (1998 as amended 2009)
- Minerals Petroleum Resources Development Act (2002)
- World Heritage Convention Act (1999)

## OVERVIEW OF SOUTH AFRICAN MARINE PROTECTED AREAS

Tsitsikamma Marine Protected Area (MPA) was South Africa's first MPA declared in 1964 and since then MPAs have steadily been added to South Africa's marine conservation estate. Until very recently (23 May 2019) South Africa had 25 formally declared coastal MPAs and one offshore open ocean MPA centred around the PEI in the Southern Ocean. Only 0.4 percent of open ocean environment of the South African EEZ was protected in the 25 coastal MPAs.

Conservation authorities were mindful of the lack of protection for offshore benthic and pelagic habitats and the National Protection Area Expansion Strategy (NPAES) was developed by the Department of Environmental Affairs (DEA) and approved for implementation in March

2009. (In May 2019 DEA became the Department of Environment, Forestry and Fisheries or DEFF). The lack of offshore MPAs was highlighted in the NPAES and subsequently, using systematic conservation planning, ten focus areas were identified for offshore biodiversity protection (Sink *et al*., 2011).

The Phakisa process of 2014 (see Case Study) with its focus on the Ocean Economy fast-tracked the process of defining conservation areas to a stage where 21 mainly offshore MPAs that included 68 578km$^2$ of ocean were proposed and gazetted for public comment in February 2016 (Operation Phakisa, 2014). The extension of Bird Island MPA to form the Addo Elephant Park MPA was gazetted at the same time since the process of formalising it had already started before Operation Phakisa. Most of the new MPAs aimed to facilitate the sustainable use of the ocean environment by fisheries and other sectors as well as to protect offshore ecosystems and species, ranging from deep areas along the Northern Cape-Namibian border to a more than tenfold expansion of iSimangaliso Wetland Park just south of the Mozambique border in the KwaZulu-Natal Province. The NPAES of 2008 was revised in 2016 (NPAES, 2016) and prioritised the conservation of the marine areas gazetted after the Phakisa process.

On 23 May 2019, 20 of the 22 MPAs that had been gazetted for comment in 2016 were formally promulgated and regulations were defined for their management (Government Gazettes Nos. 42478 and 42479 of 2019). The sizes of individual MPAs were reduced slightly in most cases such that the total area proclaimed was 54 214km$^2$ rather than the originally proposed 68 578km$^2$. Nevertheless, their declaration very significantly contributes to the achievement of the United Nations SDG 14.5 target, moving South Africa forward from <0.5 percent of the mainland EEZ under conservation to 5.4 percent conserved.

South Africa now has 42 MPAs: 41 within the mainland EEZ and the very large MPA surrounding offshore PEI. These MPAs are grouped in the following tables as "coastal" and "offshore". Three of the newly promulgated MPAs were expansions of existing coastal MPAs and have been included under the coastal section (replacing the de-proclaimed smaller MPAs embedded within them) and two new coastal MPAs were added to the coastal conservation estate. Offshore MPAs have no shoreline component. There are thus 26 coastal MPAs (see Figure 1) and 15 offshore MPAs within the mainland EEZ, plus the offshore PEI MPA (see Figure 2).

Coastal MPAs range from the very small Rocherpan MPA on the Western Cape coast with 3km of shoreline and extending 500m out to sea, to the very large iSimangaliso MPA in northern KwaZulu-Natal with 177km of coastline and with some of it extending up to 107km out to sea. These MPAs are scattered along the South African coast more or less regularly from the newly proclaimed Namaqua National Park MPA on the west coast, to the iSimangaliso MPA on the South African – Mozambique border on the east coast, and they include beaches, rocky shores, coastal and open ocean islands, lagoons, pans, estuaries and offshore shoals. Within this network there is a range of types of management areas made up of multi-purpose MPAs with Sanctuary, Restricted and Controlled zones, completely no-take MPAs, Ramsar sites, a World Heritage Site (WHS) and two UNESCO Biosphere Reserves. There is even an MPA that is effectively an MPA only between 1 July and 30 November of any one year, thus a seasonal MPA (Walker Bay Whale Sanctuary).

The recently declared offshore MPAs are also widely distributed across the South African EEZ, from the Benguela region on the border between Namibia and South Africa to the subtropical east coast near Durban. The Protea Banks MPA is the closest to the mainland, much of the inshore edge being less than 2km offshore and with inshore benthic habitats at only 30m depth. In contrast, parts of the Agulhas Front MPA and Southwest Indian Ocean and Atlantic Seamount MPAs are situated at the edge of the EEZ (370km offshore) and include abyssal benthic habitats more than 4000m deep.

The sizes of the offshore MPAs also vary very widely, with the two Seamount MPAs each including more than 7500km$^2$ of ocean, while the Benguela Muds MPA is only 95km$^2$ in extent. The management controls within these offshore MPAs range from Sanctuary areas where no resource use is allowed and vessels are not permitted to stop, to Controlled Zones where certain kinds of fishing are permitted.

The coastal MPAs protect about 34 percent of the South African shoreline and of this about 12 percent is classified as Restricted (no-take zone). It should be noted that the estimates of the percentage of protected coastline length are based on a revised coastline length of 3113km (NBA, 2011; with the previous estimate of coastline length being 3656km). With the recent addition of the offshore MPAs, 5.4 percent of the marine environment within the South African mainland EEZ is protected and of this about 3 percent is zoned as Restricted or no-take. The PEI MPA is South Africa's largest MPA because it includes 181 247km$^2$ (NPAES (2016) indicates 180 862km$^2$) of open ocean (equivalent to 38.17 percent of the PEI EEZ). Table 1 provides an overview of the extent of current protection of coast and EEZ for South Africa and the PEI.

CASE STUDY

## Phakisa Blue Ocean Economy

**Pete Fielding and Kerry Sink**

There is no definition for a "Blue Economy" but it is generally recognised as any economic activity in the marine sector with a clear focus on sustainable economic development. Many countries are currently having discussions around Blue Ocean Economy programmes.

Stimulated by the White Paper *National Environmental Management of the Ocean* the Phakisa Blue Ocean Economy project was initiated in July 2014 by the Presidency of South Africa to fast track a process of unlocking the economic potential of South Africa's coast and ocean. The National Development Plan 2030 recognised that, as a maritime nation with over 3000km of coastline, about 1.5 million km$^2$ of marine EEZ and eight commercial ports, there was considerable untapped potential for economic development in the marine environment. This was a key issue for an ailing economy. The Project was modelled on the Malaysian government's big fast results programme which entailed convening laboratories to bring together specific role players to develop detailed practical plans for marine related economic development. Phakisa is Sesotho for "hurry up" because the project was seen as a means to fast-track development.

The process identified the following key industry sectors which would be prioritised to drive future growth in the Blue Economy: i) Offshore Oil and Gas Exploration; ii) Aquaculture; iii) Marine Protection Services and Ocean Governance; iv) Marine Transport; v) Small Harbours Development; and vi) Coastal and Marine Tourism. It also focussed on bringing together key stakeholders from academia, the public and private sectors, and civil society organisations, to collaborate in intense sessions or "Labs" to get results fast. A "Lab" process did not conclude until a clear and implementable plan had been developed, targets had been set, monitoring devised, and a public commitment on the implementation of the plans by all stakeholders had been made.

From the MPA perspective the critical sector was Marine Protection Services and Ocean Governance. The brief of this "Lab" was to implement an overarching, integrated governance framework for sustainable growth of the ocean economy that would maximise socio-economic benefits while ensuring adequate ocean environmental protection. Of critical relevance to MPAs in South Africa were the commitments to:

- Protect the ocean environment from all illegal activities and promote multiple socio-economic benefits
- Create a Marine Protected Area representative network
- Deliver a National Marine Spatial Planning Framework

The development of an effective and ecologically representative MPA network was identified as a strategic initiative which would support sustainable economic opportunities and protect areas of particular importance for biodiversity and ecosystem services. Key stakeholders for each area in the network were identified and potential activities that might be compatible or incompatible in each potential MPA were workshopped. Spatial planning of the MPA network was greatly aided by the South African National Biodiversity Institute's Offshore Marine Protected Areas Project that ran from 2006–2011. After multiple consultations with the main industrial actors, the Offshore MPA Project had identified key focus areas for protection where the most offshore biodiversity targets could be met with the least impact on offshore industries.

To meet public commitment to targets, in February 2016, 22 new MPAs largely located in key focus areas were gazetted for public comment. The proposed network has undergone a thorough, iterative statutory

consultation process to identify and address stakeholder concerns. In May 2019, after final reviews and adjustments, 20 of these formally became MPAs (see map below).

The network represents a step forward in integrated ocean management because it seeks to protect more of South Africa's diverse marine ecosystems, to protect areas where the last remnants of threatened ecosystems are still in good condition, to help recovery of overexploited resources and to provide long term food and job security in a manner that has the least impact on the activities of all other stakeholders who use the ocean. Key factors in the success of the process were the very thorough engagement with commercial interests in the marine environment, a high level of spatial planning skills, and the intense "Lab" working group environment that publicly committed to a result.

The proposed MPA network is being cooperatively implemented by the South African National Biodiversity Institute and the Department of Environment, Forestry and Fisheries in consultation with the Department of Mineral Resources and Energy, the Petroleum Agency South Africa, and stakeholders from commercial fishing, mining, aquaculture, submarine communication cables and other maritime industries.

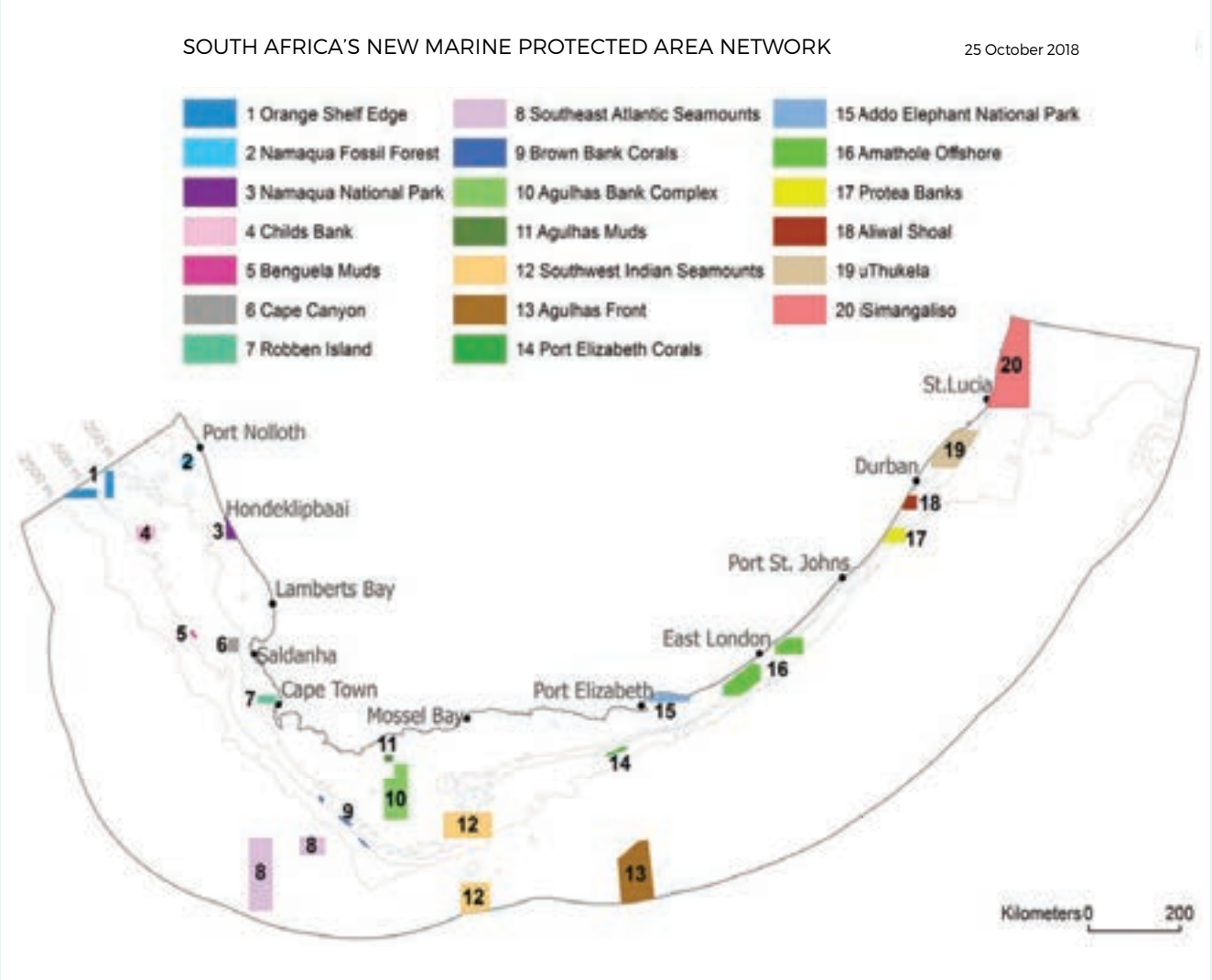

Table 1: Overview of current protection of South Africa's coast and EEZ and the PEI (MPA areas from SANBI 2019).

| Feature | Length (km) | No. MPAs | Area EEZ ($km^2$) | Area[b] MPAs ($km^2$) | % MPA Protection (applicable EEZ) | % Coastal/EEZ Restricted |
|---|---|---|---|---|---|---|
| SOUTH AFRICA MAINLAND | | | | | | |
| Coastline[a] | 3113 | – | – | – | ±34 | ±12 |
| EEZ MPAs | – | 41 | 1 072 716 | 57 943 | 5.4 | ±3 |
| PRINCE EDWARD ISLANDS | | | | | | |
| Coastline | 95 | | | | 100 | 100 |
| EEZ MPA | – | 1 | 474 897 | 181 247 | 38 | 0.33 Sanctuary 14 Restricted[c] |
| TOTAL | – | 42 | 1 547 613 | 239 190 | 15.5 | ±7 |

[a] The coastline surrounding the various MPA islands has been included in the estimate of length of protected coastline.
[b] The individual MPA areas used in these calculations are from the most recent SANBI mapping estimates (Kerry Sink – SANBI pers. comm. 2019).
[c] Scientific fishing for Patagonian toothfish only.

## Institutional arrangements for the management of MPAs

South Africa's 26 coastal MPAs are located in the four coastal provinces of South Africa (Northern Cape, Western Cape, Eastern Cape and KwaZulu-Natal). Many of the original coastal MPAs were initially declared as a means to protect intertidal resources for purposes of biodiversity conservation. The idea that offshore resources needed protection came later. The potential role of MPAs in fisheries management found its way into legislation as late as 1998. It is only relatively recently, since fairly detailed biodiversity and habitat data and systematic conservation planning software have been available, that areas have been targeted for protection based on multiple biodiversity and economic attributes.

Prior to the Marine Living Resource Act (MLRA) of 1998, MPAs were declared under the Sea Fisheries Act (1973 and 1988) and its various amendments. After 1998, MPAs were declared under Section 43 of the MLRA (Government Gazette No. 21948). By 2014, growing awareness of the broader social and livelihood responsibilities of MPAs led to a decision to separate the management of fisheries and the management of MPAs and to move MPAs under the same legislation that controlled terrestrial protected areas. Since 2014, the primary legal instrument for the establishment and protection of MPAs has been the National Environmental Management: Protected Areas Act of 2004 (NEM: PAA). On 2 June 2014, all MPAs previously declared under the MLRA Section 43 were transferred by presidential pronouncement to Section 22A of the NEM: PAA (Government Gazette No. 37710).

For more than a decade the Marine and Coastal Management (MCM) Branch of the National Department of Environmental Affairs and Tourism (DEAT) managed all matters relating to conservation, biodiversity, fisheries and MPAs. In 2009, the institutional arrangements relating to management of the environment underwent a major revision and the Department of Environment Affairs and Tourism was divided into three Departments – the Department of Environment Affairs (DEA), the Department of Agriculture, Forestry and Fisheries (DAFF), and the Department of Tourism (DoT). Management of the marine environment was shared between DEA who managed most aspects of the marine environment, and DAFF who managed fisheries. In May 2019, the portfolios of Forestry and Fisheries were again combined with the Department of Environment Affairs to form the Department of Environment, Forestry and Fisheries (DEFF).

DEFF is now the legally mandated management authority for all MPAs. DEA had contractual agreements with various provincial and municipal management authorities to manage the MPAs of the country and these agreements will be transferred to DEFF in due course. In 2017 the annual Memorandum of Understanding (MoU) cycle that underpinned the contractual arrangements was replaced with a five-year cycle and a requirement for quarterly reporting on management of natural resources, compliance and enforcement, and research and development. This arrangement is likely to be carried over to DEFF. The current contracted management authorities are: South African National Parks (SANParks); CapeNature in the Western Cape; Eastern Cape Parks and Tourism Agency

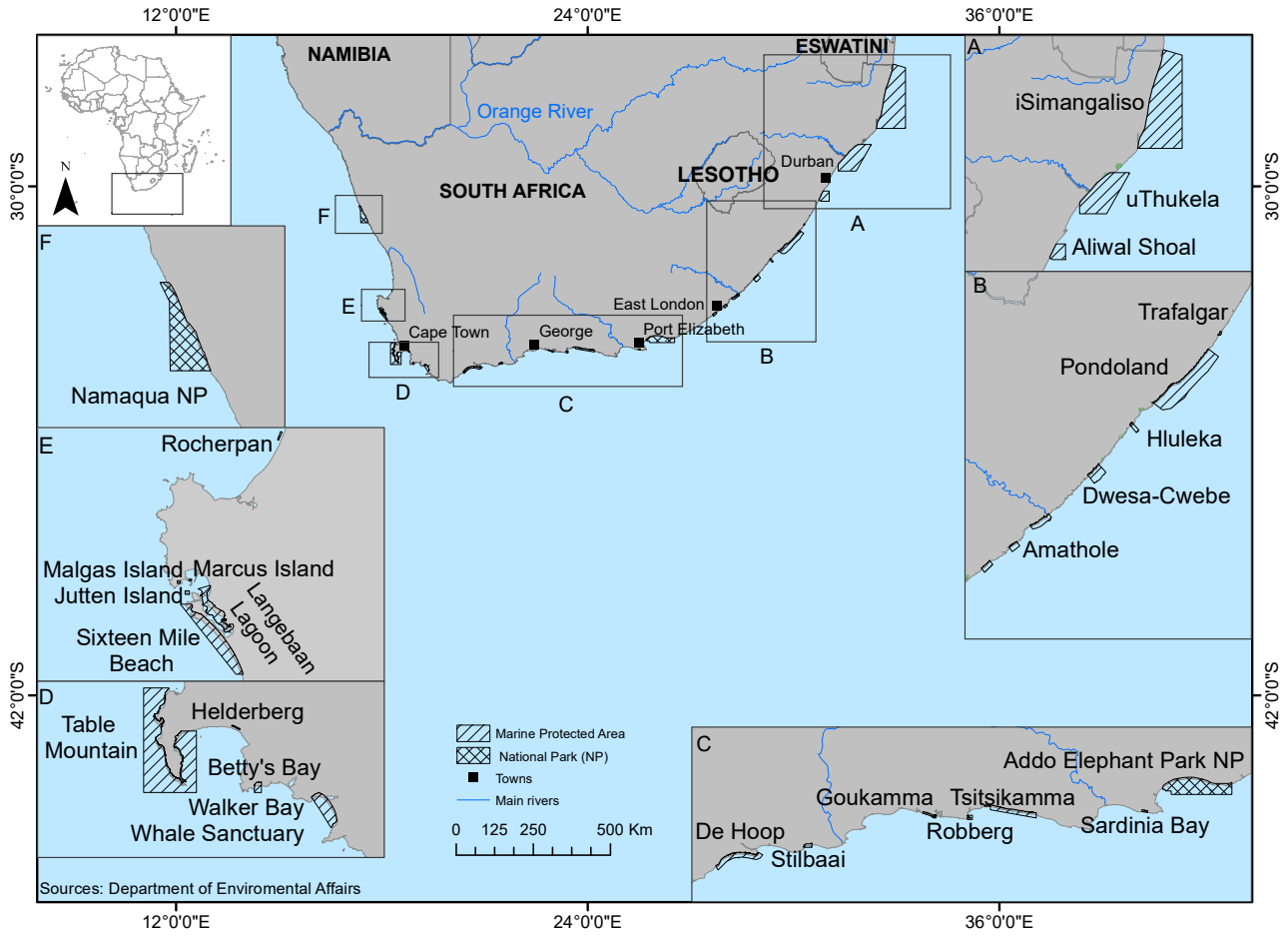


Figure 1: South African coastal Marine Protected Areas.

(ECPTA) in the Eastern Cape; Ezemvelo KwaZulu-Natal Wildlife (EKZNW) in KwaZulu-Natal; Nelson Mandela Bay Municipality (NMBM) in the Eastern Cape; the City of Cape Town (CoCT) in the Western Cape; and iSimangaliso Wetland Park Authority (IWPA) in KwaZulu-Natal. DEFF and the French Government jointly manage the mid-ocean PEI MPA. Many of the South African MPA's are adjacent to a terrestrial National or Provincial Park or Nature Reserve and the Nature Reserve Management Authority generally also manages the adjacent MPA.

## Zoning

In South Africa the MPA's are generally zoned under three classifications normally defined in the regulations associated with each MPA.

***1. Restricted Zone/Area***

These are no-take areas in which no extractive use of any part of the environment is allowed (including fishing, bait collecting, invertebrate harvesting, sand or shell removal). Note: iSimangaliso Wetland Park has specific definitions for its Restricted zones.

***2. Controlled Zone/Area***

Controlled zones are specific sections within an MPA in which fishing, other extractive resource use and other activities may take place subject to the permit conditions issued by DEFF. Typically permits are issued for the following activities: spear fishing, angling, SCUBA diving, snorkelling for shellfish extraction, boating, commercial diving, salvage operations, commercial fishing, small scale fishing, boat based whale and dolphin watching, shark cage diving or filming.

In some cases, only specific types of fishing are allowed, for example linefishing, fishing for large pelagics only, or tuna pole fishing. Note: iSimangaliso Wetland Park has specific definitions for its Controlled zones.

Some MPAs have Restricted zones surrounded by a larger Controlled zone. For example, Table Mountain National Park MPA has six relatively small Restricted zones located within a much larger MPA area of approximately 1000km$^2$ which is zoned as a Controlled area. No resource use is allowed in the Restricted zones but the extraction of marine resources under a permit is allowed from the Controlled zone.

***3. Sanctuary Area***
A Sanctuary area is one where all access other than that of the management authority, and all resource use, is generally prohibited.

## Summary tables for individual MPAs

Notes to the MPA summary tables:

1. The 26 coastal MPAs (Table 2) and the 15 offshore MPAs (Table 3) of South Africa are briefly described, from east to west (clockwise) around the South African coast. The PEI MPA in the Southern Ocean is described in Table 4.

2. Where an IUCN category is associated with an MPA, the MPA category has been described by the www.mpatlas.org website. In many cases the website www.protectedplanet.net does not assign a category to an MPA even though www.mpatlas.org has assigned a category.

**African penguins and Cape gannets on Bird Island, Addo Elephant National Park, Eastern Cape.** © Lloyd Edwards

3. Lengths of coastline protected for each MPA have been taken mainly from MPA Management Plans. Occasionally the length of coastline has been measured using Google Earth. The area associated with each MPA was calculated from the latest (2019) shape files developed by the South African National Biodiversity Institute (SANBI) using WGS84 Africa Albers Equal Areas Conical Projection.

4. The habitats associated with each MPA have been described in terms of the Critical Habitats list developed at the Mombasa Workshop in February 2018. It must be noted that these Critical Habitats are quite limited in scope and sometimes not appropriate descriptors of the habitats associated with an MPA. Where it is not possible to adequately describe an MPA habitat under one of the Critical Habitats a more appropriate description based on the SANBI habitat classifications has been provided. The offshore MPA habitats are largely SANBI habitat types.

5. South African conservation planning (NBA 2011) has differentiated 58 different coastal habitat types, 62 different offshore benthic habitat types and 16 different pelagic habitat types with conservation targets associated with each of these habitats rather than those developed at the Mombasa Workshop.

6. Species, Objectives, Risks/Threats to MPAs and Opportunities have been limited to restrict the length of the document.

7. Linefish species have not been specifically defined but include all those species commonly caught by the commercial linefish sector in South Africa. These mostly included fish species in the families Sparidae, Sciaenidae, Carangidae, Serranidae, and Carcharinidae.

8. A number of the MPAs described in the following tables were proclaimed under the Sea Fisheries Act (Government Gazette No. 11201) before they were proclaimed under the Marine Living Resources Act (of 1998 (Government Gazette No. 21948) or the National Environmental Management: Protected Areas Act of 2003 (Government Gazette No. 42478). In the interests of saving space, only the latest proclamation of each MPA is listed.

Table 2: The coastal MPAs of South Africa.

| ISIMANGALISO MPA | |
|---|---|
| DESIGNATION<br>TYPE/LOCATION | Coastal and Offshore MPA.<br>Extension of iSimangaliso Wetland Park (IWP) extending 63km to 107km offshore >2000m depth. Includes the de-proclaimed St. Lucia and Maputaland MPAs. The St. Lucia and Kosi Lake systems are Ramsar sites. The MPA to a distance 5.5km offshore is part of the Greater St. Lucia Wetland Park World Heritage Site. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA. Coastal St. Lucia and Maputaland MPAs de-proclaimed at the same time.<br>Protects a representative area of the most southern corals on the east coast, in addition to coelacanth habitat, foraging area of nesting turtles, entire canyon habitats that include deep-sea habitats in the MPA such as cold water coral reefs that were outside the previous coastal MPAs. It is a transition area between Natal and Delagoa bioregions. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Zoned into an inshore and offshore area. The inshore area consists of eight Inshore Controlled Zones, five Inshore Controlled Catch and Release Zones, eight Inshore Restricted Zones and one Inshore Wilderness Zone. The offshore area consists of two Offshore Controlled Pelagic Linefish Zones, three Offshore Restricted Zones, and one Offshore Wilderness Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 10 715km$^2$ of ocean, 177km of coastline is protected by the MPA. Additionally, 367km$^2$ of estuary is protected by the IWP.<br>Estuary: mangroves, salt marshes, seagrasses, sand flats. Coastline: beaches and nearshore rocky reefs, nearshore pelagic habitat. Subtidal: representative of the most southern corals on the east coast, submarine canyons, shelf sediments, deep rocky reefs, deep-sea soft sediments. Continental slope, shelf edge and bathyl hard substrate. Epipelagic mesopelagic and bathypelagic habitats.<br>Subtropical and cold water corals, humpback whales and whale sharks, coelacanth, leatherback and loggerhead turtles, reef fish, crustaceans. |
| INSTITUTIONAL FRAMEWORK | Managed by IWPA by contractual agreement with DEFF. IWPA have contractual agreement with EKZNW for conservation management including compliance and enforcement.<br>Co-management arrangements in place. Community actively involved in tourism ventures. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Will be managed under the approved IWP Integrated Management Plan (MP) 2017–2021 which guides conservation operations and plans for the marine section of the Park.<br>Protection of turtle nesting sites; protection of the southern-most corals of the African coast; protection of the only example of a sub-tropical Indo-Pacific marine ecosystem in South Africa; protection of exploitable marine species; manage inshore and offshore benthic and pelagic ecosystems, protect biodiversity and ecological processes, support nature based tourism, provide sites for research and monitoring. |
| RISKS/THREATS<br>OPPORTUNITIES | Climate change related ecosystem changes; IUU fishing; trawling; high tourism loads; coral damage by divers; disruption of terrestrial and wetland processes by various land use practices; subsistence resource use, gillnets in St. Lucia and Kosi lakes; poor surrounding communities; slow resolution of land claims; poor conservation-community relations.<br>Tourism; research potential; benefit sharing; environmental education; rebuilding of linefish stocks; improve understanding of coelacanths; bycatch management of trawl fisheries.<br>Currently, several activities are underway to streamline integration and the achievement of the Ponta do Ouro–Kosi Bay Trans-Frontier Conservation Area (TFCA) (see Case study, Mozambique chapter). |
| **UTHUKELA MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal and Offshore MPA.<br>Between Blythedale and Richards Bay on the northern KZN coast from the shore to between 37km and 65km offshore and to 500m depth. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>To protect unique and threatened benthic habitat types and the ecological processes related to freshwater input, as well as nursery areas for threatened fish species. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Zoned into an inshore and offshore area. The inshore area consists of two Inshore Restricted Zones and two Inshore Controlled Zones. The offshore area consists of two Offshore Controlled Zones, one Offshore Controlled Commercial Zone, one Offshore Controlled-Pelagic Linefish Zone and one Offshore Restricted Zone. |

| | |
|---|---|
| EXTENT<br>HABITATS<br>KEY SPECIES | 4100km$^2$ of ocean and about 80km of coastline is protected by the MPA.<br>Beach and nearshore sandy habitats, intertidal subtidal and deep rocky reefs, estuaries, continental slope soft sediments (muddy), submarine canyons, shelf edge and bathyl sediments, epipelagic, mesopelagic and bathypelagic habitats.<br>Linefish: Squaretail kob, Slinger, Black musselcracker, Seventy-four; sharks, cold water corals, crustaceans, turtles, prawns. |
| INSTITUTIONAL FRAMEWORK | EKZNW manages the MPA by contractual agreement with DEFF. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No Management Plan.<br>Protect interconnected coastal and offshore benthic and pelagic ecosystems of the KwaZulu-Natal (KZN) Bight; protect biodiversity and ecological processes; protect fragile sponge and coral communities; protect spawning, foraging and nursery areas for threatened species; support recovery of linefish; conserve riverine input into marine environment. |
| RISKS/THREATS<br>OPPORTUNITIES | Climate change related ecosystem changes; IUU fishing; trawling.<br>Rebuilding of linefish stocks; manage sandy beach communities; improve prawn recruitment to KZN estuaries; bycatch management of trawl fisheries; tourism. |
| **ALIWAL SHOAL MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal and Offshore MPA.<br>KZN South Coast. Extension of Aliwal Shoal MPA from shoreline to 700m depth. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA. Previous Aliwal Shoal MPA de-proclaimed at the same time.<br>To protect unique and threatened benthic habitat types, high profile deep reefs, good condition estuaries, as well as spawning areas for threatened fish species. Semi-permanent cyclonic eddy south of Durban increases the pelagic productivity of this region and is a key ecological process that contributes to recruitment success. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Zoned into an inshore and offshore area. The inshore area consists of two Inshore Restricted Zones and two Inshore Controlled Zones. The offshore area consists of two Offshore Controlled Zones, one Offshore Controlled-Pelagic Linefish Zone and four Offshore Restricted Zones. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 680km$^2$ of ocean and 28km of coastline is protected by the MPA.<br>Intertidal, subtidal and deep rocky reefs; beach and nearshore sandy substrate; shelf and shelf edge/slope sediments; epipelagic and mesopelagic habitats.<br>Migratory species – seabirds, turtles, sharks; reef fish, linefish, sardine. |
| INSTITUTIONAL FRAMEWORK | EKZNW manages the MPA by contractual agreement with DEFF. Active MPA Forum assists with management decisions. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No current Management Plan.<br>To protect inshore and offshore benthic and pelagic ecosystems; protect biodiversity and ecological processes; protect spawning, nursey and foraging areas of linefish, seabirds, turtles and sharks; protect over-exploited fish species; support recovery of linefish; promote nature-based tourism; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | Conflicts between user groups; high SCUBA diver loads damage the reef and disturb fish and sharks; chumming for sharks poses potential safety issues; industrial pollution from a papermill effluent outfall; over-exploitation of reef fish; IUU fishing in the MPA; oil and gas exploration offshore.<br>Economic benefits for communities, research potential, develop effective user conflict protocols, rebuilding of linefish stocks, tourism. |
| **TRAFALGAR MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated in the KZN province on the east coast. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Proclaimed to protect marine fossil deposits. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>No zoning. Entire MPA is a Controlled Zone – fishing with permit. Shore and boats but only pelagic species from boats. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 4.8km of shoreline and about 8km$^2$ of ocean.<br>Beach and nearshore sandy habitat; intertidal and subtidal rocky reefs.<br>Natal bioregion pelagic and reef fish. |

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| INSTITUTIONAL FRAMEWORK | EKZNW manages MPA by contractual agreement with DEFF. Regular liaison with Stakeholder MPA Advisory forum. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No Management Plan (MP) for MPA but approved MP developed in 2013 for adjoining Mpenjati Nature Reserve. MPA is managed in conjunction with Nature Reserve.<br>Protection of Cretaceous fossils; protection of a subtidal rocky reef ecosystem including extensive seaweed beds; improve tourism facilities and experience; maintain ecological integrity of the reserve.<br>Protect Natal bioregion pelagic and reef fish. |
| RISKS/THREATS<br>OPPORTUNITIES | MPA is too small to be effective; pollution from oil and plastic; illegal boat fishing in the MPA – many launch sites outside the MPA make it difficult to control fishing in the MPA; oil and gas exploration; poor surrounding local communities.<br>Minor tourism potential; minor research potential; involve local communities in management; working for the coast team helps clean the MPA. |
| **PONDOLAND MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated in the Eastern Cape province between Mzamba River and Mzimvubu River in the area known as the Wild Coast. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2004; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>A sanctuary for over-exploited fish and invertebrate species; high proportion of endemic species particularly algae; high diversity of fish; high biomass of intertidal invertebrates. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>MPA is divided into two offshore Controlled Zones (fishing with permit), one offshore Restricted Zone, five inshore Controlled Zones, four inshore Restricted Zones, seven estuarine Controlled Zones and two estuarine Restricted Zones. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 90km of shoreline and 1236km$^2$ of ocean.<br>Several estuaries with mangroves; intertidal and subtidal rocky reefs; beach and sandy nearshore habitat; submarine canyons.<br>Whales, sardines, endemic reef fish species (sparids), invertebrate species (spiny lobsters, limpets, mussels, oysters). |
| INSTITUTIONAL FRAMEWORK | ECPTA manages the MPA by contractual agreement with DEFF. ECPTA have a co-management arrangement with local community through the Mkhambathi Land Trust. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Management Plan developed in 2012; reviewed in 2014. Scheduled for update in 2019.<br>Protect marine ecosystems and species within the Pondoland MPA; protect breeding stocks of commercially important line fish and invertebrates (lobster, mussels oyster); promote ecotourism in the MPA; promote co-operative governance to reduce conflict; promote scientific research. |
| RISKS/THREATS<br>OPPORTUNITIES | Exploitation of intertidal resources; ineffective compliance; reduced freshwater flow into estuaries of the MPA; increased siltation and pollution of estuaries; high levels of illegal estuarine fishing; new toll road increasing accessibility of MPA; IUU fishing in MPA – trawling and skiboats; uncontrolled tourism ventures; poor surrounding local communities.<br>Tourism potential and local jobs; involvement of local communities in management; research potential. |
| **HLULEKA MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated in the Eastern Cape province, immediately south of the Mnenu River, in the middle of the area known as the Wild Coast. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Sanctuary for over-exploited fish and invertebrate species; high proportion of endemic species; high diversity of fish. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>No Zoning. Entire MPA is a Restricted Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 4km of shoreline and about 41km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; beach and nearshore sandy habitat.<br>Endemic reef fish species (sparids); invertebrate species (spiny lobsters, limpets, mussels, oysters). |
| INSTITUTIONAL FRAMEWORK | ECPTA manages MPA by contractual agreement with DEFF. ECPTA liaises with local community through a Stakeholder Forum. |

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| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Management Plan developed and awaiting review by ECPTA before submission to DEFF.<br>To protect marine ecosystems, habitats and species; provide a breeding and growth sanctuary for commercially important line fish and invertebrates (lobster, mussels oyster); control activities to reduce habitat degradation; reduce conflict between users. |
| RISKS/THREATS<br>OPPORTUNITIES | Absence of approved Management Plan; open access policy for local community; pressure to open MPA to resource use; small size of MPA; poaching of fish, mussels and lobsters with ineffective compliance; IUU fishing in MPA by trawling and skiboats; oil and gas exploration; poor surrounding local communities.<br>Tourism potential and local jobs; involvement of local communities in management; increase staff skills to improve enforcement procedures, boat handling; high quality education centre. |
| **DWESA-CWEBE MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated in the Eastern Cape province, between Ntlonyana River to the north and Human's Rocks to the south. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA. Re-proclaimed with new zonings and boundaries in 2015 under NEM: PAA.<br>Sanctuary for over-exploited fish and invertebrate species; high proportion of endemic species; one of two known breeding areas for White steenbras; Mbashe River is an important juvenile kob habitat and kob feeding ground. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>MPA is divided into three Restricted Zones and three Controlled Zones.<br>Local Dwesa-Cwebe community fishers may fish from the shore in Controlled Zones with permits issued by DEFF. Recreational fishing under a recreational fishing permit is allowed in part of one of the Controlled Zones. The Mbashe estuary for about 3km upstream of the mouth is part of a Restricted Zone. Offshore area is Restricted Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | About 20km of shoreline. and 265km$^2$ of ocean, is protected by the MPA.<br>Estuaries including Mbashe upstream for about 3km; intertidal and subtidal rocky reefs; beach and nearshore sandy habitat; subtidal soft sediments.<br>Endemic reef fish species (sparids), White steenbras, Dusky kob, abalone. |
| INSTITUTIONAL FRAMEWORK | ECPTA manages MPA by contractual agreement with DEFF. ECPTA have a co-management arrangement with local communities through a Land Trust. The relationship is severely conflicted. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No Management Plan. Development of Management Plan scheduled for 2019.<br>Provide a breeding and growth sanctuary for commercially important line fish and invertebrates (lobster, mussels oyster); promote ecotourism in the MPA; promote co-operative governance to reduce conflict; promote scientific research. |
| RISKS/THREATS<br>OPPORTUNITIES | Over-exploitation of fish and invertebrate resources; ineffective compliance; increased siltation and pollution of Mbashe estuary; high levels of illegal estuarine fishing; IUU fishing in MPA – trawling and boats; poor surrounding local communities; pressure to access Restricted areas; high levels of conflict between management and communities.<br>Tourism potential and local jobs; involvement of local communities in management; increase staff skills – enforcement procedures, boat handling, seamanship. |
| **AMATHOLE MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated in the Eastern Cape province, close to East London.<br>Comprises three separate areas: Gxulu, Gonubie and Kei. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2011; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Sanctuary for over-exploited fish and invertebrate species; provide a benchmark for scientific research. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>All three sections of the MPA are Controlled Zones. Fishing, spearfishing and bait collection from the shore are allowed but no boat based extractive resource use is permitted. |
| EXTENT<br>HABITATS<br>KEY SPECIES | About 54km of shoreline and about 248km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; beach and nearshore sandy habitat; probably subtidal soft sediments offshore of estuaries; epi-pelagic habitat.<br>Endemic reef fish species (sparids), shad, whales, dolphins. |
| INSTITUTIONAL FRAMEWORK | ECPTA manages MPA by contractual agreement with DEFF. Community structure still to be developed. |

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| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Management Plan developed and awaiting review by ECPTA before submission to DEFF.<br>Conserve environment and biodiversity in Amathole region; provide a sanctuary for priority linefish species; provide benchmark areas for scientific research and monitoring; control activities to reduce the risks of habitat degradation. |
| RISKS/THREATS<br>OPPORTUNITIES | Poaching of fish and abalone; limited compliance capacity – 15 boat launch sites in the area make enforcement difficult; land-based pollution from rivers; urban run-off and agriculture; IUU fishing in MPA by trawlers and skiboats; inappropriate coastal developments.<br>Involvement of local communities in management; increase staff skills to improve enforcement procedures; boat handling; research potential e.g. MPA engaged in abalone ranching experiment; monitoring of shore-based angler catches. |
| **ADDO ELEPHANT NATIONAL PARK MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal MPA.<br>Inside Algoa Bay, extending offshore of the Sundays River and Alexandria dune fields. Includes Sundays River estuary for 20km upstream of mouth. Depth range <100 m. Includes Bird Island. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed May 2019 under NEM: PAA. Bird Island MPA de-proclaimed at the same time.<br>Protect important seabird breeding area, fish nursery habitat and sandy beach/freshwater/diatom ecosystem; protect abalone population around Bird Island and high diversity of endemic species. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Zoned into three Inshore Controlled Zones, one Inshore Restricted Zone, two Offshore Controlled Zones and two Offshore Restricted Zones, one Sundays River Estuary Restricted Zone and one Sundays River Estuary Controlled Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 1130km$^2$ of ocean and 78km of coastline is protected by the MPA.<br>Intertidal and subtidal rocky reefs; island habitat; beach and nearshore sandy habitat; estuary – saltmarsh and seagrass; epipelagic zone.<br>African penguin, Cape gannet, tern species, seals, Great White shark, linefish, abalone. |
| INSTITUTIONAL FRAMEWORK | SANParks manages the MPA (and Addo Elephant National Park [AENP]) by contractual agreement with DEFF. AENP engages with the community in many ways to further local economic development. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Will be managed under the approved AENP Management Plan (2015–2025). The Management Plan includes a Marine Management sub-programme.<br>Control activities in the MPA to reduce habitat degradation; manage inshore benthic and pelagic ecosystems; protect biodiversity and ecological processes; protect linefish spawning areas; support recovery of linefish; protect African penguin, Cape gannet and Dusky kob; provide sites for monitoring and research; support tourism. |
| RISKS/THREATS<br>OPPORTUNITIES | Pollution from shipping; invasive alien species; trawling and purse seining; abalone poaching; IUU fishing in the MPA; oil and gas exploration offshore; aquaculture development zone in Algoa Bay.<br>Seabird and seal management, research potential, rebuilding of linefish stocks, economic benefits from tourism, research potential – high endemicity. |
| **SARDINIA BAY MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated on the coast of the city of Port Elizabeth in the Eastern Cape Province. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Sanctuary for over-exploited fish species; provide a benchmark for scientific research; protection of abalone. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>No zoning; entire MPA is a Restricted Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 7km of shoreline and about 13km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; minor beach and nearshore sandy habitat.<br>Endemic reef fish species (sparids), abalone. |
| INSTITUTIONAL FRAMEWORK | Nelson Mandela Bay Municipality manages the MPA by contractual agreement with DEFF.<br>Advisory committee under local coastal management Forum. |

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| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No stand-alone Management Plan but the MPA is managed under the Nelson Mandela Bay Municipality Coastal Management Programme (CMP 2015). The CMP has been gazetted for comment but is not yet finalised or approved.<br>Generic only, being to protect fauna and flora of protected areas; enforcement of the MLRA and municipal by-laws; build good working relations with national, local and provincial conservation agencies. |
| RISKS/THREATS<br>OPPORTUNITIES | Limited compliance capacity; poaching of fish and abalone; pollution risk from discharge of treated effluent from the Cape Recife Waste Water Treatment Works to the marine environment; pollution from harbour (fuel) and urban run-off; oil and gas exploration.<br>Research involvement in abalone ranching experiment; tactical force guarding abalone help with other compliance; declaration of Algoa Bay as a Hope Spot (special conservation areas that are critical to the health of the ocean). |
| **TSITSIKAMMA MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated in the Garden Route area on Southern Cape coast. Straddles the Western Cape and the Eastern Cape. Forms part of Garden Route National Park (GRNP). |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA. Re-proclaimed with new zonings in 2016 under NEM: PAA.<br>Sanctuary for over-exploited fish and invertebrate species; squid spawning area; provide a benchmark for scientific research. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Under the 2016 Proclamation the MPA is zoned into one Restricted Zone and three coastal Controlled Zones. Registered Tsitsikamma anglers may fish from the shore in Controlled Zones that extend 100m out to sea along about 12km of the MPA coastline. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 66km of shoreline and 293km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; subtidal soft bottom and gravel sediments; small estuarine environment.<br>Endemic reef fish species (sparids), small elasmobranch species, endemic sponges, cold water corals, squid. |
| INSTITUTIONAL FRAMEWORK | SANParks manages the MPA by contractual agreement with DEFF. Active Stakeholder Forum. Marine Working Group within SANParks. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Authorised GRNP Management Plan (2012–2022). A Marine MP is being prepared for Tsitsikamma MPA subsequent to the MPA being zoned for fishing and will be incorporated into the existing GRNP MP when completed and approved.<br>GRNP generic, being to promote research and monitoring; control access to tourism areas; protect fish and invertebrate spawning stock and nursery areas; provide scientific benchmark area; control activities that impact on species, ecosystems and ecological processes. |
| RISKS/THREATS<br>OPPORTUNITIES | Development pressures inland and along the coast; high tourist numbers swamp tourist facilities; poaching pressures from artisanal fishers; sea level rise; flooding and high impact weather conditions; invasive alien species (Mediterranean mussel).<br>Generic SANParks objectives, being maximise tourism and recreation development opportunities; improve access to GRNP for poor people; poverty alleviation in disadvantaged communities; improve understanding among communities; education; research; job creation through Environmental Protection Infrastructure Programmes under the DEFF Working for the Coast Initiative. |
| **ROBBERG MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated at Plettenberg Bay in the Garden Route area of Southern Cape coast.<br>Forms part of Robberg Nature Reserve Complex (RNRC). |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA. Intention to re-proclaim under NEM: PAA for re-zoning purposes gazetted July 2017.<br>Sanctuary for over-exploited fish species; provide a benchmark for scientific research. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Entire MPA is a Controlled Zone. Shore-based fishing is allowed in the MPA. No boat-based fishing, bait collection or spearfishing allowed. Proposed (July 2017) re-zoning makes most of the MPA a Restricted Zone with three Controlled Zones that would allow shore-based fishing. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 13km of shoreline and 26km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; beach and nearshore sandy habitat; subtidal soft bottom inshore sediments.<br>Endemic reef fish species (sparids, serranids) and sharks (charcharinids and lamniform sharks). |

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| INSTITUTIONAL FRAMEWORK | CapeNature manages the MPA by contractual agreement with DEFF. Robberg Nature Reserve and Marine Protected Area Working Committee discuss management, monitoring and research in the MPA. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Existing Robberg MPA Management Plan (2006) but not authorised. Currently RNRC Management Plan (2013–2018) provides overall management framework for the MPA. Marine issues covered in the Strategic Implementation Framework.<br>Protect depleted, endangered and endemic species and populations; contribute to the long-term viability of marine fisheries; optimise benefits of MPAs for communities and resource users; research and monitoring; reduce conflict among resource users in the MPA. |
| RISKS/THREATS<br>OPPORTUNITIES | Poaching of squid, abalone, fish; large numbers of seasonal users (burden on infrastructure); high potential for hazardous spills (e.g. oil spills); marine pollution from ships; climate change.<br>Monitoring and research; tourism development; contribute to local economy. |
| **GOUKAMMA MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated at Buffalo Bay on Southern Cape coast. Forms part of Garden Route Complex of Cape Floral Region Protected Areas World Heritage Site. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA. Draft notice published for comment in July 2017 withdrawing MLRA proclamation and re-proclaiming revised boundaries under NEM: PAA.<br>Sanctuary for over-exploited fish species; squid spawning area; provides a benchmark for scientific research. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Entire MPA is a Controlled Zone. Shore-based fishing allowed but no boat-based fishing in MPA. Proposed (2017) re-zoning includes two marine Restricted Zones and a Restricted Zone in the Goukamma estuary. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 16.5km of shoreline and 34km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; beach and nearshore sandy habitat; subtidal soft bottom muddy sediments; epi-pelagic habitat; estuarine environment – Goukamma estuary forms part of the MPA.<br>Endemic reef fish species (mostly sparids and sciaenids), African black oystercatcher, White fronted plover. |
| INSTITUTIONAL FRAMEWORK | CapeNature manages the MPA by contractual agreement with DEFF. There is a Protected Area Advisory Committee and an Informal Estuary Advisory Forum. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | The Goukamma Nature Reserve Complex Strategic Management Plan (2016–2021) provides the overall management framework for the MPA. Draft Estuary Management Plan for the Goukamma estuary has been completed but not finalised.<br>Protect subtidal reef structure which supports resident sparids that are vulnerable to offshore angling pressure; protect intertidal invertebrate species; manage temporary open-closed estuary that is part of the MPA. |
| RISKS/THREATS<br>OPPORTUNITIES | Adjacent habitat destruction and fragmentation; high numbers of seasonal visitors; pressure to artificially breach the estuary; upstream water abstraction and mis-management of river; political pressure to allow fishing in MPA; coastal erosion from construction of hard walls; beach erosion at Buffalo Bay from fragmentation of dune bypass corridor.<br>Monitoring and research; functional volunteer programme; tourism development; MPA expansion. |
| **STILBAAI MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated next to the town of Stilbaai on the Southern Cape coast. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2008; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Sanctuary for over-exploited fish species; protection of estuarine habitat for juvenile fish; protection of unique stone-age fish traps; protection of coastal habitats. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Three Restricted Zones and one Controlled Zone in the Stilbaai MPA. Boat and shore based recreational fishing allowed in the Controlled zone. No invertebrate collection allowed anywhere in MPA. Most of the Goukou estuary is a Restricted zone. |

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| EXTENT<br>HABITATS<br>KEY SPECIES | 14km of shoreline.and 32km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; beach and nearshore sandy habitat; subtidal muddy sediments; estuary with seagrass and saltmarsh habitats; sandy and muddy shores; epi-pelagic habitat.<br>Endemic reef fish species (sparids), other over-exploited fish e.g. sciaenids, Ragged tooth shark, Pansy shell, sand and mud prawns. |
| INSTITUTIONAL FRAMEWORK | CapeNature manages the MPA by contractual agreement with DEFF. Stilbaai Environmental Advisory Committee serves as a Liaison Committee for Geelkrans Nature Reserve, Goukou estuary and Stilbaai MPA. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Stilbaai MPA Management Plan was developed in 2008. Was not approved by Minister but serves as the main strategic management planning document for the MPA. Planning is further informed by the Goukou Estuary Management Plan.<br>Conserve coastal and marine environment around Stilbaai; protect exploited fish and shellfish species; protect the nursery function of the Goukou estuary; control activities in the MPA to reduce habitat degradation; conserve fish traps; Goukou Estuary MP has ecological, heritage and socio-economic objectives. |
| RISKS/THREATS<br>OPPORTUNITIES | Developments that alter the hydrology of the Goukou estuary; over-exploitation of intertidal resources; developments that threaten natural sand transport; poaching of fish in MPA; illegal gillnetting in fish traps; alteration of river flow and siltation in the estuary; estuarine pollution from town sewage systems and urban run-off; bank erosion and shorebird disturbance from power boats in the estuary.<br>Education; monitoring and research; ecotourism development; contribute to local economy; develop volunteer programme; recovery of linefish stocks. |
| **DE HOOP MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated near Cape Agulhas on the Southern Cape coast. Forms part of the De Hoop Nature Reserve Complex (DHNRC) which is one of the sites within the Cape Floral Region Protected Areas World Heritage Site. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Provide protected habitats for inshore fish species; protect archaeological sites and middens; protect critical breeding area for Southern right whales. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | IUCN Category Ia.<br>No zoning; entire MPA is a Restricted Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 56km of shoreline and 289km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; beach and nearshore sandy habitat; subtidal muddy sediments; epi-pelagic habitat.<br>Southern right whale, endemic reef fish species and over-exploited species (sparids), African black oyster catcher. |
| INSTITUTIONAL FRAMEWORK | CapeNature manages the MPA by contractual agreement with DEFF. De Hoop Nature Reserve Liaison Committee provides input into management. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | De Hoop Nature Reserve Complex Management Plan (2017–2022) is authorised and approved. Marine issues managed under various sub-programmes.<br>Conserve local endemic and threatened species; contribute to sustainable marine fisheries; conserve integrated land and marine ecosystems and processes; conserve cultural heritage; promote research, monitoring, environmental education and outreach programmes; promote ecotourism and benefit sharing. |
| RISKS/THREATS<br>OPPORTUNITIES | Invasive alien species; oil and gas exploration; poaching of abalone and fish; IUU trawling and skiboat fishing; missile testing degrades visitor satisfaction and safety; increased demands from tourism; possible oil spills.<br>Education; monitoring and research; ecotourism development; contribute to local economy; partnerships. |
| **WALKER BAY WHALE SANCTUARY MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated between Hermanus and Gansbaai on the southwestern Cape coast. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2001; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Provide protected habitat for Southern right whales to breed, calve and nurse. |

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| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Provisions of the MPA only apply from 1 July to 30 November in any year, thus a seasonal MPA. Between July and November, the MPA is a divided into a Sanctuary Zone where no fishing and no boats are allowed and a Restricted Zone where whale watching boats and commercial and recreational line fishing are allowed. |
| EXTENT<br>HABITATS<br>KEY SPECIES | About 42km of shoreline and 112km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; beach and nearshore sandy habitat; kelp forests; epi-pelagic habitat.<br>Abalone, West coast rock lobster, Southern right whales. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated authority and retains management of the MPA. Seawatch is volunteer organisation that helps address abalone and lobster poaching in the area. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No MPA specific management plan.<br>Provide an undisturbed area for Southern right whales to breed, calve and nurse in the whale season; promote ecotourism (whale watching) and benefit sharing. |
| RISKS/THREATS<br>OPPORTUNITIES | Coastal development at Gansbaai and Hermanus; over-exploitation of line fish resources; pollution – plastic and oil spills; poaching of lobsters and abalone; littering.<br>Education; monitoring and research; ecotourism development; contribute to local economy; potential to broaden the scope of the MPA to provide wider conservation benefits. |
| **BETTY'S BAY MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated near Hermanus on the southwestern Cape coast. Forms part of the Kogelberg Nature Reserve Complex (KNRC) which is part of the Kogelberg Biosphere Reserve. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA. July 2017 draft re-proclamation in terms of NEM: PAA to revise zoning regulations.<br>Provide protected habitats for inshore fish species, penguins, abalone and rock lobster. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Entire MPA is a Controlled Zone. Only shore angling is allowed. All other organisms are protected. Proposal gazetted July 2017 would make the entire MPA a Restricted Zone but still not finalised. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 3.2km of shoreline and 20km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; beach and nearshore sandy habitat; kelp forests; epi-pelagic habitat,<br>Abalone, West coast rock lobster, linefish species, African penguin, African black oystercatcher, Bank, Cape and Crowned cormorants. |
| INSTITUTIONAL FRAMEWORK | CapeNature manages the MPA by contractual agreement with DEFF. The Kogelberg Marine Working Group is very involved in active management of the Biosphere Reserve as a whole and the MPA in particular. Kogelberg Nature Reserve Advisory Committee addresses matters like cultural access to the MPA. Seawatch is volunteer organisation that helps address abalone and lobster poaching. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Approved KNRC Management Plan (2013–2018). MPA specific MP was drawn up in 2009 but not updated. Management of the MPA is integrated with the management of the KNRC.<br>Conserve biodiversity, ecosystems and processes of Betty's Bay MPA; protect penguin colony; contribute to sustainable marine fisheries; promote research and monitoring; promote ecotourism and benefit sharing. |
| RISKS/THREATS<br>OPPORTUNITIES | Development in the littoral zone; dune stabilisation activities; pollution – littering, plastic and oil spills; limited invertebrate data and research; over-exploitation of intertidal resources; trampling of littoral zone; poaching of lobsters and abalone.<br>Education; monitoring and research; ecotourism development; contribute to local economy; partnerships. |
| **HELDERBERG MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated east of Cape Town on the southwestern Cape coast. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Protect the last portion of pristine sandy beach on the north shore of False Bay. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | IUCN Category Ia.<br>No zoning; entire MPA is a Restricted Zone. |

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| EXTENT<br>HABITATS<br>KEY SPECIES | 4km of shoreline and 2.4km$^2$ of ocean.<br>Beach and nearshore sandy habitat; subtidal rocky reefs; subtidal soft sediment; kelp forests; epi-pelagic habitat.<br>Last relic population of giant isopod *Tylos granulatus* south of Yzerfontein; over-exploited and endemic fish species (sparids, sciaenids, carcharhinid and lamniform sharks). |
| INSTITUTIONAL FRAMEWORK | City of Cape Town manages the MPA by contractual agreement with DEFF. Stakeholder engagement is through SEAL (Somerset West Site Environmental Advisory Liaison Group) forum. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | MPA Management Plan is included as a chapter in the Cape Town City's Coastal Management Programme (2015). Cape Town city Spatial Development Framework (SDF) is also applicable.<br>Generic Cape Town city objectives, being protect marine ecosystems and endangered species and populations; promote ecotourism, research and monitoring; reduce user conflicts. |
| RISKS/THREATS<br>OPPORTUNITIES | Uncertain and shifting boundary markers; pollution from oil, plastic and urban runoff; illegal fishing in the MPA; oil and gas exploration; poor surrounding local communities; no management facilities.<br>Education; monitoring and research; minor ecotourism development; contribute to local economy; partnerships. |
| **TABLE MOUNTAIN MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated around the Cape Peninsula and Cape Town city on southwestern Cape coast. The MPA is part of the Table Mountain National Park (TMNP) which is part of the Cape Floral Region Protected Area World Heritage Site. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2004; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Protect marine and coastal biodiversity from both southwestern Cape bioregion and the Agulhas bioregion which includes many endemic species; manage integrated land-sea ecosystems and processes of the Table Mountain National Park which is part of Cape Floral Region Protected Area World Heritage Site. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | IUCN Category IV.<br>Most of the MPA is a Controlled Zone where fishing is allowed. Within the Controlled Zone, there are six Restricted Zones, five being no-take. In the sixth (Karbonkelberg Hout Bay) only Snoek may be caught commercially in water deeper than 35m. There are restrictions on vessel anchoring and mooring. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 127km of shoreline and 954km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; beach and nearshore sandy shores; kelp beds; epi-pelagic habitat.<br>White sharks, abalone, African penguins, many over-exploited linefish species, West coast rock lobster. |
| INSTITUTIONAL FRAMEWORK | Managed by SANParks by contractual agreement with DEFF. DEFF undertakes law enforcement, the issuing of permits and the determination of quotas. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Approved TMNP Management Plan 2015–2025 but no MPA specific Management Plan. MPA management falls under strategic Park management plans that address all aspects of the Park including the marine component. Cape Town city SDF is also applicable.<br>Conserve marine ecosystems and biodiversity; promote sustainable use of marine resources in the MPA; protect reproductive capacity of commercially important fish species, abalone and rock lobster; promote research and regulate ecotourism; develop awareness of MPA among recreational users. |
| RISKS/THREATS<br>OPPORTUNITIES | Poaching of fish, abalone and rock lobsters; pollutants from city rivers, storm water and sewage effluent that affect water quality; urban development; high tourist numbers; eutrophication and harmful algal blooms; pressures from small-scale fishers requiring greater access to marine resources; invasive alien species.<br>Education, monitoring and research; tourism and recreation development; contribute to local economy through poverty alleviation, partnerships. |
| **SIXTEEN MILE BEACH MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated near Saldanah Bay on the Western Cape coast. The MPA is part of the West Coast National Park (WCNP) which forms the core area of the Cape West Coast Biosphere Reserve. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Protect a representative exposed west coast sandy beach habitat. |

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| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | IUCN Category IV.<br>Entire MPA is a Controlled Zone. Fishing from the shore is not allowed but commercial line fishing from a boat is permitted and rock lobster may be caught with a recreational licence in the MPA. The WCNP Management Plan excludes boats in the inshore area of the MPA. No other extractive resource use permitted. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 25km of shoreline and 107km$^2$ of ocean.<br>Beach and nearshore sandy habitat; subtidal scattered rocky reefs; epi-pelagic habitat.<br>Black oystercatchers, galjoen, mullet, guitarfish and smoothhound sharks, occasional linefish species. |
| INSTITUTIONAL FRAMEWORK | Managed by SANParks by contractual agreement with DEFF. SANParks operates in conjunction with a Park Forum which is a formal partnership between SANParks and the communities living in and around the WCNP. The Forum contributes to management decisions. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | There is an authorised WCNP Management Plan (2013–2023) for the Park as a whole. There is no specific management plan for Sixteen Mile Beach.<br>Largely contained in general WCNP objectives to conserve terrestrial and marine, ecological and cultural, historical and scenic resources of the WCNP and natural environments of the West Coast; mainstream biodiversity issues in local planning frameworks; maintain ecosystem processes of all WCNP MPAs; develop ecotourism and effective co-management. |
| RISKS/THREATS<br>OPPORTUNITIES | Poaching of fish; abalone and rock lobsters; pollution from ships; invasive alien species; some recreational activities disturb nesting birds; multiple threats for WCNP as a whole.<br>Tourism and recreation development; promote economic, business livelihood and recreation opportunities; contribute to local economy – poverty alleviation, job creation through environmental protection infrastructure programmes. |
| **JUTTEN ISLAND MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal island situated at the entrance to Saldanah Bay on the Western Cape coast. The MPA is part of the West Coast National Park (WCNP) which forms the core area of the Cape West Coast Biosphere Reserve. The Langebaan Lagoon and the offshore islands in Saldanha Bay together form the Langebaan Ramsar site. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 to Section 22A of NEM: PAA.<br>Seabird conservation. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | IUCN Category IV.<br>Entire MPA is a Controlled Zone. No fishing from the shore is allowed but line fishing from a boat is permitted in the MPA. No other extractive resource use allowed. |
| EXTENT<br>HABITATS<br>KEY SPECIES | About 3.3km of shoreline and 1.6km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; kelp beds; epi-pelagic habitat.<br>African penguins, Cape gannets, Swift terns, kelp and Hartlaub's gulls, Bank cormorants, Cape cormorants, Crowned cormorants, Black oystercatchers. |
| INSTITUTIONAL FRAMEWORK | As for Sixteen Mile Beach MPA. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | There is an authorised WCNP Management Plan (2013–2023) for the Park as a whole. There is no specific management plan for Jutten Island but Appendix 5 of the WCNP MP constitutes a draft Langebaan Ramsar site management plan.<br>As for Sixteen Mile Beach MPA. |
| RISKS/THREATS<br>OPPORTUNITIES | As for Sixteen Mile Beach MPA.<br>Manage the seabird populations and particularly Cape cormorants and oyster catchers to increase numbers; for the Park in general, expand ecotourism, livelihood, recreation economic and business opportunities associated with Saldanah Industrial Development Zone (IDZ). |
| **MALGAS ISLAND MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal island situated in Saldanah Bay on the Western Cape coast. The MPA is part of the West Coast National Park (WCNP) which forms the core area of the Cape West Coast Biosphere Reserve. The Langebaan Lagoon and the offshore islands in Saldanha Bay together form the Langebaan Ramsar site. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Seabird conservation – particularly gannets. |

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| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | IUCN Category IV.<br>Entire MPA is a Controlled Zone. No fishing from the shore is allowed but line fishing from a boat is permitted in the MPA. No other extractive resource use allowed. |
| EXTENT<br>HABITATS<br>KEY SPECIES | About 1.5km of shoreline and 0.9km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; kelp beds; epi-pelagic habitat.<br>Cape gannets, African penguins, Swift terns, kelp and Hartlaub's gulls, Bank, Crowned and Cape cormorants, Black oystercatchers, West coast rock lobster. |
| INSTITUTIONAL FRAMEWORK | As for Sixteen Mile Beach MPA. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | There is an authorised WCNP Management Plan (2013–2023) for the Park as a whole. There is no specific management plan for Malgas Island but Appendix 5 of the WCNP MP constitutes a draft Langebaan Ramsar site management plan.<br>As for Sixteen Mile Beach MPA. |
| RISKS/THREATS<br>OPPORTUNITIES | As for Sixteen Mile Beach MPA.<br>Manage the seabird populations and particularly gannets to increase numbers; for the Park in general, expand ecotourism, livelihood, recreation economic and business opportunities associated with Saldanah IDZ. |
| **MARCUS ISLAND MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal island situated in Saldanah Bay on the Western Cape coast. The MPA is part of the West Coast National Park (WCNP) which forms the core area of the Cape West Coast Biosphere Reserve. The Langebaan Lagoon and the offshore islands in Saldanha Bay together form the Langebaan Ramsar site. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Seabird conservation – particularly African penguins. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | IUCN Category IV.<br>Entire MPA is a Controlled Zone. No fishing from the shore is allowed but line fishing from a boat is permitted in the MPA. No other extractive resource use allowed. |
| EXTENT<br>HABITATS<br>KEY SPECIES | About 1.5km of shoreline and 0.4km$^2$ of ocean.<br>Intertidal and subtidal rocky reefs; kelp beds; epi-pelagic habitat.<br>African penguins, Cape gannets, Crowned cormorants, Black oystercatchers. |
| INSTITUTIONAL FRAMEWORK | As for Sixteen Mile Beach MPA. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | There is an authorised WCNP Management Plan (2013–2023) for the Park as a whole. There is no specific management plan for Marcus Island but Appendix 5 of the WCNP MP constitutes a draft Langebaan Ramsar site management plan.<br>As for Sixteen Mile Beach MPA. |
| RISKS/THREATS<br>OPPORTUNITIES | Poaching of fish, abalone; pollution from ships and iron ore; invasive alien species; industrial and harbour development pressures; conflict between user groups; extraction of water from local aquifer affecting the Saldanah Bay and Langebaan Lagoon area as a whole; multiple threats for WCNP as a whole.<br>Manage the seabird populations and particularly African penguins to increase numbers; for the Park in general, expand ecotourism, livelihood, recreation economic and business opportunities associated with Saldanah IDZ. |
| **LANGEBAAN LAGOON MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal lagoon situated in Saldanah Bay on the Western Cape coast. The MPA is part of the West Coast National Park which forms the core area of the Cape West Coast Biosphere Reserve. The Langebaan Lagoon and the offshore islands in Saldanha Bay, together form the Langebaan Ramsar site. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2000; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Protect representative of the only true lagoon system in South Africa; important non-breeding site for Palaearctic migrant waders and nursery area for many species of fish. |

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| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | IUCN Category IV.<br>Langebaan Lagoon is divided into three zones: a Controlled Zone in the northwest allows fishing and motorised vessels; a Restricted Zone in the middle of the lagoon allows limited access – fishing and use of motorised vessel only under SANParks permit (local community only); a Sanctuary Zone at the southeast end of the lagoon – no access or resource use. The dunes and saltmarsh at the southeastern end of the lagoon are declared special conservation areas. |
| EXTENT<br>HABITATS<br>KEY SPECIES | About 80km of shoreline and 47km$^2$ of ocean.<br>Beach and nearshore sandy habitat; intertidal and subtidal soft sediments (mud flats); large saltmarsh (about 32 percent of South Africa's saltmarsh habitat) component; small seagrass component; high diversity of marine invertebrates and seaweeds.<br>Eelgrass, False limpet, Globular mud snail, mud and sand prawns, Curlew sandpiper, Grey plover, Sanderling, Knot, Turnstone; resident waders include White fronted plover, Kittlitz's plover and Chestnut banded plover; fish include mullet, White stumpnose, White steenbras, Silver kob, carcharhinid and guitar sharks, eagle rays and spearnose skates. |
| INSTITUTIONAL FRAMEWORK | As for Sixteen Mile Beach MPA. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | There is an authorised WCNP Management Plan (2013–2023) for the Park as a whole, but no specific management plan for Langebaan Lagoon. Appendix 5 of the WCNP MP constitutes a draft Langebaan Ramsar site management plan.<br>As for Sixteen Mile Beach MPA. |
| RISKS/THREATS<br>OPPORTUNITIES | Pollution from urban and harbour runoff; invasive alien species; bait digging, fishing, poaching; industrial, recreational and domestic development pressures impact hydrology and water quality; high tourism loads – boats, kites, dogs, people scare shorebirds; conflict between user groups; extraction of water from local aquifer; multiple threats for WCNP as a whole.<br>Tourism and recreation development; promote economic and business opportunities, livelihood and recreation opportunities; contribute to local economy – poverty alleviation. |
| **ROCHERPAN MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Coastal, situated north of Saldanah Bay on the Western Cape coast. The MPA is part of the Rocherpan Nature Reserve Complex (RNRC). |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in 1988 under Sea Fisheries Act. Not proclaimed in 2000 under MLRA, and not listed with other MPAs in DAFF Marine Recreational Activity Brochure 2017/2018, but assume registered as an MPA under Sub-section 82(4) of MLRA and transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Nature Reserve is an important wetland site for water birds and one of few major pans on the West Coast that offers protection and access to marine, freshwater and terrestrial habitats; the Nature Reserve is one of only two locations where the critically endangered aquatic plant *Pseudalthenia aschersoniana* has survived; the MPA is representative of exposed west coast sandy shore habitat. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN category.<br>Entire MPA is a Controlled Zone. Only shore angling is allowed. No other resource use permitted. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 3km of shoreline and 1.5km$^2$ of ocean.<br>Beach and nearshore sandy habitat.<br>Galjoen, Silver kob, Lesser guitarfish. Adjacent wetland is important for resident and migratory water birds. |
| INSTITUTIONAL FRAMEWORK | CapeNature manages the MPA by contractual agreement with DEFF. The Rocherpan Nature Reserve Complex has an established Protected Area Advisory Committee. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | RNRC has an approved management plan (2014–2019) but it is not certain that it has been signed by the Minister of the Executive Council (MEC). There is no MPA specific management plan.<br>General Nature Reserve objectives are to conserve and maintain important marine, coastal, wetland and terrestrial habitats of RNRC; encourage sustainable visitor access; provide overnight accommodation for a limited number of visitors. |
| RISKS/THREATS<br>OPPORTUNITIES | Reserve is close to towns and subject to uncontrolled access, vandalism, illegal fishing and hunting; uncontrolled beach access – driving on the beach; no marine law enforcement capability; water abstraction from the Papkuils River which feeds the wetland is not regulated; illegal access and stock grazing in the Nature Reserve.<br>Reserve and MPA are buffered by natural habitats north and south; increased tourism – more local jobs; involvement of local communities in management. |

| NAMAQUA NATIONAL PARK MPA | |
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| DESIGNATION<br>TYPE/LOCATION | Coastal MPA.<br>Between the Spoeg River and Island Point in the Northern Cape. Depth range 0m to 150m.<br>Adjacent to the Namaqua National Park. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protect coastal and offshore benthic and pelagic ecosystems in the Namaqua region, cultural heritage sites, nursery areas and promote rock lobster and invertebrate stock recovery. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Six inshore Controlled Zones, five Inshore Restricted Zones and one Offshore Restricted Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 550km$^2$ of ocean and about 55km of shoreline is protected by the MPA.<br>Inshore and offshore rocky reefs; beach and nearshore sandy habitat; kelp beds; sandy and muddy inner shelf habitat; epipelagic habitat; estuarine habitat and contiguous marine and terrestrial ecosystems.<br>Intertidal and inshore invertebrates, inshore and offshore linefish, West coast rock lobster, Atlantic Yellow-nosed and Black-browed albatross. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. SANParks will manage the MPA by contractual agreement with DEFF. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage coastal and offshore benthic and pelagic ecosystems of the Namaqua region; protect contiguous terrestrial and marine ecosystems; protect cultural heritage sites and nursery areas for fish and invertebrates; provide sites for monitoring and research particularly for recovery from intertidal and subtidal resource use; promote tourism. |
| RISKS/THREATS<br>OPPORTUNITIES | Trawling; oil and gas exploration; lobster fishing; invertebrate resource use.<br>Research on stock recovery; economic benefits from tourism. |

## Offshore MPAs

The newly promulgated offshore MPAs in the South African EEZ are summarised in Table 3. Where a newly declared (2019) MPA is an expansion of an existing coastal MPA, or has a coastal component, the MPA has been described under the coastal MPAs in the previous section (see Table 2).

The areas associated with each were calculated from SANBI shapefiles using WGS84 Africa Albers Equal Areas Conical Projection. Figure 2 provides a map of the proposed MPAs.

**Paper nautilus, an oceanic traveller.** © Peter Chadwick

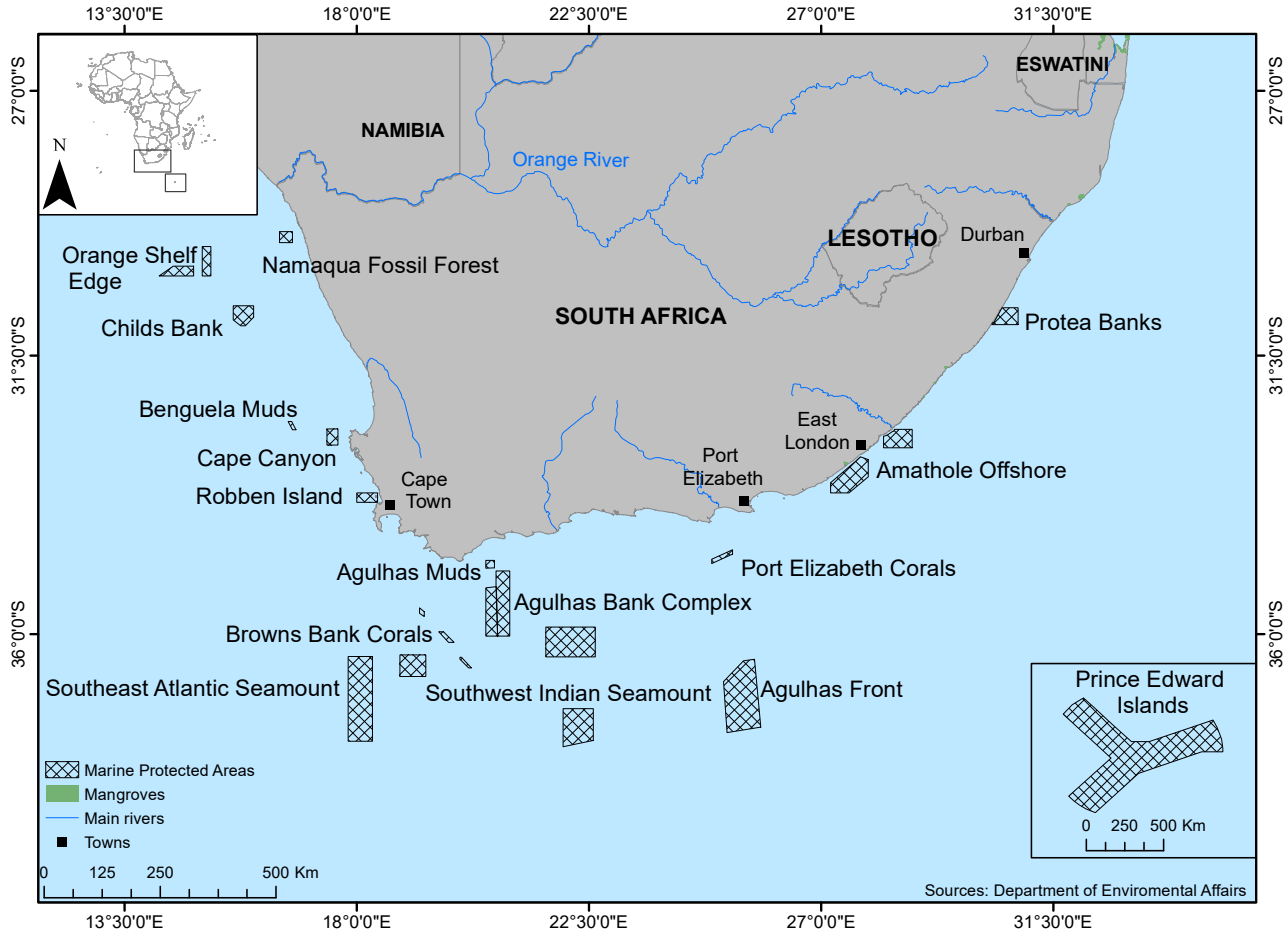


Figure 2: South African offshore Marine Protected Areas.

Table 3: The offshore MPAs of South Africa.

| PROTEA BANKS MPA | |
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| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>Southern KZN Coast. Offshore and to the north of the Trafalgar MPA extending up to 35km offshore and from 30m to 2650m depth. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protect reef building cold water corals and spawning linefish. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Zoned into one Offshore Controlled Zone, one Offshore Controlled Pelagic Linefish Zone (linefishing only) and one Offshore Restricted Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 1190km$^2$ of ocean is protected by the MPA.<br>Subtidal rocky reefs; continental slope; shelf edge and bathyl hard and soft substrate habitats; epipelagic, mesopelagic and bathypelagic habitat. With high habitat diversity; containing threatened and vulnerable ecosystems; an aggreagation area for several shark species.<br>Linefish – Black musselcracker, Red steenbras, sharks, sardine. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. EKZNW will manage the MPA by contractual agreement with DEFF. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage inshore and offshore benthic and pelagic ecosystems; protect biodiversity and ecological processes; protect spawning and aggregation areas; support recovery of linefish; protect sharks and turtles; provide sites for monitoring and research. |

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| RISKS/THREATS<br>OPPORTUNITIES | Trawling; oil and gas exploration; lobster fishing; invertebrate resource use.<br>Research on stock recovery; economic benefits from tourism. |
| **AMATHOLE OFFSHORE MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>Comprises two areas, one offshore of the existing Kei component of the Amathole MPA and the other offshore of Port Alfred and Gxulu. Both areas range from 30m to 22000m in depth and extend up to 65km offshore. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protects reef building cold water corals and spawning linefish, and protects habitats exposed to trawling and containing critically endangered Agulhas Canyons habitat and Agulhas muddy inner shelf habitat. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Zoned into two Offshore Controlled Zones, one Offshore Controlled Pelagic Linefish Zone and two Offshore Restricted Zones. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 4210km$^2$ of ocean is protected by the MPA.<br>Subtidal rocky reefs; continental slope; inner shelf; outer shelf edge hard substrates (canyon, deep reef); upper and lower bathyl substrates; sandy subtidal habitat; epipelagic; mesopelagic and bathypelagic habitats. Has high benthic habitat diversity; the area forms key feeding grounds for endangered seabirds.<br>Species: cold water corals, linefish species, South Coast rock lobster, albatross, petrel. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. ECPTA will manage the MPA by contractual agreement with DEFF. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | Management plan developed and awaiting review by ECPTA before submission to DEFF.<br>Manage inshore and offshore benthic and pelagic ecosystems; protect biodiversity and ecological processes; protect spawning areas and seabird feeding areas; support recovery of linefish; facilitate management of linefish and South Coast rock lobster; protect area of life history importance for migratory species; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | Trawling, long lining and IUU fishing in the MPA; oil and gas exploration offshore.<br>Seabird management; research potential; rebuilding of linefish and South Coast rock lobster stocks. |
| **PORT ELIZABETH CORALS MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>About 87km south of Jeffreys Bay in the Eastern Cape between 400m and 1000m depth. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protects cold water corals and benthic ecosystems of the shelf edge and slope. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Zoned as one Offshore Controlled Zone. Pelagic longlining and linefishing only. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 270km$^2$ of ocean is protected by the MPA.<br>Shelf edge and bathyl hard substrates; (canyon, deep reefs), epipelagic and mesopelagic habitats.<br>Cold water corals, fish (kingklip, hake, linefish), seabirds. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage offshore benthic and pelagic ecosystems; protect biodiversity and ecological processes; protect spawning areas; support recovery of linefish (kingklip); provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | IUU fishing – tuna; oil and gas exploration.<br>Research potential; rebuilding of linefish stocks; research potential. |
| **AGULHAS FRONT MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>About 265km south of Jeffreys Bay at the edge of the EEZ in the Eastern Cape. Depth ranges from 2200m to 4100m. |

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| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protects bathyl and abyssal benthic and pelagic ecosystems and is an important albatross, petrel and turtle feeding area. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Zoned as one Offshore Restricted Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 6255km$^2$ of ocean is protected by the MPA.<br>Bathyl and abyssal zone hard substrates; epipelagic, mesopelagic and bathypelagic habitats.<br>Leatherback turtle, Amsterdam albatross, Indian Yellow-nosed albatross, Tristan albatross, Wandering albatross, Giant petrel, White-chinned petrel, tunas and sharks. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage offshore benthic and pelagic ecosystems; protect biodiversity and ecological processes; protect area of life history importance for turtles; seabirds and large pelagic fish; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | IUU fishing – tuna and sharks; oil and gas exploration; loss of seabird feeding habitat.<br>Research potential; manage critically endangered albatross and leatherback turtle species. |
| **SOUTHWEST INDIAN SEAMOUNT MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>Consists of two separate areas 185km and 370km south of Stilbaai. The North Zone ranges from 1200m to 1500m deep and the Natal Seamount Zone is 3800m to 5200m deep. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protects many unprotected habitats, seamounts, upper bathyl benthic habitat; protects deep water corals including reef building *Lophelia pertusa*; is an important seabird feeding area; is a Mako shark nursery area. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Both the North Zone and the Natal Seamount Zone are zoned as Offshore Restricted Zones. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 7560km$^2$ of ocean is protected by the MPA.<br>Muddy, sandy and hard shelf edge habitats; seamounts; upper bathyl benthic habitat; epipelagic; mesopelagic and bathypelagic habitats<br>*L. pertusa* corals, Amsterdam albatross, Atlantic and Indian Yellow-nosed albatross, Tristan, Black-browed and Sooty albatross, Giant petrel, White-chinned petrel, Mako sharks. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage offshore benthic and pelagic ecosystems; protect biodiversity and ecological processes; protect area of life history importance for seabirds, turtles and large pelagic fish; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | IUU fishing – tuna and sharks; trawling oil and gas exploration; loss of seabird feeding habitat and Mako shark nursery area.<br>Research potential; manage critically endangered albatross feeding grounds. |
| **AGULHAS MUDS MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>About 41km east of Cape Agulhas in the Western Cape Province in the 80m to 100m depth range. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protects inner shelf muddy habitats. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>The entire MPA is zoned as a Sanctuary Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 210km$^2$ of ocean is protected by the MPA.<br>Continental slope muddy habitat; epipelagic and mesopelagic habitats.<br>Muddy substrate benthic species. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |

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| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage offshore benthic and pelagic ecosystems; protect biodiversity and ecological processes; protect area of importance for migratory species including seabirds, turtles, sharks and large pelagic fish; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | IUU fishing – trawling; oil and gas exploration.<br>Bycatch management in the trawl fishery. |
| **AGULHAS BANK COMPLEX MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>About 72km southeast of Cape Agulhas in the Western Cape in the 14m to 150m depth range. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protects hard inner and outer shelf and gravel habitats and deep reef complexes; is an important spawning, nursery and foraging area. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>The MPA consists of one Restricted Zone, one Controlled Zone (linefishing and South Coast rock lobster) and one Controlled Pelagic Linefish Zone (Alphard Banks). |
| EXTENT<br>HABITATS<br>KEY SPECIES | 4315km$^2$ of ocean is protected by the MPA.<br>Inner shelf and outer shelf hard substrate; deep reefs; gravel habitat; epipelagic habitat; inner and outer shelf sandy habitat.<br>Linefish, hake, demersal shark. Atlantic and Indian Yellow-nosed albatross, Black-browed and Tristan albatross, Giant and White-chinned petrel. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage offshore benthic and pelagic shelf ecosystems of the Agulhas Bank; protect biodiversity and ecological processes; protect linefish nursery and spawning areas; support recovery and management of line fish species and South Coast rock lobster; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | IUU fishing – trawling, line fishing; oil and gas exploration.<br>Linefish and rock lobster recovery; refuge for Red steenbras. |
| **BROWNS BANK CORALS MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>Made up of three areas lying between 107km to 188km south of Cape Agulhas in the Western Cape in the 280m to 550m depth range. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protect critically endangered untrawled southern Benguela hard shelf edge habitat; contains reef building cold water corals; is a hake spawning area. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>The three areas – Browns Bank North, Browns Bank Central and Browns Bank South are all Controlled Zones (large pelagic longline or tuna pole fishing only). |
| EXTENT<br>HABITATS<br>KEY SPECIES | 340km$^2$ of ocean is protected by the MPA.<br>Shelf edge hard substrate; epipelagic and mesopelagic habitat.<br>Cold water corals, demersal fish, kingklip, hake, shark. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage offshore benthic and pelagic shelf ecosystems of Browns Bank; protect biodiversity and ecological processes; protect cold water corals; support hake fishery eco-certification; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | Trawling; mining; oil and gas exploration.<br>Hake fishery eco-certification; cold water corals research. |
| **SOUTHEAST ATLANTIC SEAMOUNTS MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>Made up of two separate areas lying about between 172km and 366km southwest of Gansbaai in the Western Cape Province in the 2000m to 4000m depth range |

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| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protects seamount and deep-sea habitats; protects important seabird feeding grounds. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>The Argentina Seamount area is a Restricted Zone, the adjoining Protea Seamount area is a Controlled Zone and the Slope Seamount area is a Controlled Zone (large pelagic species only). |
| EXTENT<br>HABITATS<br>KEY SPECIES | 7725km$^2$ of ocean is protected by the MPA.<br>Seamount and associated bathyl rocky and abyssal plain substrates; bathy-pelagic and abysso-pelagic habitats.<br>Migratory species including seabirds, turtles, sharks and other fish, Seamount species, Atlantic and Indian Yellow-nosed albatross, Black-browed, Amsterdam, Sooty and Tristan albatross, Giant and White-chinned petrel. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage offshore, benthic and pelagic slope and deep-water ecosystems; protect biodiversity and ecological processes; protect seamount habitats; protect seabird feeding grounds; protect migratory area for seabirds; turtles; sharks and fish; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | Pelagic fishing; IUU fishing; oil and gas exploration.<br>Protection of endangered seabirds; deep water ecosystems research. |
| **ROBBEN ISLAND MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>Adjacent to the existing Table Mountain MPA and extends up to 37km offshore. Includes Robben Island. Depths range from the intertidal zone to 170m. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protect endangered and vulnerable habitats; protects breeding colonies of Cape and Crowned cormorants and swift terns; is a SA and UNESCO national heritage site; important seabird foraging area. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>MPA is zoned into an Offshore Controlled Zone (small pelagics, yellowtail, snoek), a Middle Inshore Controlled Zone (linefishing Yellowtail and Snoek only), an Inner Controlled Zone (linefishing Yellowtail, Snoek and Hottentot), and one Restricted Zone. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 615km$^2$ of ocean is protected by the MPA.<br>Island habitat; hard (rocky) inner and outer shelf habitats; sandy inner shelf habitat; kelp beds; epipelagic and mesopelagic habitat.<br>West coast rock lobster, abalone, African penguin, Bank, Crowned and Cape cormorants, Atlantic Yellow-nosed, Black-browed and Tristan albatross, White-chinned petrel. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. SANParks will manage the MPA by contractual agreement with DEFF. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage coastal, island and offshore benthic and pelagic ecosystems; protect biodiversity and ecological processes; protect seabird feeding grounds; provide recovery area for west coast rock lobster and abalone; protect cultural heritage site; promote tourism; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | IUU fishing; oil and gas exploration; pollution from shipping and urban environment.<br>Protection of endangered seabirds; economic benefits from tourism; improve sustainability of rock loster and abalone fisheries. |
| **CAPE CANYON MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>About 19km west of Paternoster in the Western Cape in the 200m to 400m depth range. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protect Benguela Canyon and rocky and sandy outer shelf habitats and important life history area for pelagic fish; and important foraging area for seabirds and mammals. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>The entire MPA is a Restricted Zone. |

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| EXTENT<br>HABITATS<br>KEY SPECIES | 585km$^2$ of ocean is protected by the MPA.<br>Epipelagic and mesopelagic habitats; continental slope and outer shelf edge hard and sandy substrates.<br>Marine mammals, demersal longline fish species, small pelagic fish species, Atlantic Yellow-nosed, Black-browed and Tristan albatross, White-chinned petrel. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage canyon and offshore benthic and pelagic ecosystems; protect biodiversity and ecological processes; protect feeding grounds for seabirds and mammals; promote tourism; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | Trawling, oil and gas exploration.<br>Protection of endangered seabirds; economic benefits from tourism; support eco-certification of demersal trawl fishery. |
| **BENGUELA MUDS MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>About 105km west of St Helena Bay in the Western Cape in the 350m to 400m depth range. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protect critically endangered muddy shelf edge habitat (only two small areas of this habitat exist). |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>The entire MPA is a Controlled Zone (large pelagic longline and tuna pole fishing only). |
| EXTENT<br>HABITATS<br>KEY SPECIES | 95km$^2$ of ocean is protected by the MPA.<br>Epipelagic and mesopelagic habitats; outer shelf edge muddy substrate habitat.<br>Soft bottom species. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage offshore benthic and pelagic ecosystems particularly muddy habitats; protect biodiversity and ecological processes; support eco-certification of trawl fishery; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | Trawling; oil and gas exploration.<br>Research on habitat impacts and recovery of trawled habitats; eco-certification of demersal trawl industry. |
| **CHILDS BANK MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>About 130km west southwest of Hondeklip Bay in the Northern Cape in the 180m to 450m depth range. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protect vulnerable shelf and shelf edge habitats; important seabird feeding area; support for fisheries by-catch management. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>The entire MPA is a Controlled Zone (large pelagic longline and tuna pole fishing only). |
| EXTENT<br>HABITATS<br>KEY SPECIES | 1210km$^2$ of ocean is protected by the MPA.<br>Benguela sandy shelf edge and rocky outer shelf habitats; submarine bank (carbonate mound) habitat; epipelagic and mesopelagic habitats.<br>Cold water corals, demersal fish; hake, monk, kingklip, jacopever; seabirds: Yellow-nosed, Black-browed and Tristan albatross, White-chinned petrel. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage offshore benthic and pelagic ecosystems particularly Childs Bank features, protect biodiversity and ecological processes, provide sites for monitoring and research particularly for recovery of trawled areas, support eco-certification of trawl fishery. |

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| RISKS/THREATS<br>OPPORTUNITIES | Trawling, oil and gas exploration.<br>Research on habitat impacts and recovery of trawled habitats; eco-certification of demersal trawl industry. |
| **NAMAQUA FOSSIL FOREST MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>About 28km west of the coastline between Port Nolloth and Kleinsee in the Northern Cape<br>Depth range 120m to 150m. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protect Namaqua shelf habitats and unique fossilised yellow wood forest colonised by cold water corals and unprotected muds and sponge gardens. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>The entire MPA is a Controlled Zone. Only linefishing allowed. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 495km$^2$ of ocean is protected by the MPA.<br>Rocky, sandy and muddy shelf habitats; epipelagic habitat.<br>Cold water corals, fossilised forest. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Manage offshore benthic and pelagic shelf ecosystems of the Namaqua region; protect biodiversity and ecological processes; protect fossilised trees and associated cold water corals; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | Trawling; oil and gas exploration; IUU fishing.<br>Research on shelf habitats. |
| **ORANGE SHELF EDGE MPA** | |
| DESIGNATION<br>TYPE/LOCATION | Offshore MPA.<br>Consists of two separate areas lying about 176km northwest of Port Nolloth in the Northern Cape in the 250m to 1600m depth range. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed in May 2019 under NEM: PAA.<br>Protect vulnerable shelf edge and slope habitats; important area for migratory species and diverse demersal fish species; important area for hake fisheries; important feeding ground for seabirds and life history importance for sharks. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>The entire Orange Shelf Edge area is zoned as a Sanctuary. |
| EXTENT<br>HABITATS<br>KEY SPECIES | 1840km$^2$ of ocean is protected by the MPA.<br>Sandy and rocky shelf edge habitats; upper bathyl zone hard and soft substrates epipelagic, mesopelagic and bathypelagic habitats.<br>Soft and hard bottom benthic species; hake, demersal fish, sharks, migratory species; Atlantic Yellow-nosed, Tristan and Black-browed albatross. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated management authority. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | No management plan.<br>Protect shelf edge and slope habitats; protect benthic and pelagic shelf ecosystems of the region; protect biodiversity and ecological processes; protect shark aggregation areas and areas for migratory species; provide sites for monitoring and research. |
| RISKS/THREATS<br>OPPORTUNITIES | Trawling; oil and gas exploration; IUU fishing.<br>Research on shelf habitats; eco-certification of trawl fishery. |

## Prince Edward Islands MPA

The PEI MPA is the largest of the South African MPAs and is located in the Southern Ocean between the sub-Antarctic Front and the Antarctic Polar Front. Three major water masses occur within the EEZ of the PEI: sub-Antarctic surface waters; northern polar frontal waters and southern polar frontal waters.

**Deep-sea trawler.** © Peter Chadwick

Table 4: Prince Edward Islands MPA.

| PRINCE EDWARD ISLANDS MPA | |
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| DESIGNATION<br>TYPE/LOCATION | Oceanic islands, situated in the Southern Ocean 2180km southeast of Cape Town. The PEI Special Nature Reserve lies at the centre of the MPA. The two islands are a Ramsar site. |
| PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | Proclaimed under the MLRA in 2013; transferred in 2014 by presidential pronouncement to Section 22A of NEM: PAA.<br>Conserve a complex marine environment of different frontal systems that separate major water bodies with different chemical and physical properties that act as strong bio-geographical boundaries with different suites of marine species to the north and south of each front. The frontal areas are areas of enhanced biological activity. |
| IUCN CATEGORY<br>MULTIPLE-USE/ZONED | No IUCN Category.<br>Sanctuary zone around the Islands – no access or resource use. Four Restricted zones where limited scientific fishing to monitor recovery of Patagonian toothfish is permitted. One Controlled zone where only vessels with a permit issued by DAFF may fish for Patagonian toothfish using only longlines and with observer on board. |
| EXTENT<br>HABITATS<br>KEY SPECIES | About 95km of shoreline and 181 247km$^2$ of ocean is protected by the MPA.<br>Four main habitats: South-West Indian Ridge in the west; a plateau area with seamounts and rises in the north; an abyssal area in the south; two islands with associated narrow, shallow shelf areas; kelp beds (*Macrocystis*); epi-pelagic meso-pelagic abyssal-pelagic habitats.<br>Patagonian toothfish, swimming prawn (*Nauticaris marionis*), King, Gentoo, Macaroni and Rockhopper penguins, Imperial cormorant, Elephant seal, Sub-Antarctic and Antarctic fur seal, albatross species, skuas, gulls, terns and petrels. |
| INSTITUTIONAL FRAMEWORK | DEFF is the legally mandated authority and retains management of the MPA. The PEI Management Committee liaises closely with the Biological and Oceanographic Sciences Task Groups and the South African Committee on Antarctic Research. A PEI MPA Working Committee is to be amalgamated with the PEI Nature Reserve Working Committee to discuss management activities, monitoring and research in the MPA. South Africa and French Governments have developed a draft management arrangement for the MPA and the Del Cano Rise. This agreement is not yet signed by the French Government. |
| MANAGEMENT PLAN: STATUS<br>DATES<br>SPECIFIC OBJECTIVES | There is a Draft Management Plan for the PEI MPA (2008). PEI Management Plan (developed 2010 approved 2014) is the strategic planning framework for the Islands (terrestrial). Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) Convention applies to all Antarctic populations of finfish, molluscs, crustacean and sea birds found south of the Antarctic Convergence. South Africa as a signatory to the Convention must implement its resolutions.<br>Rebuild Patagonian toothfish stocks; protect depleted and threatened avian species and the ecosystems on which they depend; reduce bycatch (particularly albatross and petrel) of toothfish fishery; enhance international cooperation for Monitoring, Control and Surveillance (MCS); develop effective legal structures to protect the MPA; ensure no contamination with alien species. |
| RISKS/THREATS<br>OPPORTUNITIES | Climate change related ecosystem changes; IUU fishing; expansion of fishing activities to include other resources important to Southern Ocean mammals, birds and fish; destructive fishing techniques (trawling); invasive alien species; pollution of the marine inshore and terrestrial environments and disturbance of wildlife; unknown impacts of long-line fishing; increased shipping activity; increased tourism activity.<br>Cooperation with international agencies for MCS; rebuilding of toothfish fishery. |

**Small-scale, subsistance Trek-Net fisher, False Bay, Western Cape.** © Peter Chadwick

## LOCALLY MANAGED MARINE AREAS AND OTHER PROTECTED AREAS

There appear to be no Locally Managed Marine Areas (LMMAs) listed under the SANBI GIS National Marine themes layer in South Africa. However, there are a number of informal land-based protected areas (Private Nature Reserves) that abut the coast and may afford the coastal zone a degree of protection. Most of them appear to be conglomerates of private landowners who have applied to have their joint properties declared as a Private Nature Reserve or a Conservation Area.

The Richards Bay Sanctuary, the Umlalazi and Siyaya estuaries, the Amtikulu and Nyoni estuaries, the Umhlanga Lagoon Nature Reserve, the Beachwood Mangrove Nature Reserve and the Mpenjati estuary are all estuarine habitats that lie within formally protected Nature Reserves and thus deliver some of the functions of MPAs. These areas are all managed by EKZNW as part of the adjoining Nature Reserve.

### Fishery Protection Zones

There are a number of other areas along the coast of South Africa where fishing is only allowed from the shore. These areas deliver some of the conservation benefits of Controlled zones in MPAs but cannot be considered fully equivalent to MPAs in terms of the protection afforded.

***Onrus***
Only shore fishing is permitted in Hardebaai, Onrus, near Hermanus, from the high tide mark to a line drawn between a beacon O.R.1 at Van Der Riet Hoek to a beacon O.R.2 at Marine Drive Point (±1.2km of coastline; ±0.2km$^2$).

***Strand***
Only shore fishing is permitted from the highwater mark to 500m out to sea between the security fence at Lourens River, Strand and the navigation light at the end of the eastern breakwater of the Gordon's Bay fishing harbour (±7km of coastline; ±3.5km$^2$).

***Mudge Point***
Only shore fishing and lobster fishing are permitted from the highwater mark to 100m out to sea between the western limit of the Hawston harbour and the eastern limit of the Frans Senekal Nature Reserve (±4km of coastline; ±0.4km$^2$).

***Hermanus***
Only shore fishing is permitted from the highwater mark to 500m out to sea between a beacon H.R.1 at Kraal Rock in Walker Bay to a beacon H.R.2 at Rietfontein, Hermanus (±4.5km of coastline; ±2.3km$^2$).

***Dyer Island***
Only shore fishing is allowed in the area that extends 3.7km seawards of the highwater mark on Dyer Island (±3km of coastline; ±43km$^2$).

***East London***
The previously demarcated fishing closed areas are now incorporated in the Amathole MPA and are subject to the regulations that apply to that MPA. No boat-based fishing is allowed.

***Durban***
No invertebrate collection is permitted within 5.5km of the shore in the area between the south breakwater of the Durban Harbour and the Umgeni River (±7km of coastline; ±40km$^2$).

***Breede River Estuary***
No night fishing or trolling in the estuary. No fishing for, or capture of, Elasmobranchs (sharks).

## Trawler Exclusion Areas

In certain areas along the coast, mainly in the fairly shallow inshore areas, trawling is not allowed, and this has the effect of protecting benthic, demersal and mid-water species. However, the levels of protection afforded are not equivalent to that within MPAs.

***False Bay***
The entire False Bay inside a line drawn from the lighthouse at Cape Hangklip to the lighthouse at Cape point is a trawl exclusion zone. Purse seining, longlining and the setting of lobster traps are also not allowed in this area (±1072km$^2$).

***South Coast***
No trawling is permitted in the following areas:

- Landward of a straight line drawn between the lighthouse at Cape Infanta and a beacon K2 at Cape Barracouta (±300km$^2$).
- Landward of a straight line joining Cape Vacca near Vleesbaai and the lighthouse at Cape St Blaize, Mossel Bay (±122km$^2$).
- Landward of a straight line joining the lighthouse at Cape St Blaize, Mossel Bay and Gericke Point, Sedgefield (±482km$^2$).
- Landward of a straight line drawn between the Cape Seal lighthouse and the western bank of the Bloukrans River (±144km$^2$).
- Landward of a straight line drawn between Cape St Francis Point and the lighthouse at Cape Recife (±915km$^2$).

***Algoa Bay***
No trawling is permitted in an area between the Sundays River mouth and a line extending out to sea from the Donkin reserve lighthouse in Port Elizabeth (±260km$^2$).

In other areas, purse seine netting is prohibited. This is effectively a fisheries management measure that conserves small pelagic species but has conservation benefits for other species that might be associated with small pelagic fish (large predatory fish, sharks, dolphins, seabirds, seals).

Purse seine netting is prohibited for a distance of 1.8km seaward of the high tide mark between the lighthouse at Stompneus Point and the mouth of the Bokram River (±83km$^2$); in Walker Bay in the area between Voorsteklip and beacon M1 at Mudge Point and from this beacon to the lighthouse on the southern breakwater of Gans Bay fishing harbour (±98km$^2$).

West Coast rock lobster are protected in Table Bay, in St Helena Bay, in Saldanha Bay, and in part of Walker Bay.

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MARINE & COASTAL AREAS
UNDER PROTECTION

# SEYCHELLES

Jude Bijoux

**Ste. Anne Island, Seychelles.** © Jennifer O'Leary

## COUNTRY OVERVIEW

The Seychelles Archipelago lies to the northeast of Madagascar about 1600km east of the coast of Kenya, spanning 4–11°S and 45–56°E. The country is often described as a Small Island Developing State (SIDS) or a large ocean state due to the high ratio of ocean to land. The exclusive economic zone (EEZ) is 1.34 million km$^2$ while the land area is only 445km$^2$. The archipelago is made up of 115 islands in two distinct geological groups. Forty-two islands are located on the Mahé Plateau in the eastern half of the archipelago, on the northern arc of the Mascarene Ridge (Israelson and Wohlfarth, 1999). Most of these islands are of granitic origins made of Pre-Cambrian rock dating back 650 million years (Braithwaite, 1984). All of the granitic islands are found within a radius of 50km from the island of Mahé where the capital, Port Victoria, is located. The remaining 73 islands are of coralline origin and are either sand cays or raised coral atolls, with all but two located off the Mahé Plateau, in the south and southwest of the archipelago.

The Seychelles climate is tropical and humid with an average rainfall of 2362mm per year (measured on the granitic islands). The weather is influenced by alternating monsoon seasons dominated by prevailing winds in two different directions: the generally calmer and wetter northwest monsoon prevails from November to March while the stronger and drier southeast trade winds prevail from May to October (Bijoux *et al*., 2008). Air temperatures range from 26 to 31°C with mean humidity of 80 percent. Sea surface temperatures in Seychelles range from 26 to 31°C whilst surface salinity ranges from 34.5 to 35.5g/kg (Taylor and Lewis, 1970).

As a result of the relatively small sizes of the islands, the Seychelles is often considered to be coastal in its entirety. The islands have a total coastline of about 600km and no single point of land is more than 5km from the sea. The population in mid-2017 was estimated at 95 843 (NBS, 2017). Most of the population live on the three main granitic islands of Mahé, Praslin and La Digue. As these three main islands are mountainous in nature, the majority of development occurs on the narrow coastal plateaux. The coastal zone is therefore of great social and economic importance in the day-to-day lives of the inhabitants and for the economy. The outer islands have no permanent residents; the only people living there are employed in the tourism industry, in conservation or in the upkeep and maintenance of the islands.

The nation's economy is dependent on fisheries and tourism, which have helped the islands to attain the highest Gross Domestic Product (GDP) per capita in Africa (USD 15 410 in 2016). Due to its nature-based economy, Seychelles is highly dependent on the health of its marine and terrestrial environment, and is therefore concerned about the risks from many threats including climate change.

The legislative and institutional framework for the exploration, exploitation and management of marine areas in the Seychelles is highly complex. The four main pieces of legislation pertaining to protected areas and conservation of marine resources include the Town and Country Planning Act (2016), the Environment Protection Act (2016), the Fisheries Act (updated 2014) and the National Parks and Nature Conservancy (NPNC) Act (1969), which will soon be replaced by the Nature Reserves and Conservancy Act, once approved by the Legislature.

The designation of protected areas as a conservation tool has been generally focused on terrestrial ecosystems in the Seychelles with close to 50 percent of the land area under formal protection. Until recently, less than 1 percent of the marine waters were designated as marine protected areas (MPAs) but the Seychelles is moving forward on a 30 percent goal for the ocean. To date, MPAs have been designated under three different Acts. These MPAs are being managed by a number of institutional actors including government, parastatal, non-governmental organizations and private foundations.

MPAs in the Seychelles are important for protecting critical marine habitats. Most of the marine habitats in the MPAs are known and have been documented. However, few surveys have been undertaken to describe the marine habitats within the Seychelles EEZ in any detail. Large areas of soft bottom habitats are known to be found in the deep sea but have been poorly studied. Shallow marine habitats are consequently better documented. For example, the coral reefs are estimated to cover an area of 1690km$^2$ of which 40km$^2$ are found around the inner, granitic islands (Spalding *et al*., 2001). However, the extent of seagrass beds is yet to be determined, despite large areas of seagrass documented from around many of the outer islands. The largest seagrass area surveyed to date is found around the Providence-Cerf Bank, which measures 45km long and 14km at its widest. Mangrove forests are estimated to cover around 29km$^2$ (Spalding *et al*., 1997). Most mangroves are found in the outer islands especially in the lagoons of the Aldabra and Cosmoledo atolls.

These marine habitats are the source of Seychelles marine biodiversity, but are not properly documented due to a lack of scientific research and taxonomic surveys (Bijoux

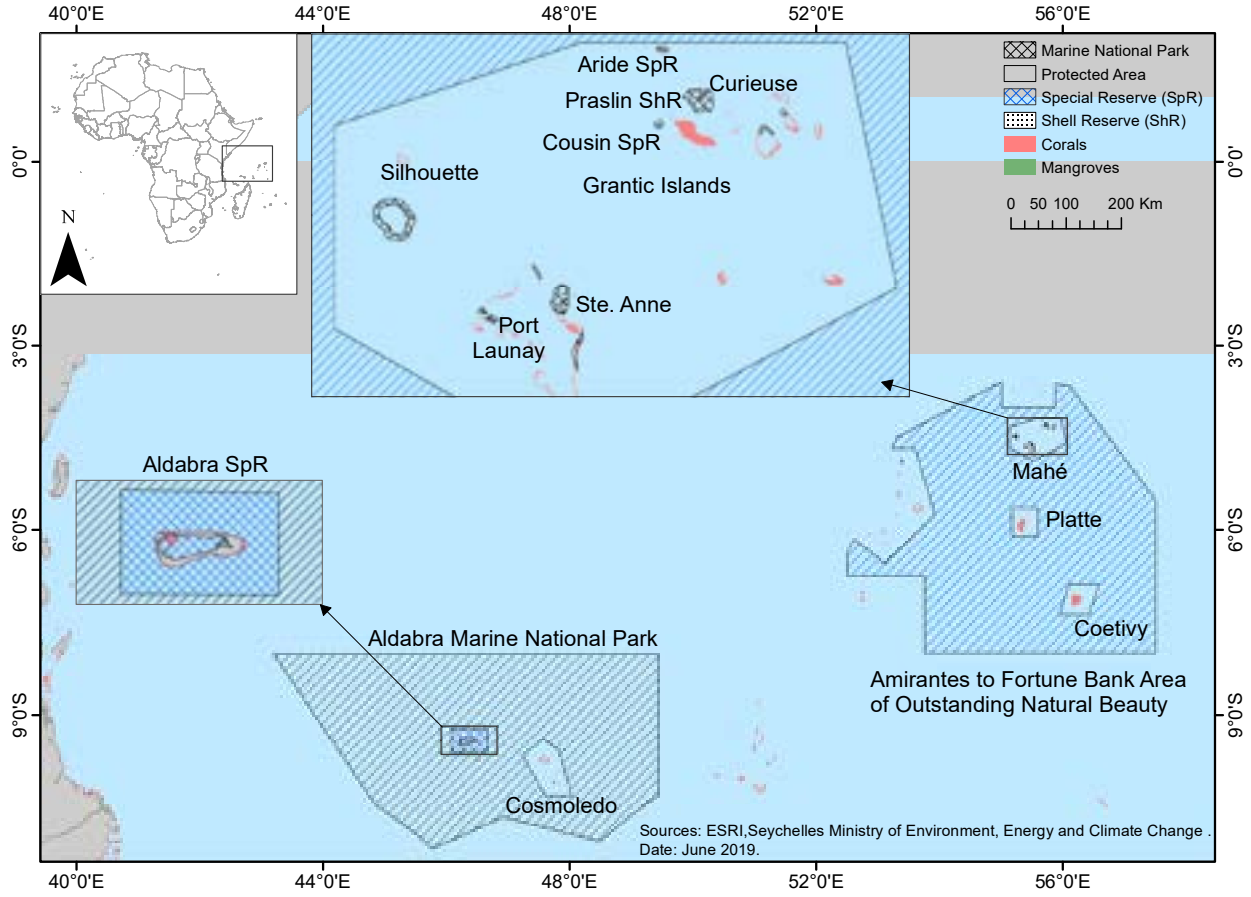


**Figure 1: Seychelles Marine Protected Areas.**

*et al*., 2003). More than 2600 species have been documented (Bijoux *et al*., 2003), many of which are protected by Seychelles' network of MPAs. Of special mention are the Critically Endangered Hawksbill turtle (*Eretmochelys imbricata*) and the Endangered Green turtle (*Chelonia mydas*) which use the beaches within the Seychelles MPA network extensively for nesting. Certain MPAs of the Seychelles are nesting sites of global significance for a number of seabird species such as Frigate birds (*Fregata* spp.), Terns (*Sterna* spp.), Boobies (*Sula* spp.), and Shearwaters (*Puffinus* spp.). The Aldabra Special Reserve and World Heritage Site is also home, to what appears to be a growing population of dugong (*Dugong dugon*), which was once thought to be locally extinct.

## MPA OVERVIEW

Seychelles currently has 16 formally declared Marine Protected Areas (Figure 1), with a total area of 353 663km$^2$ (~ 26.4 percent of EEZ). The first of these marine protections was designated in 1973 and the most recent in 2018. Although the MPAs are designated under three different Acts (see above), the majority are designated under the NPNC Act, which makes provision for the following four different types of MPAs with different levels of protection:

- **Strict Nature Reserves** – offer the highest level of protection under the law and are described as areas set aside to permit the free interaction of natural ecological factors without any outside interference excepting that deemed indispensable for the safeguard of the very existence of the reserve. These reserves are classified under IUCN Category I, but to date no sites have been proclaimed under this category.

- **Special Reserves** – also categorized under IUCN Category I are areas set aside in which characteristic wildlife requires protection and in which all other interests and activities are subordinated to this end. Three sites are currently designated as Special Reserves.

- **National Parks** – IUCN Category II protected areas are areas set aside for the propagation, protection and preservation of wildlife or the preservation of places or objects of aesthetic, geological, prehistoric,

**Seychelles National Parks Authority boat, Curieuse Island**. © Jennifer O'Leary

historical, archaeological or other scientific interest for the benefit, advantage and enjoyment of the general public and includes, in the case of a Marine National Park, an area of shore, sea or seabed together with coral reef and other marine features so set aside. There are today seven sites which have been designated as Marine National Parks.

- **Area(s) of Outstanding Natural Beauty** – IUCN Category VI classified and described as areas set aside by reason of its natural beauty or other special characteristics for its preservation and maintenance for the benefit, advantage and enjoyment of the general public. There is one MPA which has recently been declared under this category. It is anticipated that Category VI MPAs will become more widespread as Seychelles continues to reconcile the protection of its environment and the development of its ocean-based (blue) economy.

Most of the Marine National Parks and Special Reserves that exist today were first identified as part of a Government white paper, Conservation Policy in the Seychelles (1971), which accompanied the development of the then Seychelles Tourism Policy (1969). In the white paper it is stated "The Government's policy statement on tourism development in Seychelles emphasized the overriding need to protect the natural beauty of the islands and their natural environment, which are among our greatest assets. It was envisaged that one of the most important ways of achieving this should be through the designation of national parks and other reserves and through the protection of areas where characteristic wildlife could be conserved in its natural surroundings, for the enjoyment of the public."

The white paper was prepared in the same year that the Seychelles International airport was officially opened and the Seychelles tourism industry took off.

Four Shell Reserves with a total area of 7.39km$^2$ have been designated under the Fisheries Regulations (1987). The Shell Reserves were designated for the conservation of marine gastropods, which at that time were extensively exploited for the marine curio trade. The demand for local shells is currently not great and the Shell Reserves are not actively managed. The Fisheries Regulations (1987) also have foreign fisheries restriction zones, where fishing by foreign vessels is prohibited (First Schedule) and where the use of nets is banned (Section 15 (1) (2)). These restriction zones are however not considered as MPAs.

A Protected Area Policy was adopted in 2013 (GoS, 2013) with the aim of providing a framework for the elaboration of legislation and associated guidelines for the establishment, coordination, guidance and management of Protected Areas (PAs) in Seychelles. The new vision is "…to have a Protected Areas System on the land and in the sea that protects and conserves high conservation value, comprehensive and ecologically representative examples of the Seychelles' natural diversity and cultural heritage and that provides ample opportunities for the fair and equitable sharing of the benefits arising from the sustainable use of these resources."

The Nature Reserves and Conservancy Act is currently under development and will support the implementation of the PA Policy. This new Act will make provision for other forms of protection not currently covered by existing legislation, such as sustainable use and community-based MPAs.

## MARINE AREAS UNDER PROTECTION

Out of the sixteen Seychelles MPAs, fourteen are long-established and have been in existence for more than two decades. The other two were declared in 2018, as part of the Marine Spatial Planning (MSP) Initiative. The current MPA network include sites declared under four different categories. There are three Special Reserves (SRs), seven Marine National Parks (MNPs), four Shell Reserves (ShR), one Protected Area and one Area of Outstanding Natural Beauty (AONB) (Table 1). The SRs, MNPs and AONBs are designated under the NPNC Act (1969), whereas the Protected Area is designated under the Protected Areas Act (1967) and the Shell Reserves under the Fisheries Act (1987).

The Special Reserves have both marine and terrestrial components, whereas the Marine National Parks are almost entirely marine, apart from three Parks (Curieuse, Ile Cocos and Silhouette), where terrestrial components are also included. The Ste Anne Marine National Park was the first MPA to be declared in 1973 followed by the Cousin Island Special Reserve in 1975. The Aldabra Special Nature Reserve, designated in 1981, became a World Heritage Site in 1982 under the Convention concerning the Protection of World Cultural and Natural Heritage, adopted in 1972.

In February 2018, the Seychelles greatly increased the marine area under protection by a total of 208 365km$^2$ when two extensive MPAs were designated under the NPNC Act. These two areas were further extended in April 2019. The gazette area for the Aldabra "Marine National Park" covers 177 447 km$^2$. This new marine protection surrounds the existing Aldabra Special Reserve and UNESCO World Heritage Site which was also extended 2125.2km$^2$ in April 2019 to increase the total area of the Aldabra Special Nature Reserve to 2559km$^2$. This is an MSP Zone 1 Category for High Biodiversity Protection and in total is 179 853km$^2$. The gazette area includes Assumption Island, but excludes the waters surrounding Astove and Cosmoledo.

The other MPA that was designated in 2018 is the Amirantes to Fortune Bank "Area of Outstanding Natural Beauty". This is an MSP Zone 2 – Medium Biodiversity and Sustainable Uses covering 173 468km$^2$ and encompassing most of the Mahé Plateau lying beyond the territorial sea, and the waters from Amirantes east to Fortune Bank. Under the MSP Initiative (see Case Study, after Table 1) efforts are on-going to discuss the areas that are within the territorial waters and complete the zoning design for the 30 percent marine protection goal. Management and implementation plans for these areas are being prepared, including policy and regulations. Implementation of a new management approach in these newly designated areas is scheduled to start by April 2021.

**Table 1: Seychelles' established and formally declared MPAs.**

| ALDABRA SPECIAL RESERVE | |
|---|---|
| TYPE | Coastal MPA |
| ECOSYSTEM AND LOCATION | Seychelles Outer Islands<br>9°25'S, 46°24'E |
| PROCLAMATION YEAR LEGISLATION | 1981 / NPNC Act |
| PURPOSE | Protection of outstanding natural environment<br>– extensive pristine coral reefs<br>– large enclosed lagoon<br>– extensive mangrove forest<br>– vast areas of seagrass meadows<br>– striking fish biomass<br>– largest population of breeding frigate birds (*Fregata* spp.) in the Indian Ocean and large population of boobies (*Sula* spp.)<br>– 2 percent of world's population of crab plovers<br>– potentially resident population of dugongs (*Dugong dugon*)<br>– lots of marine migratory species (e.g. humpback whales *Megaptera novaeangliae*)<br>– large number of nesting Green turtles (*Chelonia mydas*)<br>– high density and diversity of sharks and groupers<br>– large population of coconut crabs<br>– high variety of resident and migratory wading birds<br>– hosts one of the world's only two oceanic flamingo populations<br>– hosts one of the largest Giant tortoise populations in the Indian Ocean |

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| IUCN CATEGORY | Category Ib |
| MULTIPLE USE ZONE | Mostly no-take and restricted access but with limited tourism and recreation and food security zones for staff |
| EXTENT | Marine area: 2406.4km$^2$<br>Land area: 152.6km$^2$ |
| HABITATS | Coral reefs, seagrass and algal communities, mangrove, rocky shores, deep sea and offshore pelagic habitats, sandy beaches, intertidal mudflats, freshwater and brackish pools |
| INSTITUTIONAL FRAMEWORK | *Site management*: On site Island Manager in charge of park operations and a Science Coordinator in charge of science and monitoring; from Mahé (Head Office) overhead coordination by Chief Executive Officer and other support staff<br>*Managed by*: Seychelles Island Foundation<br>*Oversight*: Board of Directors appointed by the President of the Republic |
| MANAGEMENT PLANNING | *Status*: Current<br>*Dates*: 2016 onwards<br>*Specific objectives*:<br>– protect and enhance the ecological integrity of the unique Aldabra Atoll<br>– facilitate research that will inform management and enhance the understanding of integrated ecological systems and global environmental change<br>– use Aldabra's on-going conservation success story to inform, educate, and inspire the local and international community<br>– promote and facilitate tourism to Aldabra where activities are closely supervised, do not impact on the values and generate financial support for on-going conservation programs |
| THREATS | – alien invasive species<br>– illegal fishing by fishermen from neighbouring countries<br>– climate change causing mass coral bleaching events and drier conditions on land<br>– oil spill from marine traffic<br>– maritime piracy<br>– accumulation of marine debris |
| OPPORTUNITIES | – extend the area of the Special Reserve by an additional 1km from its current boundary<br>– make use of the conservation success of the site to further promote it<br>– use the fish biomass at the site as a baseline for fisheries management<br>– marketing of the atoll based on its remoteness<br>– intrinsic value of the site |
| **COUSIN ISLAND SPECIAL RESERVE** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>4°20'S, 55°40'E |
| PROCLAMATION YEAR LEGISLATION | 1981 / NPNC Act |
| PURPOSE | Protection of nesting habitats for seabirds, rookeries for marine turtles, coral reefs<br>– population of eight seabird species nesting on the island stable or increasing<br>– increase of 800% in the number of nesting turtles over the last 30 years<br>– high biomass of fish important to the artisanal fishery recorded before the mass coral bleaching events<br>– high densities of commercially important sea cucumber species<br>– have large area of restored coral reef habitat |
| IUCN CATEGORY | Category Ib |
| MULTIPLE USE ZONE | Complete no-take zone |
| EXTENT | Marine: 1.7km$^2$<br>Land: 0.27km$^2$ |
| HABITATS | Coral reefs, rocky shores, sandy beaches |
| INSTITUTIONAL FRAMEWORK | *Site management*: CEO of Nature Seychelles is official site manager; Chief Warden is in charge of park operations; Science Officer in charge of science and monitoring<br>*Managed by*: Nature Seychelles<br>*Oversight*: Board of Directors |

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| MANAGEMENT PLANNING | *Status*: Current<br>*Dates*: 2018–2022<br>*Specific objectives (selected)*:<br>– to protect and manage marine flora and fauna and preserve habitats in their natural condition<br>– to understand the effects of climate change on the natural values of the reserve<br>– to conduct and support research that will lead to a better understanding of the heritage of the reserve, and to provide information that will contribute to effective management of the reserve and surrounding area<br>– to identify and monitor changes in the island environment, which will in turn provide an indication of the effectiveness of management |
| THREATS | – climate change (causing coral bleaching, extreme droughts, affecting food availability for seabirds)<br>– beach erosion which is effecting infrastructure and turtle nesting |
| OPPORTUNITIES | – to demonstrate success based on the age of the reserve and the large number of conservation initiatives that have been effectively implemented over the years<br>– to restore coral reefs in the reserve based on coral reef restoration techniques that have been effectively trialled in the reserve<br>– to make use of Cousin Island experience to inform the management of other Seychelles' MPAs, particularly on the preparation of a systems plan for Seychelles' MPAs, looking at management at a network level as opposed to the customary site level |
| **ARIDE ISLAND SPECIAL RESERVE** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>4°13'S, 55°40'E |
| PROCLAMATION YEAR LEGISLATION | 1979 / NPNC Act |
| PURPOSE | Protection of nesting habitats for seabirds, rookeries for marine turtles, coral reefs<br>– carbonate and granitic reefs (extensively affected by coral bleaching)<br>– large population of nesting seabirds<br>– nesting site for Hawksbill and Green turtles |
| IUCN CATEGORY | Category Ib |
| MULTIPLE USE ZONE | Complete no-take zone |
| EXTENT | Marine area: 6.4km$^2$<br>Land area: 0.71km$^2$ |
| HABITATS | Coral reefs, rocky shores, sandy beaches |
| INSTITUTIONAL FRAMEWORK | *Site management*: Island manager in charge of reserve operations and Conservation Officer in charge of science and monitoring<br>*Managed by*: Island Conservation Society (ICS)<br>*Oversight*: Aride Island Management Committee and ICS Council |
| MANAGEMENT PLANNING | *Status*: Outdated, but yearly targets current<br>*Dates*: 2006–2011<br>*Specific objectives (selected)*:<br>– to maintain, enhance and enforce the legal and physical protection for the wildlife and ecosystem processes on and surrounding the island, in particular by preventing the introduction of exotic species and the illegal harvesting of native biota<br>– to maintain or where desirable to increase the natural and semi-natural habitats and their associated species, both on the island and in the surrounding marine reserve<br>– to re-establish endemic or native species known or likely to have occurred previously on Aride and to provide, where desirable, a refuge for other threatened species native or endemic to Seychelles |
| THREATS | – climate change (causing coral bleaching, droughts)<br>– poaching for octopus, shearwater chicks and seabird's eggs<br>– terrestrial invasive alien species |

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| OPPORTUNITIES | – better marketing of the site in collaboration with operators making use of the park and tourism establishments<br>– offering opportunities for fund raising through longer term stay on the island<br>– building partnerships and sharing resources among partners<br>– streamlining visitor management to make it less resource intensive<br>– working in closer collaboration with the military to control poaching<br>– develop and offer specialised on-site conservation training courses for students<br>– share island conservation experiences, challenges and lessons learned with others<br>– use of long-term biological datasets to inform management practices |
| **STE ANNE MARINE NATIONAL PARK** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>4°37'S, 55°30'E |
| PROCLAMATION YEAR LEGISLATION | 1973 / NPNC Act |
| PURPOSE | Protection of coral reefs, seagrass and rookeries for marine turtles<br>– coral reefs<br>– seagrass beds<br>– nesting site for Hawksbill and Green turtles |
| IUCN CATEGORY | Category II |
| MULTIPLE USE ZONE | Complete no-take zone |
| EXTENT | Marine area: 9.96km$^2$<br>Land area: None |
| HABITATS | Coral reefs, seagrass, rocky shores, sandy beaches |
| INSTITUTIONAL FRAMEWORK | *Site management*: Operations Manager is in charge of park operation<br>*Managed by*: Seychelles National Parks Authority<br>*Oversight*: Board of Directors appointed by the Minister responsible for Environment |
| MANAGEMENT PLANNING | *Status*: No plan<br>*Dates*: None<br>*Specific objectives*:<br>– the management objectives for the park are not officially defined |
| THREATS | – climate change (causing coral bleaching)<br>– sedimentation from large scale dredging and land reclamation on the east coast of Mahé Island<br>– high nutrient input from the nearby Port Victoria<br>– poaching for fish |
| OPPORTUNITIES | – greater stakeholder involvement in park management<br>– undertake more scientific work with international partners<br>– strengthen conservation in the park through implementation of a management plan<br>– further increasing the number of visitors to the park<br>– collecting more revenues for tourism establishments based in the park<br>– to work with other law enforcement organizations to enforce park regulations<br>– coral reef restoration |
| **CURIEUSE MARINE NATIONAL PARK** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles inner Islands<br>4°17'S, 55°43'E |
| PROCLAMATION YEAR LEGISLATION | 1979 / NPNC Act |
| PURPOSE | Protection of coral reefs, seagrass and rookeries for marine turtles<br>– coral reefs<br>– mangrove forest<br>– nesting beaches for Hawksbill and Green turtles<br>– sheltered bays |

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| IUCN CATEGORY | Category II |
| MULTIPLE USE ZONE | Complete no-take zone; Park zoned for only non-extractive activities |
| EXTENT | Marine area: 13.70km$^2$<br>Land area: 2.66km$^2$ |
| HABITATS | Coral reefs, seagrass, mangrove, rocky shores, sandy beaches |
| INSTITUTIONAL FRAMEWORK | *Site management*: Park's Officer based on Curieuse is in charge of park operations under the guidance of the Operations Manager<br>*Managed by*: Seychelles National Parks Authority (SNPA)<br>*Oversight*: Board of Directors appointed by the Minister responsible for Environment |
| MANAGEMENT PLANNING | *Status*: Current<br>*Dates*: 2018–2022<br>*Specific objectives (selected)*:<br>– to ensure that prioritized marine and terrestrial habitats and populations of iconic and endangered species within the park remain healthy and are protected, and that degraded habitats are improved through restoration and other mitigation actions<br>– to offer an environment where appropriate responsible tourism can continue to develop with the involvement of and for the benefit of local communities in a way that is equitable for all<br>– to promote scientific research and monitoring of species and ecosystems within the park, and to understand and mitigate the influence of external factors<br>– to positively contribute to the local fishery through spill-over and larval subsidy<br>– to use the conservation actions being implemented in the park as a vehicle for increasing public education, awareness and activism<br>– to protect and promote the historical and cultural heritage of Curieuse Island<br>– to develop infrastructure and facilities for visitors and staff on the island in a manner that respects the sensitive natural environment of the area |
| THREATS | – Government's commitment to SNPA and the Seychelles network of MPAs so that the park is able to continue to generate funding for its operations and continue to support the large number of operators who are dependent on Curieuse for their livelihood<br>– climate change (causing coral bleaching, extreme droughts and lack of water)<br>– poaching for fish, octopus and coco-de-mer palms and nuts |
| OPPORTUNITIES | – greater stakeholder involvement in park management<br>– undertake more scientific work with international partners<br>– strengthen conservation in the park through implementation of new management plan<br>– restoration of socio-economically important coral reef sites<br>– restoration of coastal terrestrial habitats<br>– rurther increasing the number of visitors to the park<br>– rmproving knowledge transfer and the nature experience of visitors to the park |
| **PORT LAUNAY MARINE NATIONAL PARK** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>9°39'S, 5°23'E |
| PROCLAMATION YEAR LEGISLATION | 1979 / NPNC Act |
| PURPOSE | Protection of coral reefs |
| IUCN CATEGORY | Category II |
| MULTIPLE USE ZONE | Complete no-take zone |
| EXTENT | Marine area: 1.54km$^2$<br>Land area: 0.04km$^2$ |
| HABITATS | Coral reefs, seagrass, mangrove, rocky shores, sandy beaches |
| INSTITUTIONAL FRAMEWORK | *Site management*: Park's Officer based at Port Launay; also responsible for Baie Ternay Marine National Parks operations under the guidance of the Operations Manager<br>*Managed by*: Seychelles National Parks Authority (SNPA)<br>*Oversight*: Board of Directors appointed by the Minister responsible for Environment |

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| MANAGEMENT PLANNING | *Status*: Current as of 2020<br>*Dates*: 2018–2022<br>*Specific objectives*:<br>– to ensure protection of coral reefs and associated population species, while promoting scientific research and monitoring<br>– to offer an environment where sustainable eco-tourism can continue to develop for the benefit of the local communities<br>– to use conservation actions in the park as a means to engage communities, increasing public education and awareness |
| THREATS | – climate change (causing coral bleaching)<br>– poaching for fish and octopus |
| OPPORTUNITIES | – greater stakeholder involvement in park management<br>– undertake more scientific work with international partners<br>– strengthen conservation in the park through implementation of a management plan<br>– finding ways to collect more revenues from visitors to the park<br>– collecting revenue for tourism establishments based in the park<br>– working with other law enforcement organizations to enforce park regulations |
| **BAIE TERNAY MARINE NATIONAL PARK** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>4°38'S, 55°22'E |
| PROCLAMATION YEAR LEGISLATION | 1979 / NPNC Act |
| PURPOSE | Protection of coral reefs<br>– Coral reefs<br>– Touristic beach<br>– Sheltered bay<br>– Intertidal mudflats |
| IUCN CATEGORY | Category II |
| MULTIPLE USE ZONE | Complete no-take zone |
| EXTENT | Marine area: 0.86km$^2$<br>Land area: None |
| HABITATS | Coral reefs, seagrass, rocky shores, sandy beaches |
| INSTITUTIONAL FRAMEWORK | *Site management*: Park's Officer based at Port Launay is in charge of park operations under the guidance of the Operations Manager<br>*Managed by*: Seychelles National Parks Authority (SNPA)<br>*Oversight*: Board of Directors appointed by the Minister responsible for Environment |
| MANAGEMENT PLANNING | *Status*: Current as of 2020<br>*Dates*: 2018–2022<br>*Specific objectives*:<br>– to ensure that all the coral reefs and its associated populations remain healthy and are protected<br>– to promote scientific research and monitoring while improving the health of degraded marine ecosystems through restoration and other mitigation actions<br>– to offer an environment where sustainable eco-tourism can continue to develop for the benefit of the local communities |
| THREATS | – climate change (causing coral bleaching)<br>– poaching for fish and octopus<br>– future development of the area around the park<br>– crown of thorn starfish (COTS) |
| OPPORTUNITIES | – greater stakeholder involvement in park management<br>– undertake more scientific work with international partners<br>– strengthen conservation in the park through implementation of a management plan<br>– finding ways to collect more revenues from visitors to the park<br>– working with other law enforcement organizations to enforce park regulations |

| SILHOUETTE MARINE NATIONAL PARK | |
|---|---|
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>4°29'S, 55°13'E |
| PROCLAMATION YEAR LEGISLATION | 1987 / NPNC Act |
| PURPOSE | Protection of coral reefs<br>– goral reefs<br>– granitic reefs<br>– sea turtle nesting sites |
| IUCN CATEGORY | Category II |
| MULTIPLE USE ZONE | In principle should be complete no-take zone, but does not have any regulations |
| EXTENT | Marine area: 10.35km$^2$<br>Land area: 18.6km$^2$ |
| HABITATS | Coral reefs, seagrass, rocky shores, sandy beaches |
| INSTITUTIONAL FRAMEWORK | *Site management*: There is currently no active site management<br>*Managed by*: Seychelles National Parks Authority (SNPA)<br>*Oversight*: Board of Directors appointed by the Minister responsible for Environment |
| MANAGEMENT PLANNING | *Status*: No official plan but a Conservation Management Plan containing a few marine-based activities has been prepared by ICS and is being implemented<br>*Dates*: N/A<br>*Specific objectives*:<br>– the management objectives for the park are not officially defined |
| THREATS | – lack of site management.<br>– climate change (causing coral bleaching)<br>– poaching for fish and octopus |
| OPPORTUNITIES | – integrate the management of the park into the annual work plan of the SNPA<br>– work with the Island Development Company (IDC) and ICS in managing the park<br>– developing innovative sustainable financing mechanisms for park management |
| **ILE COCOS, ILE LA FOUCHE, ILOT PLATTE MARINE NATIONAL PARK** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>4°18'S, 55°52'E |
| PROCLAMATION YEAR LEGISLATION | 1997 / NPNC Act |
| PURPOSE | Protection of coral reefs<br>– coral reefs<br>– granitic reefs |
| IUCN CATEGORY | Category II |
| MULTIPLE USE ZONE | Complete no-take zone |
| EXTENT | Marine area: 1.65km$^2$<br>Land area: 0.05km$^2$ |
| HABITATS | Coral reefs, rocky shores |
| INSTITUTIONAL FRAMEWORK | *Site management*: Park's Officer based on La Digue island is in charge of park operations under the guidance of the Operations Manager from Mahé<br>*Managed by*: Seychelles National Parks Authority (SNPA)<br>*Oversight*: Board of Directors appointed by the Minister responsible for Environment |
| MANAGEMENT PLANNING | *Status*: No plan<br>*Dates*: None<br>*Specific objectives*:<br>– the management objectives for the park are not officially defined |

| | |
|---|---|
| THREATS | – climate change (causing coral bleaching)<br>– unstable coral rubble preventing recovery of reef<br>– high density of black-spined sea urchins<br>– anchor damage to coral reef<br>– poaching for octopus |
| OPPORTUNITIES | – greater stakeholder involvement in park management<br>– undertake more scientific work with international partners<br>– strengthen conservation in the park through implementation of a management plan<br>– working with other law enforcement organizations to enforce park regulations |
| **NORTH EAST POINT SHELL RESERVE** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>4°34'S, 55°27'E |
| PROCLAMATION YEAR LEGISLATION | 1987 / Fisheries Act (1987) |
| PURPOSE | Protection of marine shells (gastropods)<br>– coral reefs |
| IUCN CATEGORY | Category IV |
| MULTIPLE USE ZONE | Removal of marine shells prohibited |
| EXTENT | Marine area: 2.99km$^2$<br>Land area: None |
| HABITATS | Coral reefs, seagrass |
| INSTITUTIONAL FRAMEWORK | *Site management*: There is currently no active management of the Shell Reserves<br>*Managed by*: Seychelles Fishing Authority<br>*Oversight*: Board of Directors appointed by the President of the Republic |
| MANAGEMENT PLANNING | *Status*: No plan<br>*Dates*: None<br>*Specific objectives*:<br>– as per the Fisheries Regulations (1987) the objective is to protect marine gastropods |
| THREATS | – there are no urgent threats since the collection of marine gastropods for curio trade is not popular |
| OPPORTUNITIES | – to deregulate and deproclaim the site |
| **ANSE FAURE SHELL RESERVE** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>4°42'S, 55°31'E |
| PROCLAMATION YEAR LEGISLATION | 1987 / Fisheries Act (1987) |
| PURPOSE | Protection of marine shells (gastropods)<br>– coral reefs |
| IUCN CATEGORY | Category IV |
| MULTIPLE USE ZONE | Removal of marine shells prohibited |
| EXTENT | Marine area: 1.08km$^2$<br>Land area: None |
| HABITATS | Coral reefs, seagrass |
| INSTITUTIONAL FRAMEWORK | *Site management*: There is currently no active management of the Shell Reserves<br>*Managed by*: Seychelles Fishing Authority<br>*Oversight*: Board of Directors appointed by the President of the Republic |
| MANAGEMENT PLANNING | *Status*: No plan<br>*Dates*: None<br>*Specific objectives*:<br>– as per the Fisheries Regulations (1987) the objective is to protect marine gastropods |

| | |
|---|---|
| THREATS | – there are no urgent threats since the collection of marine gastropods for curio trade is not popular |
| OPPORTUNITIES | – to deregulate and deproclaim the site |
| **POINTE ZANGUILLES SHELL RESERVE** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>4°18'S, 55°43'E |
| PROCLAMATION YEAR LEGISLATION | 1987 / Fisheries Act (1987) |
| PURPOSE | Protection of marine shells (gastropods)<br>– coral reefs |
| IUCN CATEGORY | Category IV |
| MULTIPLE USE ZONE | Removal of marine shells prohibited |
| EXTENT | Marine area: 1.74km$^2$<br>Land area: None |
| HABITATS | Coral reefs, seagrass |
| INSTITUTIONAL FRAMEWORK | *Site management*: There is currently no active management of the Shell Reserves<br>*Managed by*: Seychelles Fishing Authority<br>*Oversight*: Board of Directors appointed by the President of the Republic |
| MANAGEMENT PLANNING | *Status*: No plan<br>*Dates*: None<br>*Specific objectives*:<br>– as per the Fisheries Regulations (1987) the objective is to protect marine gastropods |
| THREATS | – there are no urgent threats since the collection of marine gastropods for curio trade is not popular |
| OPPORTUNITIES | – to deregulate and deproclaim the site |
| **LA DIGUE SHELL RESERVE** | |
| TYPE | Coastal MPA |
| LOCATION | Seychelles Inner Islands<br>4°20'S, 55°49'E |
| PROCLAMATION YEAR LEGISLATION | 1987 / Fisheries Act (1987) |
| PURPOSE | Protection of marine shells (gastropods)<br>– coral reefs |
| IUCN CATEGORY | Category IV |
| MULTIPLE USE ZONE | Removal of marine shells prohibited |
| EXTENT | Marine area: 1.58km$^2$<br>Land area: None |
| HABITATS | Coral reefs, seagrass |
| INSTITUTIONAL FRAMEWORK | *Site management*: There is currently no active management of the Shell Reserves<br>*Managed by*: Seychelles Fishing Authority<br>*Oversight*: Board of Directors appointed by the President of the Republic |
| MANAGEMENT PLANNING | *Status*: No plan<br>*Dates*: None<br>*Specific objectives*:<br>– as per the Fisheries Regulations (1987) the objective is to protect marine gastropods |
| THREATS | – there are no urgent threats since the collection of marine gastropods for curio trade is not popular |
| OPPORTUNITIES | – to deregulate and deproclaim the site |

| AFRICAN BANKS AND SURROUNDING REEFS PROTECTED AREA | |
|---|---|
| TYPE | Coastal MPA |
| LOCATION | Seychelles Outer Islands<br>4°54'S, 53°20'E |
| PROCLAMATION YEAR LEGISLATION | 1987 / Protected Areas Act |
| PURPOSE | Purpose of designation unclear |
| IUCN CATEGORY | Undetermined |
| MULTIPLE USE ZONE | Site does not have any regulations |
| EXTENT | Marine area: 8.20km$^2$<br>Land area: 0.09km$^2$ |
| HABITATS | Coral reefs, seagrass, sandy beaches |
| INSTITUTIONAL FRAMEWORK | *Site management*: None assigned<br>*Managed by*: Ministry of Environment, Energy and Climate Change<br>*Oversight*: Board of Directors appointed by the President of the Republic |
| MANAGEMENT PLANNING | *Status*: No plan<br>*Dates*: None<br>*Specific objectives*:<br>– the management objectives for the park are not officially defined |
| THREATS | – climate change (causing coral bleaching)<br>– unregulated activities |
| OPPORTUNITIES | – to be officially managed as an MPA<br>– undertake more scientific work with international partners<br>– strengthen conservation in the park through implementation of a management plan<br>– working with other law enforcement organizations to enforce park regulations |
| **ALDABRA MARINE NATIONAL PARK** | |
| TYPE | Pelagic MPA |
| LOCATION | Seychelles Outer Islands<br>10°05'S, 46°46'E |
| PROCLAMATION YEAR LEGISLATION | 2018, extended in 2019 / NPNC Act |
| PURPOSE | Protection of pelagic waters and benthic habitats<br>– pelagic zone<br>– marine mammals<br>– marine birds<br>– whale sharks<br>– sharks and fish<br>– benthic habitats<br>– seabird foraging habitat |
| IUCN CATEGORY | To be determined |
| EXTENT | Marine area: 177 447km$^2$<br>Land area: None |
| HABITATS | Deep sea and offshore pelagic and benthic habitats |
| INSTITUTIONAL FRAMEWORK | *Site management*: New marine protection category for MSP Initiative. The institutional framework for site management is in progress and will be determined by 2020 |
| MANAGEMENT PLANNING | *Status*: Underway with the Seychelles MSP Initiative<br>No management plan at present<br>*Specific objectives*:<br>As per the nomination package, namely:<br>– expand the area and increase the level of protection for the deep, marine waters and seabed surrounding the Aldabra Group, conserving unique biodiversity features in these waters of the Seychelles archipelago, improving management for large marine predators and highly migratory species, and protecting the seabed from any alteration |

| | |
|---|---|
| THREATS | – overfishing<br>– piracy (still a real if intermittent threat)<br>– illegal, unreported and unregulated (IUU) fishing<br>– fisheries by-catch<br>– waste and oil spill from marine traffic<br>– petroleum development |
| OPPORTUNITIES | – to meet the national goal of protecting 30% of Seychelles' EEZ |
| **AMIRANTES TO FORTUNE BANK AREA OF OUTSTANDING NATURAL BEAUTY** | |
| TYPE | Pelagic MPA |
| LOCATION | Seychelles Outer Islands<br>5°06'S, 54°30'E |
| PROCLAMATION YEAR LEGISLATION | 2018, extended in 2019 / NPNC Act |
| PURPOSE | Protection of seascape<br>– pelagic zone<br>– deep sea reefs<br>– upwelling and drop-off ecosystems<br>– seabird foraging habitats<br>– marine mammals foraging and breeding habitats<br>– sharks, rays, turtles |
| IUCN CATEGORY | To be determined |
| EXTENT | Marine area: 173 468km$^2$<br>Land area: None |
| HABITATS | Deep sea and offshore pelagic and benthic habitats |
| INSTITUTIONAL FRAMEWORK | *Site management*: New marine protection category for MSP Initiative. The institutional framework for site management is in progress and will be determined by 2020 |
| MANAGEMENT PLANNING | *Status*: Underway with the Seychelles MSP Initiative<br>No management plan at present<br>*Specific objectives*:<br>As per the nomination package:<br>– the purpose of this zone is to expand marine protection for marine biodiversity, benthic habitats and the important upwelling ecosystem that occurs in these waters of Seychelles, and to improve sustainable management of compatible uses of coral reef and bank habitats found outside of the Inner Islands and off the Plateau |
| THREATS | – illegal, unreported and unregulated (IUU) fishing<br>– fisheries by-catch<br>– chronic oiling and oil spills<br>– overfishing |
| OPPORTUNITIES | – to meet the national goal of protecting 30% of Seychelles' ocean<br>– to demonstrate how biodiversity conservation and sustainable use of the marine environment can be effectively achieved |

CASE STUDY

## The Seychelles Marine Spatial Planning Initiative

**Joanna Smith, Didier Dogley, Alain de Comarmond, Wills Agricole, Helena Sims, Rob Weary, Martin Callow, Rick Tingey and Jude Bijoux**

The Seychelles Marine Spatial Planning (SMSP) initiative was established in 2014 after the Seychelles Government announced that it will be designating 30 percent of its Territorial Waters and EEZ as protected areas. The SMSP is led by the Government with process design and facilitation from The Nature Conservancy (TNC). To establish the funding mechanism in support of this commitment, the Government partnered with TNC to develop an innovative debt restructuring. To accomplish this refinancing, TNC facilitated a buy-back of USD 21.6 million of Seychelles' debt, blending impact capital and grant finance, with the Paris Club. Proceeds from the deal repay the impact investor and TNC, as well as releasing funds to support in-country, nature-based solutions to marine conservation and climate change.

From its inception, the SMSP was founded on a public participatory process, drawing on best available data and local knowledge. There are over 11 marine sectors involved in the planning, with a decision-making framework developed comprising an Executive Committee, Steering Committee and Technical Working Groups. The SMP has five thematic areas: fisheries, conservation, utilities and infrastructure, non-renewable resources, and recreation and tourism. The zoning design was developed using an iterative process, with three categories – Zone 1: High Biodiversity Protection category to cover 15 percent of Seychelles EEZ; Zone 2: Medium Biodiversity Protection and Sustainable Uses category to cover another 15 percent, provide access and opportunities for existing and new sustainable uses; and Zone 3: Multiple Use Zone to occupy 70 percent of the EEZ, aimed at optimizing economic opportunities and the Blue Economy, and to include essential marine infrastructure and public utilities. The first two new marine protection zones were designated in February 2018 and extended in April 2019 to increase the protected marine area by more than 350 000km$^2$ to cover 26.4 percent of the EEZ. Thus, Seychelles greatly surpassed the 10 percent goal of the Aichi Target 11 and UN Sustainable Development Goal 14.

## AREAS UNDER CONSIDERATION FOR FORMAL PROTECTION

The government of Seychelles has set a target to have 30 percent of its EEZ and territorial waters under increased protection by 2020. This is being facilitated by the MSP Initiative described above. The MSP Initiative is a public process that uses an integrated approach to improve ocean management with participation from all key stakeholders.

Outputs of this government-led initiative include 410 000km$^2$ of Seychelles' waters with increased protection status and the full 1.34 million km$^2$ in improved management for marine resources (Smith *et al*., 2018). Implementation of the Seychelles MSP Initiative will commence from 2021 onwards. In preparation for this, the MSP Initiative is developing a Marine Spatial Plan Policy, a governance framework and costing analysis.

A number of areas in the Seychelles outer islands have been previously identified for MPA status (Table 2 and Figure 2) through the GoS-UNDP-GEF Outer Islands Protected Area Project. These areas contain a diversity of shallow marine habitats (less than 200m depth) including coral reefs, seagrass beds, mudflats, mangrove areas and shallow lagoons. Within these areas there are also documented spawning aggregation sites for coral reef associated fish species. Discussions are still ongoing concerning the designation of new MPAs in the outer islands and there is a possibility that the proposed number and extent of MPAs designated would change

Once designated, the sites will greatly increase the area of shallow marine ecosystems under formal protection. It has not been decided what management authority will be mandated to manage the sites. As a result of the logistical issues of operating in the Seychelles outer islands, it is expected that there will be some form of co-management arrangement with responsibility shared amongst a number of organizations. The outer island project and the MSP team are working together to ensure synergies in efforts of site identification and objectives for marine protection.

In the inner islands there are a number of sites under consideration for designation as MPAs including the areas around North, Denis and Récif Island. While the area for designation around North and Denis Island is yet to be established, an area within the perimeter, 300m from the high-water mark, is being proposed for Récif Island. An extension of the Aride Special Reserve from 400m to 1000m from the high-water mark is also

**Estimating seagrass density, under a Science for Active Management (SAM) initiative, Curieuse Island MPA, Seychelles.** © Jennifer O'Leary

under consideration. There are also proposals to designate five important nesting sites for marine turtles along the south coast of Mahé Island and two aggregation areas for the whaleshark (*Rhincodon typus*) and other marine megafauna as Temporary Protected Areas (TPAs) with an IUCN Category IV (Ecological Reserve) status. The Turtle TPAs are proposed to protect the Critically Endangered Hawksbill turtles (*Eretmochelys imbricata*) at these important nesting areas during their peak nesting season between October and April. A total of 0.4km$^2$ is proposed, containing beach, nesting platform and near-shore foraging habitats.

The two marine megafauna TPAs are proposed for the areas around the south and northwest of Mahé Island extending respectively around 2km and 3km offshore with a total area of 27.8km$^2$ and 25.1km$^2$, with the purpose of protecting migratory whalesharks. Designation of these sites should become possible when the Nature Reserves and Conservancy Act is enacted. The Act will provide the legal framework for the designation of TPAs, which is not in the preset legal framework.

**Table 2: New protected areas identified for designation in the Seychelles Outer Islands.**

| SITE | MARINE AREA (km$^2$) | TERRESTRIAL AREA (km$^2$) |
|---|---|---|
| Alphonse group | 128.3 | 19.4 |
| Desroches | 343.0 | 3.7 |
| Poivre | 28.4 | 1.4 |
| Farquhar | 223.0 | 4.0 |
| D'Aross and St. Joseph | 40.0 | 1.4 |

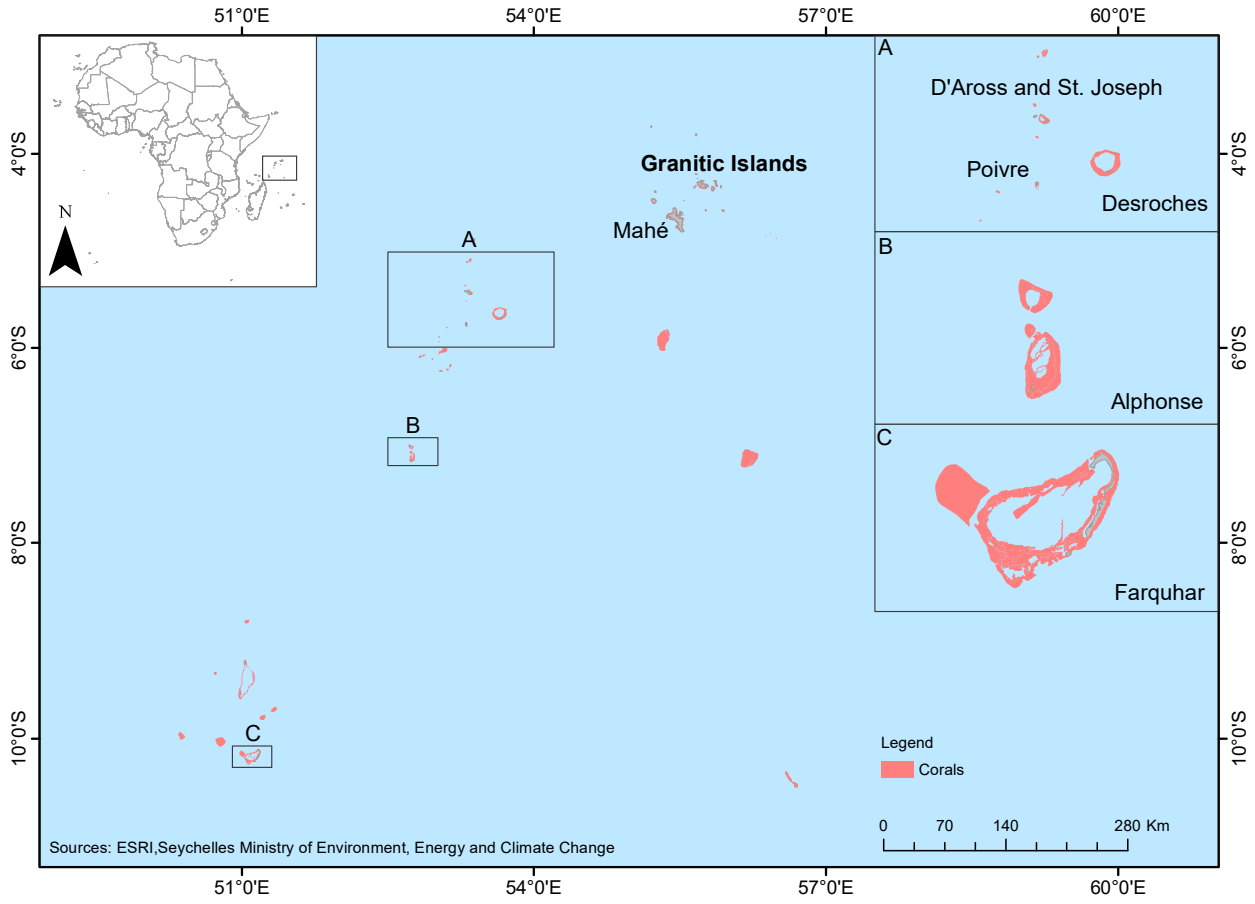


Figure 2: Island groups for which parts of the marine area are under consideration for designation as new MPAs.

## Total area currently under protection and proposed for protection

The current situation indicates that over a quarter of Seychelles' EEZ is now under protection, and with the addition of the proposed MPA the area under protection will approach 27 percent of the EEZ (Table 3). When the proposed MPAs are formally recognized, the 30 percent target will be reached.

Table 3: Seychelles EEZ under protection and proposed for protection.

| | |
|---|---|
| Seychelles' EEZ | 1 336 559km$^2$ |
| EXISTING MPAs | |
| No. of MPAs | 16 |
| MPA area | 353 663km$^2$ |
| % EEZ | 26.46 |
| PROPOSED MPAs | |
| No. of proposed MPAs | To be determined |
| Proposed MPA area | Approx. 50 000km$^2$ |
| Potential % EEZ | 4 |

## NON-FORMAL PROTECTED AREAS

The role of non-formal, voluntary, protected areas in the Seychelles is mostly of an educational and social empowerment nature, which encourages the public or group of stakeholders to actively manage certain areas for environmental purposes. The groups involved with the management will tend to have some form of direct or indirect benefits from their involvement with management.

Seychelles has only one voluntary Marine Protected Area. This is the Port Launay coastal wetland, which was declared a Ramsar Site in November 2004. The site is one of the best preserved mangrove wetlands in the Seychelles' inner island group and is an area which has been left relatively intact over the years. It occupies an area of 1.24km$^2$ and includes both mangrove forest and coral reef habitats. The wetland was proposed for inclusion within the boundaries of the Morne Seychellois National Park but this did not occur. The site does have a current management plan and is being managed with the involvement of partners from the community, the private sector and government.

The islands of D'Arros and St. Joseph atoll in the Amirantes group are privately owned and the marine areas around them are privately managed as *de facto* marine protected areas. Management is carried out by the Save Our Seas Foundation D'Arros Research Centre. This area was designated as a Special Reserve by National Parks (D'Arros and St. Joseph Special Reserve) (Designation) Order, 2014 but the legislation was repealed less than two months later. Presently, D'Arros and St. Joseph atoll is not recognised by fishers or tourism operators as a voluntary protected area. It however remains one of the sites being considered for formal protection under the GoS-UNDP-GEF Outer Islands Protected Area Project.

The islands in the D'Arros and St. Joseph atoll have a total land area of approximately 6.3km$^2$. The shallow marine habitats around the islands cover an area of approximately 28km$^2$. Most of the marine environment is made up of reef flats dominated by seagrasses and reef slopes dominated by hard corals. A shallow lagoon 3.5km in length and 3 metres in average depth is found at St. Joseph and is popular with rays, blacktip reef shark (*Carcharhinus melanopterus*) and sicklefin lemon sharks (*Negaprion acutidens*). The beaches around the islands are popular rookeries for Green turtles (*C. mydas*) and Hawksbill Turtles (*E. imbricata*). Manta rays (*Manta birostris*) are frequently found in the channel between D'Aross and St. Joseph. The St. Joseph atoll is also an important site for seabirds with more than 1000 Greater Frigate (*Fregata minor*) and Lesser Frigate (*Fregata ariel*), and 1500 Lesser Noddies (*Anous tenuirostris*) roosting on the atoll. At least seven species of seabirds breed on the islands including 23 000 pairs of Wedge-tail shearwaters (*Ardenna pacifica*) and 500 pairs of Roseate terns (*Sterna dougallii*). A population of Pink-backed Pelican (*Pelicanus rufescens*) has been lost from St Joseph Atoll (Bijoux *et al*., 2003).

The marine areas around the island of Denis and North are also currently managed as voluntary MPAs while the nomination of the sites for formal protected area status are considered alongside the new Protected Area Policy and new Protected Area legislations currently being prepared. The privately owned islands of Bird and Fregate also have active marine conservation programmes and the marine areas around them are managed as *de facto* marine protected areas.

Over the years there has also been growing realization by resource users of the need to protect the marine resources on which they depend for their livelihood. The Praslin Fishers Association (PFA) is presently implementing a project with financial support from the Seychelles Conservation and Climate Adaptation Trust (SeyCCAT) to establish an informal voluntary temporal fisheries reserve in the bay of Baie Ste Anne, Praslin (5.4km$^2$). The rationale is that fishermen from this area will voluntarily fish outside the reserve for six months of the year, during the northwest monsoon when the weather is calm, and fish the reserve during the rough weather period when it is difficult to venture far from the coast. The voluntary temporary closure is seen as a means of conserving the fisheries resources inside the bay while safeguarding the livelihood of fishermen. The marine environment in the bay of Baie Ste. Anne is dominated by shallow seagrass beds. The area is one of the few places in the Seychelles where the Broadblade seagrass (*Enhalus acoroides*) is found.

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MARINE & COASTAL AREAS
UNDER PROTECTION

# UNITED REPUBLIC OF TANZANIA:
## TANZANIA MAINLAND

Milali E. Machumu

Mnazi Bay-Ruvuma Estuary Marine Park, Tanzania. © Jennifer O'Leary

## COUNTRY OVERVIEW

The United Republic of Tanzania (URT) is an independent, sovereign coastal state that was formed of the union of two countries, namely Tanganyika (mainland) and Zanzibar (Unguja and Pemba islands) in 1964. Tanzania is located in the Eastern Africa region, between latitudes 1°00'S and 11°45'S and longitudes 29°15'E and 41°00'E (URT, 2012). Tanzania mainland covers a total area of 948 740km$^2$, of which 889 460km$^2$ is terrestrial. The coastline of Tanzania mainland extends 800km from the north at the border with Kenya to the south at the border with Mozambique. The entire coastline of Tanzania, including inner waters, and major and small islands covers 1424km. The continental shelf is narrow, with the 200m depth contour occurring at about 4km offshore, except in the Zanzibar and Mafia channels where the shelf extends up to 80km from the mainland coast. Tanzania's (mainland and Zanzibar) Territorial Waters cover 64 000km$^2$ with the exclusive economic zone (EEZ) covering an area of 223 000km$^2$ (URT, 2003). This area includes Zanzibar's Unguja and Pemba islands.

The country is endowed with a high diversity of coastal and marine resources. These include critical habitats such as sandy beaches, cliffs, major estuaries, mangrove forests, coral reefs, seagrass beds and muddy tidal flats. Sandy-muddy flats or rocky reef platforms are found in the intertidal zone, while the sub-littoral zone consists of extensive seagrass beds and coral reefs. Tanzanian waters are species rich, and support many species of fish, cetaceans, sharks and rays, turtles, corals, seagrasses and mangroves. Dugongs are also seen occasionally or caught accidentally in the Pemba Channel, within the Rufiji, Mafia and Kilwa seascape, and within the northern areas along the border between Tanzania and Kenya (Muhando and Rumisha, 2008). As with other countries on the Africa continent, Tanzania's coastal and marine resources are under increased pressure due to anthropogenic factors such as increasing costal populations, high resource dependence and illegal harvesting methods (see Case Study), as well as natural drivers of ecosystem change (Machumu and Yakupitiyage, 2013).

There are a range of policies and laws governing the conservation and management of marine and coastal resources in Tanzania mainland, including: a Fisheries Policy (2015); an Environmental Policy (2012); a Forest Policy (2014); a Wildlife Policy (2007), and associated laws and regulations. In addition to those policies and laws, Act No. 29 of 1994 was enacted by the National Assembly to guide the management and administration of marine protected areas (MPAs), notably of Marine Parks and Reserves (MPRs). This Act also legislated for the establishment of the Marine Parks and Reserves Unit (MPRU) mandated with the management of the MPRs (URT, 1994). Fisheries in the Tanzania's EEZ are a Union matter (involving both Tanzania mainland and Zanzibar) and are regulated by the Deep Sea Fishing Authority (DSFA). The management of marine fisheries in Tanzania is therefore carried out under a range of different policies and at three institutional levels: Tanzania mainland, Zanzibar and DSFA. Tanzania has also ratified a number of international conventions and protocols related to management of marine resources including, the Convention on Biological Diversity (CBD); the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); the Convention on Migratory Species (CMS) and the Nairobi Convention for the Development, Protection, Management and Development of the Marine and Coastal Environment of the Western Indian Ocean (WIO) Region.

## MPA OVERVIEW

MPAs have been established in Tanzania as a key conservation tool to protect marine biodiversity. A sustainable-use approach prevails whereby sustainable fishing practices are generally permitted in order to safeguard the security of coastal livelihoods. Establishment of marine reserves in the country dates back to the 1960s, when surveys were conducted of key marine habitats, mainly coral reefs, and several sites were legislated as marine reserves in the mid 1970s under the Fisheries Act (1975). However, no specific management and institutional mechanisms were put in place to effectively manage those reserves. As a result, those marine reserves existed without any management interventions, and were merely "paper parks" (Bryceson, 1981).

The continued existence of these unmanaged MPAs in Tanzania led the government to collaborate with other key stakeholders to promulgate the Marine Parks and Reserves (MPR) Act in 1994. The MPRs are operating under the auspice of the Board of Trustees and Ministry of Livestock and Fisheries Development. Following the promulgation of this Act, formally proclaimed MPAs, known as either Marine Parks or Marine Reserves, operate mostly under the auspices of the MPRU. However, there are some marine and coastal areas proclaimed under the Tanzania National Parks Authority (TANAPA), established under TANAPA Act No.14 of 1959 (CAP 282, after revision in 2002); and the Mangrove Forest Reserves operate under the Forestry Act No.14 of 2002. The main objective of MPAs in Tanzania is to safeguard

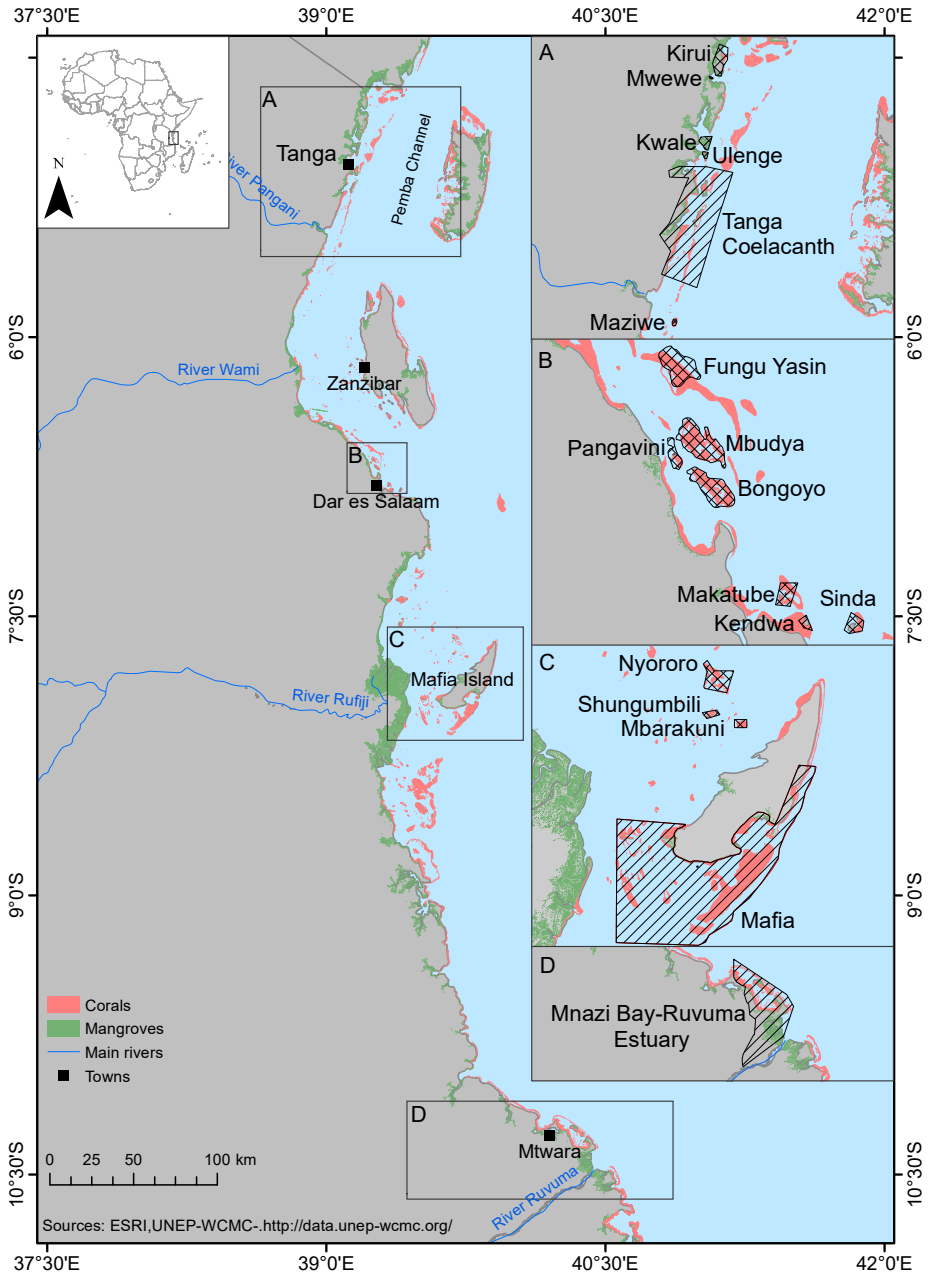


Figure 1: Tanzania Marine Parks and Marine Reserves operating under the auspices of the Marine Parks and Reserves Unit.

and sustainably manage the fabric and integrity of marine resources in partnership with the local and global fraternity (URT 1994). MPAs in Tanzania are being promoted to mitigate over-fishing and other anthropogenic impacts on marine resources (Machumu and Yakupitiyage, 2013). Other important functions of MPAs include: protection of biodiversity and ecosystem functions; controlling over-exploitation of resources and activities in sensitive habitats; and facilitating responsible utilization of coastal and marine resources (URT, 1994). The MPRU approach is participatory/co-management where local community members and other key stakeholders are involved at different levels of management such as planning; decision-making and implementation of conservation activities; benefit sharing and evaluation.

Currently there are 18 formal MPAs, comprising three Marine Parks and 15 Marine Reserves, all operating under the auspices of the MPRU (Figure 1). Many of the Marine Reserves are small, with ten being less than 10km² in area. The total area covered by formal MPAs operating under auspice of MPRU is 2142.57km², representing about 1 percent of the country's EEZ. There is also one National Park and a number of mangrove forest reserves extending along the five coastal regions of Tanga, Coast, Dar es Salaam, Lindi and Mtwara.

CASE STUDY

## Persistence of blast fishing

**Milali E. Machumu**

**A blast fisher loses his hands.** © Jason Rubens

Blast (or dynamite or explosive) fishing in Tanzania dates back to the 1960s and was outlawed in 1970. However the scourge re-surfaced and became epidemic in 1998 and 1999 along the Tanzanian coast, at which point some control was exercised by a special operation involved the military. However, blast fishing has since become almost normalized as a practice at varying magnitudes. About ten years ago, Tanzania was the only country in Africa where blast fishing was still occurring on a large scale, while the neighboring states of Kenya and Mozambique had managed to control blast fishing in waters falling within their jurisdictions.

Blast fishing is an extremely destructive practice, and can cause serious harm to fishers' organs even to the extent of killing them. Blast fishing also destroys critical habitats especially corals, and their associated biodiversity. There are many reasons given by different groups of people as to why blast fishing persists along the coastal area of Tanzania. The main reason for the widespread use of blast fishing in Tanzania is the view that the practice is cheaper and more productive than traditional methods of fishing, such as the use of gill nets, basket traps and hook and line. The Indian Ocean Commission's SmartFish Project, involved in conducting operations against blast fishing in Tanzanian waters, revealed that fishers can make profits of up to USD 1800 at the Dar es Salaam fish market from a single blast (*pers. comm.*), though typically the catch collected is only a few kilogrammes compared to fish mortality per blast. The possibility of such huge profits attracts more people to engage in blast fishing. Other reasons for the prevalence of blast fishing include: explosives being cheap and easily accessible because of a boom in mining and construction activities; inadequate awareness of the immediate, medium-term and long-term effects of blast fishing; weaknesses in law enforcement for various reasons including inadequate human and financial resources; allegations of corruption, especially among law enforcers and within the judicial system, though there is no clear evidence of this; and some suggestion of a lack of political will and commitment and even political patronage in some areas.

Despite the government collaborating with conservation agencies to combat illegal fishing practices including blast fishing, the situation had reached an alarming level and appeared to be getting out of control. In order to control environmental crime, including blast fishing, the government established a task force known as the Multi-Agency Task Team (MATT). The task force involves staff from different ministries. In addition, the government in collaboration with other key stakeholders including local agencies and fishing community members have been implementing the directives from the fifth phase President by undertaking focused initiatives against blast fishing.

Currently, the incidence of blast fishing has been reduced to a great extent along the entire coast of Tanzania. If these initiatives continue, there is a high possibility of controlling blast fishing in the country and consigning the practice to history.

# MARINE AREAS UNDER PROTECTION

## Management objectives of MPAs

The management objectives of the MPAs under MPRU are clearly stated under Section 10 of the Marine Parks and Reserves Act No. 29 (URT, 1994) as follows:

- To protect, conserve and restore the species and genetic diversity of living and non-living marine resources and ecosystem processes of marine and coastal areas.
- To manage marine and coastal areas so as to promote sustainability of the use, and the recovery of areas and resources that have been over-exploited or otherwise damaged and to rehabilitate damaged ecosystems.
- To ensure that villages and other local resident resource users in the vicinity of, or dependents on, a marine park or marine reserve are involved in all phases of the planning, development and management of that marine park or marine reserve, share in the benefits of the operation of the protected area and have priority in the resource use and economic opportunity afforded by the establishment of the marine park or marine reserve.
- To stimulate the rational development of underutilized natural resources.
- To promote community oriented education and dissemination of information concerning conservation and sustainable use of the marine protected area.
- To facilitate research and to monitor resource conditions and uses within the marine park or marine reserve.

However, the Act also makes provision for specific MPAs to incorporate additional purposes as required, based on the physical environment of the gazetted area.

## Governance structure of the Marine Parks and Reserves Unit

The governance structure including statutory organs/ authorities for MPRU has been defined in the MPRs Act No. 29 (URT, 1994). The main function of the mandated authorities is to oversee implementation of various activities of MPAs management.
These authorities are as follows:

- Ministry of Livestock and Fisheries Development
- Board of Trustees for Marine Parks and Reserves
- Marine Parks and Reserves Unit, under the Unit Manager
- Advisory Committees of individual Marine Parks
- District Council and Village Liaison Committees
- Park management of individual Marine Parks under the Warden in-Charge

The relationship and interactions of these authorities is described in the MPRU management structure (Figure 2).

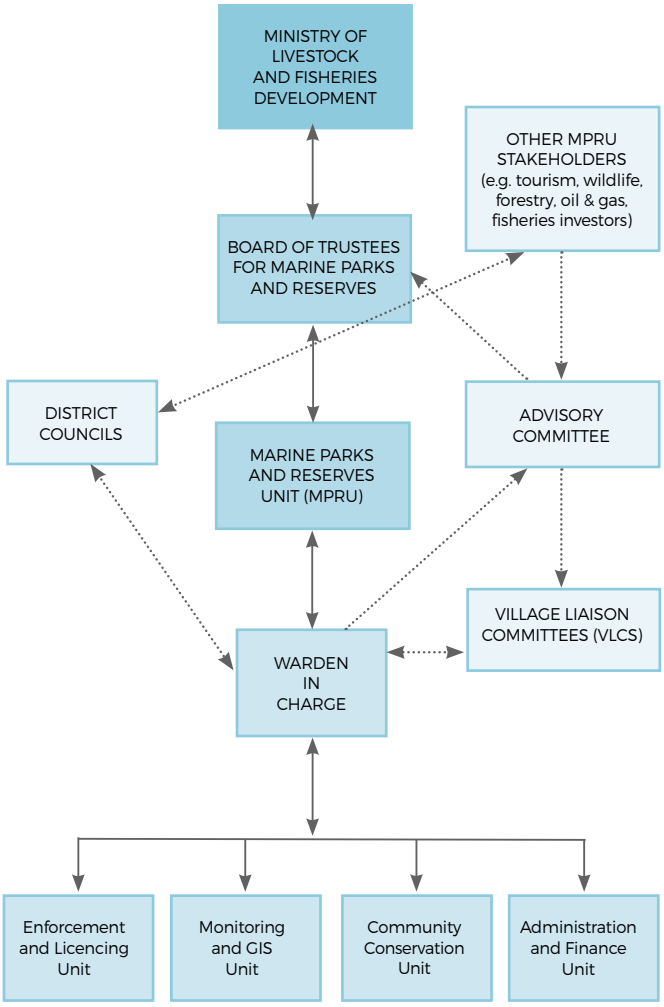


**Figure 2: Organogram of the Marine Parks and Reserves Unit management structure** (source: URT, 2005).

## Opportunities, risks and threats associated with MPAs

This section is intended to highlight the key generic internal and external features of the MPAs operating under MPRU and how these factors are contributing to or affecting the sustainability of its conservation mandate. The following opportunities and risks/threats therefore represent features of all Tanzanian MPAs.

***Opportunities***

- Presence of tourism attractions/values.
- Diversified source of revenue from oil/gas exploitation projects, tourism investments, user fees, donations.
- Existence of statutory organs (Board of Trustees, Advisory Committees and Village Liaison Committees) at different levels, which support implementation of MPAs activities.
- Support from government and conservation
- partners (development agency and local/ international NGOs).
- Appropriate policies and laws which support conservation activities.
- Peace and political stability.
- Retention of user fees in the repository account (Conservation and Development Trust Fund).
- Existence of the National Integrated Coastal Environmental Management Strategy (NICEMS) framework that provides links and supports partnership between and within different sectors promoting sustainable coastal development.

***Risks and threats***

- High levels of poverty among resource users.
- High dependence on natural resources by local communities.
- Potential negative ecological impacts from oil/gas exploration/production (see Case Study, after Table 1).
- Use of unsustainable and highly damaging harvesting methods (blast fishing and beach seine).
- Government scaling down funding due to its high expectations of revenue collection by MPAs.
- Migration of people from inland to coastal areas including the MPAs.
- Political patronage (in most cases weak punishment given to offenders not commensurate with severity of their offences).
- Disconnect between science and management policy.

## Categories of MPAs

MPAs in Tanzania are divided into two fundamental categories, namely Marine Parks and Marine Reserves. Marine Parks are multiple use areas, where people are allowed to remain and can conduct their normal activities provided they comply with existing regulations. Marine Reserves are no-take areas where extractive use of resources is strictly prohibited. Details of marine areas under formal protection are provided in Table 1. The table includes name, designation and ecosystems within the MPA, year of proclamation and purpose, IUCN category, extent, and details on institutional framework and management plans and objectives.

Table 1: Details of Tanzania Marine Parks and Marine Reserves.

| NAME and DESIGNATION<br>ECOSYSTEMS<br>LOCATION | PROCLAMATION LEGISLATION YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE/ ZONED | EXTENT ($km^2$) | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN STATUS and DATES<br>OBJECTIVES |
|---|---|---|---|---|---|
| **Mafia Island Marine Park (MIMP)**<br><br>Coastal/epipelagic and a small portion of deep sea area<br><br>Mafia District, Coast Region | Established 1995, MPRs Act No. 29, 1994<br><br>Conservation of sensitive marine ecosystems including corals, seagrass beds and mangroves which are spawning and nursery grounds for fish and endangered species such as turtles and dugongs; presence of migratory species | Category IV<br><br>Zoned multiple use area | 822$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | Reviewed GMP (2011–2022)<br><br>Conservation of ruins and migratory species visiting the area such as Humpback and Sperm whales, dolphins and Whale sharks |

| NAME and DESIGNATION<br><br>ECOSYSTEMS<br><br>LOCATION | PROCLAMATION<br>LEGISLATION<br>YEAR<br><br>PURPOSE | IUCN CATEGORY<br><br>MULTIPLE-USE/ ZONED | EXTENT ($km^2$) | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN STATUS and DATES<br><br>OBJECTIVES |
|---|---|---|---|---|---|
| **Mnazi Bay Ruvuma Estuary Marine Park (MBREMP)**<br><br>Coastal/epipelagic and deep sea<br><br>Mtwara Rural District, Mtwara Region | Established in 2000<br>MPRs Act No. 29, 1994<br><br>Conservation of biodiversity of local, regional and global significance value, partly due to MBREMP being where the South Equatorial Current (SEC) meets the African mainland after crossing the Indian Ocean and the source point for the East African Coastal Current (EACC) and the Mozambique Channel eddies (Ruitenbeek *et al.*, 2005) | Category IV<br><br>Zoned multiple use area | 650$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | Reviewed GMP (2011–2022)<br><br>Ensuring co-existence of biodiversity conservation and oil/natural gas exploitation |
| **Tanga Coelacanth Marine Park (TACMP)**<br><br>Coastal/epipelagic and deep sea<br><br>Muheza and Tanga Districts, Tanga Region | Established in 2009<br>MPRs Act No. 29, 1994<br><br>i) the presence of the CITES-listed and iconic coelacanth, (*Latimeria chalumnae*);<br>ii) highly productive and diverse fisheries resources;<br>iii) diverse coral reef communities with high levels of resilience against the impacts of climate change; and<br>iv) identified by WWF as an eco-regionally important seascape (Tanga-Msambweni) within the East African Marine Eco-region. | Category IV<br><br>Zoned multiple use area | 522$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | New GMP (2011–2022)<br><br>Conservation of coelacanth |
| **Bongoyo Island Marine Reserve**<br><br>Coastal/epipelagic<br><br>Kinondoni District, Dar es Salaam Region | Established in 1975<br><br>Fisheries Act of 1970<br><br>Conservation of corals | Category II<br><br>No-take area | 9.15$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP (2005–2010), under review |
| **Mbudya Island Marine Reserve**<br><br>Coastal/epipelagic<br><br>Kinondoni District, Dar es Salaam Region | Established in 1975<br><br>Fisheries Act of 1970<br><br>Conservation of corals | Category II<br><br>No-take area | 14.22$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP (2005–2010), under review<br><br>Conservation of locally endangered coconut crab |
| **Pangavini Island Marine Reserve**<br><br>Coastal/epipelagic<br><br>Kinondoni District, Dar es Salaam Region | Established in 1975<br><br>Fisheries Act of 1970<br><br>Conservation of corals and seagrass | Category II<br><br>No-take area | 2.13$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP (2005–2010), under review |

| NAME and DESIGNATION<br>ECOSYSTEMS<br>LOCATION | PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE/ ZONED | EXTENT ($km^2$) | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN STATUS and DATES<br>OBJECTIVES |
|---|---|---|---|---|---|
| **Fungu-Yasini Marine Reserve**<br>Coastal/epipelagic<br>Kinondoni District, Dar esSalaam Region | Established in 1975<br>Fisheries Act of 1970<br>Conservation of corals | Category II<br>No-take area | 22.90$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP (2005–2010), under review |
| **Makatube Island Marine Reserve**<br>Coastal/epipelagic<br>Temeke Muncipal, Dar es Salaam Region | Established in 2007 MPRs Act No. 29, 1994<br>Conservation of corals and seagrass | Category II<br>No-take area | 7.78$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP under development (under Dar es Salaam Marine Reserves System) |
| **Sinda Island Marine Reserve**<br>Coastal/epipelagic<br>Kigamboni Muncipal, Dar es Salaam Region | Established in 2007 MPRs Act No. 29, 1994<br>Conservation of corals and associated biodiversity | Category II<br>No-take area | 1.80$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP under development (under Dar es Salaam Marine Reserves System)<br>Conservation of breeding ground of the endangered Hawksbill turtles (*Eretmochelys imbricata*) and Green turtles (*Chelonia mydas*) |
| **Kendwa Island Marine Reserve**<br>Coastal/epipelagic<br>Temeke Muncipal, Dar es Salaam Region | Established in 2007 MPRs Act No. 29, 1994<br>Conservation of corals | Category II<br>No-take area | 5.30$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP under development (under Dar es Salaam Marine Reserves System) |
| **Ulenge Island Marine Reserve**<br>Coastal/epipelagic<br>Mkinga District, Tanga Region | Established in 2010 MPRs Act No. 29, 1994<br>Conservation of mangroves and corals | Category II<br>No-take area | 3.16$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP under development<br>Conservation of indigenous and migratory birds (Important Bird Area, IBA-35) as defined by Birdlife International |
| **Mwewe Island Marine Reserve**<br>Coastal/epipelagic<br>Mkinga District, Tanga Region | Established in 2010 MPRs Act No. 29, 1994<br>Conservation of mangroves and corals | Category II<br>No-take area | 0.40$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | Baseline study (biophysical and socio-economic) completed; GMP under development |
| **Kirui Island Marine Reserve**<br>Coastal/epipelagic<br>Mkinga District, Tanga Region | Established in 2010 MPRs Act No. 29, 1994<br>Conservation of ecosystems (coral, mangrove (10 spp) and seagrass beds) | Category II<br>No-take area | 36.10$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | Baseline study (biophysical and socio-economic) completed; GMP under development |

| NAME and DESIGNATION<br>ECOSYSTEMS<br>LOCATION | PROCLAMATION<br>LEGISLATION<br>YEAR<br>PURPOSE | IUCN CATEGORY<br>MULTIPLE-USE/ ZONED | EXTENT ($km^2$) | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN STATUS and DATES<br>OBJECTIVES |
|---|---|---|---|---|---|
| **Kwale Island Marine Reserve**<br>Coastal/epipelagic<br>Mkinga District, Tanga Region | Established in 2010<br>MPRs Act No. 29, 1994<br>Conservation of mangroves and corals | Category II<br>No-take area | 12.13$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | Baseline study completed; GMP under development<br>Conservation of indigenous and migratory birds (both Ulenge and Kwale Island Marine Reserves form IBA-35) |
| **Maziwe Island (submerged island) Marine Reserve**<br>Coastal/epipelagic<br>Pangani District, Tanga Region | Established in 1981<br>Fisheries Act of 1970<br>The reserve supports a diversity of nearly 400 species of fish, 35 general of hard and soft corals, sponges and algae as well as shoreline birds, long reef slopes and beautiful coral gardens (Muhando, 2011) | Category II<br>No-take area | 4.5$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP under development<br>Conservation of breeding ground of the endangered Hawksbill turtles (*Eretmochelys imbricata*) and green turtles (*Chelonia mydas*) |
| **Shungumbili Island Marine Reserve**<br>Coastal/epipelagic<br>Mafia District, Coast Region | Established in 2007<br>MPRs Act No. 29, 1994<br>Conservation of corals | Category II<br>No-take area | 4.20$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP partially developed |
| **Nyororo Island Marine Reserve**<br>Coastal/epipelagic<br>Mafia District, Coast Region | Established in 2007<br>MPRs Act No. 29, 1994<br>Conservation of corals | Category II<br>No-take area | 21.00$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP under development |
| **Mbarakuni Island Marine Reserve**<br>Coastal/epipelagic<br>Mafia District, Coast Region | Established in 2007<br>MPRs Act No. 29, 1994<br>Conservation of corals | Category II<br>No-take area | 3.80$km^2$ | Legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders | GMP under development |
| **Saadani National Park**<br>Coastal and epi-pelagic<br>Extends from Tanga to Coastal Region | Established in 2005 under TANAPA Act No. 14 of 1959 (CAP 282, after revision in 2002)<br>Tourist attractions of terrestrial and marine environment | Category II<br>No-take area | 1062$km^2$ | Legally mandated, managed by Tanzania National Parks Authority (TANAPA), using paramilitary approach | GMP in place (2010–2020) |

| NAME and DESIGNATION<br><br>ECOSYSTEMS<br><br>LOCATION | PROCLAMATION LEGISLATION YEAR<br><br>PURPOSE | IUCN CATEGORY<br><br>MULTIPLE-USE/ ZONED | EXTENT ($km^2$) | INSTITUTIONAL FRAMEWORK | MANAGEMENT PLAN STATUS and DATES<br><br>OBJECTIVES |
|---|---|---|---|---|---|
| **Mangrove Forest Reserves**<br><br>Middle to upper intertidal<br><br>Extend along the coast of Tanzania (Tanga, Coast, Dar es Salaam, Lindi and Mtwara Regions) | Established during colonial era; under the Forest Ordinance of 1957, which governs the administration of all territorial forest reserves<br><br>Mangrove forest reserves established to manage mangroves (striking a balance between conservation and sustainable use) | Category IV<br><br>Multiple use area | 1250$km^2$ | Managed by central government in collaboration with local communities and local governments | GMP in place though outdated; developed in 1991 |

## PROPOSED MPAs AND AREAS UNDER CONSIDERATION FOR FORMAL PROTECTION

Tanzania has opted to place more marine areas under formal protection, in line with fulfilling international obligations, including those related to Sustainable Development Goal 14, which the country has ratified. Currently, there are four islands which are under consideration for formal protection within the country following preliminary surveys. These islands are Ukuza, Nyuni, Simaya and Fanjove, all located in Kilwa District, Lindi region and included in the Mafia-Rufiji-Kilwa Ramsar Site. A consultation process has been initiated with the district authorities. The four marine areas (islands) proposed or under consideration for formal protection are coastal and epi-pelagic and will be managed under MPRU using the MPRs Act. More information, especially bio-physical baseline data, will be collected immediately after completion of the gazetting process. Such information will also be used in development of General Management Plan.

Another ongoing initiative is the establishment of the Trans-boundary Conservation Area (TBCA) between Tanzania and Kenya in line with both the stated objectives of the East Africa Community (EAC) which aims at promoting synergy in regional initiatives for economic, social and conservation benefits among EAC member states, and with the Nairobi Convention obligations. It is anticipated that the proclaimed area will include both coastal/epipelagic ecosystems and a portion of the deep-sea EEZ as the current proposal includes the Pemba Channel due to its potential in terms of biodiversity. The consensus on legislation for the proclaimed area under the TBCA, including the management approach and delineation of the area, depends on the findings on the existing legal frameworks for both countries and on the biophysical and socio–economic studies which will be commissioned once funds are available. Besides Marine Parks and Marine Reserves, the TBCA will include Locally Managed Marine Area (LMMAs). Most of the LMMAs are located on the Kenya side and their details are provided in the Kenya chapter.

### Summary of coverage of existing and proposed MPAs

Table 2 provides a summary of the existing number of MPAs and the area covered by them, and the number of proposed MPAs. At present, precise information on the areas the proposed MPAs will cover is not available.

**Table 2: Existing and proposed Tanzanian Mainland Marine Protected Areas.**

| | |
|---|---|
| URT's EEZ | 223 000$km^2$ |
| EXISTING MPAs | |
| No. of MPAs | 18 |
| MPA area | 2143$km^2$ |
| % EEZ | 0.96 |
| PROPOSED MPAs | |
| No. of proposed MPAs | 4 |
| Proposed MPA area | Unknown |
| Potential % EEZ | Unknown |

CASE STUDY

# Oil and gas operations inside an MPA

**Milali E. Machumu**

**Gas pipeline dredging operations inside MBREMP.** © Matthew D. Richmond

The Mnazi Bay Ruvuma Estuary Marine Park (MBREMP) was gazetted in 2000, under Act No. 29 of 1994 of Marine Parks and Reserves of Tanzania. The area is considered to have globally significant marine biodiversity values and covers 650km$^2$, of which 33% is terrestrial. The area is also endowed with natural gas; the gas field was discovered in 1982 by AGIP Tanzania Limited, a sister company of AGIP Petroli (Italy), established in 1966 and dealing with marketing of petroleum products all over the country. Gas wells were brought into operation in 2006, when gas from the wells was piped to Mtwara where a gas to power plant provides electricity for the Mtwara and Lindi regions. Since the quantity of gas available is far greater than what is needed in those regions the construction of a pipe to supply Dar es Salaam has been completed in order to supply gas to industries and power to the national grid as a strategy to relieve national power supply problems. To date there are five wells and two gas processing facilities located at Ruvula and Madimba villages in Mtwara District.

Prior to commencement of exploration and drilling of four other wells, there were concerns from different environmental stakeholders regarding oil and gas operations within the MPA especially considering that Act No. 29 strictly prohibits mining activities in MPAs. This issue was finally resolved by the government, finding that these operations could co-exist with conservation activities due to gas being discovered in the area before the establishment of the MPA, and the economic importance of the gas to the area and the nation at large. It was anticipated that, if the projects were implemented successfully, this would demonstrate to the global community how conservation could co-existence with development projects like gas exploitation without causing adverse impacts on environment. In order to mitigate adverse impacts all mining activities were subjected to Environmental and Social Impact Assessment (ESIA). The Marine Parks and Reserves Unit (MPRU), in collaboration with National Environmental Management Plan (NEMC), were given the role of supervising the compliance of the gas company with the ESIA requirements.

Through seismic exploration it was revealed that there were insufficient reserves to warrant further well drilling and exploitation. This was good news from a conservation point of view, as all existing wells had significant amounts of natural gas (clean hydrocarbon), and ten years since the commencement of the exploitation, no major impacts on the environment have been observed. However, some key lessons have been learned in relation to the environmental impacts of the undertaking: i) All implementers of the projects are supposed to work closely and in a trustful, committed and transparent manner in order to minimize the identified impacts, especially those related to the untreated effluents from gas processing facility and domestic wastes. However, negative effects of discharging untreated effluents/wastes into the marine environment have been noticed as some of the corals, seagrass and mangroves and associated biodiversity are affected; ii) Strong gas flaring has reduced the number of nesting turtles on the beaches; iii) Drilling of gas wells and associated activities on beaches has reduced the touristic exclusivity of the area, and currently there are no investors interested in constructing eco-lodges in the MPA, unlike the past before gas exploitation activities; iv) It is evident that economic projects override conservation issues as decisions made by the government when resolving conflicts favour the gas projects over the MPA; and v) Tanzania Petroleum Development Corporation (TPDC) is not willing to invest some revenues accrued from the gas to support conservation activities, although gas is one of the resources from within the MPA, necessitating the MPRU to allocate its own meagre resources to monitor gas activities to safeguard the environment.

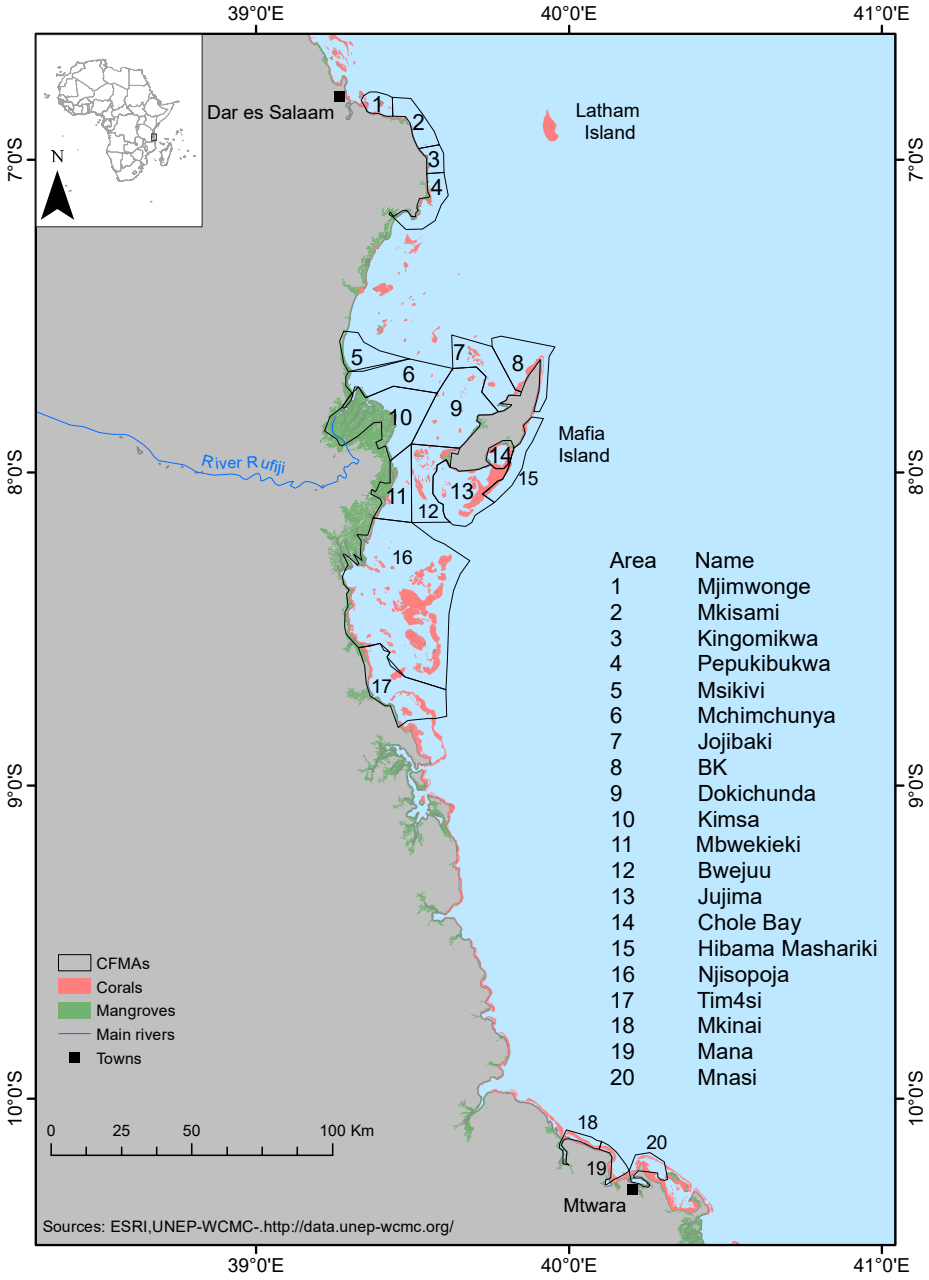


Figure 3. Tanzanian Collaborative Fisheries Management Areas.

## AREAS UNDER NON-FORMAL PROTECTION

The Tanzanian government, through the Fisheries Act No. 22 of 2003 and its Principle Regulations of 2009, provides for establishment of participatory resource management (co-management) approaches through involving local communities, principally through establishment of Beach Management Units (BMUs).

Co-management is a partnership where resource users and the government share the responsibility and authority for decision-making (Pomeroy *et al*., 2001).

### Collaborative Fisheries Management Areas

Since 2005, national fisheries authorities in Tanzania, in collaboration with selected district authorities and NGO partners (principally WWF), have developed and piloted the concept of Collaborative Fisheries Management Areas (CFMAs), as shown in Figure 3. This has built on an earlier experience under the Tanga Coastal Zone Conservation and Development Programme (TCZCDP) (1994–2004). CFMAs involve the organization of a number of BMUs sharing a common fishing ground (networking) and designation of a common fisheries management area with a dedicated management plan. The institutional context

includes agreement of roles, responsibilities and operational procedures and the development of plans and guidance for monitoring, evaluation and reporting (Sobo, 2012), all of which are guided by the National Guidelines for Establishment of CFMAs of 2010.

To date, CFMA boundary designation has been legislated under district by-laws but a proposed revised/amended Fisheries Act is expected to include provisions for formal designation of CFMAs at national level. Coral reefs are the main habitats protected under such non-formal protection measures. This is due to their ecological importance for both the fisheries, especially for artisanal fishers (coral reef species), and the tourism sectors.

***Management objectives***

The management objectives of CFMAs are as follows:

- involving stakeholders in the development and implementation of sectoral policies;
- enhancing conservation, development, management and utilization of marine and coastal resources by devolving powers to the resource users;
- building the capacity of the coastal communities on the management of marine and coastal resources;
- improving socio-economic benefits of coastal communities from sustainable use of marine and coastal resources; and
- enhancing gender equity in the management of coastal and marine resources.

Mollusc harvesting, Mnazi Bay Ruvuma Estuary Marine Park.
© José Paula

***Governance structure***

There are stipulated roles and responsibilities laid out for each of the different stakeholders including village government, local government (District Councils), central government (Fisheries Division), non-governmental organizations (NGOs), community-based organizations (CBOs) and the private sector. Management of the resources involves a group of stakeholders within a fishing community whose main function is the management, conservation and protection of fish in their locality in collaboration with the government.

Involvement of local communities in fisheries management makes sense as they are the beneficiaries with vast experience and indigenous knowledge of local fishery resources and they are the first to suffer when the resource is depleted. To date a total number of 19 CFMAs covering an area of 5 611.45km$^2$ have been established in the five districts of Kibiti (formerly Rufiji), Mafia, Kilwa, Kigamboni and Mtwara (Figure 3). Their establishment was made possible by WWF in collaboration with local communities and the Fisheries Division, under the Ministry of Livestock and Fisheries Development.

## Collaborative Management Areas

The establishment of CMAs was facilitated by the Tanga Coastal Zone Conservation and Development Program. The programme is designed to empower local people to meet their basic needs through restoring and protecting the coastal environment (Torell *et. al*., 2000). The process started with the holding of workshops with villagers and government personnel to identify critical issues; the undertaking of participatory socio-economic and coral reef surveys; and a study on existing traditional management (Scheinman and Mabrook, 1996). The workshops held with the villagers of both Kigombe and Kipumbwi identified that the major issue which was affecting them was a tremendous decrease of fisheries resources due to illegal fishing methods, particularly blast fishing (Kalombo, *pers. comm.*). Thereafter, the villagers formed a village committee to take action by enforcing existing regulations against fisheries-related illegal activities. Eventually, a total of six CMAs were formed along the coastline of the Tanga region, covering an area of 1914km$^2$ (Figure 4).

Currently, the CMAs are no longer as effective as they used to be prior to phasing out of the TCZCDP (1994–2003). Some of the areas which were under CMAs have

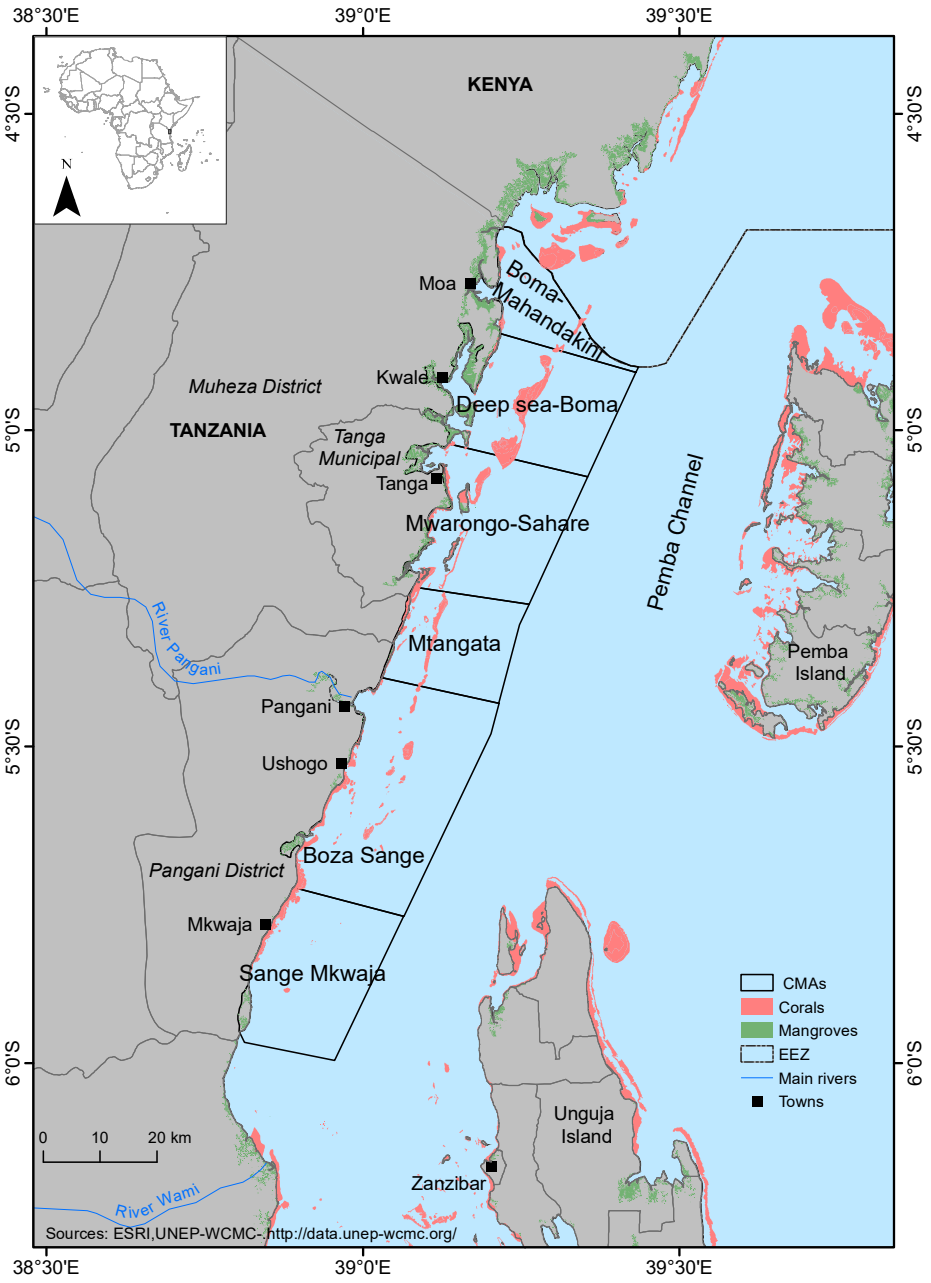


**Figure 4: Collaborative Management Areas in Tanga Region, Tanzania.**

been incorporated into the Tanga Coelacanth Marine Park and associated reserves. MPRU in collaboration with other stakeholders are in the process of reviving the rest of the CMAs/LMMAs, with the process underway at the Boma-Mahandakini CMA to the north, bordering Kenya. Some of the CMAs will form part of the TBCA.

The CMAs included representatives of the stakeholder groups including district personnel (Natural Resources Officer, Fisheries Officer and Community Development staff) while TCZCDP staff provided technical assistance to the CMAs. The names of the CMAs and their extents are listed in Table 3.

**Table 3: Tanga Collaborative Management Areas and their extent.**

| COLLABORATIVE MANAGEMENT AREA | SIZE (km²) |
|---|---|
| Boma-Mahandakini | 100 |
| Deepsea-Boma | 400 |
| Mwarongo-Sahare | 300 |
| Mtang'ata | 150 |
| Boza-Sange | 559 |
| Mkwaja-Sange | 405 |

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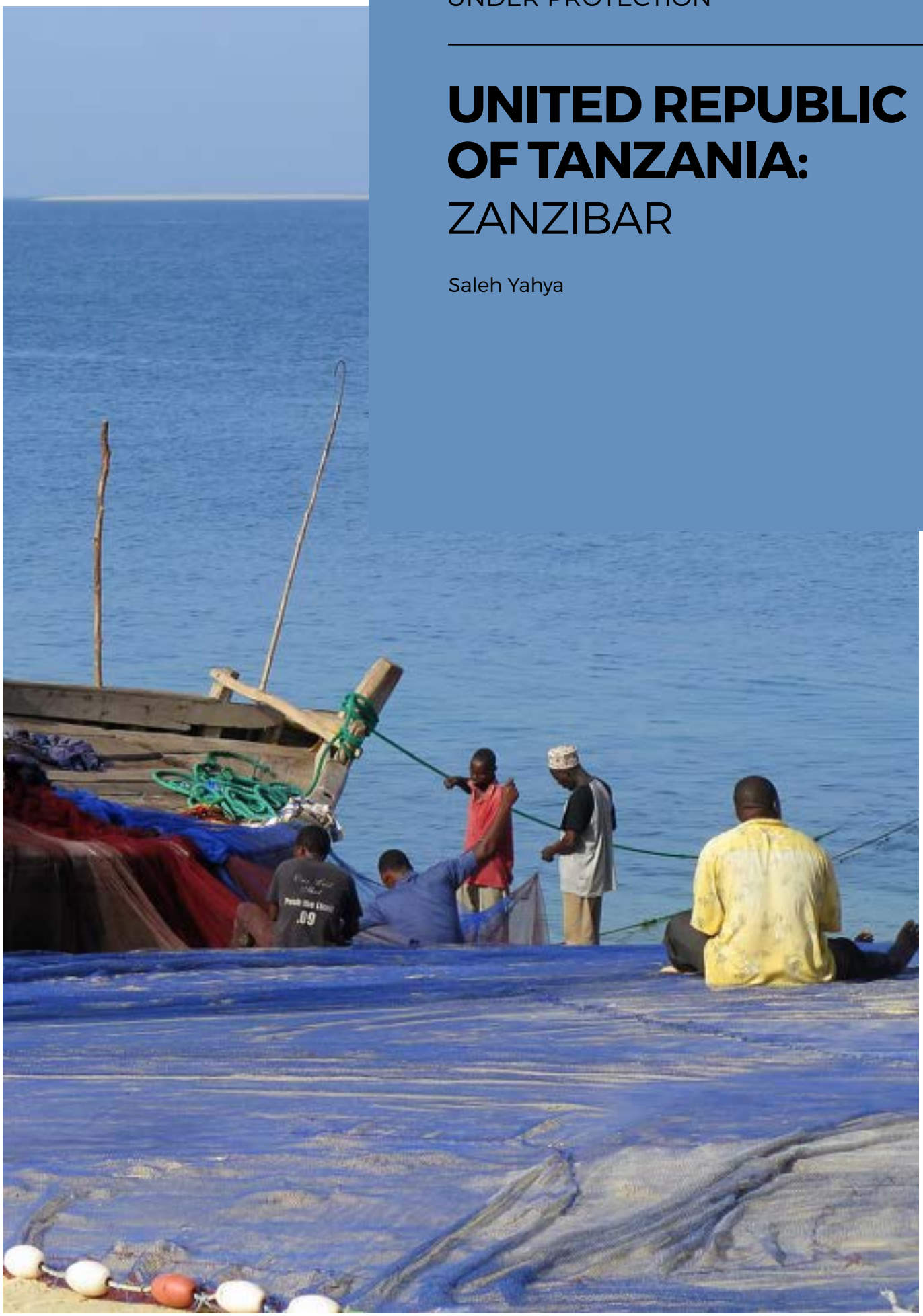
MARINE & COASTAL AREAS
UNDER PROTECTION

# UNITED REPUBLIC OF TANZANIA: ZANZIBAR

Saleh Yahya



Fishers mending their nets after a fishing outing off Zanzibar, Tanzania. © Bernadine Everett

## COUNTRY OVERVIEW

Zanzibar is a semi-autonomous state that, together with mainland Tanzania, forms the United Republic of Tanzania (URT). It is composed of the two main islands of Unguja and Pemba, which both lie about 40km off the mainland shores. There are also a large number of smaller islands, of which the larger ones are almost all inhabited. The coastline of Zanzibar stretches over a distance of 370km, and is influenced by monsoon winds and local storms, especially on the eastern side.

Mainland Tanzania and Zanzibar share an exclusive economic zone (EEZ) of 223 000km$^2$. In the URT, Zanzibar has retained autonomy over certain issues and exercises total jurisdiction on environmental management and natural resources separate from the Union (and Mainland Tanzania) laws. Issues of international relations are Union matters, thus international legal instruments that have a bearing on environmental and conservation matters (such as matters to do with the EEZ) are dealt with at a Union level. At the national level, therefore, the legislation and management of MPAs differs between these two parts of the URT.

Much of Zanzibar's coastline is flanked by fringing reefs that form a natural barrier. Coral reefs form perhaps the most important coastal habitat in the area, and provide fishing grounds for reef fish, as well as small and large pelagic species. Over 90 percent of the fisheries production in Zanzibar is artisanal, depending either directly or indirectly, on coral reefs (Jiddawi and Öhman, 2002). Fishing activities in the nearshore areas are carried out using traditional fishing vessels such as dugout canoes, outrigger canoes and sailboats. Common fishing gears in use are gillnets, hand-lines and basket traps.

**Squirrelfish on reef at Misali Island, part of the Pemba Channel Conservation Area (PECCA).** © Matthew D. Richmond

These highly productive ecosystems are under increasing pressure from both natural and indirect anthropogenic factors (diseases, outbreaks of predators, rough weather, abnormal temperatures leading to coral bleaching), and direct anthropogenic stressors (land-based pollution, over-harvesting, anchor breakage, oil spills and unsustainable and highly damaging fishing practices such as use of drag-nets).

Seagrass grows in the shallow and intertidal mud and sand flats all around Zanzibar. Twelve seagrass species have been recorded on the east coast of Africa (Short *et al*., 2007) with the most common genera being *Thalassia*, *Halodule*, *Syringodium*, *Halophila*, *Cymodocea* and *Thalassodendron*. These form important nursery areas for juvenile fish and also are foraging areas for herbivorous fish such as rabbitfish (*Siganidae*), parrotfish (*Scaridae*) and surgeonfish (*Acanthuridae*) (Ochieng and Erftemeijer, 1999). A significant economic activity relating to marine macro-algae in Zanzibar is the seaweed farming industry, which began in 1989. Two main species are farmed: *Eucheuma denticulatum* and *Kappaphycus alvarezii*.

Pemba Island has a convoluted coastline with numerous inlets into mangrove creeks and few calcareous sand beaches. Its numerous islets have sandy shores whose ecological importance lies mainly in providing turtle nesting sites, and which also provides substrates for seaweeds and seagrasses and their associated fauna. Misali Island is one of the most important nesting sites for turtles in Tanzania (Muir, 2005). Ten mangrove species are found in Zanzibar, namely *Rhizophora mucronata*, *Avicennia marina*, *Bruguiera gymnorrhiza*, *Ceriops tagal*, *Sonneratia alba*, *Xylocarpus granatum*, *X. moluccensis*, *Heritiera littoralis*, *Pemphis acidula* and *Lumnitzera racemosa* (Shunula and Whittick, 1999). These are estimated to cover approximately 60km$^2$ in Unguja and over 120km$^2$ in Pemba (Ruitenbeek *et al*., 2005). Coastal forests in Zanzibar, with the exception of those within the protected areas, are under pressure from exploitation, mostly due to overharvesting for building poles and firewood or charcoal.

Two distinct monsoon wind periods occur: the northeast monsoon (*Kaskazi*) which prevails from November to February and the southeast monsoon (*Kusi*) that blows from April to September. Between the two monsoons is a period dominated by an intermediate easterly wind (*Matlai*). The northeast monsoon is characterized by higher air temperatures and weaker winds while the southeast monsoon is marked by lower air temperatures as well as stronger winds and rough seas (UNEP, 2001).

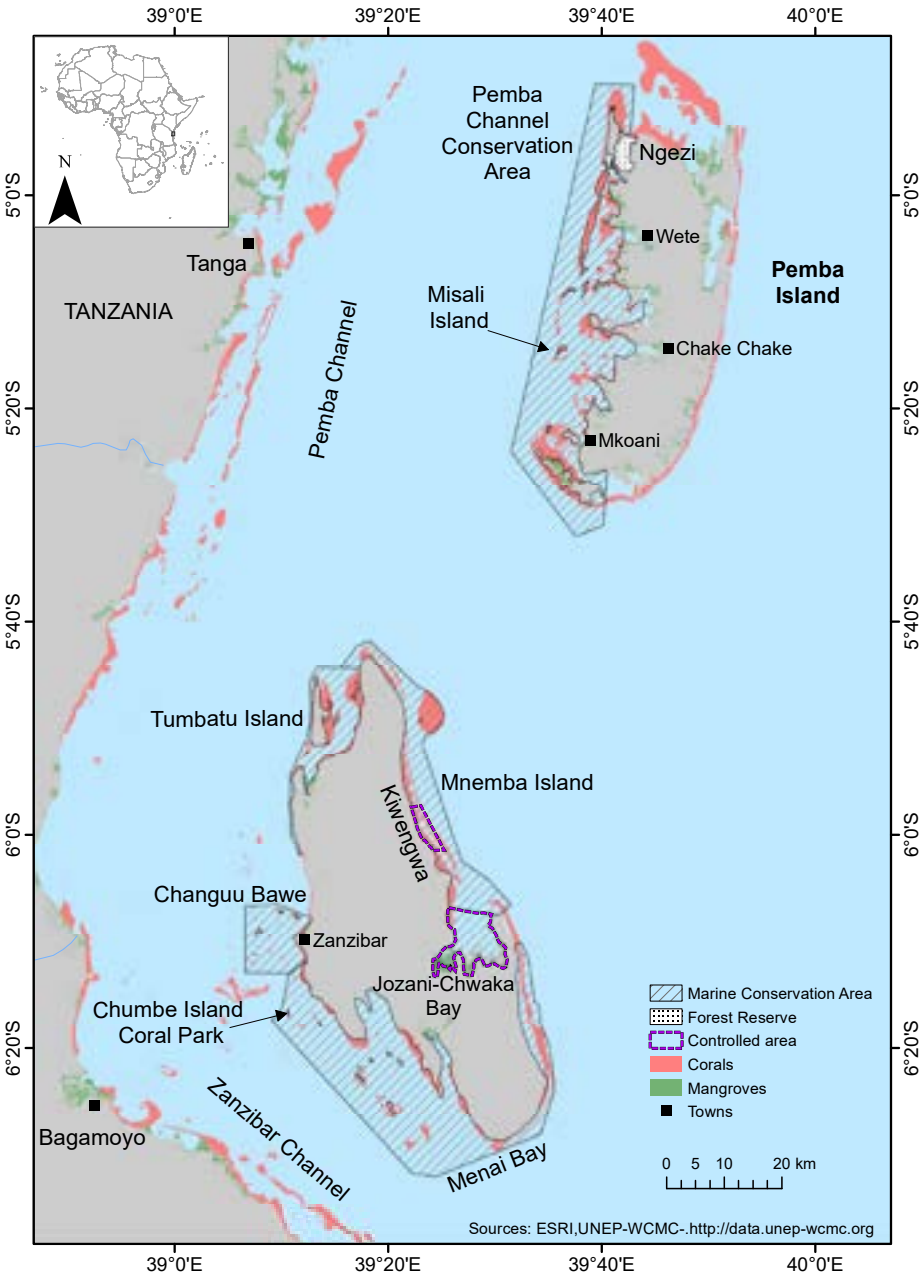



Figure 1: Zanzibar Marine Protected Areas.

## MPA OVERVIEW

The Zanzibar Environmental Management Act of 2015 states that "The Minister responsible for terrestrial or marine natural resources, in consultation with (the) Minister (for Environment), may declare any area of Zanzibar with ecological importance to be a protected area". The Marine Conservation Unit (MCU) was established in November 2005 by the Department of Fisheries and Marine Resources Zanzibar (now the Department of Fisheries Development and Marine Resources (DFDMR)) and was legally enabled through the Fisheries Act No. 7 of 2010, which gives the Director responsible for fisheries the power to establish marine parks and sanctuaries. The MCU has now (as of mid 2021) developed into the Department of Marine Conservation. The primary legal tool for managing marine protected areas (MPAs) in Zanzibar is currently the MCU Regulations of 2014.

The MPAs in Zanzibar (Figure 1) are classified as Marine Conservation Areas (MCAs) and are designed to enable the comprehensive integration of communities in their decision making structures (McLean *et al.*, 2012; Richmond *et al.*, 2014). The Fisheries Policy (draft of 2014) seeks to promote the development of MCAs to ensure appropriate use of fisheries resources to preserve the integrity of sensitive coastal ecosystems and conserve

marine biodiversity as well as to contribute to management efforts for inshore fisheries. Thus most MCAs in Zanzibar are partially protected areas that are managed with a focus on fisheries management (Lindhjem, 2003; McLean *et al.*, 2012). The terms MPA and MCA are used interchangeably in this review. Three coastal protected areas that contain a significant proportion of mangrove and coastal forest, and are influenced by regular inundation of seawater, are also included.

As a result of a sectoral management approach, there are different legislative instruments that influence coastal resource management in Zanzibar. These include: the MCU regulations; the Fisheries Act No. 7 of 2010; the Environmental Management Act No. 3 of 2015; the Zanzibar Forest Act No. 10 of 1996 (which deals with the conservation of mangroves and the flora and fauna found therein). The Department of Marine Conservation was established as the entity responsible for coordinating the management of all marine conservation areas in Zanzibar and also for fulfilling a coordination role with other types of marine managed areas (MMAs) such as privately managed sanctuaries. Additionally, there are coastal protected areas (mainly composed of mangrove and terrestrial forests) that do not fall under the MCU Regulations and these are under the Department of Forestry and Non-renewable Natural Resources (DFNR). For this reason for example, the DFNR manages the mangrove and coastal forests on smaller islands lying within the MCAs e.g. Misali Island in the Pemba Channel Conservation Area (PECCA) and Chapwani in the Changuu-Bawe Marine Conservation Area (CHABAMCA).

The situation of different authorities having jurisdiction over marine and coastal protected areas has implications for the recognition and management of these areas. One is that the protected areas under the DFNR may be omitted from assessments of marine and coastal protected areas in Zanzibar. Another is the potential for overlap, conflict or misunderstandings, such as the nesting of smaller protected areas within larger ones, and the lack of clarity over the seaward boundaries of Jozani-Chwaka Bay National Park. As Zanzibar transitions towards a Blue Economy, it is expected that co-ordination between sectors will be improved.

Zanzibar has recently increased the area under conservation significantly, with two new MPAs and the expansion of both the Menai Bay Conservation Area (MBCA) and the boundaries of PECCA, which now covers the entire western coast of Pemba Island (Yahya *et al.*, 2017a). The MCU Regulations of 2014 provide updated geographical coordinates of the MCAs, thus enabling accurate updated calculations of the area covered by individual MCAs

Table 1: MPAs in Zanzibar.

| MARINE MANAGEMENT/ CONSERVATION AREA | DATE ESTABLISHED | AREA |
|---|---|---|
| **Pemba Channel Conservation Area (PECCA)**<br>Includes MICA, which was repealed in 2005 | 2005 | 825.8km$^2$ |
| **Menai Bay Conservation Area (MBCA)**<br>IUCN Category VI, expanded in 2014 to envelope CHICOP | 1997 | 717.5km$^2$ |
| **Mnemba Island Marine Conservation Area (MIMCA)**<br>IUCN Category VI, no-take area, privately managed island within the MCA | 2002 | 337.3km$^2$ |
| **Chumbe Island Coral Park/ Sanctuary (CHICOP)**<br>IUCN Category II, no-take area, leased to and managed by a private not-for-profit company | 1994 | 0.55km$^2$ |
| **Tumbatu Marine Conservation Area (TUMCA)** | 2014 | 162.9km$^2$ |
| **Changu-Bawe Marine Conservation Area (CHABAMCA)**<br>Includes all the islands off Zanzibar Town | 2014 | 118.2km$^2$ |
| OTHER COASTAL PROTECTED AREAS | DATE ESTABLISHED | AREA |
| **Jozani – Chwaka Bay National Park**<br>Forest Reserve in 1960, established as National Park in 2004, UNESCO Man and Biosphere Reserve in 2016 | 1995 | 56km$^2$ (with 86km$^2$ buffer) |
| **Ngezi-Vumawimbi Nature Forest Reserve**<br>Forest Reserve status in 1959, first protected 1996, Nature Forest Reserve since 2005 | 1959 | 29.9km$^2$ |
| **Kiwengwa Controlled Area (KCA)**<br>Forest Reserve | 2002 | 34.1km$^2$ |

as well as total protected area coverage. Table 2 shows the formally proclaimed and recognised MPAs in Zanzibar, together covering a marine area of 2281.7km$^2$ which is 7.36 percent of territorial waters and about 1.02 percent of the EEZ.

## MARINE AREAS UNDER PROTECTION

### Pemba Channel Conservation Area

The Legal Notice that established Pemba Channel Conservation Area (PECCA) in 2005, also repealed earlier legal orders that established the Misali Island Conservation Area (MICA) in 1998. As with other MPAs, this then fell under the Fisheries Act No. 7 of 2010 and thereafter the MCU Regulations of 2014. PECCA covers an area of 825.8km$^2$, in a 3.22km-wide band encompassing the former MICA and stretching all along the western coast of Pemba Island from Ngazi Islet to Ras Kigomasha. It includes numerous coral islands (Vikunguni, Kashani, Mapanya, Kokota, Funzi, Pembe and Uvinje), fringing reefs, coral patches and outcrops, rock platforms, sandy beaches important for turtle nesting and seabirds, intertidal and subtidal flats with formations of seagrass beds and algal growths, small patches of mangrove forests, and ancient coral limestone (also known as coral rag) forests, with rich bird life and high marine biodiversity.

The western margin of PECCA is pelagic, bordering the Pemba Channel, a deep channel which drops sharply to a depth below 1000m separating Pemba Island from the mainland Tanzania (PECCA GMP, 2010). Misali Island remains under the Misali Forest Order as a protected forest. PECCA was established with the aim of ensuring sustainable utilisation of resources and preserving biodiversity through sustainable management for improved livelihoods (PECCA GMP, 2010). As with other marine protected areas in Zanzibar, PECCA is a multiple-zone, multiple-resource-use marine protected area gazetted as a Marine Conservation Area (MCA). It supports key fishing grounds, high coral reef and reef fish diversity around Misali Island and the Njao and Fundo Straits, also dolphins, whales (principally Humpback whales *Megaptera novaeangliae*) and dugongs (the latest report of which was in 2017, for a bycaught specimen at Chambani, just outside the southern boundary of PECCA (Cockroft *et al.*, 2018).

***Legally mandated institution***

PECCA is managed by the Department of Marine Conservation.

***Management partners***

Management is effected through collaboration with the community, with Village Fishing Committees/Shehia Fishermen's Committees (VFCs/SFCs) playing a significant role at ground level.

***Management plan***

PECCA has a draft General Management Plan (2010), due for update and review in 2018–2019.

***Management objectives***

The General Management Plan lists the key management objectives as:

- conserving biodiversity to retain the conservation importance and value of the area;
- maximizing socio-economic benefits from the area over the long term;
- improving research and monitoring;
- increasing public awareness of the conservation importance, economic value and management requirements of the area; and
- promoting ecotourism.

***Risks and threats***

- Illegal destructive fishing and lack of capacity to deal with it adequately.
- Outsider/migrant fishers exacerbating the illegal fishing pressure.
- Coral bleaching incidents have caused significant coral mortality.
- An increase in coral diseases.

**CHICOP ranger educates local students on marine life.**
© Ulrike Kloiber

## Mnemba Island Marine Conservation Area

The idea of establishing a Marine Conservation Area at Mnemba Island was proposed in the early 2000s, primarily to enhance conservation of the marine resources in an area under pressure from local fishers and tourism (MIMCA GMP, 2010).

Mnemba Island Marine Conservation Area (MIMCA) is composed of a small island and its coral atoll in north-eastern Unguja Island, off Ras Nungwi and extending down the eastern coast to Chwaka Bay. It was gazetted in 2002 to protect the entire Mnemba atoll including a private area concession on a 33 year lease (for the island) and Chwaka Bay (excluding the mangrove area). Prior to that, formal protection of the island and atoll commenced in 1992, and was later repealed and the MIMCA order issued in 2002 when it was extended to include Chwaka Bay. MIMCA is an IUCN Category VI, multiple-use marine protected area.

Over its 337km$^2$ area, MIMCA has sandy beaches, vast seagrass beds in Chwaka Bay and to the north of Mnemba Island, coral reefs at the mouth of the Bay and in the atoll around Mnemba. The reef to the east of the island, while having relatively low cover of living coral (currently 12 percent), has high fish abundance and diversity, and hence is very popular with tourists, both snorkelers and SCUBA divers (Yahya *et al*., 2017b).

Rare fish species reported from the area include the Napoleon wrasse (*Cheilinus undulatus*) and the Coelacanth (*Latimeria chalumnae*) of which at least three specimens have been landed in MIMCA in the last decade (N. Jiddawi pers. comm.). The sandy beaches in the MCA are also important turtle nesting sites.

***Legally mandated institution***
It is managed by the Department of Marine Conservation.

***Management partners***
The DFDMR is assisted by an Executive Committee which is composed of the community, DFDMR itself, the local District Authority, and a private sector leaseholder. The private sector partner is allowed to utilize/manage a 200m long "special area" on the leeward side of Mnemba Island. Village Conservation Committees of the approximately 31 villages in the area are also involved in the running of the protected area.

***Management plan***
A baseline study for the management plan was done in 2005, and the GMP was produced in 2010. A review and update of the GMP is scheduled for 2018–2019.

***Management objectives***
The GMP states the management objectives as:
- conserving biodiversity to retain the conservation importance and value of the area;
- maximizing socio-economic benefits from the area over the long term;
- improving research and monitoring;
- increasing public awareness of the conservation importance, economic value and management requirements of the area; and
- promoting ecotourism.

***Risks and threats***
- Congestion of fishers and tourists and consequent damage to the reefs.
- Lack of alternative income generating activities.
- Lack of conservation/management oriented research programmes.
- Lack of procedure, adequate by-laws and regulations to guide fishing activities.

Additionally, there has been significant coastal erosion as a combined result of climate change and local anthropogenic impacts, which has in turn caused severe reef degradation.

## Tumbatu Marine Conservation Area

The Tumbatu Marine Conservation Area (TUMCA) is a 162.9km$^2$ multiple-use marine conservation area in northwest Unguja Island. It extends from Kendwa to Bumbwini Mnarani and includes Ras Usowa Membe and the islands of Mwana wa Mwana, Tumbatu popo and Kisiwa pili. Its habitats include sandy beaches, seagrass beds, mangrove forests (the third largest in Zanzibar) and coral reefs. TUMCA contains important traditional fishing grounds and popular tourist beaches.

The MPA was first surveyed in 2009 and established in 2014 under the MCU Regulations of 2014. The reasons for establishment of TUMCA were: local fishers' concern at regulating fishing pressure; finding a balance between expanding tourism and the local community; and the presence of high fish biodiversity and a very productive fishery, and an extensive mangrove forest. TUMCA is fairly new, thus management effectiveness is currently low.

***Legally mandated institution***
It is managed by the Department of Marine Conservation.

***Management partners***
Management involves collaboration at local level with village conservation committees, mangrove conservation villages and VFCs.

***Management plan***
Its first management plan is scheduled for development in 2018–2019.

***Management objectives***
The overarching management objective of TUMCA is to control the illegal harvest and use of fish and forest products.

***Risks and threats***
- Conflict between conservation and illegal destructive fishing (e.g. dragnets).
- Destruction of the mangrove forests.
- Low public awareness of the ecological importance of the area.
- Pollution from a sugar factory situated up a creek to the south of the area.

## Menai Bay Conservation Area

The Menai Bay Conservation Area (MBCA) is an IUCN Category VI MPA which encloses an area of about 717.5km², from the eastern side of Unguja Island at Bwejuu, proceeding south round Kizimkazi and to the western side extending past the peninsula, round Fumba village, then northwards to Mazizini near Zanzibar Town (MCU Regulations 2014). Chumbe Island, while lying within the extended borders of the MBCA, is considered a separate and independent (although essentially nested) MPA.

The MBCA was declared a marine conservation area in 1988 and was officially gazetted by an order published in the Legal Supplement (Part II) of the Zanzibar Government Gazette vol. CVI No.5755 of 9 August 1997 (MBCA GMP, 2010). The reasons for establishing the conservation area included its high biodiversity, local fishers concern to regulate migrant fishers' pressure, and unsustainable fishing practices with subsequent decline in fish resources (MBCA GMP, 2010).

MBCA is characterized by a mixture of tropical habitats including mangroves, coral reefs and seagrasses. Large seagrass beds extend across the sandy seabed, supporting diverse marine communities. It is rich in coral formations and smaller coral reefs partially, or sometimes completely surrounding most islets (Muhando, 1995). The MBCA comprises a number of small-uninhabited islands/islets, including Pungume, Kwale, Miwi, Nyemembe, Komonda, Vundwe, Sume, Tele, Nguruwe and Ukanga. Sandbanks are found adjacent to some of these islets such as at Kwale and Pungume, which provide shelter to seabirds, other organisms and camping fishers during northeast monsoon (Muhando, 1995).

Spawning aggregations of the Giant Grouper *Epinephelus lanceolatus* have been reported from this MPA (Samoilys *et al*., 2013). Kizimkazi is home to resident populations of Indo-Pacific Bottlenose (*Tursiops aduncus*) and Humpback (*Sousa plumbea*) dolphins (Amir *et al*., 2002; 2005). This has led to the development of dolphin tourism (Amir and Jiddawi, 2001), which unfortunately mayactually represent a threat to the conservation status of the dolphins in the MBCA (Berggren *et al*., 2007). Green and Hawksbill turtles are known to nest on the sandy beaches of Menai Bay (Khatib *et al*., 2002).

***Legally mandated institution***
Management of MBCA falls under the Department of Marine Conservation.

***Management partners***
These include the MBCA Management Unit, 27 Village Fishing Committees and four mangrove conservation committees, from Unguja Ukuu, Mungoni, Kisakasaka and Nyamanzi.

***Management plan***
The MBCA GMP was issued in 2010, reviewed in 2012 and is due for updating and review in 2018–2019.

***Management objectives***
Sustainable use involving regulated fishing with non-destructive gears, tourism activities and sustainable mangrove harvesting, for the benefit of local communities.

***Risks and threats***
- Conflict between conservation and illegal destructive fishing (e.g. dragnets).
- Outsider/migrant fishers continue to exacerbate illegal fishing.
- Conflicts between fishing and tourism (SCUBA/snorkelling).
- Indications that dolphin-watching tourism may be distressing dolphin populations.

## Chumbe Island Coral Park

Chumbe Island Coral Park (CHICOP), an IUCN Category II MPA was gazetted in December 1994 as a no-take area, and includes a Coral Reef Sanctuary of > 0.55km$^2$ and a Forest Reserve of ~0.17km$^2$. Features include a coral rag island approximately 1.1km long and 300m at its widest point with a vibrant shallow fringing reef running from NW to SW of the island with high biodiversity of fish and corals. The pristine coral rag forest supports an IUCN data deficient coconut crab population and IUCN Red List critically endangered individuals of Ader's Duiker (ex-Mtende) and the rare Rosette Tern (*Sterna dougalli*) breed regularly on Chumbe (1994, 2006, 2012, 2017 and 2018) attracted by abundant fish in the reef sanctuary (CHICOP, 2017a).

The coral reef is now one of the most diverse in the region, with over 500 species of fish and 59 genera of reef-building corals. Although the coral communities in the sanctuary survived the bleaching event in 1998 relatively unscathed, they suffered significant bleaching and mortality in 2016 (Yahya *et al*., 2017a). The fish population includes ten species of groupers including the Black-saddle grouper *Plectropomus laevis* classified as Vulnerable (IUCN Red-List) and an estimated population of 59 individuals of the six most commonly-encountered grouper species with a mean biomass of approximately 44kg/0.125km$^2$ (Nesbitt and Richmond, 2014).

The Chumbe nature reserve (which includes the Coral Reef Sanctuary and the Closed Forest Reserve) is managed by a not-for-profit company, CHICOP Ltd, which had proposed the MPA as a Privately Protected Area (PPA) investment in 1991 and entered into management agreements with the Government of Zanzibar for the management of the island, the forest and the reef on the western side of the island on renewable leases. As of 2014, Chumbe Island lies within the boundary of the expanded MBCA, however, it will continue to be a private entity managed separately (MCU Regulations, 2014).

***Legally mandated institution***

Administratively, CHICOP reports to the Zanzibar Investment Promotion Agency (ZIPA) and Ministry of Blue Economy and Fisheries, while managing all day to day operations, with oversight provided by an Advisory Committee established in 1994.

***Management partners***

The Advisory Committee includes five representatives from CHICOP and nine representatives from different stakeholder groups, mainly several Government of Zanzibar departments, research institutions and leaders from the three fishing villages adjacent to the MPA, Dimani, Chukwani and Kombeni.

***Management plan***

CHICOP has had two prior ten-year management plans from 1995, and now – in its third decade of operations – has a current management plan (2017–2027).

***Management objectives***

- Conservation: to protect and manage the marine and forest ecosystems, promote research, implement biodiversity monitoring for conservation of rare and endemic species.
- Education: to provide environmental education to local schools and communities and to national and international visitors.
- Ecotourism: to manage the Chumbe ecolodge as a model for sustainable tourism, with not-for-profit intentions, so that revenue generated supports the MPA (see CHICOP, 2017b).

***Risks and threats***

- Boundary issues (solved through village meetings, involving the use of GPS data and installation of demarcation buoys).
- Fishing pressure outside the MPA leading to a few but serious poaching attempts in the 1990s (DHI/Samaki, 2014).

## Changuu-Bawe Marine Conservation Area

The Changuu-Bawe Marine Conservation Area (CHABAMCA) is a 162.9km$^2$ protected area, bordering the MBCA to its south and encompassing the archipelago in front of Zanzibar Stone Town, islands (including Changuu, Bawe and Chapwani), a number of sandbanks, coral reefs, seagrass beds and sandy and rocky beaches. It is a multiple-use marine conservation area (MCA) surveyed in 2009 and gazetted in 2014 (McLean, *et al*., 2012; MCU Regulations 2014). CHABAMCA is a relatively young MPA, thus management effectiveness is currently low.

***Legally mandated institution***

Currently operating under the Department of Marine Conservation, management of CHABAMCA will likely be a collaborative effort.

***Management partners***

Likely partners are the local community, particularly involving the approximately 13 VFCs in the area.

***Management plan***
The management plan is planned for development in 2018–2019.

***Management objectives***
The reason for establishing CHABAMCA was local residents' concern over:
- unregulated fishing activities;
- pollution; and
- the need for adequate law enforcement.

***Risks and threats***
- Conflict of conservation and illegal destructive fishing (e.g. dragnets, small mesh sizes, irresponsible SCUBA practices and fishing of juveniles).
- Pollution from garbage (especially from tourist picnics on the sandbanks), oil spills, anchored boats, sewage from hotels and residential buildings.
- Inadequate law enforcement.

## OTHER COASTAL PROTECTED AREAS

### Jozani-Chwaka Bay Conservation Area

Jozani-Chwaka Bay Conversation Area (JCBCA) is a natural protected forest reserve in southwest Unguja, covering about 56km$^2$, with a buffer zone of 86km$^2$. The area is characterized by a groundwater forest, plantation, ancient coral limestone forest, mangroves and salt marshes. It provides habitat for wildlife species of national and international significance, including the endemic and the rare Zanzibar Leopard (*Panthera pardus adersi*), the Red Colobus Monkey (*Procolobus badius kirkii*) and the Ader's Duiker (*Cephalophus adersi*). Well-developed mangroves are situated to the north in Chwaka, with less well-developed mangroves around the village of Pete to the south (Finnie, 2002; Nahonyo *et al.*, 2002). The JCBCA is also an Important Bird Area (IBA, no. TZ057) and was declared a UNESCO Man and Biosphere Reserve in 2016. The park was set up to prevent deforestation and further degradation.

***Legally mandated institution***
JCBCA is under the jurisdiction of the Department of Forestry and Non-renewable Natural Resources (DFNR).

***Management partners***
A local community-based organization (Jozani Environmental Conservation Association JECA) and the international NGO CARE are actively involved in the management as are selected Steering and Management Committees, and Village and Mangrove Conservation Committees from the communities bordering the forest.

***Management plan***
A General Management Plan (2003–2007) exists. This, as with other GMPs should be up for review in 2018/2019.

***Management objectives***
These include:
- research and conservation;
- community participation in managing biodiversity and catchments; and
- conservation of rare species.

***Risks and threats***
- Conflict between conservation and illegal destructive harvest of forest products.
- Illegal fishing practices (drag nets etc.) in the bay.

### Ngezi-Vumawimbi Nature Forest Reserve

Covering an area of 29.9km$^2$ (expanded from 14.4km$^2$ in 2004), the Ngezi-Vumawimbi Nature Forest Reserve (NFR) is the last patch of indigenous forest in Pemba. It was given Forest Reserve status in 1959, first protected in the 1990s and was declared a Nature Forest Reserve in 2005. NFR was established to reduce deforestation and degradation of the natural forests and mangrove stands. It hosts a mix of Eastern Arc and Asian forest species with endemic species, coastal forest and a stretch of mangrove forest, and sandy-muddy beaches with associated sparse seagrass beds. A number of endemic species are found here, notably the Pemba flying fox (*Pteropus voeltzkowi*). Ngezi-Vumawimbi Nature Forest Reserve is basically nested inside the Pemba Channel Conservation Area (PECCA).

***Legally mandated institution***
The NFR is managed by the DFNR.

***Management partners***
At local level there is a management committee which oversees MPA Village Conservation Committees (VCC), Community Forest Management Agreements (CoFMAs) and mangrove conservation villages. The management is typically shared by Government, the community and one or two NGOs.

***Management plan***
The Ngezi-Vumawimbi Management Plan (2007–2015) is now under review.

**Cargo dhow off Zanzibar's Stone Town.** © Matthew D. Richmond

***Management objectives***
Management objective is to "improve the livelihood of ten villages surrounding Ngezi Forest, while enhancing the conservation of biological resources".

***Risks and threats***
- Conflict between harvesting forest products for building and conservation objectives.
- Boundary conflicts.

## Kiwenga Controlled Area

The Kiwengwa Controlled Area (KCA) is a 34.1km$^2$ protected area containing rain forest and mangrove forest. It covers the coastal villages of Kiwengwa, Pwani, Mchangani and Pongwe and spreads inland to Upenja, Kilombero, Pangeni and Bambi. It contains caves with underground water reserves and was established with the aim to conserve forest and water resources. Its sandy beaches were once important turtle nesting areas. Established in 2000, it is encompassed within the MBCA and essentially became a "nested" MPA (Day *et al*., 2012).

***Legally mandated institution***
The KCA is a forest reserve falling under the jurisdiction of DFNR.

***Management partners***
Management at the local level is by a Community Advisory Committee in collaboration with the Conservation Network of Kiwengwa (an umbrella NGO) and Village Conservation Committees.

***Management plan***
KCA has a management plan (2008), currently under review.

***Management objectives***
Management objectives are sustainable fisheries and protection of the marine ecosystems supporting fisheries, specifically:
- halting all forms of destructive fishing; and
- halting all other activities that will lead to degradation of the marine ecosystems supporting fisheries.

***Risks and threats***
- Conflict between illegal (destructive) fishing, natural resource users and long term conservation of the productivity of the area.
- Conflict between different government institutions over utilization of water sources.
- Potential conflict between land use by community (agriculture) and conservation.
- Rapid development of the Kiwengwa coastline for tourism.

## PROPOSED MPAS

### Kojani Marine Conservation Area (KOMCA)

The Kojani Marine Conservation Area (KOMCA) is mentioned in the Fisheries Policy (draft of 2014) under the section on extending the MCAs network, and is tabled in early draft versions of the MCU Regulations (together with CHABAMCA and TUMCA). Stakeholder meetings have been held and a rapid assessment was to follow, but this has not, as yet, materialized as there is some reluctance on the part of local stakeholders.

The proposed KOMCA area extends from Kiuyu to Kojani in Pemba, characterized by coastal forest, mangroves, coral reefs, seagrass beds and sandy and muddy beaches. The local community, the Kojani, are famous for their migratory camping fishing trips (locally known as *dago*), and their highly successful, though habitat-damaging, net fishing methods. *Dago* fishermen are in general unlikely to be interested in local area management initiatives (Ruitenbeek *et al*., 2005), and this could be a contributing factor to why the initiative has not taken off thus far.

### Summary of coverage of existing and proposed MPAs

Table 2 provides a summary of the existing number of MPAs and the area covered by them, and the number of proposed MPAs. At present, precise information on the areas the proposed MPAs will cover is not available.

**Table 2: Existing and proposed Zanzibar Marine Protected Areas.**

| | |
|---|---|
| URT's EEZ | 223 000km$^2$ |
| EXISTING MPAs | |
| No. of MPAs | 9 |
| MPA area | 2281.7km$^2$ |
| % EEZ | 1.02 |
| PROPOSED MPAs | |
| No. of proposed MPAs | 1 |
| Proposed MPA area | Unknown |
| Potential % EEZ | Unknown |

## NON-FORMAL PROTECTED AREAS

Zanzibar does not have non-formal marine protected areas such as Locally Managed Marine Areas (LMMAs). Rather it has what can be referred to as community closures or management zones. These exist within the MCAs so do not add to the overall area under protection. They do however increase the area effectively protected. There are currently two such areas, both located within the PECCA area, namely Gando and Makaangale, in northwestern Pemba.

The Gando community-managed closed zone (about 2.5km$^2$), located between the Fundo and Njao passes, was established at the request of local fishers, with assistance from a local NGO, the Pemba Foundation. The other area is at Makaangale, also established by fishermen to protect their fishery resources, and with financial assistance from a tourism investor in the area. The Government, through the Department of Fisheries Development and Marine Resources is a partner in the process. Both these closures cover areas containing coral reefs, sandy substrate and seagrass beds. Periodic closures such as those gaining popularity as a management tool within the octopus fishery in both Pemba and Unguja have not been considered in this assessment.

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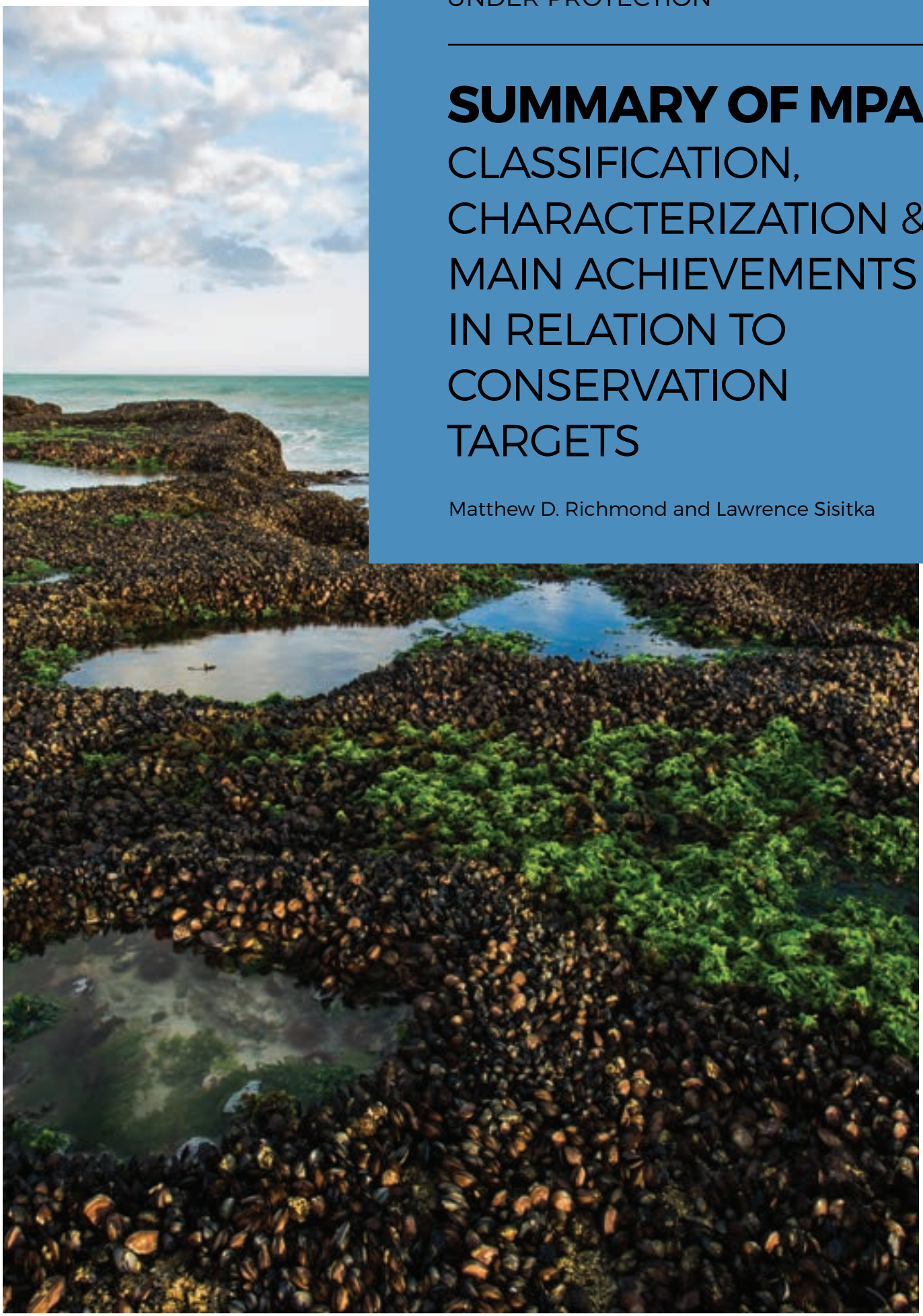
MARINE & COASTAL AREAS
UNDER PROTECTION

# SUMMARY OF MPAs: CLASSIFICATION, CHARACTERIZATION & MAIN ACHIEVEMENTS IN RELATION TO CONSERVATION TARGETS

Matthew D. Richmond and Lawrence Sisitka



Low tide rocky shore with mussel beds, South Africa. © Peter Chadwick

# INTRODUCTION

The production of this *MPA Outlook* has provided a tremendous opportunity to pull together a wealth of valuable information on the current state of marine conservation, in particular through the establishment of MPAs, across the Western Indian Ocean (WIO) Region. Throughout the *Outlook* the term "MPA" has been used as shorthand for all marine and coastal areas which meet the IUCN criteria for formal protection. These include a range of approaches and terms, from Fisheries Reserves (Republic of Mauritius), and the variously named National Parks, Nature Parks, and Parks and Reserves conserved under appropriate legislation by different countries. The MPA country chapters, in the preceding section of Part III, provide a rich picture of marine conservation within respective countries, highlighting both the achievements and the challenges faced in realizing effective conservation measures and future plans for spatial expansion of areas under protection. While there are many contextual differences and a range of governance approaches taken by different countries in the management of MPAs, there are also considerable similarities in the threats faced by their marine ecosystems and species, and the challenges inherent in providing adequate protection for these.

The ten country chapters (including separate chapters for the United Republic of Tanzania (URT) mainland and URT Zanzibar) are essentially a quantitative assessment of marine conservation in terms of the numbers of sites under protection, their areas, and the habitats and species afforded protection. As noted, there are initial indications of more qualitative aspects related to MPA management, including management effectiveness. This is dealt with in depth in Part IV that follows, with the Case Study on Strategic Adaptive Management (SAM) in this section providing an update of this approach as developed in Kenya and URT mainland.

This summary of the country chapters focuses on the classification and characterization of MPAs in the region and the main achievements to date particularly on where the countries are in relation to conservation targets. The chapter provided the basis for the final section, Part V, where a detailed analysis of the implications of the information compiled in the course of the development of this volume, in relation to the obligations of the contracting parties to the Nairobi Convention to meeting the requirements of SDG 14.5 and Aichi 11 is undertaken.

# OVERVIEW OF MAIN CHARACTERISTICS OF THE MPAS OF THE REGION

## Evolution in MPA approach, objectives and sizes

Currently there are 143 formally proclaimed MPAs across the WIO region. From a total of 19 MPAs by the end of the 1970s, the number of MPAs in the WIO region has increased dramatically, especially over the past 20 years. During this period, 70 percent of today's 143 MPAs were proclaimed. These recently-proclaimed MPAs are mostly in Madagascar and South Africa, with a few others in the URT, French Territories and Seychelles. In the latter, recent expansion of the MPA estate has resulted in 30 percent of Seychelles' exclusive economic zone (EEZ) being protected.

What has also changed since the turn of the century is the management approach and objectives, from initially focusing on conserving inshore fish stocks and associated habitats, as strictly small no-take zones, to much larger areas, with often diverse zoning schemes that permit multiple uses. As Wells *et al*., (2007) describe, since the first MPAs were established in the 1960s, between 4 and 9 percent of the continental shelves in Kenya, Tanzania and Mozambique have been included within proclaimned MPAs. Even more recently, the emphasis has been on inclusion of offshore areas, with new such sites being proclaimed in four countries namely Seychelles, South Africa, French Territories and Mozambique's small offshore St. Lazarus Bank within the Quirimbas MPA.

A good example of how these last twenty years have altered the setting is seen particularly in Madagascar, where in 2003, the government made a major commitment to marine and coastal biodiversity conservation to meet the Convention of Biological Diversity (CBD) target through the expansion of its MPA estate. From then to 2016, the spatial coverage has quadrupled in area (Gardner *et al*., 2018). The main thematic areas covered by the country chapters are summarized below as a regional synthesis.

CASE STUDY

# Adaptive Management in MPAs in Kenya and Tanzania

Arthur O. Tuda

Effective management of MPAs requires that those who manage MPAs should know whether or not they are doing an effective job. Their decision-making processes should produce the kind of results desired by their agencies, local communities, and the public. With limited resources available to manage MPAs, accountability is more important than ever. Producing results is the key to success, meaning that MPA managers must have the necessary data to make enlightened decisions and improve ongoing management actions to achieve desired results.

**Rangers on patrol, Mombasa Marine Park.**


Adaptive management has been put forward as a way of managing natural resources through "learning-by-doing". The goal is to learn from experience and constantly improve MPA management practices over time. This requires ongoing monitoring of MPA systems to assess progress towards management targets and objectives. Where adaptive management is fully integrated into strategic planning and implementation processes, it is considered Strategic Adaptive Management (SAM). Through funding by WIOMSA, SAM was initiated in Kenya and Tanzania MPAs in 2013, with the ultimate objective of enhancing the adaptive capacity of MPA management systems and improve MPA management effectiveness. SAM was implemented as a way to formalize, institutionalize and operationalize adaptive management for MPAs. The processes of planning, monitoring, and evaluation make up the SAM approach, intended to aid decision-making towards explicit MPA objectives. The implementation of SAM has enabled MPA managers to formulate MPA objectives that focus on results that matter. MPA managers and scientists have worked together to identify ecological and socio-economic indicators that are monitored through systematic collection of data. MPA managers in both Kenya and Tanzania are now able to evaluate past management actions and to make mid-course adjustments to MPA plans as part of necessary adaptive management.

The implementation of SAM has also improved the capacity of MPA managers to address the external human and environmental drivers that influence ecological or other associated outcomes in MPAs. However, some factors, such as likely future changes in habitat conditions, are still not clearly understood and remain beyond the capacity of most MPA managers to predict and prepare for. More immediate factors such as poor fishing practices in areas bordering MPAs that are currently influencing MPA outcomes are being addressed by taking appropriate management actions e.g. through compliance management and working with stakeholders through co-management approaches, etc. Although significant improvement has been seen through the adoption of strategic management actions, there remains an urgent requirement to implement actions that have a high impact on MPA outcomes at minimal cost as opposed to routine actions.

Despite notable improvements in MPA objective setting and monitoring since the introduction of SAM in Kenya and Tanzania, there still remain considerable challenges in fully integrating monitoring outcomes into management planning and in developing institutional mechanisms to ensure that knowledge gained is effectively applied in adaptive management. Presently, adaptive management in both Kenya and Tanzania MPAs is not a fully-executed management strategy, although significant steps have been made in organizational learning. There is still more that needs to be done to change the operational status quo, which remains a big challenge to building adaptability. Full implementation of adaptive management would involve its application to all aspects of performance management. However, implementation of SAM in Kenya and Tanzania over the last five years has served as an important lesson learnt for improving adaptive and effective MPA management with potential for replication in other WIO countries.

## Legislation

The initial focus of this section is on the importance of an appropriate and robust legislative and governance framework for supporting conservation efforts. The foundation of effective conservation is clearly the development of appropriate legislation under which to proclaim and manage protected areas. The country chapters, reinforced by the outcomes of the regional management effectiveness assessment (Part IV), suggest that in almost all cases such legislation is in place, with recent improvements to and strengthening of such legislation having been carried out in many countries.

There have also been moves by many countries to reduce the complications in MPA management caused by conflicting laws and ministerial mandates, which in the past have resulted in anomalies such as the issuing of permits under one law, administered by one government department, established and managed under another law administered by another government department. Complete alignment is still not widespread as noted in some cases where for instance, terrestrial national parks with marine portions in some countries operate without collaborating with marine protection authorities.

**Locally-built wooden dhows and other vessles resting on intertidal mud sheltered by mangroves on Zanzibar.**
© Rahim Saggaf

## Governance

This section elaborates on the governance regimes adopted within different countries in the management of MPAs ranging from government managed, those managed by non-government organizations (NGOs) to those under various forms of collaboration including with the private sector. As revealed in the country chapters, there has been a shift in the management authority in some countries. While overall government-managed MPAs (including the provincial agencies in South Africa) accounts for 86.7 percent of all sites in the region, privately managed, collaboratively managed between communities and NGOs (particularly in Madagascar), and exclusively NGO-managed site are beginning to make their presence felt, being the dominant approach in 3.5, 7.7 and 2.1 percent of MPAs, respectively. The change in approach from local community exclusion to involvement may be an inevitable response to the sheer magnitude of the increase in coastal populations in some countries, coupled with legislative developments making participation mandatory in public decision making and empowerment of communities, most markedly in Kenya, Tanzania (including Zanzibar), Mozambique, Madagascar and South Africa. This broader local stakeholder participation is also reflected in changes to governance on-the-ground. While government agencies continue to play the lead role in managing MPAs, there is an encouraging move towards more open and collaborative forms of governance involving multiple stakeholders including coastal communities affected by the existence of MPAs in their area and the tourism operators and others benefitting from the MPAs. In Madagascar, the previous small network of strict, centrally-governed MPAs expanded to include sites characterized by multiple-use management models, shared governance arrangements involving local community associations assisted by NGOs and, an emphasis on livelihood-based approaches and social safeguards (see Gardner *et al*., 2018).

Of note in Madagascar is that, MPAs are under the guardianship of two ministries while the management is delegated to partners such as NGOs, national associations or private companies. Regional authorities and regional ministry representatives are involved in the management of the protected areas within a region through an over-arching committee. Consequently, MPA establishment and management in Madagascar is mainly funded by international donors with the national government providing support particularly to the MPAs within the National Parks under its jurisdiction. Only two MPAs are financially self-sustaining, mainly from ecotourism activities: Nosy Antsoha, which is privately managed and Nosy Tanikely National Park, which is co-managed by

Madagascar National Parks, Nosy Be Urban Commune and Nosy Be Tourism Office. Within the URT, mainland MPAs are funded by the central government, which is also the case on Zanzibar, with the exception of the Chumbe Island Coral Park which is privately funded from tourist revenues. International NGOs, particularly the World Wildlife Fund (WWF), the Wildlife Conservation Society (WCS), the MacArthur Foundation, and to a lesser degree IUCN and CARE International, have supported MPAs in various countries, often channeling funds from bi-lateral country donors such as Norway, France, UK, USA or the World Bank, or the European Union (EU) through the Indian Ocean Commission (IOC), directly to the receiving governments, in some cases for budget support and/or to provide technical assistance. In a few cases, NGO and donor support has been critical in the early stages of MPA establishment.

As highlighted by Gardner *et al*., (2018), with respect to Madagascar but relevant across the region, as sizes of coastal MPAs grow, so do challenges related to stakeholder participation, financial sustainability, enforcement, ensuring conservation goals (especially when faced with permitted resource extraction), reducing natural resource dependence of communities through transformative livelihood change, and developing long-term visions to reconcile the differing objectives of conservation NGOs and other stakeholders. In general, in Madagascar, as with many other areas in the WIO, MPAs have had limited effectiveness in reducing mangrove and coral reef degradation and other threats, which, in the case of Madagascar, may be related to their rapid establishment processes and the complexity of management towards multiple objectives, coupled with insufficient resources (Gardner *et al*., 2018). While the achievements of the region's 143 MPAs provide a basis for conserving the biodiversity of the WIO, the challenge faced by most MPAs will continue to grow. That this can be addressed primarily by non-State actors is yet to be proven, but so far, the indications are very positive, and the consensus is that multiple-use MPA categories and shared governance arrangements will have an important role to play in the future, for among other reasons, they reduce the management burden on the State (Gardner *et al*., 2018). While no-one can pretend that such collaborative approaches are easy, and in fact they can be quite demanding of time and resources, there is little argument against the reality that without the active cooperation of the various stakeholders, there will be a bleak future for MPAs, thus making the case that governments cannot do it alone.

There is also evidence of collaboration between neighboring governments, in the form of transboundary MPA initiatives, such as that between Kenya and Tanzania (see Case Study, Kenya chapter) and between Mozambique and South Africa (see Case Study, Mozambique chapter). While these initiatives are very much in their nascent stages, they may prove that cooperation between countries in the management of MPAs is more efficient at delivering management objectives that individual efforts, especially when the main threats and challenges are common to both sides of the border.

A further development in the legislative and governance arena has been the adoption of holistic approaches to the management of the ocean through initiatives linked to the concept of the 'Blue Economy'. Both the Seychelles Marine Spatial Planning initiative (see Case Study, Seychelles chapter) and South Africa's 'Operation Phakisa' (see Case Study, South Africa chapter) are good examples of this, with other states moving in this direction. These initiatives serve to focus attention on reconciling conservation with economic development, and they have provided opportunities for the proclamation of offshore MPAs, which otherwise may have been a long time in coming.

## National and regional representativity of habitat coverage in MPAs

The habitat types used in this *MPA Outlook*, and which are explored in depth in the sister *Critical Habitats Outlook* volume, have been adapted from the list developed for the *Regional State of the Coast Report for the Western Indian Ocean* (RSOCR WIO), and include:

1. Sandy and rocky shores
2. Mangroves
3. Seagrasses
4. Salt marshes
5. Coral and biogenic reefs
6. Estuaries
7. Nearshore
8. Offshore pelagic
9. Shelf and deep-sea
10. Seamounts and ridges
11. Small islands and atolls
12. Coastal forests
13. Threatened systems and species (including seabirds)

There is certainly a strong degree of at least superficial homogeneity of coastal habitats across much of the region, at least as far south as Durban on the east coast of South Africa and the southern tip of Madagascar, where the waters become more temperate. It is these coastal habitats which are conserved in the majority of the regions' MPAs, including coral reefs (the sole biogenic

reef type across much of the region), seagrass beds, mangroves, and sandy and rocky shores. Coastal forests (other than mangroves) and estuaries (including coastal lagoons) feature in some MPAs with the latter becoming more common along South Africa's south coast. Perhaps surprisingly, only 20 of the region's 143 MPAs are offshore, the remaining being classified as coastal. The latter also include nearshore small islands and atolls. Non-coral biogenic reefs, such as bivalve reefs are fairly common in the cooler temperate waters around much of South Africa and may also be found around southern Madagascar (Obura, 2015).

Even the coral reefs in South Africa waters are atypical, in that rather than being built entirely through biotic accretion they are characterized by a thin biogenic veneer over Pleistocene sandstone. However, these are still considered under the habitat classification of coral reef (Harikishun, 2015).

The predominance of the key coastal habitats being represented within most MPAs in most countries confirms that there is reasonable national and regional representation, at a generic level at least (see Table 1). From this summary, most inshore habitats, particularly those regarded as 'critical habitats' (Guidance Note 6 of the International Finance Corporation, 2012), namely coral reefs, seagrass beds and mangroves, are well represented in countries where they occur, together with their associated threatened species. The frequently represented habitat types also include sand and rocky shores and coastal forests. However, it can be seen that offshore, deep-sea and seamounts are only included in MPAs for Seychelles, French Territories and South Africa, as discussed in more depth in the sections that follow below. When examining Table 1, it is important to reflect on the size of the MPA areas (Table 2) and on the length of the protected coastlines compared to the size of the EEZ and entire country coastline length, respectively.

**Table 1. Relative representation of habitat types within formal MPAs in the WIO region.**

| HABITAT | COMOROS | FRENCH TERRITORIES | KENYA | MADAGASCAR | REPUBLIC OF MAURITIUS | MOZAMBIQUE | SEYCHELLES | SOUTH AFRICA | URT MAINLAND | URT ZANZIBAR |
|---|---|---|---|---|---|---|---|---|---|---|
| Sandy and rocky shores | + | ++ | ++ | + | + | ++ | ++ | + | ++ | ++ |
| Mangroves | ++ | ++ | ++ | + | + | ++ | +++ | +++ | ++ | +++ |
| Seagrasses | + | ++ | ++ | + | + | ++ | ++ | ++ | ++ | ++ |
| Salt marshes | o | + | o | o | o | + | o | ++ | + | + |
| Coral and biogenic reefs | + | +++ | ++ | + | + | ++ | ++ | +++ | +++ | +++ |
| Estuaries | + | ++ | + | + | + | + | o | ++ | + | + |
| Nearshore | + | +++ | ++ | + | + | ++ | ++ | ++ | +++ | +++ |
| Offshore pelagic | o | ++ | + | + | + | + | +++ | + | o | o |
| Shelf and deep-sea | o | + | + | o | + | + | +++ | + | o | o |
| Seamounts and ridges | o | ++ | o | o | o | + | ++ | + | o | o |
| Small islands and atolls | + | ++ | + | + | + | + | ++ | + | o | ++ |
| Coastal forests | + | + | + | + | o | ++ | + | o | ++ | ++ |
| Threatened systems and species (including seabirds) | + | ++ | ++ | + | + | ++ | +++ | ++ | ++ | ++ |

Habitat extent included within MPAs: o = none; + = <30%; ++ = 30–60%; +++ = >60%.

Notes:

1. The absence of coverage or a specific habitat of species does not necessarily imply lack of protection, since for some countries, certain habitats are not a significant feature of their coast e.g. saltmarshes in Republic of Mauritius, or estuaries in Comoros.
2. Equally, for some countries where only a small area of a certain habitat exists but is included in MPAs (e.g. mangroves in South Africa) the +++ score only reflects proportion included, not area size of the habitat.

Concerning the equivalence of different coral reefs, or seagrass beds or mangroves (which are the most frequently cited habitats), there is need for some caution. The habitat descriptors in the country chapters were generally too coarse to provide meaningful analysis in terms of representation, except to say that considerable areas of (generic) coral reef, seagrass and mangroves areas are under protection, with no real qualitative analysis of the specific values of these in different places provided, nor their spatial extents. The challenge emerges when nuanced differences between generically similar habitats are brought into play. For example, can a small mangrove forest in the south of the region in the South Africa be considered in the same way as an extensive Kenyan mangrove forest or a forest on Madagascar's west coast? While it is possible, to some extent at least, to take nuanced differences into account when assessing representation at a national level (see below on the South Africa's rocky and sandy shores), this might prove more challenging at a regional level, where comparisons between essentially similar habitats are extremely difficult, making recourse to the generic level the only option. It could indeed be argued that nuanced representation at the national level should translate directly into some nuanced representation at the regional level. However, the habitat identification for the MPAs in this *MPA Outlook* is itself only at a broad generic level, posing a challenge to any more fine-scale analysis of representativeness.

A further issue concerns the different approaches taken by different countries in relation to the inclusion of coastal forests in their MPA coverage. Mozambique and URT (both mainland Tanzania and Zanzibar) include quite extensive areas of coastal forests reaching considerable distances inland in their MPA coverage; on the other hand South Africa, which has very large areas of coastal forest associated with many of their MPAs, especially along the south and south-east coasts, does not include these in the MPAs, but in the adjoining terrestrial PAs. The inclusion or exclusion of these forests therefore has considerable implications for the percentage coverage claimed for the MPAs.

South Africa presents something of an anomaly within the WIO as its waters vary from sub-tropical to cool temperate around the mainland, and to sub-antarctic around the Prince Edward Islands (PEI).[1] The coastline west of Agulhas Point (the western boundary of the WIO) is also strongly influenced by the cold Benguela Current originating in the Southern Ocean. This means that the South Africa coastal habitats are dominated far more by rocky and sandy shores than in many WIO countries. These habitats are in themselves subject to enormous variation in terms of their aspect, gradient, geology, structure and biological associations, posing a considerable challenge in terms of effecting full representativity in their conservation. Saltmarshes, mostly associated with estuaries, are also more commonly found in temperate regions, with South Africa being the principle country in the WIO to support these habitats, although it is reported that Maputo Bay may support a small saltmarsh (Lugendo, 2015), and the French Territories chapter (this volume) also reports the presence of saltmarsh in Mayotte. Nevertheless, both regional and national representation of saltmarshes under protection falls mainly in South Africa. The more westerly and southerly areas of the South Africa coastline also support extensive kelp beds, a habitat not included in the analysis for this *MPA Outlook*, and not found elsewhere in the region (although they are moving eastwards (Bolton *et al*., 2012), and do occur within the WIO, in de Hoop MPA at its southwestern extremity, and which are vitally important for the ecology of these areas.

Inevitably the habitats such as offshore pelagic, shelf and deep-sea and seamounts and ridges feature only in the offshore deep-sea MPAs, which often also include small islands and/or atolls. Seamounts (and ridges) are only specifically identified as being protected within the Marine Nature Park of Mayotte, although ridges and other important seabed features are likely to be found within the large MPAs of the French Southern Territories' Glorieuses Archipelago Natural National Reserve, and the two recently proclaimed large Seychelles MPAs: the Greater Aldabra Marine National Park Pelagic MPA, and the Amirantes to Fortune Bank Area of Outstanding Natural Beauty Pelagic MPA. All these large, offshore MPAs certainly also include nearshore, offshore pelagic, and shelf and deep-sea habitats.

Of the 20 recently proclaimed MPAs in South Africa, 14 of which are either entirely offshore or include large offshore components, two are identified as intended for the protection of seamounts: the Southeast Atlantic seamount, and the Southwest Indian Ocean seamount. Other new South Africa MPAs include continental slope, shelf edges and canyons as habitats they are intended to protect, and the Quirimbas MPA in northern Mozambique also includes the offshore seamount St Lazarus Bank. Offshore surveys of these environments, such as those of the RV *Dr. Fridtjof Nansen* are timely because of the continuing threat posed to seamount ecosystems by deep-sea fisheries and the high likelihood of seabed

[1] Given the anomalous nature of this MPA, being in the Southern Ocean within a markedly different biogeographical context than that of the WIO, the PEI is not included in the MPA coverage for South Africa.

sulphide mining along mid-ocean ridges in the future. As such, the management of such activities require detailed information on the ecology of these unique systems so that impacts can be predicted and appropriate mitigation measures taken (Rogers *et al*., 2017).

These very recently proclaimed offshore MPAs represent a long-awaited and very welcome move towards the conservation of offshore habitats in the region. At their current scale and coverage they cannot be considered as achieving adequate representation of the diverse and complex deep-sea habitats in the WIO as a whole, however they do provide important models and object lessons to support further proclamations of offshore deep-sea MPAs within and beyond other countries' EEZs. Increasing focus on marine protection in areas beyond national jurisdiction (ABNJ) is a global phenomenon as the urgency of the need to conserve the 'high seas' is becoming increasingly recognized. Such protection, of course, can only be afforded through strong international collaborations, both within the WIO and elsewhere.

At present there are only three countries with offshore, shelf and deep-sea habitats covered, as described above, but it is also clear that all states could potentially develop MPAs to include them. That is not the case of other habitats, where it is for example obvious that with respect to mangroves forests, only those states along the fully tropical mainland Africa and Madagascar could potentially protect them because this habitat is largely absent from all other areas.

### Species under protection

Most of the country chapters provide only scant information on individual species under protection, although the chapters for the French Territories, Madagascar and South Africa do present detailed inventories of species within their MPAs, and Tanzania mainland does include the Coelacanth as a theme in its's most recently proclaimed Coelacanth Marine Park. Other MPAs are known for including certain species. For example, the small, privately run MPA Chumbe Island (CHICOP) is home to the locally endangered Coconut crab (*Bigrus latro*) and provides a regular annual nesting site for the Roseate tern (*Sterna dougallii*). Two other MPAs in Tanzania (Mafia Island and Mnazi Bay) include protected turtle nesting sites, as do some of the MPAs in Kenya, South Africa and Mozambique. The Bazaruto Archipelago is home to possibly the largest remaining population of the dugong (*Dugong dugon*) in the entire region, as well as protecting turtle nesting sites. All three mainland states, including Zanzibar within the URT, protect endangered marine mammals, particularly the Indian Ocean humpback dolphin and where present, small numbers of dugongs. South Africa's MPAs highlight the species under protection, as described in the MPA details provided in the country chapter, ranging from critically endangered albatross and Leatherback turtles, to various fish, southern right whales and the critically endangered aquatic plant *Pseudalthenia aschersoniana*. Some of the Madagascar MPAs list species ranging from various marine mammals, including migrating humpback whales, the endemic fish eagle (*Haliaeetus vociferoides* and endemic big-headed turtle (*Erymnochelys madagascariensis*), duck (*Anas bernieri*), to various molluscs and fish species.

Whether existing MPAs suitably cover endangered species, including shorebird and seabird populations, is a matter of on-going debate within some countries. For example, Wells et al (2007) considered that the location of existing MPAs in Kenya, Tanzania mainland and Mozambique shows good correlation with known sites of high species diversity; and coral reefs and Important Bird Areas are well represented. More recently though, for Kenya the conclusion with respect to coastal birds is that marine protected areas in the country do not adequately represent high priority areas for conservation of seabirds and shorebirds, with only about 20 percent of selected priority areas found within MPAs (Musangu, 2012). The MPAs of Seychelles protect a number of species of special mention, including the Critically Endangered Hawksbill turtle (*Eretmochelys imbricata*) and the Endangered Green turtle (*Chelonia mydas*) which use the beaches within the Seychelles MPA network extensively for nesting. Certain MPAs are also nesting sites of global significance for a number of seabird species such as Frigate birds (*Fregata* spp.), Terns (*Sterna* spp.), Boobies (*Sula* spp.), and Shearwaters (*Puffinus* spp.). The Aldabra Special Reserve and World Heritage Site is also home, to what appears to be a growing population of dugong, which were once thought to be locally extinct.

## MAIN ACHIEVEMENTS

### Sum of areas within MPAs (or equivalent areas)

As detailed in Table 2, the raw quantitative data reveals that the 143 MPAs (or equivalent) in the WIO region, cover a total of 555 436.68km$^2$, representing 7 percent of the total combined EEZ of all nine countries (including Zanzibar within the United Republic of Tanzania). However, this 7 percent considers only South Africa's

mainland EEZ. When the PEI MPA and the large EEZ associated with this distant site is included in the analysis, the overall MPA coverage for the region increases to 9.22 percent, and the portion of South Africa's EEZ under MPA management increases from 5.4 percent to 15.5 percent. However, this is very misleading, as the PEI are in the Southern Oceans system, which is a completely different biogeographical region to South Africa's inshore and immediate offshore mainland EEZ in every sense. Thus, for the remainder of this analysis only South Africa's mainland EEZ and associated MPAs are considered.

As described in the previous sections, the numerical majority of MPAs in the region protect predominantly coastal habitats. However, the few MPAs proclaimed over large areas of deep-sea habitats (by France, Seychelles and South Africa) contribute by far the largest proportion of the total area under protection, and make the greatest quantitative contribution (6.2 percent of the 7 percent) to the percentage of total EEZ protected. In other words, the 20 offshore MPAs contribute 88.4 percent of the total protected marine and coastal areas in the WIO region.

Excluding South Africa's PEI MPA (see discussion on this, above), the four largest offshore MPAs in the region, totaling 460 164km$^2$ coverage, are:

- French Territories – The Marine Nature Park of Mayotte (63 176km$^2$) and the Glorieuses Archipelago Natural National Reserve (46 073km$^2$).
- Seychelles – The Aldabra Marine National Park (177 447km$^2$) and the Amirantes to Fortune Bank Area of Outstanding Natural Beauty (173 468km$^2$).

**Table 2. WIO region existing and proposed MPAs and protected proportions of EEZs.**

| COUNTRY | EEZ (km$^2$) | No. of existing MPAs | MPA area (km$^2$) [12] | % EEZ protected | No. of Proposed MPAs | Proposed MPA area (km$^2$) | Total potential % EEZ |
|---|---|---|---|---|---|---|---|
| COMOROS [1] | 160 000 [2, 3] | 1 | 449 | 0.28 | 3 | 180.9 | 0.39 |
| FRENCH TERRITORIES in the WIO | 1 009 455 [2, 4] | 5 | 111 427 | 11.04 | 0 | 0 | 11.04 |
| KENYA | 142 000 | 6 | 941 | 0.67 | 3 | TBD | TBD |
| MADAGASCAR [5] | 1 147 712 [3] | 22 | 14 451 | 1.26 | 1 | 4321 | 1.64 |
| REPUBLIC OF MAURITIUS | 2 300 000 [4, 6, 7] | 18 | 139 | 0.01 | 1 | 97 | 0.01 |
| MOZAMBIQUE [1] | 571 452 | 7 | 11 999 | 2.10 | 1 | 140.2 | 2.12 |
| SEYCHELLES [13] | 1 336 559 | 16 | 353 663 | 26.40 | TBD | 50 000 [8] | 30.00 |
| SOUTH AFRICA (mainland) [5, 13] | 1 072 716 [9] | 41 | 57 943 | 5.4 | 0 | 0 | TBD |
| URT MAINLAND [1] | 223 000 [10] | 18 | 2143 | 0.96 | 4 | TBD | TBD |
| URT ZANZIBAR [1] | 223 000 [10] | 9 | 2282 | 1.02 | 1 | TBD | TBD |
| TOTALS [11] | 7 962 894 | 143 | 555 437 | 7.0 (of total) | 14 | 54 739 | 7.6 |

Notes:

1. For these countries, the MPA areas given include small portions of terrestrial habitat, namely coastal forest, but also farmland and in some cases urban areas.
2. Both Comoros and France include the disputed Mayotte Island and its associated EEZ in their territorial claims.
3. The EEZ boundary between Comoros and Madagascar has not been finally determined, so both countries' EEZ areas cannot be considered definitive. This extends to the calculations of percentage coverage, which also cannot be considered definitive.
4. Both France and Republic of Mauritius include the disputed Tromelin Island and its associated EEZ in their territorial claim.
5. Some of the more recently proclaimed and smaller MPAs have not been formally demarcated with area not specified.
6. The Republic of Mauritius includes the Chagos Archipelago (some 640 000km$^2$ under dispute with the United Kingdom) in the calculation of its EEZ. It does not in its MPA coverage include the Chagos Marine Protected Area proclaimed in 2010 by the UK. The establishment of this MPA was declared illegal, under UNCLOS, by a UN Tribunal in 2015.
7. Includes 400 000 km$^2$ which is jointly managed with the Seychelles.
8. Estimated to be at least this area, but enough to meet the 30% target.
9. This excludes Prince Edward Islands MPA (181 247km$^2$).
10. Tanzania and Zanzibar share the EEZ under the URT. This is only included once in the total.
11. All totals are distorted by the disputed claims over Mayotte and Tromelin (and Chagos) and cannot be considered definitive.
12. All country total MPA area figures are rounded to the nearest whole number; see country chapters for more details.
13. Seychelles and South Africa official total MPA area figures differ slightly from the sum of the areas of each MPA as presented in the country chapters, being 0.1 % and 0.2 % higher, respectively. These discrepancies are possibly due to inclusion of terrestrial portions that were not included in the present analysis. The discrepancy has an imperceptible influence on the overall percentage of EEZ under protection.

TBD: To be determined.

In the broader, regional perspective, these figures are not encouraging. Only two states, both with large offshore MPAs are able to claim to have met the 10 percent of EEZ target despite the double claim of Mayotte by both Comoros and France. Of the remaining countries, South Africa has reached just over 5 percent, and with the exception of Mozambique with 2.1 percent and when combined, Zanzibar and mainland Tanzania, reach 1.98 percent of their collective EEZ. The other states of Comoros, Republic of Mauritius, Madagascar and Kenya currently protect less than 1 percent of their EEZs through formal MPAs.

Added to that is the fact that for these countries, namely Tanzania mainland, Mozambique, Madagascar and Comoros, some of the MPAs also include small portions of terrestrial habitat, such as coastal forest (recognized in this study as a valid MPA habitat), but also farmland and in some cases urban areas, thus the marine areas under protection are actually slightly less in spatial extent than indicated.

It could also be argued that the large deep-sea MPAs, although performing an immensely valuable function, are generally protecting areas subject to considerably lower threat levels than the coastal sites, and their qualitative contribution cannot therefore be considered entirely equivalent. The existence of these MPAs, and their dominant role in contributing towards the achievement of the SDG Targets, therefore, should not in themselves be necessarily taken as a reason for not expanding existing or proclaiming new coastal MPAs, or indeed more deep-sea MPAs. However, it is clear that without the proclamation of large offshore MPAs, despite their shortcomings including challenges in effective management, the SDG Target 14.5 of 10 percent of EEZ conserved, can never be reached.

Even when including the currently proposed MPAs, the increase in proportion of the overall EEZ protected does not change much. The proposed Barren Islands MPA in Madagascar is expected to contribute some 4321km$^2$ which would increase the proportion of protected area for that country from 1.26 percent to 1.64 percent.

Together with the proposed sites from Comoros, French Territories, Republic of Mauritius and Mozambique, the overall proportion of protected area increases slightly, but only to 7.6 percent (Table 2).

## Sum of coastline length within MPAs (or equivalent)

When only the coastal habitats are considered, through an analysis of the coastline length extending 5km to sea, the proportion of protection compared to overall coastline length per country tells a quite different story. The extent of protection of the coastal habitats through formal MPAs ranges from 8.26 percent (Madagascar) to 84.28 percent (French Territories) (Table 3). The seven countries that fared less well in the analysis of the proportion of their EEZ areas that were under formal protection, namely South Africa, Mozambique, the URT (including the combined protected coastlines for the mainland and Zanzibar), Kenya, Republic of Mauritius, Madagascar and Comoros are here protecting between 8.26 percent and 36.76 percent of their coastline, and by implication, their coastal habitats. The regional sum of protected coastline is 17 percent (Table 3), compared to 7 percent of the EEZ that is formally protected (Table 2).

The fact that almost one-sixth of the coastline, and by implication, its coastal habitats, is under formal protection should be seen as a positive and encouraging sign of the progress in marine conservation in the region. This is especially noteworthy given the widely recognized fact that the highest marine biodiversity, and in many cases productivity, lies within the inshore habitats of the coastal zone. It is also recognized that this is the zone where pressure on marine resources is highest and where anthropogenic impacts are greatest. Therefore, attaining any degree of marine conservation within these inshore waters is by far the greatest challenge, certainly compared to distant offshore, uninhabited areas.

Furthermore, apart from the French Territories, all the countries in the region, including Tanzania (and Zanzibar), have mangroves that are identified as protected habitats under forestry policies and laws, some dating back several decades. While it is recognised that in many parts of the region, the implementation of the applicable forestry legislation has not been entirely successful, it must be recognised that as a result of the historic focus on mangroves, the actual reach of conservation of this coastal marine habitat extends beyond the above figures for MPA coverage alone.

As with area size, for some countries, proclamation of their currently proposed MPAs will significantly add to the proportion of coastline length under protection, but disproportionately much more than that of the respective EEZ area protected. Taking Comoros as an example, when the additional three proposed MPAs described in the Comoros chapter become formally proclaimed, they

Table 3. WIO region coastline lengths and MPAs protected coastlines.

| COUNTRY | Coastline (km²) [1] | No. of existing MPAs | No. of existing MPAs with coastline | MPA coastline (km²) [1] | % coastline protected |
|---|---|---|---|---|---|
| COMOROS [2] | 469 | 1 | 1 | 46.8 | 9.97 |
| FRENCH TERRITORIES in the WIO [2, 3] | 418 | 5 | 5 | 347.1 | 83.04 |
| KENYA | 1586 | 6 | 8 | 207.8 | 13.10 |
| MADAGASCAR [3, 4] | 9935 | 22 | 10 | 820.5 | 8.26 |
| MAURITIUS [5] | 496 | 18 | 11 | 133.0 | 26.82 |
| MOZAMBIQUE [1] | 6942 | 7 | 6 | 877.8 | 12.64 |
| SEYCHELLES | 747 | 16 | 13 | 186.4 | 24.95 |
| SOUTH AFRICA (mainland) [3, 6] | 3751 | 41 | 26 | 1378.8 | 36.76 |
| URT MAINLAND [1] | 2515 | 18 | 7 | 225.0 | 8.95 |
| URT ZANZIBAR [1] | 945 | 9 | 5 | 497.2 | 50.99 |
| TOTALS | 27 804 | 143 | 92 | 4720.2 | 17.0 (of total) |

Notes:

1. Country coastal length and MPA coastline length data are based on the World Vector Shoreline, 1:250,000; derived from the global coastline (Global Self-consistent Hierarchical High-resolution Geography, GSHHG L1, Version 2.3.7 June 15, 2017 ) available at www.ngdc.noaa.gov/mgg/shorelines/, from which the length of each MPA side parallel to the coast were considered, and only for MPAs in the proximity of 5km to the coast. For MPAs with overlapping coastlines only one MPA was counted for the overlapping parts. Note: this is a different resolution from the country and MPA coastline lengths given in the country chapters, hence lengths will differ slightly.
2. Both Comoros and France include the disputed Mayotte Island and its associated EEZ in their territorial claim, though the coastline of this island is not included in this analysis.
3. The analysis excludes MPAs with only reef areas protected and no shoreline included.
4. A few of the more recently proclaimed and smaller MPAs have not formally demarcated their coastline length.
5. Four small fishing reserves in Rodrigues are excluded from the calculation as their boundaries are not formally defined.
6. This excludes the coastline of Prince Edward Islands MPA.

will increase the protected coastline length from 9.97 percent to 31.7 percent, compared to an increase in EEZ protection from 0.28 percent to 0.39 percent (Table 2).

For the Republic of Mauritius, when the proposed south-west site that surrounds the current Black River Fishing Reserve is proclaimed, it will add another 40km of protected coastal habitats to the national total, increasing it by a further 7 percent. In the URT mainland, Saadani National Park is essentially a terrestrial protected area, yet it represents an important area for inclusion within the MPA network (Mangora *et al*., 2012), adding some 20km of coast, including mangrove and estuary habitat, an important breeding site for endangered Green turtles (*Chelonia mydas*), as well as 70km² of ocean with offshore coral reefs.

With this site added to the national total, the overall EEZ proportion protected does not change significantly, but the combined URT mainland and Zanzibar shoreline protected increases from 20.87 to 21.45 percent.

Similarly, the lengths of coastline currently under voluntary, community or locally management arrangements in countries like Madagascar and Tanzania (as discussed below) will raise the overall percentage of 'protected' coastal habitat even more.

Both SDG Target 14.5 and Aichi Target 11 refer to the need to conserve at least 10 percent of coastal and marine areas. While there is some divergence of opinion in relation to precisely to what 'marine areas' these targets refer, the consensus globally, and in developing this *MPA Outlook*, is that it refers to the entire marine environment (all oceans and all seas), and for coastal states this would include 10 percent of their extended economic zones (EEZ).

On this front, it is clear that there is a long way to go for the Contracting Parties, apart from Seychelless, to meet these targets. However, when considering the 'coastal' component of the targets, the picture is much more promising. Indeed, with 17 percent of coastline

**Supporting LMMAs in SW Madagascar through seaweed farming.** © Matthew D. Richmond

and associated inshore areas under protection across the region (see Table 3), the target has been exceeded quite considerably, which is certainly cause for some celebration. This stark contrast between the degrees of success in meeting the coastal and marine components of the targets suggests, as also discussed elsewhere in this summary, potentially suggests that the future focus for MPA establishment should be in the offshore areas, in the deep sea within signatory states' EEZs, and even in the 'high seas' beyond these.

***Non-formal Protected Areas***

While the main emphasis of the *MPA Outlook* is on formally designated and protected areas, and this remains the core focus, there has been a strong move in some countries towards the establishment and support of less formal forms of protection, in particular those involving coastal communities in the conservation of their marine resources. Many of these sites have in fact been established on the initiative of the communities themselves, although they do seek management and other support from government and NGOs.

Information concerning these forms of protection was collated by the chapter authors, and while the levels of protection may not yet match that provided by many MPAs, the designation of Locally Managed Marine Areas (LMMAs, in Madagascar and Kenya), Collaborative Management Areas and Collaborative Fisheries Management Areas (CMAs and CFMAs in Tanzania), and Voluntary Managed Conservation Areas (VMCAs in Republic of Mauritius) holds considerable promise for the protection of coastal habitats and species. Madagascar has clearly led the way in this process, with over 200 LMMAs now recognized, and the majority of these linked to the MIHARI Network (see Case Study, Madagascar chapter). Bringing these LMMAs together in this way provides a great opportunity for sharing and learning from experiences and ultimately strengthening the protection they afford.

It would appear that the future of coastal conservation may lie very much in the hands of the coastal communities themselves, with appropriate support from external agencies, with the aim of bringing the levels of protection and effectiveness of management to that required for formal recognition. An enabling policy environment and capacity building of communities will be key for the effective establishment and management of these community managed areas.

A criteria for identification of these areas as formally protecting coastal and marine biodiversity alongside formal MPAs will be critical. In the best-case scenario, with the coastal areas under effective community-lead management, governments could turn more of their attention to the potential for offshore MPAs, for which only they, and then only in collaboration with their neighboring states, can afford any meaningful protection.

***Science for management***

Over the past 20 years there has been exponential growth in our scientific understanding of the marine environment in the region; in particular in relation to coastal habitats and species, and migratory species. Better understanding of the ecology of the WIO has led to a more

ecosystem-based approach to conservation, taking into consideration the importance of networks of linked sites, particularly relevant for migrating species and recognizing the need to include sites for breeding and of spawning aggregations. This understanding is increasingly being fed into processes for the proclamation of MPAs, with the more recent proclamations being founded very strongly on deep science. Particular examples of this are the 20 mostly offshore MPAs recently proclaimed in South Africa's waters, and the marine spatial planning process identifying large new areas for MPAs in Seychelles.

It can now be claimed with considerable authority that the more recently proclaimed MPAs are responding to real conservation needs supported by detailed scientific research and assessment. Many studies demonstrate that effectively managed MPAs are the way forward (see Case Study, this section). A valuable summation of this understanding is provided by a PEW Charitable Trusts brief in July 2019, which, citing Edgar *et al*. (2014), states that effectively managed MPAs are a critical tool for protecting ocean life and that scientists have found that "the conservation benefits of MPAs increase exponentially with the accumulation of five key features: no take, well enforced, old (>10 years), large (>100km$^2$), and isolated by deep water or sand."

This applies equally to the deep-sea areas, of which the vast majority of the regions' EEZs and extra-territorial waters are comprised. The great majority, in numerical terms, of the currently proclaimed MPAs are essentially coastal, with just a few encompassing large areas of open deep-sea habitats. Any view of the future of marine conservation suggests that more deep-sea areas will need to be afforded protection in order to maintain the functioning of their ecological systems and their productivity.

For this to happen, the scientific understanding of their ecology will need to be strengthened, as the identification of areas for protection must be based on strong science, as was the case in the proclamation of the deep-sea areas in both South Africa and Seychelles. The challenge here is that while these two countries have access to the financial resources needed for the research to develop this understanding, most other countries in the region, although having the institutions and scientists capable of conducting such research, do not have access to adequate funding.

This would suggest that a collaborative regional approach to deep-sea research both within the EEZs and in areas beyond national jurisdiction (ABNJ) needs to be taken, perhaps supported by global financing. Such collaboration in already underway, reflected in the numerous historic and recent jointly organized, transboundary deep-sea exploratory expeditions that are documenting marine life, fisheries and seabed biodiversity and chemistry in many parts of the EEZ of WIO countries. Notably examples are the cruises of the RV *Dr. Fridtjof Nansen*, RV *Agulhas*, and RV *Angra Pequena*, among others.

A continuation and intensification of such collaborative research will be essential to inform the identification of future deep-sea MPAs both within and beyond signatory states' EEZs, with an expansion of the collaborative ethic also needed to ensure adequate protection for thee MPAs.

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# PART IV:
# MANAGEMENT EFFECTIVENESS

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With contributions by Joseph Maina and Arthur O. Tuda

## SUMMARY

Marine protected areas (MPAs) have become increasingly recognised as a key tool to conserve marine habitats and their biodiversity as well as to support fisheries management, as evidenced by their inclusion in Sustainable Development Goal (SDG) 14.5 target. Effective MPA management hinges on the understanding of successes and gaps in management processes and of the present and future relevant threats. Moreover, generating knowledge on threats and processes that may determine the outcomes of an MPA is critical for spatially adaptive management approaches. This knowledge may be obtained through repeated assessments that document historical and current management actions against a suite of clear objectives and goals. Understanding MPA management effectiveness is particularly important in the context of international conservation targets set out under the Convention of Biological Diversity (CBD) Aichi Target 11 and SDG 14 targets for 2020.

Part III of this MPA Outlook indicates that the nine countries with territories within the Western Indian Ocean (WIO) region collectively support 143 formally designated MPAs. The current chapter sought to assess the management effectiveness of these MPAs across the different countries using the Management Effectiveness Tracking Tool (METT) for 101 MPAs. At the time of the assessment, there were only 134 proclaimed MPAs of which only a sample could be studied. Our assessments found that legislative and institutional frameworks that support the establishment and management of MPAs exist in every country. This was the most positive outcome of the assessment, suggesting that there is the political will to meet the global and regional marine conservation objectives and targets. However, of similar but converse significance was the widespread failure to implement legislation, and in many countries, the ineffective functioning of mandated institutions. Among the challenges identified, those that are cross-cutting throughout the region include shortfalls in financial and personnel capacity, insufficient clarity on MPA boundaries, thereby leading to compliance challenges, and management decision support systems that are only weakly guided by science.

Drawing upon these findings, it is recommended that a regional framework for MPA capacity development is required. Such a framework would be based upon a common curriculum for capacity building that would enable the strengthening of MPA management effectiveness. Furthermore, sustainable financing to support equipment and infrastructure, skilled personnel, and effective enforcement is absolutely critical in ensuring the protection of the biodiversity, ecosystem and cultural assets of the MPAs. Area integrity through effective law enforcement and compliance is the foundation for successful MPA management and as such, MPA law enforcement and compliance training should be developed and prioritized for implementation across the region. Building resilience against the common threats identified for the WIO, including pollution, climate change, coastal development and resource use conflicts requires functional and effective MPAs. Strong commitment from governments to support the MPAs under their jurisdiction, especially during periods when alternative funding options have not materialized is critical. A regionally agreed upon approach to undertaking management effectiveness assessments should be developed and implemented. The methodology for these assessments must be standardized across the region. In the meantime, the METT can be used as a baseline framework with adaptations being made so that MPA specific issues may be addressed and monitored.

## INTRODUCTION

Global biodiversity degradation from direct human impacts and climate change has spurred the largest expansion in the number and coverage of marine protected areas (MPAs) in history (Hooker and Gerber, 2004; Ban *et al*., 2014). As part of the Convention on Biological Diversity (CBD) Aichi Targets and the SDG 14, approximately 200 countries have committed to protecting 10% of coastal and marine areas as MPAs and "other effective area-based conservation measures" by 2020 (Ban *et al*., 2014). Underpinning these agreements is the understanding that among other benefits, marine reserves can protect marine biodiversity and habitats from degradation, replenish depleted fish populations, regulate tourism and recreation, accommodate conflicting resource uses, and enhance the welfare of local communities (Fox *et al*., 2012; Roberts *et al*., 2017).

Numerous indicators have been proposed to track progress towards achieving SDG 14 and Aichi 2020 targets (Le Blanc, 2015). One of these indicators is the coverage of protected areas, generally seen as a key pathway to protection of biodiversity. However, as has been demonstrated widely, implementation of a spatial MPA design does not necessarily guarantee that biodiversity outcomes will be achieved (Stoll-Kleemann, 2010). Similarly, without effective management, there is a risk that the proclamation of MPAs in itself may provide the illusion that marine conservation objectives and obligations are being met. This global phenomenon has been

**Traditional boat building skills still in use on Zanzibar.** © Rahim Saggaf

well documented, and as Mora *et al*. (2006) explains, less than 0.1 percent of the world's coral reefs are within MPAs classified as no-take, and have no poaching, and that the establishment of new MPAs is rarely followed by good management and enforcement. Using levels of poaching as an indirect measurement of management performance, Mora *et al*. (2006) found that only 1.6 percent of the world's coral reefs are managed in such a way as to prevent the removal of functional animal and plant groups, including large herbivorous and predatory fishes.

Beyond the MPA area coverage, a solution to evaluate the benefits of MPAs involves including their management effectiveness in the equation (Agardy *et al*., 2003; Stoll-Kleemann, 2010). Management effectiveness assessment is defined as "the assessment of how well a protected area is being managed – primarily the extent to which it is protecting values and achieving goals and objectives" (Hockings, 2006). Formulating new MPAs without the understanding of the effectiveness of the existing arrangement may limit the benefits envisaged from proclamation of new protected areas as part of the prevailing conventions. Yet, the efficacy of many MPAs remain uncertain (Gill *et al*., 2017), while most lack a proper structure for assessment for continuous feedback of information to achieve objectives (Pomeroy *et al*., 2005). As part of a regional initiative to assist countries achieve international commitments on MPA targets while maximizing the potential benefits, this chapter evaluates the effectiveness of the formally designated MPAs within the nine countries in the WIO region that have established such measures.

Previous assessments of the MPA management effectiveness in the WIO region are limited and have tended to focus on local scale studies (e.g. McClanahan *et al*., 2006; Muthiga *et al*., 2003 (but see Wells and Mangubhai, 2005). Only two countries, Kenya and South Africa, have undertaken repeated country level assessments. In Kenya, assessments are undertaken annually, while in South Africa three assessments were carried out in 2003, 2009 and 2013. Reports suggest that while most of the issues originally identified in the assessments still persist (Chadwick *et al*., 2014), repeated assessments have placed emphasis on management functions that promote MPA success (Giakoumi *et al*., 2018). While this approach is beneficial to specific MPAs, the opportunity for collective assessments using standardized methods at country and regional scale is missed.

Evaluating the effectiveness at country and regional scale may help in identifying causes of success or failure and promote learning and application of similar standards across the region (Giakoumi *et al*., 2018). It may also help in regional scale objective setting for MPA networks, which is necessary for setting a common goal to mitigate against large scale trans-maritime boundary impacts and activities such as climate driven range shifts, fisheries, seabed mining, and shipping (Jameson *et al*., 2002).

Several factors influence MPA effectiveness, among them are the numerous, and often uncontrollable, external stressors from atmospheric, terrestrial, and oceanic sources, all of which can degrade the environment and compromise protection. The current arrangement of

MPAs in the region did not consider locations that are minimally impacted and that can cost-effectively address management objectives. Whether or not an MPA can achieve its management objectives also depends greatly on the level of compliance by local resource users, who bear most of the costs of an MPA (Gill *et al*., 2017). The limitation to management effectiveness in most parts of the WIO region has been largely due to lack of compliance and conflicts with local communities (Rocliffe *et al*., 2014). For example, Diani in Kenya, and many of the early marine reserves gazetted in Tanzania, have not been operationalized since their promulgation over forty years ago (Giakoumi *et al*., 2018), though in Tanzania some progress has been made in recent years (see Francis and Machumu, 2014).

Compliance issues may also stem from inadequate staff capacity (Chadwick *et al*., 2014; Gill *et al*., 2017). Adequate investment in human and financial capacity can lead to optimal conservation outcomes (Gill *et al*., 2017). In many cases, weaknesses in compliance are related to the absence of or weak support for MPAs at higher government levels, with sufficient funding and commitment not forthcoming and MPA managers unable to adequately implement operational activities.

Comparative studies of biodiversity distribution along the protection gradient (e.g. McClanahan *et al*., 2006) and investment in human and financial capacity (Gill *et al*., 2017) demonstrate that compliance is key to maintenance of sustainable fish biomass and coral cover and their persistence through disturbances (McClanahan *et al*., 2007). The level of community and institutional capacity are also important determinants of MPA success (Jameson *et al*., 2002). Community capacity refers to the rules, procedures and values that people hold, which pre-dispose them to work collectively for mutual benefit (Rudd *et al*., 2003). Institutional capacity is the ability of government agencies to provide public goods and services and ensure that laws and regulations will be enforced.

Stakeholder engagement is also considered as one the most important factors affecting MPA success, and equally, its absence, as the most important factor driving failure (Pollnac and Seara, 2011; Giakoumi *et al*., 2018). Addressing these vital stakeholder issues may be achieved through a range of integrated approaches, including effective legal and institutional frameworks, comprehensive management planning and efficient and well-supported management systems (Kelleher, 2002; Pomeroy *et al*., 2007). Furthermore, systematic conservation planning, involving a range of focused actions, is needed to ensure the effective management of MPAs. It is also important to recognize that weak support for enforcement of MPA regulations can have a knock-on effect that results in weakened stakeholder perceptions, belief and support for MPAs, especially when promises of commitment from higher authorities do not materialize, and where visible flaunting of regulations takes place without management intervention. This is particularly the case where tourism operators are important stakeholders.

A common challenge to evaluating management effectiveness is the choice of assessment indicators. Among the key requirements are that indicators are specific to the individual MPA objectives and must be undertaken at strategic and operational levels. Indicators should also be quantifiable and must be supported by qualitative data as well as provide scalable comparisons to assess overall management effectiveness. Furthermore, legislative support for the assessment process that includes resolving the implications of weak management and functions needs to be established. Recommendations need to identify a plan for strengthening management, and capacity must be available to address identified issues. Feedback of lessons learnt must be widely shared to assist with the generation of support and to justify the continued existence of the protected area through demonstrating real values.

Several toolkits for assessing management effectiveness exist today, including the Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) Methodology (Ervin, 2003), the Management Effectiveness Tracking Tool (METT) (Hockings, 2006), and UNESCO's Enhancing our Heritage (EoH) Toolkit (Hockings *et al*., 2008). These and other methodologies can help to examine overall effectiveness of MPAs while identifying factors influencing their effectiveness and to determine common threats and the risks they pose. In this chapter, we present results on management effectiveness scores for protected areas in the WIO, focusing on the METT. Based on simple score card questionnaires, METT is adaptable to suit various scales, needs, and data limitations. Due to the scarcity of relevant data and information in the region, a snapshot assessment based on the METT toolkit as opposed to a full and comprehensive assessment was developed and applied in 2018.

## Data and methods

We constructed a regional database of all the MPAs in participating countries (Comoros, France, Kenya, Madagascar, Republic of Mauritius, Mozambique, Seychelles, South Africa and Tanzania/Zanzibar). A team of experts from each of the countries was invited to participate in a management effectiveness assessment survey

using the management effectiveness tracking (METT) tool. The original METT tool was adapted to assess 21 specific management elements (instead of the usual 30) ranging from legal status, equipment, and quality of management plans, to outreach programmes and tourist facilities (see Annex Table 1) (Hockings, 2006).

Each country's METT assessment was conducted by the chapter author in collaboration with in-country MPA Managers who assigned scores on a four-point scale from 0 to 3 depending on the status of indicators considered (for example maintenance: 0 = There is no maintenance taking place; 1 = There is a maintenance schedule, but not all maintenance is taking place; 2 = There is a maintenance schedule and maintenance is mostly taking place; 3 = There is an approved maintenance schedule that is being fully implemented). In this example, as with all other indicators, a score of 3 represents the desired state of management.

To ensure consistency in the assessments across all the countries, the authors were briefed on the key measures and indicators. The authors were also asked to consult with the relevant management authorities for each MPA within their jurisdiction to ensure recording of accurate and current information.

To conduct a threat analyses on each MPA, questions which elicited information on threats and pressures currently being experienced on each MPA, or likely to be faced in the near future, were formulated (Annex Table 2). Survey questions were based on 11 threats and pressures. For each threat question, a Likert scale of ordered values between 1 and 5 was used for scoring (1 being less important and 5 being very important).

A total of 101 surveys were administered (Table 1). To obtain overall scores for management effectiveness indicators and threat likelihood, scores were aggregated for each MPA and at a country level. In the latter case, scores were scaled by the number of MPAs in a respective country to allow a level of comparisons between countries. However, given the vastly different contexts among countries and between MPAs, METT assessments are ideal for site level assessments and are not suitable for comparing between sites and among countries. Indeed, METT assessments are not intended to provide comparisons between protected areas, but specific to each MPA within respective contexts as management interventions are in most cases site specific.

Here, country and site comparisons are applied in the context of the type of interventions that are required as a strategy to enhance management effectiveness.

**Table 1: Number of MPAs assessed per WIO country.**

| COUNTRY | No. MPAs |
|---|---|
| Comoros | 4 |
| French Territories in WIO | 10 |
| Kenya | 5 |
| Madagascar | 12 |
| Republic of Mauritius | 14 |
| Mozambique | 7 |
| Republic of South Africa | 24 |
| Seychelles | 10 |
| Mainland Tanzania (URT) | 6 |
| Zanzibar (URT) | 9 |
| **Total** | **101** |

# RESULTS

## Management effectiveness

Overall, the majority of MPAs across the region have established institutional frameworks for MPAs with legislative backing and administrative systems (Table 2). However, there were major weaknesses in MPA planning, boundary and area integrity. As an indicator of management effectiveness, the boundary integrity of an MPA is critical as it largely determines the levels of compliance by the wider community and defines the spatial boundaries within which enforcement can be applied. Survey responses indicated a low-moderate MPA boundary integrity (Table 2), where in most cases MPA boundaries were known by the management authority but not known by local residents or neighbouring land and sea users. This leads to ineffective protection systems that can further exacerbate poor enforcement, lack of compliance and conflicts – a fundamental weakness for effective management.

The series of questions on management inputs addressed the adequacy of resources needed to conduct critical management activities, including the number of staff available for management, the adequacy of data collection equipment, and the maintenance of infrastructure (Table 3). Most MPAs reported acute shortfalls in human resource capacity (Table 2). Common among many MPAs was the lack of sufficient, suitably qualified and experienced personnel and inadequate staff capacity development programmes (Table 2). Infrastructure in general, including operational infrastructure (i.e. infrastructure required for

**Republic of Mauritius, North Coast, facing the Coin de Mire island and nature reserve.** © José Paula

operational management purposes) and equipment were inadequate and where they existed, many MPAs showed challenges with proper maintenance (Table 2).

Despite many MPAs having a tradition of management planning, many did not have up to date management plans, and where these did exist, implementation of the plans and management actions was inadequate (Table 2). Furthermore, the annual plans of operation are seldom directly linked to the management plans. The low levels of implementation of management plans can be seen as a direct result of shortage of adequate budgets for the MPAs and inadequate human resource capacity, as demonstrated in survey responses to the associated indicator.

When assessed for the community development and engagement programmes indicator, surveys indicate overall community development programmes, with set measurable objectives to enhance stakeholder and community relations, are seldom in place in MPAs in the region (Table 2). These responses suggest that significant investment in public awareness and education programmes may need to be made to improve understanding of, and garner support for, MPAs, thereby resulting in more positive compliance and improved protection of biodiversity and habitats. There were mixed perceptions about the existing knowledge on biodiversity and ecology within MPAs, primarily based on the research carried out in MPAs themselves. There was overall consensus however, that where biodiversity and ecological research is undertaken, it is not applied to supporting management decisions.

It is important to recall that the scores presented in Table 2 are derived from the summarized findings presented in Table 3 (originally guided by the 21 questions in Annex Table 1), and to note that attaining a score of 2 (or 2.5) indicates that the minimum standard required for that indicator was achieved but shows that gaps and weaknesses persist. It is only a score of 3 that represents that indicator achieving the standard equivalent to what can be considered best practice (Table 2). Finally, it is also important to recognize that the assessment reflects a snapshot of the status of management effectiveness of the MPAs assessed at a particular point in time (mid-2018), reflecting the findings and the situation at that time, with any recommendations based purely on that assessment. Naturally, some countries may have made changes to the way their MPAs are managed, be faced with new challenges to management, or improved their management effectiveness since then.

## Summary of key regional issues identified

1. Boundary integrity of MPAs is weak and knowledge of MPA boundaries by external stakeholders is poor.

2. Poor enforcement systems are resulting in large-scale illegal resource use within MPA boundaries.

3. Effective job-specific staff development programmes are largely absent, or take place too infrequently, with general shortfalls in human resource capacity.

4. There is inadequate operational infrastructure and equipment and the associated maintenance of available infrastructure and equipment is not prioritised. This can be seen as a direct result of insufficient budgets being available for the MPAs.

5. Most MPAs have management plans that have not been updated for a long period of time and therefore emerging issues will not have been documented or addressed.

6. Dedicated, secure and adequate budgets that enable effective management are lacking for most MPAs across the region. Although funding is generally available to cover staff salaries, the goals, objectives and operational requirements of MPAs cannot be fulfilled due to the absence of funds.

7. Community development and engagement programmes with set measurable objectives to enhance stakeholder and community relations are lacking.

8. Public awareness and education programmes need to be developed to improve support for and understanding of MPAs.

9. Adequate understanding of the biodiversity and ecology of the majority of MPAs is deficient, precipitating a deficiency of information on which to base appropriate decision-making to protect these systems.

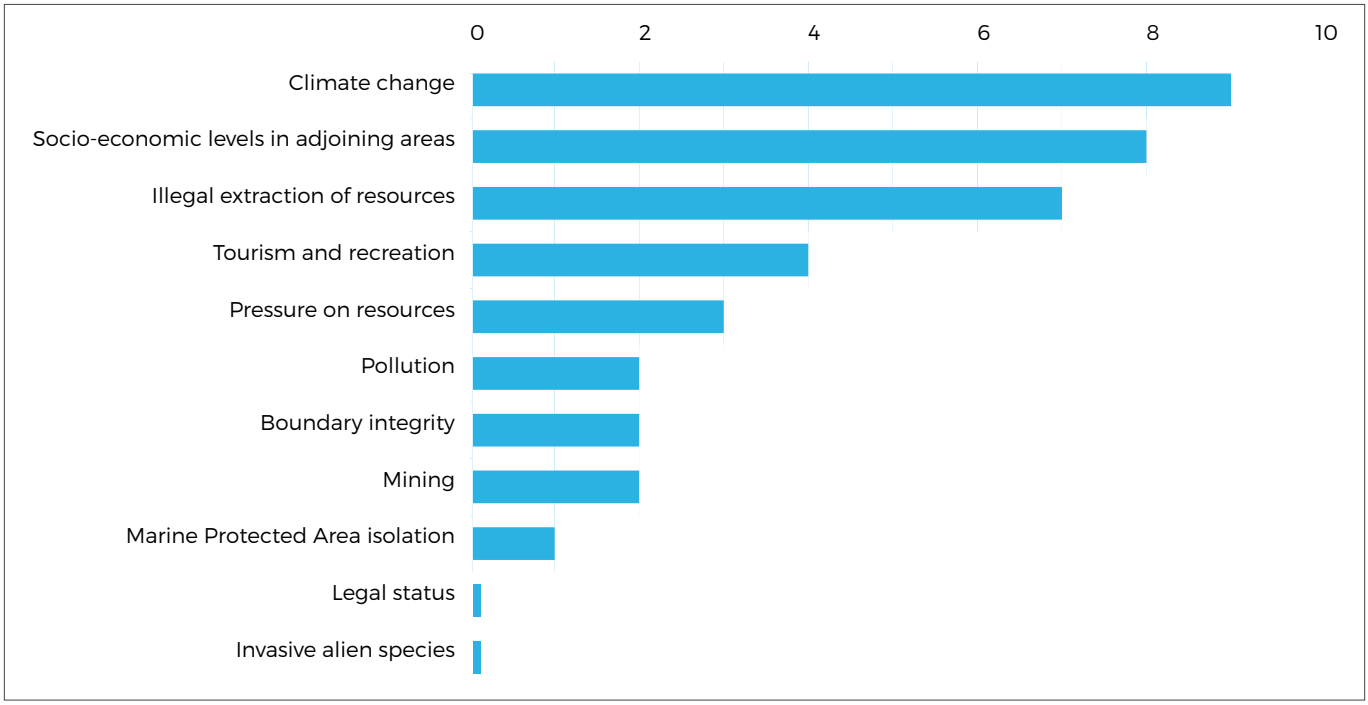
The four most critical findings of the study were:
- inadequate enforcement leading to continuing illegal harvesting of resources;
- lack of understanding of the biology and ecology within the MPA , including by MPA personnel;
- insufficient staff development programmes; and
- maintenance not being prioritized (which is critical as this inevitably leads to higher costs down the line).

## Key threats to MPAs in the WIO Region

The assessment also analysed pressures on and threats to MPAs across the WIO (Figure 1). The perceived importance of the major pressures and future threats to MPAs varied among countries. Nonetheless, the majority of countries were consistent in identifying climate change as the main threat across the WIO region, in particular, elevated sea water temperatures, ocean acidification, storm surges and sedimentation. Human related pressures were also identified as critical, with unsustainable resource use by local communities threatening biodiversity and habitat functionality within MPAs. In many cases, MPA management is unable to effectively monitor this extractive use.

High levels of poverty in areas that are adjacent to MPAs was identified as reinforcing the risk of illegal activities such as poaching. Pollution from agricultural and urban run-off was also identified as an important growing threat to MPAs in the region, where it negatively impacts on ecosystems within MPAs. Other threats negatively impacting on MPAs in the region include the increased damaging footprint from coastal development near MPAs and tourism related activities.

**Figure 1: Relative importance of threats in the region based on relevance (i.e. frequency) across the MPAs in the region.**



| Table 2: Summarised country findings of the snapshot 2018 management effectiveness assessment for the Western Indian Ocean marine protected areas. | Comoros | French Territories in WIO | Kenya | Madagascar | Republic of Mauritius | Mozambique | Republic of South Africa | Seychelles | Mainland Tanzania (URT) | Zanzibar (URT) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Legal Status | | | | | | | | | | |
| 2. Protected Area Regulations | | | | | | | | | | |
| 3. MPA Boundary Demarcation | | | | | | | | | | |
| 4. Zonation Planning | | | | | | | | | | |
| 5. Management Plan | | | | | | | | | | |
| 6. Implementation of Management Plan | | | | | | | | | | |
| 7. Operational Budget | | | | | | | | | | |
| 8. Annual Plan of Operation (APO) | | | | | | | | | | |
| 9. Administrative Support Systems | | | | | | | | | | |
| 10. Human Resource Capacity | | | | | | | | | | |
| 11. Staff Development Programmes | | | | | | | | | | |
| 12. Operational Infrastructure | | | | | | | | | | |
| 13. Maintenance and Functionality of Infrastructure | | | | | | | | | | |
| 14. Operational Equipment | | | | | | | | | | |
| 15. Maintenance and Functionality of Operational Equipment | | | | | | | | | | |
| 16. Biodiversity Knowledge and Understanding | | | | | | | | | | |
| 17. Ecological Processes | | | | | | | | | | |
| 18. Research Programme | | | | | | | | | | |
| 19. Protection Systems | | | | | | | | | | |
| 20. Public Education, Awareness and Communication Programme | | | | | | | | | | |
| 21. Community Partners | | | | | | | | | | |

No evidence presented/ No effort made to address indicator.

Some effort made to address indicator but less than minimum standard achieved.

Minimum standards achieved but gaps still exist.

Meets best practice.

**Table 3: Country-specific assessment outcomes, threats and priority actions for country MPAs across the WIO.**

**Notes:**

1. For the purposes of this document, the definition of an MPA is in accordance to the IUCN definition: "Any area of intertidal or sub-tidal terrain, together with the overlapping water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment". This definition covers all titles as given by the various countries to marine areas under formal legal proclamation, including protected mangrove areas, formal community-managed areas and internationally recognized areas (e.g. RAMSAR sites).
2. The results of the assessment for each MPA and country have been loaded for reference onto the online dashboard that is available for the overall MPA project. For ease of purpose country results have been listed alphabetically.

| COMOROS | |
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| ASSESSMENT OUTCOMES | One proclaimed MPA was assessed along with three proposed MPAs in the Comoros. |
| | Currently there is just one proclaimed MPA (Parc National de Mohéli, or PNM), with three others scheduled for proclamation. |
| | Legal mechanisms for controlling use of and activities within the MPAs exist but enforcement and compliance is weak. |
| | Boundaries of the MPAs are known by management but are not known by external stakeholders. |
| | Zonation is identified for each MPA, but implementation of the zonation plan is problematic. |
| | Only PNM has an up to date management plan. |
| | Operational budgets for Comoros MPAs are deficient or are only provided on an ad-hoc basis. This has knock-on effects of preventing implementation of the management plan and therefore the achievement of MPA goals and objectives is not possible. |
| | Administrative support is available for all MPA sites. |
| | The MPAs have sufficient personnel and there is a staff development programme in place, but this is not always focussed on the requirements of the job. |
| | Operational infrastructure and equipment are largely lacking for effective MPA management and where this is in place maintenance is inadequate. |
| | Biodiversity and ecological knowledge are only meeting minimum required standards within the PNM. In the remaining three sites, information on critical habitats, species and ecosystems is insufficient to support planning and decisionkm-making. |
| | Protection systems are ineffective in controlling access or use of the MPA in accordance with designated objectives. |
| | Only PNM has an education and awareness programme in place that meets minimum requirements. |
| | None of the Comoros MPAs have a community development and engagement programme in place that has set measurable objectives to enhance stakeholder and community relations. |
| THREATS | Illegal extraction and over-utilization of resources is the greatest current threat facing the Comoros existing and proposed MPAs. This is largely as a result of the low socio-economic status of the coastal communities. Poor knowledge of MPA boundaries, and protection systems that fail to control access and use of the MPA exacerbate the issue. |
| PRIORITY ACTIONS | Designation of the three un-proclaimed MPAs needs to be finalised so that effective mechanisms may be put in place to ensure the meeting of the specific MPA objectives. |
| | Educational awareness programmes need to be put in place to ensure thorough knowledge of the MPA boundaries by all stakeholders and to ensure that there is a firm understanding of the rules and regulations of the MPAs. |
| | Management plans need to be updated for the three MPAs other than PNM. |
| | Adequate and secure operational budgets are urgently required for all the Comoros MPAs. |
| | Funding must then be prioritised to train and equip personnel to implement effective law enforcement and ensure adherence to rules and regulations and ensure adherence to the zonation plans. |
| | Budgets also need to ensure the provision of adequate infrastructure and ensure that proper maintenance schedules are developed and implemented. |
| | Staff development programmes need to focus on MPA job-specific requirements. |

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| | A community development programme with set objectives needs to be drafted and implemented to enhance stakeholder and community relations. This must focus effort on identifying and developing alternative livelihood opportunities for impoverished communities. However, implementation of alternative livelihood projects will need to be addressed by government and other strategic partners. |
| | Increasing understanding of biodiversity and ecological knowledge needs to prioritized so that proper planning and decision-making can be made to achieve goals and objectives. This must be achieved through the development of relevant research and monitoring programmes. |
| FRENCH TERRITORIES IN THE WESTERN INDIAN OCEAN REGION | |
| ASSESSMENT OUTCOMES | Ten MPAs under French authority were assessed. |
| | All ten marine protected areas under French authority and jurisdiction have been designated. N.B. in 2018, five small 'protection zones' (previously considered separate MPAs) were merged into the Marine Nature Park of Mayotte; the La Réunion Fishing Reserve was considered an MPA at the time of the study, but was subsequently confirmed not to have any legal mandate; thus at the time of this publication, there were five formally proclaimed MPAs in the French Territories in the WIO. |
| | Regulations are in place for the majority of MPAs but are inappropriate to control resource use at the lagoon of Ambato-Mtsangamouji and Fishing Reserve of Sainte-Rose (La Réunion). |
| | Managing authority and stakeholders know of the MPA boundaries in only four out of ten of the sites. |
| | Approved management plans, zonation plans and annual plans of operation in place and are being implemented in 50% of MPAs and are totally lacking in the others (Fishing Reserve of Sainte-Rose (La Réunion), lagoon of Ambato-Mtsangamouji, biotope of Papani, Marine Park of Saziley and N'Gouja). |
| | Funds not allocated for the Fishing Reserve of Sainte-Rose (La Réunion), the lagoon of Ambato-Mtsangamouji, biotope of Papani, Marine Park of Saziley and site of N'Gouja. Therefore, no management implementation is taking place at these sites. |
| | Administrative support and human resource capacity is available for the Marine Reserve of La Réunion, the Marine Nature Park of Mayotte, the wilderness reserve Passe en S, the Marine Park of Saziley, the site of N'Gouja and the Glorieuses Archipelago Natural National Reserve. |
| | For the MPAs that have management plans and operational budgets, staff development programmes are in place but these do not necessarily focus on MPA job-specific requirements. |
| | Operational infrastructure and equipment is available in the MPAs that have management plans and budgets in place (Marine Reserve of Reunion, Marine Nature Park of Mayotte, the wilderness reserve Passe en S, the Marine Park of Saziley and the Glorieuses Archipelago Natural National Reserve). |
| | Biodiversity and ecological process knowledge needs to be greatly expanded on to enable proper management decision-making. |
| | Access systems are moderately effective in controlling access or use of MPAs in accordance with desig--nated objectives at the Marine Reserve of La Réunion, Marine Nature Park of Mayotte, Natural Reserve of Mbouzi, Marine Park of Saziley, Glorieuses Archipelago Natural National Reserve and the N'Gouja site. |
| | Public education and awareness programmes and community development and engagement programmes are only in place for the reserves with operational budgets and management plans. Implementation of these plans is however needed. |
| THREATS | Climate change and associated natural disasters pose severe risks to MPAs under French authority. |
| | Illegal extraction that is exacerbated by low socio-economic conditions places biodiversity and ecosystems at extreme risk. |
| | Increasing tourism and recreation is placing pressure on the environment. |
| PRIORITY ACTIONS | Regulations need to be reviewed and updated to control resource use at the Fishing Reserve of Sainte-Rose and the lagoon of Ambato-Mtsangamouji. |
| | Educational and awareness programmes need to be developed and implemented to ensure stakeholder knowledge and understanding of MPA boundaries and regulations on resource use. |
| | Approved management plans, zonation plans and annual plans of operation need to be developed and implemented for the Fishing Reserve of Sainte-Rose (La Réunion), the lagoon of Ambato-Mtsangamouji, biotope of Papani, Marine Park of Saziley and site of N'Gouja. |
| | Budgets that meet operational requirements and needs must be prioritised and secured for Fishing Reserve of Sainte-Rose (La Réunion), lagoon of Ambato-Mtsangamouji, biotope of Papani, Marine Park of Saziley and N'Gouja. Once budgets are secured, operational requirements including ensuring management plans, staff capacity and provision of infrastructure and equipment need to be met. |

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| | Staff development programmes must be put in place that focus on MPA job-specific requirements. |
| | Protection systems that are effective in controlling access and resource use of the MPA in accordance with designated objectives need to be developed and implemented for all MPAs. |
| | Research and monitoring programmes focusing on building biodiversity and ecosystem knowledge need to be developed and implemented across all sites. |
| | A community development programme with set objectives must be drafted and implemented to enhance stakeholder and community relations. This must focus effort on identifying and developing alternative livelihood opportunities for impoverished communities. However, implementation of alternative livelihood projects will need to be addressed by government and other strategic partners. |
| | Zonation plans need to be reviewed and these zones must then be regulated to address increasing pressure as a result of tourism and recreation. |
| KENYA | |
| ASSESSMENT OUTCOMES | Five MPAs were assessed. |
| | Kenya has an effective MPA management system in place for its MPAs. These MPAs are well supported and managed by the Kenyan Wildlife Service. |
| | All MPAs have been officially gazetted. |
| | Marine protected area regulations exist but these do not always address the challenges faced. |
| | Boundaries are clearly demarcated and understood by all stakeholders. |
| | Apart from Mombasa Marine Park and Reserve, all MPAs have management plans in place that are also being implemented. |
| | Budgets currently meet only 50% of the requirements for planned activities. |
| | Annual plans of operation do exist but these are not linked to the management plans. |
| | There are deficiencies in the numbers of available personnel and capacity development of these personnel is not focussed on meeting job requirements. |
| | Major gaps exist in infrastructure and equipment needs and no maintenance schedules are in place. |
| | Biodiversity and ecological knowledge that is supported by a research and monitoring programme is available but this is not being used for management purposes. |
| | Enforcement operations are fully functional and access to marine resources is fairly well regulated. |
| | There is an education programme that is supported by partners but gaps still exist. |
| | Community development programmes exist but implementation varies across the different MPAs. |
| THREATS | High levels of poverty in areas adjacent to MPAs are increasing the risk from illegal extraction and this is further exacerbated by the open nature of the MPA boundaries that makes enforcement difficult. |
| | Increasing levels of tourism and recreation is placing biodiversity and ecosystems at risk. |
| | Climate change is impacting negatively on biodiversity and ecosystem processes and functioning. |
| PRIORITY ACTIONS | An up-to-date and approved management plan needs to be developed and implemented for Mombasa Marine Park and Reserve. |
| | All annual plans of operation need to be linked to the management plans. |
| | Sustainable budgets need to be secured to enable full implementation of required activities. |
| | Staff development programmes need to focus on job requirements with an emphasis on MPA management and MPA law enforcement and compliance. |
| | Biodiversity and ecological knowledge needs to guide management decision-making processes. |
| | Implementation of the educational and community development programmes needs consistent roll out across all the MPAs. |
| MADAGASCAR | |
| ASSESSMENT OUTCOMES | Assessments of 12 MPAs were undertaken. |
| | All the listed MPAs that were assessed in Madagascar have been formally proclaimed. |

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| | Legal mechanisms for controlling inappropriate use and activities exist in all of the MPAs but there are some problems in effectively implementing the rules and regulations. |
| | Marine National Park Nosy Ve Androka, Kirindy Mite National Park, Parc National de Sahamalaza-Iles Radama have no boundary demarcations but boundaries of the other MPAs are known by both the management authorities and the stakeholders. |
| | Approved zonation plans exist but these are only being partially implemented because of funding constraints. |
| | Five-year management plans are in place and these are being partially implemented as budgets allow. Annual plans of operation that are linked to these management plans are also in place and being implemented. |
| | Acceptable budgets are available and secure on an annual basis, but extended funding is required to fully achieve effective management. |
| | Human resource capacity and administrative support is adequate at all sites apart from Masoala Marine Park, Nosy Mangabe National Park and Ambodivahibe MPA. |
| | Capacity development programs do not focus on MPA specific job requirements. |
| | Ankarea MPA and Ankivonjy MPA lack operational infrastructure and equipment and large gaps in actual needs still occur at the other sites. Maintenance of this infrastructure and equipment is inadequate. |
| | Good research and monitoring programmes are in place that provide for sufficient biodiversity and ecological knowledge. |
| | Protection systems are moderately effective in controlling access and resource use within all of the MPAs assessed. |
| | Community development and education and awareness programmes have been developed and are being partially implemented. |
| THREATS | Climate change with its associated increase in natural disasters is highlighted as the greatest threat to Madagascar's MPAs. |
| | High levels of poverty and the general absence of socio-economic opportunities are resulting in high levels of illegal extractive use from MPAs. |
| PRIORITY ACTIONS | An awareness programme that focuses on detailing the MPA boundaries and regulations is required. |
| | Staff development programs need to focus on job requirements and specifically on MPA management training. |
| | Effort must be placed on ensuring the maintenance of all infrastructure and equipment. |
| | Protection systems and law enforcement effort must be maintained and improved on, so as to ensure full compliance with regulations. |
| | Community development programmes must focus effort on identifying and developing alternative livelihood opportunities for impoverished communities. However, implementation of alternative livelihood projects will need to be addressed by government and other strategic partners. |
| REPUBLIC OF MAURITIUS | |
| ASSESSMENT OUTCOMES | 18 sites were assessed. |
| | Effective legal status and area regulations are in place for all MPAs. |
| | All management authorities and stakeholders know the various MPA boundaries, but demarcation is absent in over 65% of cases. |
| | Apart from the Blue Bay Marine Park, there are no zonation plans for the other MPAs assessed |
| | The process of developing management plans has only been recently initiated. |
| | The Ministry of Ocean Economy only provides an adequate budget for nine of Republic of Mauritius' 18 MPAs. |
| | Annual plans of operation have been developed but are not linked to any form of management plan. |
| | Human resource capacity and administrative support is lacking for all the MPAs apart from the Blue Bay Marine Park. Where there are personnel in place capacity development does not focus on MPA-specific job requirements. |

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| | Infrastructure and operational equipment is inadequate for effective MPA management with the exception of the Blue Bay Marine Park. |
| | Further research and monitoring that expand biodiversity and ecological knowledge are required across all of the MPAs. |
| | Protection systems are moderately effective in controlling access and resource utilization. |
| | Although community development and educational and awareness plans have been developed, these have yet to be implemented. |
| THREATS | Increasing frequency and impacts of natural disasters linked to climate change. |
| | Pollution is negatively impacting on MPAs in the Republic of Mauritius. |
| | Illegal extraction of resources is placing risk to biodiversity resources. |
| PRIORITY ACTIONS | Develop and implement management plans and the associated annual plans of operation. |
| | Effort must be made to develop an awareness programme that ensures that MPA boundaries are known and that regulations are clearly understood. |
| | Sustainable operational budgets need to be secured for all the MPAs in the Republic of Mauritius. |
| | Sufficient and properly trained personnel need to be appointed for effective MPA management. |
| | Research and monitoring programmes need to be developed and implemented to enhance suitable understanding of biodiversity and ecosystems so that appropriate decision making is possible. |
| MOZAMBIQUE | |
| ASSESSMENT OUTCOMES | Seven MPAs were assessed. It must be noted that Cabo de São Sebastião Total Protection Zone is under private management and communication is very difficult due to its remoteness and therefore fully credible information on management effectiveness is lacking. |
| | Pomene is currently a terrestrial reserve. Plans and documentation for extension to 3 nautical miles (nm) offshore have been prepared and submitted for approval by the relevant Minister. All other MPAs have been officially designated. |
| | Protected area regulations exist for all sites except the Primeiras and Segundas Environmental Protection Area (PSEPA). |
| | Apart from the PSEPA where no management authority has been appointed, all stakeholders know the MPA boundaries. |
| | Management plans have been developed and are being implemented, though annual plans of operations are generally not linked to these strategic plans. |
| | Pomene National Reserve and PSEPA have no secure budgets while the remaining sites have an acceptable budget that is specific to the MPA, is secure and is guaranteed on an annual cycle, but requires external funding to fully achieve effective management. |
| | Human resource capacity and administrative support systems exists for all MPAs apart from the PSEPA and the Marromeu National Reserve. |
| | Staff development programmes do not focus on job requirements for the MPAs. |
| | Operational infrastructure and equipment is only in place for Quirimbas National Park, Ponta do Ouro Partial Marine Reserve and Bazaruto Archipelago National Park. No maintenance of this infrastructure or equipment is taking place. |
| | Information on critical habitats, species and ecosystems is only available for planning and decision making at Ponta do Ouro Partial Marine Reserve and Bazaruto Archipelago National Park. However, additional information is still required. |
| | Cabo de São Sebastião Total Protection Zone, Ponta do Ouro Partial Marine Reserve and Bazaruto Archipelago National Park are the only sites that have clearly defined enforcement procedures that are being implemented to control unsustainable human activities. |
| | Community development and educational awareness programmes need to be fully developed and implemented. Only partial implementation is taking place on some MPAs. |

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| THREATS | High levels of poverty in areas adjacent to MPAs are increasing the risk from illegal extraction and this is further exacerbated by the open nature of the MPA boundaries that makes enforcement difficult. |
| | Increasing levels of tourism and recreation is placing biodiversity and ecosystems at risk. |
| | Climate change with associated natural disasters is impacting negatively on Mozambique's MPAs. |
| PRIORITY ACTIONS | The 3 nm extension of the Pomene terrestrial reserve needs to be designated. |
| | Protected area regulations need to be developed for the PSEPA. |
| | Management authorities need to be appointed for the PSEPA. |
| | Budgets need to be secured for the Pomene National Reserve and PSEPA. |
| | Annual plans of operations must be linked to the achievement of the management plans. |
| | Human resource capacity to be made available for the PSEPA and the Marromeu National Reserve. |
| | Staff development programmes to focus on job specific requirements and MPA management training. |
| | Operational infrastructure and equipment must be acquired and then maintained for all MPAs. |
| | Clearly defined enforcement procedures that are being implemented to control unsustainable human activities must be put in place for Mozambican MPAs. |
| | Biodiversity and ecological knowledge needs to be expanded and then incorporated into management decision-making. Specific research and monitoring projects need to be developed to enable this. |
| | Community development programmes must focus effort on identifying and developing alternative livelihood opportunities for impoverished communities. However, implementation of alternative livelihood projects will need to be addressed by government and other strategic partners. |
| REPUBLIC OF SOUTH AFRICA | |
| ASSESSMENT OUTCOMES | 24 MPAs were assessed |
| | All MPAs have been officially gazetted and rules and regulations are in place, but implementation of these regulations is usually lacking. |
| | Boundaries of MPAs are well known but infractions do occur, particularly during holiday periods when there is a peak in visitor numbers. |
| | Management plans are in existence for most MPAs but many of these are now out of date and require review and updating. |
| | Implementation of the management plans is dependent on available personnel and budgets. |
| | The Department of Environmental Affairs (DEA) has provided budgets for operational management, but these are inadequate to meet full management requirements. N.B. The Department of Environment, Forestry & Fisheries was created in mid-2019 by the merger of the DEA with the forestry and fisheries components of the Department of Agriculture, Forestry and Fisheries. |
| | Annual plans of operations do exist, but these are not directly related to management plans. |
| | In most cases, South African MPAs lie adjacent to terrestrial protected areas and personnel work across both these systems. This means that implementation of MPA operational objectives is often not achieved effectively. |
| | South Africa has focussed on ensuring regular provision of MPA management training and this has had positive implications for personnel and management effectiveness. |
| | South African MPAs generally have sufficient infrastructure and equipment in place but maintenance does not meet required standards. |
| | Biodiversity and ecological knowledge is sufficient in most cases but is generally not used for management decision-making. |
| | Research and monitoring programmes are in place and at many sites have been long-term in nature. However, analysis of information gathered, and use of the data to inform management is often absent. |
| | A high level of illegal resource use within most MPAs with little effective enforcement taking place. |
| | Community development and education and awareness programmes have been developed but implementation is often lacking. |

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| THREATS | Changing water temperatures and wind patterns together with increased flooding and sediment loads are increasingly being detected and these are early indications of climate change impacts. |
| | Mining is increasingly becoming a major threat for South Africa's MPAs with oil and gas exploration taking place off the Cape and east coasts. |
| | Illegal resource use is rife and authorities do little to tackle the issue. This includes abalone poaching that is driven by gangs involved in organised crime. |
| | Impoverished communities with little likelihood of alternative livelihoods live adjacent to the majority of MPAs. This exacerbates illegal resource use. |
| | There are increasing impacts from urban and agricultural run-off that is entering the MPAs. |
| | High levels of urban development and increasing tourism are placing many of South Africa's MPAs at risk. |
| PRIORITY ACTIONS | MPA management plans need to be reviewed updated, signed off and implemented. |
| | Annual plans of operation that align directly with the management plans need to be developed. |
| | Dedicated and adequate budgets need to be secured for all MPAs so that management goals and objectives may be achieved. |
| | Dedicated MPA personnel need to be appointed to ensure operational implementation. |
| | There is an urgent need to focus attention on addressing illegal activities taking place within MPAs. |
| | Zonation plans for MPAs need to be reviewed and updated and then strict implementation of these plans needs to reduce negative impacts of increasing tourism pressures. |
| | Analysis of research and monitoring needs to be undertaken and this needs to then feed directly into management decision-making. |
| | Community development and educational and awareness programmes need to be implemented. |
| SEYCHELLES | |
| ASSESSMENT OUTCOMES | Ten MPA sites were assessed. |
| | All Seychelles MPAs have been effectively proclaimed. |
| | All MPAs have regulations in place apart from African Banks and Silhouette Marine National Park. |
| | The MPA boundaries of African Banks, Silhouette Marine National Park and Aldabra are poorly known by external stakeholders. |
| | Aldabra Atoll and Cousin Island Special Nature Reserves have effective management systems in place while the remaining protected areas require enhancement of their management systems. |
| | Up to date and approved management plans with annual plans of operation are in place for Aldabra and Cousin Island Special Nature Reserve. Management plans do not exist for other MPAs assessed. |
| | Overall, budgets for MPA management in the Seychelles are considered inadequate and there is a large reliance on external funding. |
| | Suitably qualified, experienced and sufficient personnel lacking for the majority of Seychelles MPAs. |
| | Training plans are developed but are not specific to MPA job requirements and tend to be focussed on administrative rather than operational aspects. |
| | Infrastructure and equipment largely absent for Seychelles MPAs with the exception of Aldabra and Cousin. |
| | Understanding and knowledge of biodiversity and ecological processes are deficient at Ile Cocos Marine National Park, Silhouette Marine National Park, Ste Anne Marine National Park and African Banks Protected Area. |
| | Apart for Aldabra and Cousin Island, there are limited systems in place to ensure protection of resources through effective law enforcement. |
| | Cousin Island has a long-term education and awareness programme in place to bring youth groups to the island. At the other sites, there are some education and awareness activities taking place that largely focus on theme days. |
| THREATS | The primary risk facing the Seychelles suite of MPAs is climate change. |
| | Illegal extractive use that is closely linked to boundary integrity of MPAs is a high risk. |

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| PRIORITY ACTIONS | Implementation of management programmes on Aldabra and Cousin should be considered as examples for other Seychelles MPAs and models of effectiveness need to be replicated. |
| | Regulations need to be put in place for African Banks and Silhouette Marine National Park. |
| | Management plans need to be developed and implemented for all Seychelles MPAs apart from Aldabra and Cousin. Annual plans of operation that are linked to these management plans also need to be developed and implemented. |
| | Capacity development needs to focus on job specific requirements with a specific focus on MPA management and operational training. |
| | Secure and sustainable budgets need to be prioritised for all Seychelles MPAs. |
| | Improved understanding and knowledge of biodiversity and ecological processes is required at Ile Cocos Marine National Park, Silhouette Marine National Park, Ste Anne Marine National Park and African Banks Protected Area. |
| | Effective law enforcement processes need to be developed and implemented across Seychelles MPAs. |
| UNITED REPUBLIC OF TANZANIA: TANZANIA MAINLAND | |
| ASSESSMENT OUTCOMES | Six MPAs assessed. Tanga Marine Reserves System comprises five separate MPAs and Mafia Marine Reserves System comprises three that have, respectively, been clumped and assessed together. |
| | All MPAs have been officially gazetted with rules and regulations and zonation plans being in place. |
| | Boundaries of MPAs legislated but are not demarcated and are not well known by stakeholders. |
| | Management plans exist for four of the assessed MPAs and a process is underway to review and update three of these. The two marine reserve systems lack management plans. |
| | Financial constraints hinder the implementation of the management plan. |
| | Operational budgets do exist, but these largely depend on funds generated by the MPAs themselves. |
| | Annual plans of operations are developed from the management plan and are dependent on available budgets. |
| | There is a general shortage of personnel available for MPA management in Tanzania. Community members and other stakeholders around reserves are used to help management implementation. |
| | Financial constraints hinder the development needs for infrastructure and equipment purchase. |
| | Research and monitoring are in their infant stages and have only recently been initiated and this means that there are gaps in biodiversity and ecosystem knowledge. |
| | Access controls and protection systems are only partially successful. |
| | Defined education and awareness and community development programmes are not in place but these activities are undertaken in an ad-hoc manner. |
| THREATS | Climate change increases the likelihood of natural disasters and storm surges are increasing beach and island erosion. |
| | High levels of poverty in areas adjacent to MPAs are increasing the risk from illegal extraction and this is further exacerbated by the open nature of the MPA boundaries making enforcement difficult. |
| | Mining rights issued by other authorities do not take MPAs into account. |
| PRIORITY ACTIONS | Sustainable budgets need to be secured to enable the roll out and full implementation of required activities. |
| | Education and awareness programmes are needed to inform stakeholders of MPA boundaries and regulations pertaining to access and resource use. |
| | Management plans need to be reviewed and updated for the outstanding reserves. |
| | Budgets need to accommodate the appointment of the required number of personnel and these individuals need to be trained in line with the job requirements with MPA management training being prioritised. Without adequate personnel the MPA management goals and objectives cannot be achieved. |
| | Community development programs and stakeholder engagement needs to be enhanced. |

| UNITED REPUBLIC OF TANZANIA: ZANZIBAR | |
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| ASSESSMENT OUTCOMES | Nine MPAs were assessed. |
| | All MPAs in Zanzibar are afforded the highest possible legal status. |
| | All have regulations in place, except Tumbatu Marine Conservation Area (TUMCA) and Changuu-Bawe Marine Conservation Area (CHABAMCA), though effectiveness of implementation varies. |
| | Management of any form is largely absent in all aspects at the TUMCA and at the CHABAMCA. |
| | The boundaries of the MPAs are known by both the management authority and local residents and are appropriately demarcated. |
| | Zonation plans are not in place for the majority of MPAs. |
| | Management plans have been developed but require updating. These plans are being partially implemented as determined by availability of budget. |
| | Operational budgets are only available for Jozani Chwaka Bay National Park (JCBNP) and Chumbe Island Coral Park (CHICOP). Other MPAs only receive budgets on an ad-hoc basis, which will make any management difficult to implement. |
| | Human and administrative resource capacity is generally adequate but there are some inadequacies in personnel for some of the key positions. |
| | Capacity development and training that is provided does not focus on meeting job requirements. |
| | Operational infrastructure and equipment is available, but there are large gaps in requirements and adequate maintenance of this infrastructure and equipment is lacking. |
| | Although biodiversity knowledge is sufficient for management purposes and is being supported by research programmes, ecological processes are only partially understood. |
| | Only Mnemba Island-Chwaka Bay Marine Conservation Area and CHICOP have effective protection systems in place. |
| | Community development and engagement programmes are in place but are only partially implemented. |
| | Public education and awareness programmes are limited with no overall planning in place for this. |
| THREATS | The impact of climate change according to current and future predictions is listed as being the greatest threat to Zanzibar MPAs. |
| | Illegal extraction that is exacerbated by the low socio-economic status of coastal communities places biodiversity and ecosystems at extreme risk. |
| PRIORITY ACTIONS | Management needs to be implemented at the TUMCA and at the CHABAMCA. |
| | Management plans require review and updating |
| | Annual plans of operation need to be directly linked to the management plans and must be implemented according to budget availability. |
| | Operational budgets for MPAs in Zanzibar need to be prioritised and secured. |
| | Budgets must accommodate for the appointment and job specific training of sufficient personnel for each of the MPAs. |
| | Budget must be obtained to ensure proper maintenance of current infrastructure and equipment and be available to purchase additional equipment that is needed to fill gaps. |
| | A community development programme with clear objectives needs to be drafted and implemented to enhance stakeholder and community relations. This must focus effort on identifying and developing alternative livelihood opportunities for impoverished communities that pose the greatest risk to the marine protected areas. However, implementation of alternative livelihood projects will need to be addressed by government and other strategic partners. |
| | Effective law enforcement and area integrity programmes need to be put in place to successfully protect biodiversity and ecosystem assets. |
| | A national climate change mitigation strategy should be developed that identifies set targets and deliverables for each of the MPAs. |

## Priorities for strengthening MPA management

One of the main benefits of conducting management effectiveness assessments is that it helps to identify weak areas in the MPA management system for possible intervention. Based on a regional assessment, priority actions can be formulated as part of strengthening the management effectiveness for the full benefit of MPAs to be realized. As previous studies have shown (e.g. Gill *et al*., 2017) capacity is one of the main determinants of management success.

To avoid chronic weak management of the MPAs across the region, dedicated, secure and adequate financing is required to facilitate effective management and achievement of goals and objectives. The apparent lack of financial capacity based on the METT survey cascades across all other components of effectiveness, such as poor enforcement due to inadequate and weakly motivated staff, and the weak or absence of infrastructure, research and monitoring, and effective engagement with stakeholders. Consistent efforts are needed by MPA management on site and the supporting government or donor institutions to maintain the necessary funding streams. Often this critical element is underestimated when MPAs are gazetted and this leads to immense challenges which if not quickly overcome can result in the critical weaknesses described above, starting with reduced enforcement leading to continuing illegal harvesting of marine resources.

Effective management of MPAs in the region will require, as one of the main actions, finding ways to secure sustainable financing of these MPAs. Increased budgetary allocation, or a sustainable funding mechanism would facilitate acquisition of skilled and motivated personnel and adequate equipment and infrastructure maintenance. Effective law enforcement and compliance urgently needs to focus on boundary integrity of the MPAs and addressing illegal activities within MPAs. This will reduce excessive and unsustainable resource utilization and thereby increase the benefits that these MPAs will provide. All management plans need to be checked for authorised signoff and to ensure that they are up to date. Management planning review processes need to be implemented across the region. Annual plans of operation need to be developed and linked to the management plans and these must be directly linked to the strategic plans so that identified actions are implemented.

In addition, education and awareness programmes are essential for creating and disseminating information among various stakeholders on boundaries and regulations pertaining to access and resource use. Education and awareness programmes should also be developed to raise awareness on the importance of MPAs and why adherence to regulations is necessary. Because conflicts with stakeholders may arise due to displacement that occurs from MPA zoning, community development programmes that focus on identifying alternative livelihood opportunities for affected communities may be necessary. However, implementation of alternative livelihood projects would require support by the government and/or development partners and should not be left to MPA management authorities alone. Such projects need to form part of government-led broader-scale economic development initiatives.

As research was identified as completely deficient or insufficient in most MPAs, relevant research and monitoring programmes may need to be developed to generate science that can be used to support spatially explicit management decisions. At the same time, regional approaches to addressing common threats need to be developed to limit and address pollution and climate change impacts on MPAs.

A Network of MPA Managers for experience sharing and promotion of shared learning across the region will enhance regional collaboration as countries are at various stages in their MPA management (see WIO-COMPAS programme Case Study on the next page).

CASE STUDY

# A global first: WIO-COMPAS programme for certification of MPA professionals

Lawrence Sisitka

**Assessors and candidates, Toliara, Madagascar.**
© Lawrence Sisitka

In the WIO region various traditional and non-traditional capacity building activities have been implemented. The first Regional Training Course in MPA Management in WIO was held in 2000 and five years later a similar course, but at the country level, was developed by WWF South Africa. However it was recognised that there was still a need to raise the profile and enhance the status of MPA personnel within their own organisations and in the wider conservation arena, and ensure full professionalization of their roles. It was also important to encourage a culture of continuous professional development. A partnership between WIOMSA and the Coastal Resources Centre (CRC) of the University of Rhode Island (URI) was established in 2005 under the SUCCESS programme, funded by USAID. The WIO-COMPAS programme grew out of this partnership in 2007, representing the first ever certification programme for MPA professionals anywhere in the world.

It was agreed that the certification programme would be offered at three levels. The development process entailed the identification of the key competences required, initially for staff directly managing MPAs (Level 2), then for those with particular areas of responsibility within MPAs (Level 1) and finally for those operating at the strategic and policy-making levels (Level 3). The next stage, perhaps the most critical, was identification of appropriate means of assessing the competences at the three levels. It was recognised that a variety of different assessment instruments should be used for each level, as they should resonate with the ways in which professionals at the three levels communicate in the course of their work. For instance, Level 1 includes a practical element, absent from the other two levels. A language policy was also developed which enables Level 1 candidates to be assessed in their first language, the official language of their country or English, whichever they prefer, while Level 2 assessments are in the respective official national languages or English, and Level 3 assessments are only in English. The full package was developed for Level 2 and piloted at the first English language "certification event" in Malindi, Kenya in August 2008, with an event for the Francophone island states held in Antananarivo, Madagascar in July 2009. To date, nine events have been held at Level 1, eight at Level 2 and one at Level 3, with some 88 MPA professionals (MPA PROs) being successful in achieving certification. The programme has undergone considerable refinement over the years and each event is evaluated thoroughly.

The impact of the programme on individual professionals is well documented and often quite profound. In a formal impact assessment conducted in 2012, 95% of Level 1 and 79% of Level 2 MPA PROs claimed they became more confident in the execution of their duties, with 89% of the former and 64% of the latter asserting that involvement in the programme improved their management capabilities (ref). The impact on the effectiveness of management of the regions' MPAs is not yet as clear, although anecdotal evidence suggests that there may already be a link. A process is underway to assess any correlation between the presence of MPA PROs in an MPA management team, and the management effectiveness of the MPA. Considerable interest in the programme has been shown by IUCN and other international conservation organisations with endorsement from WWF South Africa, the Game Rangers Association of Africa (GRAA) and the International Ranger Federation (IRF). At the time of writing, no similar programme has been established anywhere for either terrestrial or marine protected area personnel, and WIO-COMPAS remains the global first – and only!

## CONCLUSIONS

The primary objective of the assessment was to provide guidance to decision makers on problems and priorities with respect to the management of MPAs in the WIO.

Overall, the results of the assessments show that only a few MPAs are being well managed, while most are not effectively managed and have significant deficiencies, in particular with respect to inadequate management, where basic needs are not being met. This may be attributable to the fact that, in some cases, MPAs in the region were not designed for their potential to achieve certain goals as part of national interests and priorities, but were rather established for fisheries management purposes while noting that there has been a shift in the roles of MPAs, from fisheries protection and management, to ecosystem management, and the increasing pressure on ever-depleting marine resources.

The WIO region and the countries falling within its boundaries have a large number of MPAs that have already been designated. The fact that many lack adequate budgets has negative knock-on effects on the provision of adequate management plans, personnel, equipment etc. thus hindering effective management of most of these sites. In addition, poor stakeholder engagement and inclusiveness results in these conservation sites lacking legitimacy amongst user groups and consequently non-compliance.

The absence of management effectiveness can result in these MPAs being regarded as "non-existent" or in other words "paper parks". This factor is of great importance when considering the proclamation of new MPAs that are critically needed across the region (see Part V of this *MPA Outlook*. Meeting the Targets). It is vital to ensure effective management of existing MPAs and guarantying that effective management mechanisms are planned for and put in place for any new MPAs prior to proclamation.

As further management effectiveness studies are conducted, more evidence will be generated on how the standard of MPA management in the WIO can be improved. A targeted programme of MPA assessments accompanied by additional inputs can lead to effective and often dramatic results. Kenya has shown some progress in this regard (see the Case Study on the next page).

Further analysis of available information relating to the severity of threats is needed to better understand the situation. However, it is hoped that this preliminary analysis will be useful in providing an initial picture of threats facing MPAs in the WIO.

Some threats, such as climate change and pollution management are clearly major problems across the entire WIO; such threats warrant systemic policy reform and substantial resource allocation across all WIO countries.

Overall, the results from this study concur with those from other global studies of MPA management effectiveness. The WIO region is by no means unique in having a large proportion of its MPAs failing to deliver effective marine biodiversity and ecosystem protection and local livelihood sustenance. The challenge is to rectify this situation without delay in a structured and progressive manner. The current study indicates a need for further detailed examination of these challenges and the need to effectively address the barriers identified.

Without a committed, focused and consistent approach being taken, these barriers to management effectiveness will persist and escalate thus nullifying the benefits of protection systems. This in turn will lead to biodiversity and ecosystem loss with negative socio-economic impacts.

The seriousness and urgency of the situation cannot be understated, particularly as the aim of this *MPA Outlook* project is to support the signatories of the Nairobi Convention in moving towards meeting the requirements of SDG 14, especially Target 14.2 by 2020; to sustainably manage and protect marine and coastal ecosystems; and 14.5 on increasing the area under protection to 10 percent by 2020.

**Supporting LMMAs in SW Madagascar through seaweed farming interventions.** © Matthew D. Richmond

CASE STUDY

## Kenya: Changes in MPA management effectiveness over time

**Tourists in Mombasa Marine Park exploring the reef crest.** © Arthur O. Tuda

**Arthur O. Tuda**

Between 2014 and 2019, Kenya conducted two assessments in the same MPAs (Kisite, Mombasa, Watamu and Malindi) using the same methodology (METT). A comparison of the first and second assessments showed that effectiveness improved in all MPAs over time following concerted financial support.

Kenya Wildlife Service (KWS) received funding from the World Bank and the Global Environment Facility (GEF), through the Kenya Coast Development Project (KCDP) that supported MPA infrastructural development after the first METT assessment revealed major shortfalls in MPA inputs. The KCDP funding supported improvement of tourism infrastructure and MPA equipment (boats, mooring buoys etc.). In addition, the Western Indian Ocean Marine Science Association (WIOMSA) also funded KWS MPAs to enhance their adaptive capacity.

The WIOMSA funded adaptive management project focused on building knowledge and capacity of MPA staff to: 1) understand ecosystem dynamics and services; 2) feed such knowledge into adaptive management practices and 3), deal with external perturbations, uncertainty, and surprise. After the project, notable changes have been seen in the capacity of MPA managers to address the external human drivers that influence ecological or other outcomes in MPAs (e.g. fishing).

However, some factors, such as likely future changes in habitat conditions, are still not clearly understood and still remain beyond the capacity of most MPA managers to predict and prepare for. More immediate factors such as poor fishing practices in areas bordering MPAs that are currently influencing MPA outcomes are being addressed by taking appropriate management actions (e.g. through compliance management and working with stakeholders through co-management approaches, etc.).

The most dramatic improvements shown between the first and last assessments were in management planning and using research for management. Strong improvement is also seen in the involvement of communities and stakeholders and in the availability and security of funding. Marking or fencing of MPA boundaries, measured in the repeat studies, showed improvement over time. Although significant improvement has been seen in taking strategic management actions, there remains an urgent requirement to implement actions that have a high impact on MPA outcomes at minimal cost as opposed to routine actions that have little impact.

There remain considerable challenges in fully integrating monitoring outcomes into management planning and in developing institutional mechanisms to ensure that knowledge gained is effectively applied in adaptive management. Presently, adaptive management is not a fully-executed management strategy, although significant steps have been made in organizational learning. There is still more that needs to be done to change the operational status quo, which remains a big challenge to building adaptability. Full implementation of adaptive management would involve its application to all aspects of performance management.

## OVERARCHING RECOMMENDATIONS FOR IMPROVING MPA MANAGEMENT EFFECTIVENESS

1. The allocation of dedicated, secure and adequate budgets needs to be prioritized for MPA management. These budgets form the baseline of being able to achieve MPA objectives and mitigate and respond to current identified shortfalls in management effectiveness.

2. Sufficient suitably qualified and experienced personnel need to be appointed to enable management implementation. This can be supported through capacity development programmes that support actual job requirements.

3. All management plans need to be reviewed, updated, adopted and implemented. Annual plans of operation need to be directly linked to these strategic management plans.

4. Adequate equipment and infrastructure need to be acquired, and where this is in place proper scheduled maintenance needs to be planned for and executed.

5. Proactive law enforcement and compliance strategies urgently need to focus on ensuring boundary integrity of the MPAs and on addressing illegal activities within MPAs.

6. Relevant research and monitoring programmes need to be developed that improve understanding of biodiversity and ecosystems to inform management decision-making.

7. Education and awareness programmes need to be developed that raise awareness of the boundaries of the MPAs and the importance of these areas, and why adherence to regulations is necessary. Focussed attention must be given to garnering support from government agencies and policy makers.

8. Community development programmes should focus on identifying and developing alternative livelihood opportunities for impoverished communities.

9. The development of a comprehensive regional monitoring programme to continuously evaluate management effectiveness and to facilitate adaptive management is vital.

The findings of this analysis and the interest in improving management effectiveness in the WIO region represent a timely opportunity to develop regional interventions that can assist the currently designated MPAs. Furthermore, they can play a critical role in drawing much needed higher-level government attention to the current situation, and ensuring that there is sufficient capacity and ability to effectively manage any sites that may be proclaimed in the future.

The approaches available to address these key recommendations and opportunities to develop regional mitigation measures that can then be filtered down to country and site level will be further elaborated in the forthcoming volume in the series, *MPA Recommendations Outlook*.

Those working on strengthening capacity must also consider the higher levels of governance where effort is needed to strengthen both capacity and commitment.

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**Annex Table 1: Snapshot assessment questions and associated scoring categories.**

| QUESTIONS | CRITERIA | VALUE |
|---|---|---|
| **1. Legal Status**<br><br>Does the MPA have secure permanent conservation legal status in terms of relevant legislation? | The MPA's conservation status is not secured by its current legal status. | 0 |
| | There is a formal agreement that the MPA should be afforded the highest possible legal protection relevant to the authority, but the process has not yet begun. | 1 |
| | The MPA is in the process of being afforded the highest possible relevant legal protection. | 2 |
| | All properties managed as part of the PA have been declared and listed as per legislative requirements. | 3 |
| **2. Protected Area Regulations**<br><br>Are there legal mechanisms in place to control inappropriate activities? | There are no legal mechanisms for controlling inappropriate use and activities in the MPA. | 0 |
| | Legal mechanisms for controlling inappropriate use activities in the MPA exist but are not being implemented. | 1 |
| | Legal mechanisms for controlling inappropriate use and activities exist in the MPA exist but there are some problems in effectively implementing them. | 2 |
| | Legal mechanisms for controlling inappropriate use and activities in the MPA exist and are being effectively implemented. | 3 |
| **3. Marine Protected Area Boundary Demarcation**<br><br>Is the boundary known and appropriately demarcated? | The boundary of the MPA is not known by the management authority or local residents/neighbouring land users. | 0 |
| | The boundary of the MPA is known by the management authority but is not known by local residents/neighbouring land users. | 1 |
| | The boundary of the MPA is known by both the management authority and local residents and is appropriately demarcated. | 2 |
| | The boundary of the MPA has been surveyed and is known by the management authority and local residents and is appropriately demarcated. Any deviations have been recorded in a legally binding document. | 3 |
| **4. Conservation Development Framework (CDF)**<br><br>Is there a zoning system in place indicating visitor use zones, and positioning and nature of operational and visitor infrastructure. | There is no CDF for the MPA. | 0 |
| | A CDF is being prepared or has been prepared but is not being implemented. | 1 |
| | An approved CDF exists but it is only being partially implemented because of funding constraints or other problems. | 2 |
| | An approved CDF exists and is being implemented. | 3 |
| **5. Management Plan**<br><br>Is there an up to date and approved management plan in place with clear objectives and does the management plan incorporate both biophysical and socio-economic scientific information in planning process? | There is no Management Plan for the MPA. | 0 |
| | A Management Plan is being prepared or has been prepared but is not yet approved. | 1 |
| | An approved Management Plan exists and is being implemented but has not been updated/reviewed during the past five years. | 2 |
| | An approved Management Plan exists, is being implemented & has been updated/reviewed during the past five years. | 3 |
| **6. Implementation of Management Plan**<br><br>Is the management plan being implemented? | The Management Plan is not being implemented and is unlikely to be implemented in the year (or there is no management plan). | 0 |
| | The Management Plan is not being implemented but is scheduled for implementation in the next year. | 1 |
| | The Management Plan is being partially implemented. | 2 |
| | The Management Plan is being fully implemented. | 3 |

| QUESTIONS | CRITERIA | VALUE |
|---|---|---|
| **7. Operational Budget**<br><br>Is there a dedicated, secure and adequate budget for the MPA? | There is no secure budget for the MPA. | 0 |
| | There is a budget, but it is only available on an ad hoc basis or the budget is not specific to the MPA which must depend on an allocation of funds from a centralized budget. | 1 |
| | An acceptable budget, specific to the MPA, is secure and guaranteed on an annual cycle, but external funding is required to fully achieve effective management. | 2 |
| | The available budget is guaranteed, secure and sufficient and meets the full management needs of the MPA without external funding. | 3 |
| **8. Annual Plan of Operation (APO)**<br><br>Is there an annual plan of operations in place and is this measured and reported on – (Does the plan provide adequate direction on management actions that should be taken? | No approved/standardized APO exists. | 0 |
| | An APO exists but activities are not linked the two MPA's Strategic Management Plan's targets. | 1 |
| | An APO exists and actions are linked to the MPA's Strategic Management Plans targets. | 2 |
| | An approved APO exists, and actions are linked to the MPA's Strategic Management Plans targets. | 3 |
| **9. Administrative Support Systems**<br><br>Are the administrative systems supportive of effective management? | Administration support systems are poor and significantly undermine effectiveness. | 0 |
| | Administration support systems are poor and constrain effectiveness. | 1 |
| | Administration support systems are adequate but could be improved. | 2 |
| | Administration support systems are excellent and fully support effectiveness. | 3 |
| **10. Human Resource (HR) Capacity**<br><br>Does the MPA have sufficient HR capacity to manage the protected area? | The MPA has no HR capacity. | 0 |
| | HR capacity is inadequate for critical management activities. | 1 |
| | HR capacity is sufficient, but there are some deficiencies for critical management activities. | 2 |
| | HR capacity meets with approved staffing levels and is adequate for management needs. | 3 |
| **11. Staff Development Programmes**<br><br>Is there an effective staff development programme in place? | There is no training programme. | 0 |
| | There is some training, but it is not focused on job requirements. | 1 |
| | There is a training programme that focuses on the needs of the individual staff members to make them more effective. | 2 |
| | Training equips the staff their tasks and an individual career path has been determine for each staff member. | 3 |
| **12. Operational Infrastructure**<br><br>Is infrastructure required operational management purposes (excluding tourism/visitor facilities) adequate and functional? | There is little or no operational infrastructure. | 0 |
| | There is some infrastructure, but it is wholly inadequate. | 1 |
| | There is equipment and infrastructure, but still some major gaps that constrain management. | 2 |
| | There is adequate operational infrastructure. | 3 |
| **13. Functionality of Infrastructure**<br><br>Is infrastructure (including tourism/visitor facilities) adequately maintained? | There is no maintenance taking place. | 0 |
| | There is a maintenance schedule, but not all maintenance is taking place. | 1 |
| | There is a maintenance schedule and maintenance, and most is taking place. | 2 |
| | There is an approved maintenance schedule that is being fully implemented. | 3 |

| QUESTIONS | CRITERIA | VALUE |
|---|---|---|
| **14. Operational Equipment**<br><br>Is equipment required for operational management purposes adequate and functional? | There is little or no operational equipment and infrastructure. | 0 |
| | There is some equipment & infrastructure, but these are wholly inadequate. | 1 |
| | There is equipment and infrastructure, but still some major gaps that constrain management. | 2 |
| | There is adequate operational equipment and infrastructure. | 3 |
| **15. Maintenance and Functionality of Operational Equipment**<br><br>(as required for operational management purposes) | There is no maintenance taking place. | 0 |
| | There is a maintenance schedule, but not all maintenance is taking place. | 1 |
| | There is a maintenance schedule and maintenance, and most is taking place. | 2 |
| | There is an approved maintenance schedule that is being fully implemented. | 3 |
| **16. Biodiversity knowledge and understanding**<br><br>Does the MPA have enough information and understanding to effectively manage the biodiversity? | There is little or no information available on critical habitats, species and ecosystems of the PA. | 0 |
| | Information on critical habitats, species and ecosystems is not sufficient to support planning and decision making. | 1 |
| | Information on critical habitats, species and ecosystems is sufficient for planning/decision making, but additional information is required. | 2 |
| | Information concerning critical habitats, species and ecosystems of the MPA is sufficient to support planning and decision making and is being maintained. | 3 |
| **17. Ecological Processes**<br><br>Does MPA management effectively maintain the ecological processes critical for the achievement of biodiversity targets? | Ecological processes are not being maintained with the result that ecological integrity and biodiversity are being compromised. | 0 |
| | Ecological processes are only partially maintained with the result that ecological integrity and biodiversity are being partially compromised. | 1 |
| | Ecological processes are being adequately maintained through process simulation, requiring further management interventions to improve ecological integrity and biodiversity. | 2 |
| | Ecological processes are being effectively maintained with the result that ecological integrity and biodiversity are not being compromised. | 3 |
| **18. Research Programme**<br><br>Are there research and monitoring projects that take into consideration both biological and social aspects and that are relevant to the management of the MPA being undertaken? | Research and monitoring needs have not been identified nor is any research or monitoring work taking place in the MPA. | 0 |
| | Research and monitoring needs have been identified, but other than for ad hoc research and monitoring, no management orientated research and monitoring is being done. | 1 |
| | There is considerable research and monitoring work but only limited "management" orientated research and monitoring is being done. | 2 |
| | There is considerable research and monitoring work being undertaken, which is relevant to management needs and monitors the results of management actions. | 3 |
| **19. Protection Systems**<br><br>Are there clearly defined enforcement procedures and are they being implemented and are the mechanisms sufficient to control unsustainable human activities? | Protection systems (patrols, permits entry gates etc.) are ineffective in controlling access or use of the MPA in accordance with designated objectives. | 0 |
| | Protection systems are only partially effective in controlling access or use of the MPA in accordance with designated objectives. | 1 |
| | Access systems are moderately effective in controlling access or use of the MPA in accordance with designated objectives. | 2 |
| | Access systems are largely or wholly effective in controlling access or use of the MPA in accordance with designated objectives. | 3 |

| QUESTIONS | CRITERIA | VALUE |
|---|---|---|
| **20. Public Education, Awareness and Communication Programme**<br><br>Is there a planned education, awareness and communication programme? | There is no education, awareness and communication programme. | 0 |
| | There is a limited and ad hoc education awareness and communication programme, but no overall planning for this. | 1 |
| | There is a planned education, awareness and communication programme but there are still serious gaps. | 2 |
| | There is a planned and effective education, awareness and communication programme fully linked to the objectives and needs of the PA. | 3 |
| **21. Community Partners**<br><br>Does the protected area have a community development and engagement program with set measurable objectives to enhance stakeholder and community relations? | There is no community development program. | 0 |
| | A community development program has been developed but has not been implemented. | 1 |
| | A community development program has been developed and is being partially implemented. | 2 |
| | A community development program has been developed and is being fully implemented with annual updating. | 3 |

**Annex Table 2: Threats and pressures questionnaire.**

| # | PRESSURE/THREAT | DESCRIPTION |
|---|---|---|
| 1. | Climate change | The impact of climate change according to current and future projections on biodiversity in the MPA. Explain details - increased water temperatures, storm damage etc. |
| 2. | Mining and mining rights extraction of non-renewable resources | Mining and mining rights on the boundary and in the marine protected area. Mining rights issued by other authorities without consideration of the MPA. Oil & gas, phosphates, diamonds, sand extraction, etc. |
| 3. | Illegal extraction or use of resources (poaching) both internal and external | Poaching – illegal removal of species and non-biotic resources. |
| 4. | Marine Protected Area Isolation & fragmentation | The marine protected area is isolated from other natural areas and the lack of connectivity makes the long-term sustainability difficult. |
| 5. | Socio-economic levels in adjoining areas | The low levels of socio-economic conditions are such that the local population places great pressure on the legal and illegal use of resources. There are unrealistic expectations of benefits from marine protected areas. |
| 6. | Pressure on resources | The demand for the legal use of resources is under pressure (often political) for more delivery to local communities leading to unsustainable levels being reached. Management is unable to effectively monitor extractive use. |
| 7. | Boundary integrity | The open access system or the nature of the boundary makes control over illegal access and activities very difficult to apply. This is linked to low socio-economic levels in the surrounding areas. |
| 8. | Invasive alien species | Non-indigenous and indigenous plants and animals which establish and advance aggressively and out-compete natural indigenous vegetation and animals, resulting in dense infestations. |
| 9. | Legal status | The current legal status does not afford long term protection or does not allow for effective management particularly law enforcement. |
| 10. | Pollution | Pollution from outside of marine protected area - includes heavy metals, agricultural runoff, siltation, plastic, etc. |

# PART V:
# MEETING THE GLOBAL GOALS & MARINE BIODIVERSITY CONSERVATION TARGETS

Matthew D. Richmond, Vera Horigue, Joseph Maina and Arthur O. Tuda

# INTRODUCTION

## Background

A regional approach to formulating strategies to address global goals and international biodiversity conservation targets is important to increase the effectiveness of environmental management activities undertaken by countries. This is also especially important for those countries with shared ecosystems and disparate contexts. By aligning country-level conservation interventions at the regional level, neighbouring states are encouraged to coordinate and work together to achieve environmental management objectives more efficiently and effectively, particularly since coastal and marine ecosystems extend beyond government jurisdictions. Hence, as part of the United Nations Environmental Programme (UNEP) Nairobi Convention Conference of Parties (COP) decisions, the Contracting Parties in the Western Indian Ocean (WIO) committed to enhance collaboration in the region.[1] One of the decisions made by the Contracting Parties was to periodically create and share reports on the status of conservation initiatives and coastal and marine environments. This *MPA Outlook*, reflects the commitment of WIO countries to strengthen conservation initiatives in the region.

This *MPA Outlook*, led by the UNEP–Nairobi Convention in partnership with the WIO member states and other institutions, aims to measure and present the progress of individual countries and the region in achieving the Convention on Biological Diversity (CBD) 2020 Aichi Targets and the United Nations 2030 Sustainable Development Goals (SDG). More specifically, this volume presents the progress of the Nairobi Convention Contracting Parties to achieving Aichi Target 11 (conservation of 10 percent of coastal and marine areas) and SDG 14 (Life Below Water), through an assessment of the status and implementation of marine protected areas (MPAs) across the WIO region.

This *MPA Outlook* is the first volume in a planned series of regional reports, that presents the latest information about MPA implementation in WIO countries. Producing regular status reports will be of great value to the member states, because it promotes and encourages them to practice transparency and accountability when governing transboundary resources and ecosystems in the WIO, in addition to enhancing shared learning.

## Review of sections presented in the *MPA Outlook*

This *MPA Outlook* is divided into five parts. Parts I and II describe the process, methods, limitations and the international and regional contexts that served as the impetus to develop this report. Part III is a compilation of country reports on the status, challenges, and trends on MPA establishment and management. This section includes ten chapters for nine WIO states, including two separate reports for the United Republic of Tanzania (URT) mainland (hereafter Tanzania) and Zanzibar. These chapters, written by country representatives, present valuable information on MPAs (e.g., governance arrangements, year established, total area, species and habitats protected), and some insights about MPA management. The last section in Part III analysed the MPA data presented from the country chapters and presented the progress of each country in terms of achieving the Aichi Target 11 and SDG14.5, which both aim to conserve at least 10 percent of coastal and marine areas.

By synthesising the MPA country chapters, Part III also discusses key lessons learned and main challenges experienced by each WIO country related to MPA planning and establishment. This section leads to Part IV, which summarises and analyses the results of the MPA management effectiveness assessment by each country. Moreover, in Part IV, a more detailed discussion on MPA best practices and further needs for improvement were described for each country.

## Purpose of this chapter

This final section or Part V of this *MPA Outlook* is primarily intended to review and analyse the progress made at the regional level towards achieving Aichi Target 11 and SDG 14. The findings are based on the previous sections of this report, and also used the WIO MPA Database to summarise the relevant data. Currently, the development and maintenance of the WIO MPA database are supported by the clearing house mechanism of the UNEP Nairobi Convention.[2] This section also aims to present

[1] The specific decisions that support regional cooperation, collaboration, and support (CP.9/13), and the development of MPA and Critical Habitats Outlooks (CP.9/11) are available from https://www.unenvironment.org/nairobiconvention/events/conference/ninth-conference-parties-nairobi-convention

[2] See https://www.nairobiconvention.org/clearinghouse/node/410 to view and learn more about the clearing house mechanism and its database.

recommendations on potential approaches to advancing the establishment of MPAs, monitoring, reporting, and management from individual governance units and countries, to the entire WIO region. Moreover, this section also presents preliminary recommendations, as well as outlining priorities for further action and other important opportunities beyond 2020, in light of the ongoing discussions on the new Global Biodiversity Framework (GBF) under the CBD, and the comprehensive review of the SDG targets by the Inter-Agency and Expert Group organised by the UN. Lastly, this section sets the scene for forthcoming reports – the *Critical Habitats Outlook* and *Recommendations Outlook*, which will provide more detailed spatial analyses and ideal scenarios on MPAs and coastal and marine ecosystems in the WIO, and recommendations for improving MPA design, management, and ocean governance overall for the region.

# REVIEW AND SUMMARY OF REGIONAL PROGRESS ON MPAS

## Reconciling the Aichi Biodiversity Targets (2020) and SDGs (2030)

Launched in 2010, the Aichi Biodiversity Targets serves as the overarching framework for the conservation and management of biodiversity for all the countries in the United Nations. It presents targets and some guidance as to how to address such objectives. The SDGs, on the other hand, provides a general list of development goals to address broader needs to eradicate poverty and improve human well-being whilst conserving the Earth's natural resources. Though broader than the Aichi Biodiversity Targets and adopted five years later, the SDGs recognise the important role of maintaining biodiversity to sustain human well-being. Some of the environmental indicators described in the SDGs echo and expand on the Aichi Targets.

Both the Aichi Target 11 and SDG Targets 14.2 and 14.5, recommend conservation and effective management of at least 10 percent of coastal and marine areas by 2020. Whilst the Aichi Target 11 indicators provided some guidance on how to protect coastal and marine resources using MPAs, it is not explicit enough to help governments plan and implement conservation and other related management plans. To clarify this target, the 46th Session of the United Nations Statistical Commission (UNSC, 2015), described Indicator 14.5.1 and prescribed placement of 10 percent of each country's exclusive economic zone (EEZ) in MPAs. Hence, the Contracting Parties to the Nairobi Convention agreed to use this definition during the inception meeting for the *MPA Outlook* in Seychelles in June 2017. This was reflected in the analyses in Part III, and is summarised in the next section (Part V below). In terms of management, the international agreements did not specify the target to be achieved nor explicitly define "effective and sustainable management". Hence, in this section and Part IV, the Management Effectiveness Tracking Tool (METT) (Hockings *et al.*, 2000; Stolton and Dudley, 2016) was used to understand the current status of MPAs, specifically the strengths and weaknesses in management. Moreover, the assessment also identified the major threats to MPAs that could lessen their impact to conservation and described priorities for action to guide investments accordingly.

## Regional progress in achieving conservation objectives

Significant progress has been achieved in the region towards the CBD biodiversity conservation targets and goals when examined against previous assessment and studies (e.g. Francis *et al.*, 2002; Wells *et al.*, 2007; UNEP-WCMC, 2008). Looking closely at the elements described in Aichi Target 11, there are clear gaps that need more attention to improve the effectiveness of MPA design and management in the region. Table 1 presents a summary of the progress made towards achieving the different elements of Aichi Target 11. The results presented in Table 1 are further explained in the succeeding sections below.

## Regional coverage

Significant positive changes in numbers and coverage of MPAs have occurred in the WIO over the last two decades. In the early 1990s there were only a few coral reef MPAs in Kenya, Tanzania, Mozambique and Seychelles (Wells *et al.*, 2007). As of 2019, a total of 143 MPAs were recorded from the participating countries in this *MPA Outlook* (Figure 1). This represents the protection of 555 437km$^2$ or 7 percent of the combined EEZ (see Part III as to how these estimates were derived). Since the 1950s, MPA establishment in the region was slow and often protected relatively smaller areas (i.e., 1s to 10s km$^2$) (Figure 2). These started to expand in the 2000s, particularly from 2010, when governments exerted more effort in establishing more and much larger MPAs (i.e., from 100s to 10 000s km$^2$). This coincided with the launch of the Aichi Targets, consequently serving as the institutional catalyst for governments to expand their efforts.

Since the launch of the Aichi Targets, 46 MPAs have been established across the region and with more areas

Table 1. Summary of progress in the Western Indian Ocean region towards each element of Aichi Target 11.

| ELEMENTS | PROGRESS AT THE REGIONAL LEVEL IN 2019 |
|---|---|
| REGIONAL COVERAGE | The total number of MPAs established (Part III) has increased significantly. Currently, 7 % of the total EEZ in the WIO region is protected in MPAs. The observed increase in MPA coverage reflects the new designations and indicates improved reporting by countries. |
| AREAS OF IMPORTANCE FOR BIODIVERSITY AND ECOSYSTEM SERVICES | There has been some progress in protecting important areas for biodiversity and ecosystem services (Part III). The majority of the MPAs protect nearshore habitats such as mangroves, seagrass beds and coral reefs that are important to coastal populations. The MPAs established are also notable for protecting a variety of endemic and endangered species in the WIO. |
| ECOLOGICALLY REPRESENTATIVE | Coastal habitats are relatively well-represented in the region, because the majority of MPAs were established nearshore. Currently, a total of ~4,750 km or 17 % of total coastline of the WIO is protected (see Part III, Table 3). Portions of offshore areas are also protected, which are mostly due to the recent expansion of MPAs in Seychelles and South Africa (see Part III, Table 2). However, significant steps are still required to address the conservation of offshore areas and deep-sea habitats in other countries. |
| EFFECTIVELY MANAGED | The development of this *MPA Outlook* facilitated the first management effectiveness assessment of MPAs in the region (~68% of the total number of MPAs). Results of the assessment showed that the majority of the MPAs evaluated were not well-managed. Despite these shortcomings, the assessment allowed systematic identification of strengths and weaknesses of MPA management. |
| EQUITABLY MANAGED | There is very little progress made on measuring equity, including gender equality, in MPA management and outcomes. Only a few MPAs have been assessed but the information was not available at the time of preparing this report. Further research and development is required. |
| CONNECTIVITY | There are very few initiatives that considered protection of ecological connectivity in the region. A recent study (Maina *et al.*, 2020) suggested that the links across established MPAs are weak, and require further efforts from governments to increase protection in the region and to consider distances, spacing and ocean currents in MPA design. |
| OTHER EFFECTIVE AREA-BASED CONSERVATION MEASURES (OECM) | Although community-managed marine areas are currently under-represented in the regional MPA database used to assess the regional progress towards the Aichi Target 11, they play an increasingly important role in protecting biodiversity and ecosystem services. Currently, there are 173 existing and proposed community-based management initiatives, which translate to protection of at least 1600km$^2$ of nearshore habitats. A supporting policy framework needs to be developed across countries to help facilitate capacity building of local managers and leverage resources. Additionally, a mechanism needs to be developed to formally recognise the contributions of these community managed areas in the overall MPA achievements by the countries. |
| INTEGRATED IN THE WIDER LANDSCAPE AND SEASCAPE | Only Seychelles and South Africa have developed marine spatial plans that integrated MPAs into relevant policies. Integration of MPAs and OECM into the wider seascape is a priority area for the region and experience from these two countries provide a great opportunity for shared learning across the region, while appreciating specific country contexts. |

proposed for conservation. Though it is not always the number of sites, but rather the protected area covered that is important. From time to time, MPAs may be merged for many reasons; thus, the total MPA number for a country may come down, while the area protected remains unchanged. In the last few years, this has happened in South Africa and the French Territories. Currently, there are 14 proposed MPAs in the region covering a potential area of more than 50 000km$^2$. These proposed MPAs have undergone substantial assessments and public consultations and will be legally established soon.

Although more work is to be done to increase protection of biodiversity further, countries in the WIO are expanding their efforts beyond the 2020 CBD targets. For example, some countries applied marine spatial planning to integrate conservation efforts and manage the ecosystem services that WIO constituents benefit from (see Part III – Seychelles, South Africa and Kenya for more details). Integrating conservation plans into broader spatial plans is very important in the WIO because it can avoid the threats that could reduce the effectiveness of MPAs.

## Areas of importance for biodiversity and ecosystem services

The majority of the MPAs recorded in Part III protect nearshore habitats that are important to coastal populations. These coastal habitats include mangrove forests, coral reefs and seagrass beds. An analysis of the legislation and information presented in Part III, shows that mangrove are the most protected habitats in the region, because most of them are managed under

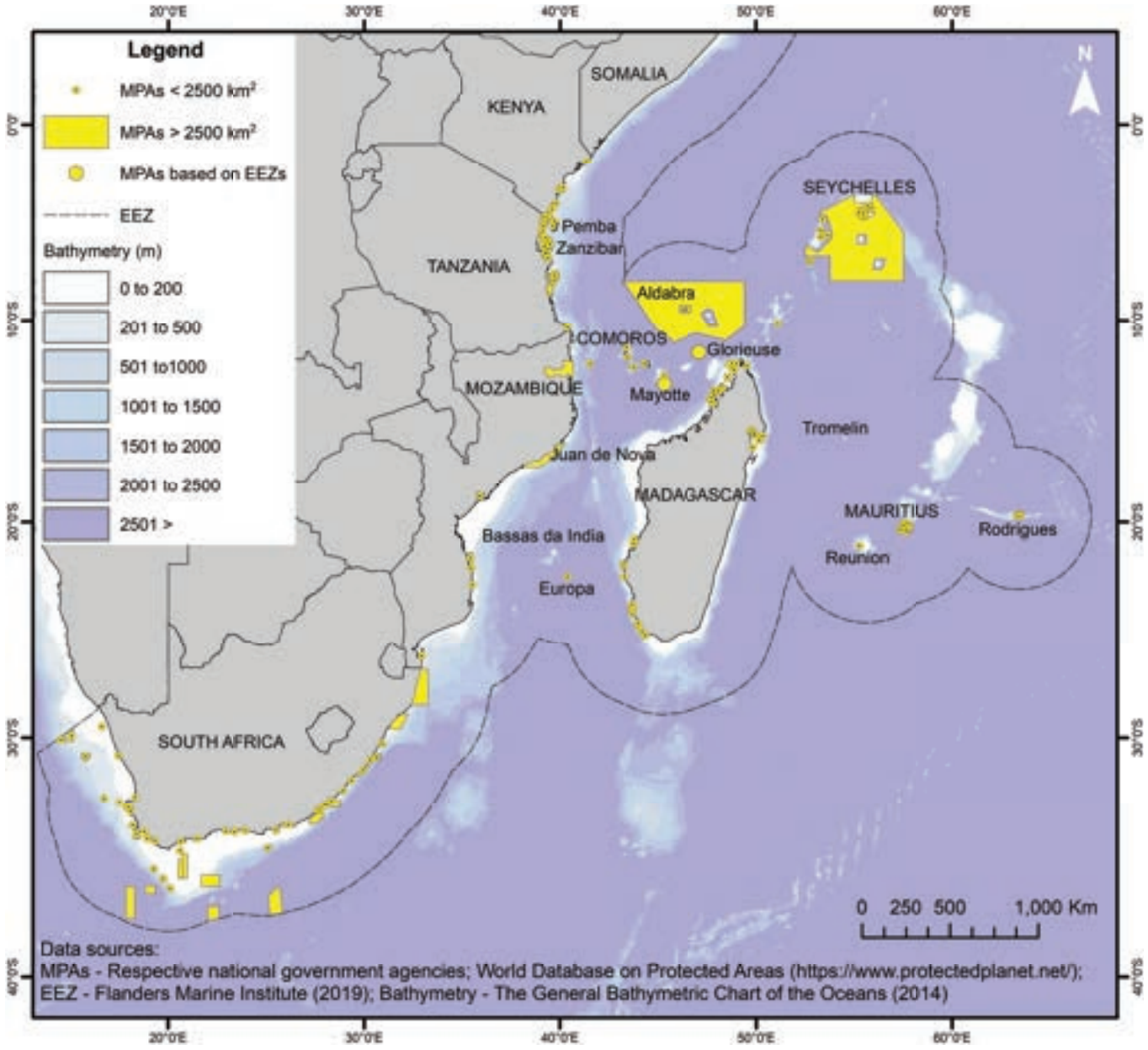



Figure 1. Established MPAs in the WIO region. Note: this map excludes the Prince Edward Islands MPA in South Africa, mangrove forest reserves, and locally-managed MPAs as described in Part III.

national forestry laws aside from MPAs. Coral reefs were the second most protected ecosystem in the region, due to biases in conservation and management initiatives, because of their importance to fishing communities and tourism potential. Although some MPAs covered seagrass beds and other coastal habitats in South Africa, greater efforts are still needed to protect larger areas of these biodiverse habitats.

The habitat types that were least protected were offshore features, which include seamounts and banks. The only countries that protected large proportions of offshore areas were Seychelles, the French territories and South Africa (see Part III, Table 2). This is understandable because it requires considerable financial, technological and human resources to manage these offshore MPAs, particularly when coastal and nearshore MPAs are still not effectively managed due to the same constraints across many countries (Figure 3). There will need to be a pragmatic balance between the spatial expansion of MPAs and effective management. It is important that as WIO countries invest in the expansion of MPAs, these investments need to be matched with appropriate management resources. Most of the WIO MPAs still have significant management issues (Figure 3); therefore, it is probably best for more investments to be in management

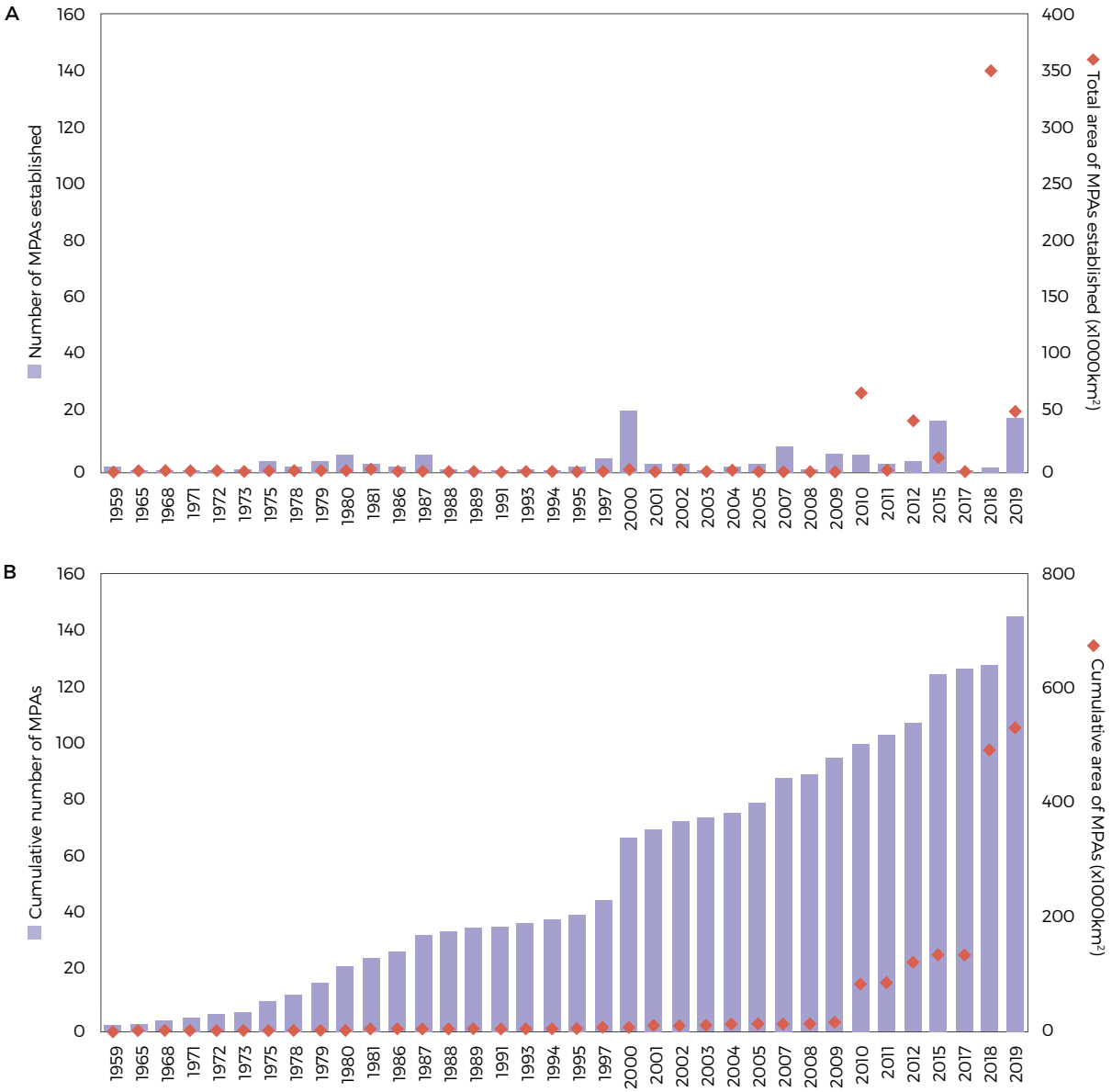



**Figure 2. Established (A) and cumulative (B) number and area of MPAs in the WIO from 1959 to 2019. Note: these graphs exclude the Prince Edward Islands MPA in South Africa, mangrove forest reserves, and locally-managed MPAs as described in Part III.**

before any further expansion. Effective management can provide immediate biodiversity benefits, and thus management should be considered just as important as expansion.

In addition to protecting coastal and marine habitats and the diversity of associated species, MPAs in this region also contribute to the protection of endemic and/or endangered species found in the WIO. These include the Coelacanth (*Latimeria chalumnae*) in Tanzania's most recently proclaimed Tanga Coelacanth Marine Park, and the endangered Coconut crab (*Bigrus latro*) and the Roseate tern (*Sterna dougallii*) in the Chumbe Island Coral Park in Zanzibar. The Bazaruto Archipelago in Mozambique is also home to possibly the largest remaining population of the dugong (*Dugong dugon*) in the entire region. Some of the MPAs in South Africa protect several key species ranging from several critically endangered albatross species and Leatherback turtles (*Dermochelys coriacea*), Southern right whales, the African penguin (*Spheniscus demersus*) and the red-listed endemic aquatic plant P*seudalthenia aschersoniana*. In Madagascar, some of the MPAs protect critical habitats of the endemic fish eagle (*Haliaeetus vociferoides*), big-headed turtle (*Erymnochelys madagascariensis*), and Madagascar teal (*Anas bernieri*). The MPAs in Seychelles

were also established to conserve the critically endangered Hawksbill turtle (*Eretmochelys imbricata*), and the endangered Green turtle (*Chelonia mydas*), and a growing population of dugongs that were initially thought to be locally extinct. Apart from representing habitats that are important to different species, the MPAs in Tanzania, Kenya, South Africa and Mozambique also protect key turtle nesting sites that most likely sustain the WIO turtle population. In addition to aquatic species, some of the MPAs also protect globally significant seabird nesting sites for frigate birds (*Fregata* spp.), terns (*Sterna* spp.), boobies (*Sula* spp.), and shearwaters (*Puffinus* spp.).

Representing the diversity of coastal and marine habitats and species in MPAs is crucial to sustaining the numerous ecosystem goods and services that people depend on. In Part III, the individual country reports presented the benefits and values of coastal communities that directly access these valuable ecosystems and also support protection of MPAs and even locally-managed marine areas (LMMAs). Coastal communities in the WIO depend largely on fisheries resources and utilise ecosystems for their cultural, recreational, and educational value.

## Ecological representativeness

Evaluating the achievement of habitat representation targets across the WIO requires spatial analysis. Since the available spatial data on various coastal and marine ecosystems for the region was still limited, a regional analysis of how well MPAs represent the full range of habitat types across the different ecological scales in the WIO was not yet possible. This is a clear gap that needs to be addressed to fully report on the Aichi Target 11 achievements. Currently, efforts are being made to collect and analyse relevant data, which will be presented in the forthcoming *Critical Habitats Outlook*.

Despite the lack of spatial analyses to determine ecological representativeness, the estimates in Part III showed that nearshore habitats (i.e., mangroves, coral reefs and seagrass beds) were relatively well-represented in the region, because most MPAs were established along the coast. This contributed to the protection of ~4720km or 17 percent of the East African coastline (see Part III, Table 3). This finding reflected biases in protection, since nearshore MPAs are easier to enforce than offshore MPAs. Moreover, protecting pelagic waters and deep-sea benthic features are more difficult to plan and manage, because most people, including lawmakers, do not understand the value of ecosystems and habitats that they do not see or know about. Hence, as mentioned in the previous section above, more efforts are needed to increase the representation of nearshore habitats, and even greater effort to protect offshore features.

Establishing offshore MPAs, those that are unconnected to the coastline or have boundaries that extend from the coast to offshore areas and beyond territorial waters, can contribute to meeting the Aichi Target 11. Although establishing and managing coastal MPAs is less difficult than offshore MPAs, they are still insufficient to contribute to achieving representation targets because they tend to be small and can be severely impacted by land-based threats and coastal activities. Protecting offshore features such as the North Kenya Banks, Tanzania's Pemba Channel and Latham Island (seamount), the Republic of Mauritius' Carajos Cargados Bank (Mascarene Ridge), the northern Mozambique Channel area, etc., will ensure comprehensive representation of biodiversity and meet international targets.

Although the common practice is to establish MPAs at the country-level, it would also be worth considering representing the full range of habitat types in each marine ecoregion in the WIO. Marine ecoregions are spatial representations of broad-scale patterns of species and ecological communities, which is defined in the global biogeographical classification of coastal and shelf areas by Spalding *et al.* (2007). According to the authors, there are nine marine ecoregions in the WIO, which extend from the Southern Somali coast to the northeast of South Africa near the Mozambique border. These should inform ongoing expansion of MPAs, including potential establishment of transboundary MPAs.

## Evaluating MPA management effectiveness

A management effectiveness assessment was conducted for 101 MPAs from nine WIO countries in 2019 (see Part IV for details). Country authors that contributed to Part III worked with local managers to undertake a self-assessment of their MPAs using the Management Effectiveness Tracking Tool (METT) (Hockings *et al.*, 2000; Stolton and Dudley, 2016). Results showed that most of the MPAs assessed still need to strengthen their management practices. In terms of indicators, the majority of MPAs evaluated have legal bases for the establishment and set protected area regulations (Figure 3). However, there is still much to be done to maintain the MPAs in the region, because the ratings for the other 19 indicators were still relatively low.

Of all the management concerns documented, the four most critical challenges that required urgent attention

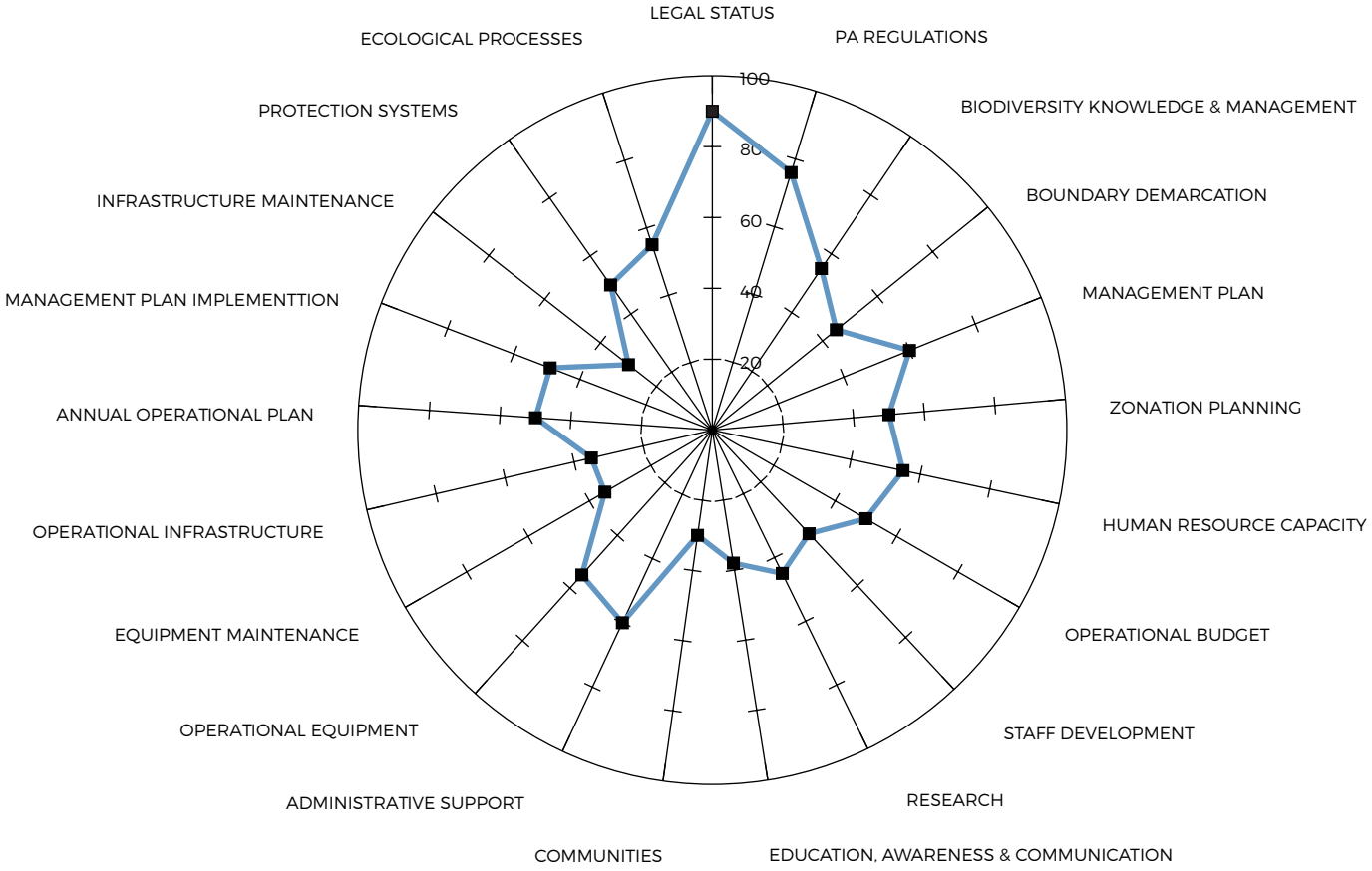



**Figure 3. Percentage scores for 21 indicators applied from the METT (Hockings *et al.*, 2000; Stolton and Dudley, 2016) for the 101 MPAs evaluated in the WIO in 2018. Scores were calculated from the management indicators from Table 2 in Part IV.**

were: i) inadequate enforcement and illegal harvesting of resources; ii) lack of understanding of staff on the biological and ecological importance of MPAs; iii) insufficient development programmes to build the capacity of MPA staff; and, iv) poor maintenance of infrastructure and equipment used for MPA enforcement and management. Addressing these challenges requires adequate financial resources, which all countries noted as key to successful MPA management and should be prioritised by governments. Funding is particularly important because it helps sustain the implementation of MPAs. Although the economies of scale could help augment the financial requirements to help maintain MPAs, very large MPAs require substantial amounts of funding, particularly during the establishment phase (McCrea-Strub *et al.*, 2011).

Apart from the management gaps identified from the METT assessments local managers identified climate change as the greatest threat to MPAs followed by the social and economic contexts surrounding the MPAs. Human-induced climate change and other anthropogenic stressors also threaten to reduce the effectiveness of MPAs. These broader social and economic contexts contribute to increased human activities such as illegal extraction, poorly regulated tourism, development, mining, shipping and pollution, which are often happening in or near MPA boundaries. Threats far way from MPAs can still affect the status of MPAs through spillover (e.g. pollutants transported by currents or through river systems on land).

Whilst these management problems and external threats contribute to the reduction of MPA management effectiveness, continuous monitoring, evaluation, and feedback, including the contribution of this *MPA Outlook*, can help enhance management since problems have already been identified and discussed. It is recommended that MPA managers conduct regular assessments to be able to record and reflect on the success and weaknesses of management interventions, refine methodology and track trends. Regular assessments contribute to increased transparency and accountability amongst managers and government officials, which can help improve the governance of MPAs and coastal marine resources overall.

In addition to improving management, complementary adaptation and mitigation approaches that increase the resilience of coastal ecosystems to climate change and reduce impacts of anthropogenic stressors may also increase the ecological outcomes of MPAs. For example, Seychelles uses active coral restoration to rehabilitate coral reefs impacted by coral bleaching and extreme weather events (see Case Study on the following page).

## Equitably managed MPAs

Regionally, there is limited evidence of progress toward this commitment, partly due to the lack of a standardized approach to assess and monitor equity and the difficulty of reducing it to a series of metrics (see Zafra-Calvo *et al.*, 2017). Recently, the first global assessment of social equity in protected areas (including land and marine) showed that there are still significant challenges to achieve equitable management. A survey of different managers revealed a general lack of accountability and transparency in protected area management, and poor participation because of the low recognition of the rights, values, and diversity of communities affected (Zafra-Calvo *et al.*, 2019). That assessment included the Tanga Coelacanth Marine Park in Tanzania as a case study and provided some useful insights on the different aspects of equity. It showed that dynamite fishing remained a problem for a long time in Tanga, because it was driven by influential people employing villagers to engage in this illegal and destructive practice. Local residents also conflicted with park management when they were evicted from their homes and prohibited to access land to support their livelihoods, even when the law recognized their customary land rights.

These events in Tanga showed the different dimensions of equity that surround park management and influence resource use of communities, and that the lack of environmental justice usually marginalizes and preys upon communities, especially the poor (Zafra-Calvo *et al.*, 2019). Hence, park management in the WIO should strive to be more inclusive – with deliberate strategies to address aspects related to equity, accountability and transparency in the overall governance of MPAs.

Many lessons could be learned on how to equitably manage MPAs from community-led initiatives, such as LMMAs, and other co-management schemes. Although there is still much to be learnt, the general practice of involving communities and other local stakeholders in management and decision-making helps increase both community knowledge and appreciation of conservation, and social equity in protected area management (McDermott *et al.*, 2013; Law *et al.*, 2018).

## Connectivity

Existing MPAs in the WIO cover a range of coastal and offshore habitats with some MPAs protecting large to vast areas (i.e., 100s to 10 000s km$^2$). This can contribute to increased protection of the life histories of local fauna, including their home ranges, spawning migration routes and areas, and the ontogenetic movement patterns of species (i.e., when species travel to different areas and/or habitats when they are young compared to their preferences as adults) (Green *et al.*, 2015). For example, the beach-nesting sites of turtles that are protected across the different countries in the WIO could ensure the persistence of turtle populations in the region similar to the transboundary turtle MPA network in Southeast Asia (see Miclat and Arceo, 2018). However, there should be some more effort to understand oceanographic processes, and larval connectivity to design MPAs to support the persistence of species across the region.

Recent studies of larval connectivity on coral reefs in the WIO identified priority conservation areas that should be considered when establishing a regional network of MPAs. Protecting connectivity in the WIO would ensure demographic persistence of different coral reef species, and increase reef resilience (Gamoyo *et al.*, 2019). Previous reports have indicated that global marine protected areas not interconnected, limiting their capacity to effectively seed areas where fisheries are most critical for food and livelihood security (Andrello et al. 2017). At the WIO scale, more than half of all the MPAs were reported as being isolated (Maina *et al.*, 2020). Implementing conservation connectivity in the region, which involves locating MPAs more strategically to enhance their interconnectedness, can support successful biodiversity conservation and fisheries outcomes.

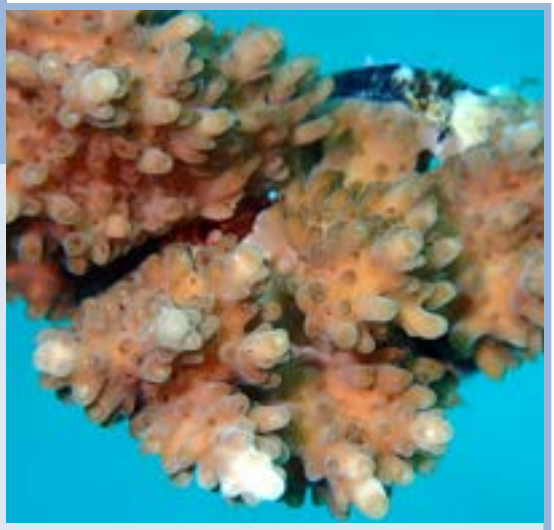
Although these studies have contributed to understanding connectivity in the region, a recent global review by Balbar and Metaxas (2019) showed that MPA and connectivity research in the WIO is still very low. There should be efforts to build capacity and collaborations of the WIO academics and governments to undertake the oceanographic and genetic research to properly determine the appropriate spatio-temporal scales for implementing MPAs in the region.

Fragmentation of coastal and marine ecosystems in the WIO is not evident, however, as a precaution MPAs should be established and/or expanded to increase

CASE STUDY

# Restoring coral reef ecosystem services degraded by climate change

**Nirmal Jivan Shah, Nature Seychelles**



**Corals are transplanted once they reach the size of a football.** © Nature Seychelles/Chloe Shuter

In 1998 an El-Niño event coupled with the Indian Ocean Dipole, resulted in the highest seawater temperature anomaly recorded in 50 years and in the greatest world-wide coral mortality, affecting most severely the reefs of the Indian Ocean. In the central granitic islands of Seychelles, this 1998 global mass bleaching catastrophe decreased the coral cover to less than 3 percent in some areas. The reefs of well protected MPAs, in particular the Cousin Island Special Reserve, a no-take MPA since 1974 and with the highest biomass of fish and other species important to the artisanal fishery in the granitic islands, were some of the worse affected.

The Reef Rescuers project, which began in 2011 by the national NGO Nature Seychelles and funded by United States Agency for International Development (USAID) and the Global Environmental Facility (GEF) of the United Nations Development Programme (UNDP) implemented the first-ever large scale reef restoration project using the "coral gardening method". The aim of the project was to build resilience in coral reefs degraded by bleaching and restore the ecosystem services coral reefs provide for fisheries, tourism and coastal protection. Most of the initial attention was focused on a degraded area in the Cousin Island Special Reserve, although two other smaller projects were undertaken with five-star resorts, one in another MPA.

The project is now in its tenth year. It has involved collecting more than 50 000 nubbins – very small pieces of healthy coral – from sites that survived the 1998 bleaching, raising them in underwater nurseries for about a year and transplanting about 30 000 over an area approximately 6000m$^2$ in size. Since 2017, "super-corals" – corals which show inherent resilience to the increased ocean temperatures and acidity associated with climate change by surviving successive bleaching events – have been discovered, grown on, and planted. The initial work of convincing coral reef scientists and donors to support the project was quite challenging.

Now that coral reef restoration has become more accepted, the next challenges for the project are (a) to undertake assisted evolution, through understanding the mechanism of resilience and undertaking whatever is necessary to identify, obtain, develop and use new generations of super corals, and (b) to produce millions of these corals in land-based nurseries through sexual reproduction either by collecting spawn or inducing spawning.

The success of this initiative has stimulated many others but, to date, few to scale. Community based coral reef restoration programs are proliferating in the Seychelles. For small developing islands and coastal states, adaptation is the only appropriate response to climate change and therefore adapting coral reefs to the changing climate is a vital component in any national response. The project has trained over 50 practitioners from at least 15 countries through formal training programmes or "learning by doing". This means that there are now similar projects ongoing in many countries. The project has also produced a *Restoration Tool Kit* distilling the experience over six years which has proven invaluable to others wishing to undertake reef restoration.

the area managed to potentially reduce the negative impacts of various human activities and climate change. Additionally, more effort should be invested in protecting the diversity of habitats, and offshore areas, seabed habitats (e.g., banks, mesophotic reefs), and pelagic waters. The current evidence that mesophotic reefs (in the deeper, mid-light zone) serve as a refuge to highly mobile species and provide larval supply to shallow-water coral reefs and associated fish species is still inconclusive. However, these deep-sea habitats are also increasingly becoming threatened by climate change and human activities and are also in need of protection (Rocha *et al.*, 2018). Moreover, links between upper ocean communities, seabed ecology and biogeochemistry make protecting deep seabeds and their water column important and urgent (O'Leary and Roberts, 2018).

As well as protecting ecological connectivity across the WIO, there are efforts to increase social connectivity across the different stakeholders and governance scales in the region. Currently, there are efforts to establish a network of MPA managers to share best practices and experiences. The Western Indian Ocean Marine Protected Areas Management Network (WIOMPAN) is a network that brings together MPA practitioners from all the countries in the WIO. The WIOMPAN facilitates learning exchanges among WIO MPA managers, rangers and scientists to deal with common issues in different local contexts. Additionally, government representatives and academics across the WIO region also meet regularly to discuss and share progress on related research and development in the region through various regional fora organised by WIOMSA. One regular meeting organised by WIOMSA is the biennial scientific symposium, which convenes various institutions that undertake research activities in the region. The UNEP Nairobi Convention Secretariat also organises regional workshops and capacity building initiatives to support the member states – including meetings that led to the development of this *MPA Outlook*.

## Other effective area-based management (OECMs)

Although community-based management initiatives such as locally-managed marine areas (LMMAs) and collaborative fisheries management areas (CFMAs) were not formally recognized for their contributions towards achieving the Aichi Target 11, these community-led efforts have made a positive impact in conservation in the WIO. Many countries have worked with communities to establish LMMAs or CFMAs. In Part III, Kenya, Madagascar, Mozambique, and Tanzania described the contributions of community-led initiatives to conservation and coastal resource management. Currently, there are 173 existing and proposed LMMAs in Kenya (n=41), Madagascar (n=132), and Mozambique (n=15), which could potentially translate to the protection of more than 1600km$^2$ of nearshore habitats. However, the majority of LMMAs do not have data on area and extent. Some of these LMMAs were established as early as 2000 in Madagascar, and 2006 in Kenya and Mozambique. Tanzania had the earliest CFMAs established since 1996. However, since some of these CFMAs were poorly managed, the Tanzanian government integrated them into the Tanga Coelacanth Marine Park. Efforts are also currently underway to revive and re-organise communities to enforce the other CFMAs excluded from the Tanga Coelacanth Marine Park.

These locally-managed efforts have the potential to contribute to improving representation and achievement of targets, mainly since more may be established across the region, e.g. LMMA efforts in Mozambique (Osuka *et al.*, 2020). Moreover, locally-managed MPAs can contribute to enhancing management effectiveness in the region because of the direct involvement of communities. It is widely known in the conservation literature that involving communities in decision-making and management have contributed to increased enforcement and compliance in MPAs, and general knowledge and concern for coastal and marine environments (e.g., Christie, 2005; Crawford *et al.*, 2004; Weeks and Jupiter, 2013). However, it is also important to note that these locally-managed MPAs require a lot of government and non-government support, particularly during the start-up phase, until communities can be more independent and manage areas with less support (Butardo-Toribio *et al.*, 2009; McCrea-Strub *et al.*, 2011).

Governments need to be involved in local efforts because they can provide the enabling policies and legislative framework to help communities enforce these MPAs. Governments and non-government partners could also provide the necessary institutional support and networks to help increase local community managers' capacity and skills (Pajaro *et al.*, 2010). For example, WIOMSA, Blue Ventures, and the University of Rhode Island have been working with the MIHARI LMMA Network of Madagascar to build the capacity of their managers. This partnership also provided direct support to ensure adequate financing mapping and delineation of the LMMA boundaries. Despite the fact that these community-led efforts have contributed to increased management of coastal and marine ecosystems, the IUCN protected area categories do not recognise all kinds of local efforts as MPAs. The IUCN limits the use of its "MPA categories"

**Launching a traditional outrigger canoe ("ngalawa"), Zanzibar.** © Rahim Saggaf

to communities and indigenous groups that are implementing initiatives for the sole purpose of conservation. They do not consider as MPAs fisheries management areas where harvest controls are implemented, nor some reserves that allow tourism. Although these definitions are understandable, it is worth recognizing the pivotal role and influence of community-managed areas on the overall protection and resource governance. The IUCN could consider developing the criteria to include community-managed areas in their MPA categories.

## Integrated in the wider landscape and seascape

A notable achievement is that 7 percent of the total EEZ of the WIO countries has some form of protection. However, it is still crucial for governments to consider integrating conservation plans into broader spatial plans to manage activities that occur along the borders of MPAs (Agardy *et al.*, 2011; Weeks *et al.*, 2015). The WIO region is undergoing rapid development, with increasing populations dependent on coastal resources. It is experiencing increased ship traffic from fishing vessels, offshore oil and gas transport, and trade. Hence, even if the WIO countries reach the target of 10 percent of well-managed MPAs the other 90 percent of marine space should also be regulated to avoid overwhelming the health and integrity of coastal and marine ecosystems (Obura, 2018).

This is important because of the connectivity between the MPAs and the adjoining areas. If these adjacent areas are not well managed, this will compromise any gains made in conservation within the MPAs. Broader planning frameworks, such as marine spatial planning (Ehler and Douvere, 2009) and integrated land-sea planning (Álvarez-Romero *et al.*, 2011), are holistic planning tools that should be used to regulate the different human activities. These frameworks are useful in integrating and prioritising existing MPAs and future conservation

CASE STUDY

# Seychelles debt conversion for marine conservation and climate adaptation

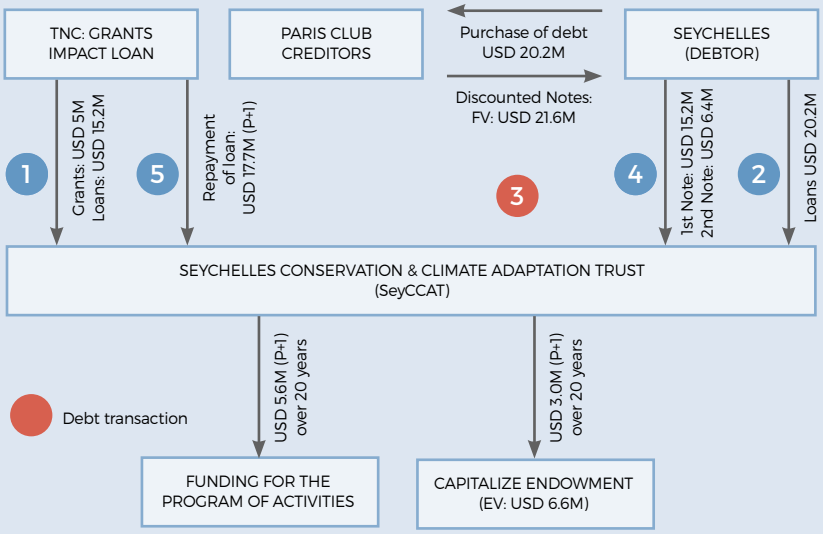
**Robert Weary (The Nature Conservancy) and Didier Dogley (Government of Seychelles)**

Seychelles, like many Small Island Developing States (SIDS), has limited fiscal space, due to high debt loads, low growth, and competing development needs, to invest in much needed marine conservation and climate adaptation activities. The Government of Seychelles, with the support of The Nature Conservancy (TNC) the leading conservation organization working around the world to protect ecologically important lands and waters for nature and people – was able to purchase, via a blend of impact capital and grants, and restructure a portion of its current sovereign debt to fund nature-based solutions to climate change and marine conservation using a debt for nature instrument. This agreement was reached with the creditor nations of Belgium, France, Italy and the United Kingdom (under the Paris Club). As part of the deal, the Government of the Seychelles agreed to place 30 percent of its Exclusive Economic Zone into Marine Protected Areas (MPAs), with half of this area in no-take fish replenishment zones, resulting in over 400 000km$^2$ of new MPAs. The MPAs were identified via a science based, stakeholder driven Marine Spatial Planning (MSP) exercise.

This debt conversion instrument has proven itself to be a potential high-impact model for SIDS that face high levels of sovereign debt and limited fiscal space to address developmental challenges. The instrument could also be of interest to countries that are facing foreign currency constraints as a portion of the existing international debt is effectively converted to local currency. The structure and flexibility of the model also assists with the institutionalization of a purpose-driven institution that provides a permanent funding stream, via the capitalization of an endowment, for interventions long after the initial deal has closed. There are four high level steps to structure such deals. These include:

1. Identify and work with debtor country to purchase sovereign debt; secure commitments from debtor to improve policy and increase investment in the specific developmental area.
2. Identify and reach agreement with creditors willing to sell debt owed by debtor country at a discount.
3. Fundraise for repayable impact loan and non-repayable grant capital for debt buyback.
4. Establish a local trust fund or non-profit entity to lend debtor country funds to purchase sovereign debt (discounted), receive debt payments and fund programming of interventions for the specific developmental challenge in the future.

In this case the Seychelles non-profit entity assigned as the implementing agent to manage the funds was the Seychelles Conservation and Climate Adaptation Trust (SeyCCAT). Building on the successes of the Seychelles, TNC has set out on a mission to finance USD 1 billion of new debt conversions around the world. There is clearly considerable potential for other countries in the WIO, particularly the SIDS to explore the possibilities for such debt conversions.




**Financial framework for Seychelles debt conversion instrument**

planning efforts to reduce the negative impacts of land-based and marine activities on MPAs.

Currently, Seychelles and South Africa are at various stages of implementing their marine spatial plans. The spatial plans have provided the means to establish larger MPAs that are integrated with other zones for different marine uses (see Case Study of Seychelles' debt conversion using marine spatial planning, following page). This is a positive development in the region that other WIO countries are trying to follow.

## CONCLUSIONS AND RECOMMENDATIONS

The preparation of this *MPA Outlook* increased the appreciation of WIO governments and partners of the importance of monitoring, evaluation, and reporting to track progress, which is a crucial mechanism to increase transparency and accountability in the coastal and marine governance of the region. Even though there are shortfalls in the achievement of conservation targets and management effectiveness of MPAs in the region, the countries have made tremendous progress in protecting the WIO. The following subsections summarize the findings and general recommendations for consideration by WIO countries to strengthen the implementation and performance of MPAs. It also addresses regional efforts that could accelerate progress towards the different elements of the CBD Targets and the SDGs.

### Summary and recommendations for individual WIO states

The WIO region has made substantial progress towards achieving the habitat representation component of the Aichi Target 11, with a total MPA extent covering 7 percent of the combined region's EEZ. Individually, the WIO countries are implementing MPAs and other spatial management approaches to address the Aichi biodiversity targets and the SDG goals. Whilst the 7 percent protection of the total EEZ in the region is a notable achievement, countries still need to make great effort to expand protection and improve the management of existing MPAs. The majority of the MPAs that were assessed using the METT still show major deficiencies in management. Financial and human resources for the majority of MPAs are inadequate, which consequently contributed to the low enforcement capacity of managers and rangers. Investing resources on establishing and implementing MPAs is crucial because it can ensure the sustainability of coastal and marine resources that WIO communities and global populations rely on.

***MPA design: representativeness and connectivity***

Although the results presented in this report are preliminary and require further analysis, there is already evidence that the WIO countries need to increase efforts to protect under-represented areas, particularly of offshore and deep-sea habitats. There has also been considerable effort to increase the sizes of MPAs established, with individual sizes ranging from <1km$^2$ to >100 000s km$^2$. Although some of these MPAs are large enough to protect different habitat types and protect movement ranges of highly mobile species, well-designed MPAs and MPAs networks can be an effective strategy for sustaining target species within MPA boundaries and beyond. Moreover, there are also a few extensive and offshore no-take zones.

Establishing more and well-placed MPAs in each of the countries will also ensure the protection of the demographic persistence of different species because it will increase the chances of protecting their complete life histories. More studies are needed to understand the role of counter currents and eddies on larval dispersal in the region in the prioritization of areas for protection. Understanding the role of larval dispersal in the region requires building the capacity of academics and researchers, preferably those based in the region, to undertake oceanographic surveys and modelling, and genetic studies to better understand the connectivity of MPAs and different habitats in the WIO. These oceanographic studies and connectivity research will also require collaboration between the WIO states. Such partnership plays an important role particularly if the countries develop a regional conservation plan for the WIO.

The preliminary results presented here can contribute to the discussions to support the development of a regional conservation plan for the WIO. Moreover, the information gathered through the development of this *MPA Outlook*, will be used to determine how well existing MPAs protect the full-range of biodiversity in the region. The forthcoming *Critical Habitats Outlook* will provide more specific recommendations on how to focus and prioritise MPA placement and sizing to increase habitat representation and enhance protection of connectivity across the region.

***MPA management effectiveness***

The evaluation of management effectiveness using the METT shows that most MPAs in the WIO are not well-managed, due to many challenges related to management and the broader social, economic, and political

contexts that affect the implementation of MPAs. Moreover, there are also other threats, such as climate change and other human activities that could reduce the effectiveness of the MPAs in the region. Despite these shortcomings and challenges, using the METT identified strengths and weaknesses of MPA management based on the evaluation criteria in the tool.

Nearly all the MPAs evaluated had legal bases and regulations instituted, which is very important because these establish the legitimacy of MPAs and their management authority. However, governments must also consider the financial sustainability to continually enforce and implement other management activities to support their MPAs. Involving the communities more in MPAs might also alleviate some of the pressures on MPA management. Undertaking regular management effectiveness assessments is a vital part of the adaptive management cycle. Periodic evaluations can help governments identify best practices and gaps that can be improved. It can also help increase government transparency and accountability, and help maintain MPAs in the long-term.

New and realistic targets that include both spatial extents not necessarily as a percentage of EEZ and management effectiveness should form a significant focus area within the post-2020 discussions. Another major challenge in some parts of the region is the matter of disputed territories, where one country claiming a territory has declared it an MPA, the status of which is not recognized as such or conferred by another state laying a concurrent claim on the same territory.

**Tourists snorkelling in the Mafia Island Marine Park core zone, Tanzania.** © Matthew D. Richmond

The leadership example set by Seychelles and the Republic of Mauritius in the management of the Joint Management Area (JMA) demonstrates what is possible where there may be territorial claims (Republic of Mauritius and Seychelles, 2012). Although the establishment of the JMA includes commercial objectives, the decision and agreement of both governments to share resources and conduct joint activities could serve as an opportunity to resolve boundary disputes and territorial claims.

***Recommended activities and initiatives to enhance efforts of WIO countries***

Whilst it is understandable that MPAs, whether established nearshore or offshore, require considerable human, financial and technological resources, governments must continue to strive to do better and prioritise their actions whether they are implementing new MPAs and/or improving the management of existing ones.

The general recommendations below are envisioned to guide WIO countries to enhance their current efforts.

- Encourage establishment and expansion of MPAs by developing a regional MPA network and creating a system that sets standards and criteria that can expedite this process.
- Protect the full extent or large proportions of key biodiversity areas in MPAs.
- Encourage regular monitoring and reporting on MPA management effectiveness, and develop tools and platforms to allow MPA managers to participate actively.
- Increase MPA visibility, understanding and awareness by various stakeholders through the development of strategic partnerships, approaches and the application of new technologies.
- Mobilise sustainable and innovative financing options (e.g., impact investment, green and blue bonds) towards MPA management and use these options as leverage for other funding sources.
- Develop the capacity of communities and government officials to manage MPAs more effectively through capacity building initiatives that include and are not limited to seminars, trainings, site visits and learning exchanges.
- Enhance community-led conservation initiatives by encouraging relevant government officials to develop enabling policies and legislation to recognise such efforts and provide adequate financing and some technical support.

## Role of regional collaborations to scale up existing efforts

Most of the problems and gaps identified in this *MPA Outlook* require substantial support and resources from the countries and their respective local planners and managers to resolve. The UNEP through its corresponding Regional Seas Programmes (RSP) and the Nairobi Convention and WIOMSA have been providing technical and financial support to enhance coastal and marine ecosystems research and development, as well as building the capacity of local institutions in the region. They also help increase social capital among governments and various representatives, thereby promoting regional collaboration and partnerships among the WIO countries. Therefore, these organisations and collaboration efforts can be used to leverage further partnerships to develop strategies and approaches to scaling up existing MPAs and other management efforts in the region.

***Developing a regional network of MPAs***

The UNEP RSP for East Africa and other regions has developed guidelines for MPAs that also indicate the need to consider the establishment of MPA networks. In terms of institutional arrangements, the WIO countries are ready to create a regional MPA network that considers both the social connections among institutions and the links across different ecosystems in the region. Through the regular fora organised by the Nairobi Convention, governments can discuss efforts to expand and scale-up individual MPA efforts to establish a regional network.

Establishing a regional MPA network will involve different levels of organisation, partnerships, and technical expertise. A system should be put in place that could work for all the countries that are implementing different kinds of MPAs and other spatial management strategies as part of their national network. Since ecological boundaries do not recognise government jurisdictions, the regional network could also facilitate the protection of transboundary areas and offshore areas that are part of boundary disputes.

Currently, this is already happening in some form. For example, the governments of Kenya and Tanzania are working together to establish a transboundary marine conservation area on the common border (MPRU/KWS, 2015). Another example is the collaboration between the governments of the Republic of Mauritius and Seychelles. Both countries agreed to establish a JMA, as described above, to utilise and manage the extended continental shelf between both their boundaries. These kinds of agreements could be a means to resolve boundary disputes among the countries in the region, particularly when one country declared certain areas as an MPA, whereas another country does not recognise that status. Rather than asserting individual interests, countries could declare JMAs that could achieve mutual objectives agreed upon by governments. These JMAs can be part of the regional MPA network, because different zones and MPA types could be included in the regional conservation plan.

The results and recommendation presented in this *MPA Outlook* can guide the initial discussions of the regional network development, particularly since gaps in habitat representation and management of MPAs are discussed. The WIO governments could already use these findings and work together to address the various challenges described and develop a regional strategy for the establishment of the WIO MPA network.

***Establishment of regional offshore enforcement network***

To complement the regional MPA network, it is also important for the WIO countries to work together to manage offshore areas. Enforcing offshore MPAs and patrolling oceanic waters requires considerable amounts of funding and human resources, of which many WIO countries may not afford. Since vessel monitoring systems are very expensive, WIO countries could instead work together to share intelligence and resources for enforcement. Currently, there is no formal and regional strategy towards enforcement and patrol of oceanic waters, but some countries in the WIO have bilateral agreements to help each other. For example, South Africa and France are working together to monitor the Prince Edward Islands MPA. Because France was already patrolling the French Southern and Antarctic Lands, it extended its surveillance to the surrounding waters of the Prince Edward Islands.

This collaboration is very important, because enforcement costs can be very expensive for offshore MPAs. Establishing a regional enforcement network in the WIO will not only be useful for implementing offshore MPAs, but it can also be used to monitor other activities in the region. These activities include: oil and gas concessions, deep-sea fishing, shipping, and whaling, which threaten biodiversity conservation efforts in the region.

***Integrating MPAs within broader planning frameworks***

Integrating MPAs into broader spatial management plans, such as MSP and integrated land-sea planning, could reduce threats that occur near the borders of MPAs and increase their effectiveness. Some of the WIO countries are already developing marine spatial plans, which includes protected zones. Currently, the UNEP-Nairobi Convention is facilitating the creation of a regional MSP strategy and technical working group to help guide the

WIO states to develop marine spatial plans. This is an important and welcome development because the MSP strategy could further legitimise and strengthen proposed regional efforts above – the regional MPA and enforcement networks.

## MOVING FORWARD FROM 2020 AND BEYOND

The CBD outlines an ambitious vision, "...by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people". Yet, biodiversity declines have continued, despite repeated policy commitments aimed at slowing, halting, or reversing the rate of loss. The global marine (as with the terrestrial) environment is under ever-increasing threat; much more than ten years ago (when the Aichi biodiversity targets were agreed), and even more than three years ago when work commenced on the *MPA Outlook*. The imperative to afford real and effective protection to substantial areas has increased correspondingly. While ongoing negotiations on the post 2020 GBF may or may not propose area based targets, proponents of percentage area targets have argued that 10 percent, even 20 percent under conservation management is just a starting point and we should aim for 40-50 percent.

The new and overarching GBF is to be adopted at the 15th meeting of the COP to the CBD, in 2021. It is expected to provide renewed motivation for the WIO region to work towards a no-net loss of biodiversity by 2030, and to expand its MPA estate by 2050 whilst ensuring ecosystem resilience. Though ambitious and challenging, configuring an effective post-2020 regional network of effectively managed MPAs will require concerted efforts and in some cases radical measures from WIO governments. Increasing protection of ecosystems within their jurisdictions and bringing large offshore areas under meaningful and effective protection will require a fundamental shift in the understanding and actions of governments globally; one which some may be able to make and others less so. Applying the theory of change, that assumes transformative actions are taken to create tools and solutions for implementation and mainstreaming, to reduce threats to biodiversity, and to ensure it is used sustainably to meet people's needs, is one such change in approach.

The preparation of this *MPA Outlook* enabled UNEP and its partners to develop a database of MPAs and LMMAs in the region. This is the most comprehensive regional spatial dataset on MPAs to date. The development of this database is essential to support conservation and development activities in WIO countries and in the region as a whole. The MPA database developed will also be useful in succeeding reviews and reporting, particularly when the CBD launches new conservation targets and guidelines after the "*Deal for Nature*" dialogues. Although the development of the database and the preparation of this report is an outstanding achievement, there are still a lot of data items that are missing and require further verification. Hopefully, the existing partnerships in the region and the experiences in creating this *MPA Outlook* will encourage governments to improve MPA monitoring, data gathering, and reporting.

This is also a timely reminder for WIO governments to share and submit their data via the clearing house mechanism (described in the Introduction). The data provided by WIO governments are critical, because they can be analysed and used to develop reports and knowledge products that could support evidence-based policymaking.

Thus the scope of the post-2020 WIO MPA framework should:

- Commit to the development and implementation of a regional MPA network and other relevant initiatives.
- Promote and support the use of marine spatial planning and integrated land-sea planning to include MPA network components.
- Facilitate better application of the best science, technical and policy advice on MPAs, MPA networks, and the global system by strengthening collaboration efforts between MPA practitioners, academia and other relevant partners like WIOMSA.
- Facilitate the development and sharing of knowledge on MPAs through the well-established MPA management networks that exist in the region.
- Support capacity building at all levels to address the variety of challenges to increase social responsibility among institutions and communities, and strengthen the regional commitment to conservation and resource management.
- Develop guidelines and assess social equitability in the region's MPAs.
- Develop a regional approach and programme to sustain systematic monitoring and evaluation efforts across all important sites, and regularly conduct MPA management effectiveness assessments using agreed approaches that also describe biodiversity outcomes.
- Foster innovation to come up with new solutions to tackle current and future challenges.
- Strengthen bilateral and multilateral cooperation in the region to support sharing roles and responsibilities to manage the WIO more effectively.

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This *MPA Outlook for the Western Indian Ocean (WIO)* is the first comprehensive regional analysis that provides a detailed update on the efforts by the Nairobi Convention countries to meet globally agreed marine conservation targets especially SDG14.5, which states that by 2020, to conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on the best available scientific information. This is also aligned to the Convention on Biological Diversity Strategic Plan for Biodiversity 2011–2020, Aichi Target 11. In 2019, the region had 143 proclaimed MPAs with several proposed across different countries.

A key purpose of this *MPA Outlook* was to establish baselines using appropriate indicators to assess the progress of the Contracting Parties to the Nairobi Convention in meeting these targets. Thirty authors contributed to the nine country chapters, the various case studies and other parts of this volume. Included are detailed descriptions of the MPAs in the countries of the region, the legal mandates under which they exist, the challenges they face and estimates of their management effectiveness. The main findings indicate that the vast majority of the sites across the WIO region, that are considered as MPAs or as having equivalent legal status and levels of protection, are coastal and/or inshore, however the largest, covering by far the greatest extents of the ocean, are those with considerable offshore elements. The assessment also established that the majority of existing MPAs across the region are not managed as effectively as they could and should be, due primarily to lack of funding for essential staff, equipment and capacity development, and commitment from relevant authorities. Recommendations are provided to support improved management of current MPAs and strengthen proposals from different countries for the establishment of further areas under protection, so as to reach conservation goals, including those being developed under the post-2020 Global Biodiversity Framework, while safeguarding coastal livelihoods and economies over the coming decades.