



# Ponta do Ouro Partial Marine Reserve

## Management Plan

November 2009

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November 2009

Compiled for:

**Direcção Nacional de areas de Conservacao**

Maputo Special Reserve Marine Management Component

Facilitated by:

**Peace Parks Foundation**



## Table of Contents

Table of Contents .....	i
List of Figures .....	ii
List of Maps.....	ii
List of Tables .....	iii
Acronyms .....	iv
<b>1 INTRODUCTION.....</b>	<b>1</b>
1.1 DEVELOPMENT OF THE MANAGEMENT PLAN .....	1
1.2 STRUCTURE OF THE PLAN .....	1
1.3 PURPOSE OF THE PLAN .....	1
1.4 LEGAL FRAMEWORK .....	1
<b>2 THE PLACE.....</b>	<b>3</b>
2.1 GEOGRAPHY AND HABITAT .....	5
2.1.1 Beaches and Rocky Shoreline .....	5
2.1.2 Sub-tidal Reefs .....	5
2.1.3 Mangrove Forests and Intertidal Sand flats .....	6
2.1.4 Sea Grass Beds .....	6
2.1.5 Estuaries.....	6
2.2 MARINE FLORA AND FAUNA .....	6
2.2.1 Beaches.....	6
2.2.2 Rocky Shores.....	7
2.2.3 Sub-tidal Reefs .....	8
2.2.4 Mangrove Forests and Intertidal Sand Flats.....	9
2.2.5 Sea Grass Beds .....	10
2.2.6 Estuaries.....	10
2.3 CURRENTS, WIND, AND WEATHER .....	10
2.4 HUMAN SETTLEMENTS AND HISTORY .....	11
<b>3 THE PLAN .....</b>	<b>13</b>
3.1 THREATS AND PRESSURES.....	13
3.1.1 Ponta Techobanine Port Development.....	13
3.1.2 Fishing .....	14
3.1.3 Scuba Diving.....	14
3.1.4 Use of Vessels/Launch Site Management .....	15
3.1.5 Dolphin and Whale Watching .....	15
3.1.6 Shark Diving.....	15
3.1.7 Jet-skis.....	16
3.1.8 Coastal development .....	16
3.1.9 Community Pressures .....	17
3.2 ACTION PLAN.....	18
3.2.1 Vision.....	18
3.2.2 Key Performance Areas and Objectives .....	18
3.2.3 Required Actions .....	18
3.2.3.1 Biophysical .....	18
3.2.3.2 Socio-economic.....	19
3.2.3.3 Governance .....	19
3.2.4 Plans.....	20
3.2.4.1 Scientific Research and Monitoring .....	20
3.2.4.2 Awareness .....	22
3.2.4.3 Compliance.....	25
3.2.4.4 Infrastructure, Equipment and Maintenance .....	29
3.2.4.5 Financial Sustainability .....	33
3.3 BOUNDARIES AND ZONING .....	36

3.3.1	Key Navigation Points .....	36
3.3.2	Zonation Detail and Management .....	38
3.3.2.1	Restricted Zone .....	40
3.3.2.2	Beach Management Area .....	40
3.3.2.3	Core Area: Milibangalala and Dobela.....	40
3.3.2.4	Launch Areas.....	40
3.3.2.5	Multiple Use Zone .....	41
3.3.2.6	Buffer Zone .....	45
3.4	SANCTUARY AREA BOUNDARIES.....	45
3.4.1	Overview of Marine Sanctuaries.....	45
3.4.2	Techobanine Sanctuary Area.....	45
3.4.3	Chemucane Sanctuary Area .....	45
3.4.4	Rio Bembi Estuary Sanctuary.....	45
3.4.5	Barreira Vermelha Coral Gardens .....	46
<b>4</b>	<b>THE PEOPLE.....</b>	<b>47</b>
4.1	COOPERATIVE MANAGEMENT.....	47
4.2	COMPOSITION.....	47
4.3	RESPONSIBILITIES .....	48
4.4	MEETINGS.....	48
4.4.1	PPMR Steering Committee Meetings .....	48
4.4.2	Finance Meetings.....	49
4.4.3	Reserve Management Meetings .....	49
	REFERENCE LIST .....	50
	APPENDIX 1: PROCLAMATION DECREE OF PPMR .....	51
	APPENDIX 2: DIVER CODE OF CONDUCT.....	54
	APPENDIX 3: DOLPHIN, WHALE AND WHALE SHARKS CODE OF CONDUCT .....	56
	APPENDIX 4: FISHERS CODE OF CONDUCT FOR PPMR .....	57
	APPENDIX 6: MONITORING AND RESEARCH WITHIN PPMR .....	58
	APPENDIX 7: GENERIC LIST OF MONITORING PROJECTS .....	61
	APPENDIX 8: MANAGEMENT EFFECTIVENESS TRACKING TOOL (METT) .....	62
	APPENDIX 9: PATROL BOAT SPECIFICATIONS.....	63
	APPENDIX 10: PRO FORMA EQUIPMENT LIST .....	65
	APPENDIX 11: BUDGET FORECAST .....	66
	APPENDIX 12: REGULATIONS .....	67

## List of Figures

Figure 1: Fishing Catch Card.....	57
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## List of Maps

Map 1: Ponta do Ouro Partial Marine Reserve - Significant Biological Features .....	4
Map 2: PMR Boundary .....	37
Map 3: Zonation of PPMR .....	39
Map 4: Management Areas within the PPMR .....	44

## List of Tables

Table 1: Coordinates for Multiple Use Zone.....	41
Table 2: Human Resources for the MSR Marine Component .....	28
Table 3: Human Resources for the INAMAR and Navy Staff Compliment .....	28
Table 4: Human Resources for the Inhaca Authority Staff Compliment .....	28
Table 5: Infrastructure Requirements for the Restricted Zone .....	30
Table 6: Infrastructure Requirements for the Multi-use Zone .....	30
Table 7: Infrastructure Requirements at Inhaca Island .....	30
Table 8: Communication Requirements .....	31
Table 9: Vehicle Requirements .....	31
Table 10: Maintenance Plan.....	32
Table 11: Boat Requirements .....	32
Table 12: Maintenance Plan for Patrol Boats.....	32
Table 13: Income Streams .....	33
Table 14: Desired State – Income Generation .....	33
Table 15: Annual Budget PPMR.....	66

## Acronyms

DNAC	Direcção Nacional de áreas de Conservacao
HWM	High Water Mark
IIP	Institute for Fisheries Research
INAMAR	National Maritime Institute
MICOA	Ministry of Fisheries, Tourism, Environment and Transport
MITUR	Ministry of Tourism
MOU	Memorandum of Understanding
MPA	Marine Protected Area
MSR	Maputo Special Reserve
PPF	Peace Parks Foundation
PPMR	Ponta do Ouro Partial Marine Reserve

# 1 INTRODUCTION

## 1.1 DEVELOPMENT OF THE MANAGEMENT PLAN

The Ponta do Ouro Partial Marine Reserve (PPMR) was proclaimed on the 14th July 2009. This management plan was compiled by multidisciplinary team with collaboration of the Ministry of Tourism (MITUR) and the Peace Parks Foundation (PPF) advisory team as part of its commitment to the proclamation and management of the PPMR. The management plan outlined within this draft follows the format and style that was adopted from managed Marine Protected Areas (MPA) within the Western Cape Province of South Africa that fall under the direct management of the Western Cape Nature Conservation Board. These MPAs are both complex, with high visitor numbers to them and furthermore irreplaceable in terms of their biodiversity; like the PPMR. This particular plan prescribes the management of the PPMR. The plan should be amended every five years, to allow for heightened performance in achieving its bio-diversity goals since the areas biodiversity remains under continual threat as marine fish stocks and resources continue to decline in this area.

This plan draws on international and local experience of marine protected area management, as well as relevant guidelines published by the International Union for the Conservation of Nature and incorporates legal and institutional requirements.

## 1.2 STRUCTURE OF THE PLAN

The plan aims to address three basic components: (1)The Place, (2)The Plan and (3)The People.

**The Place** describes the geography, habitats, fauna and flora, currents, wind and weather, and human settlements and history of the area.

**The Plan** sets out the threats and pressures, action plan including the vision, Key Performance Areas, objectives, required actions, plans; boundaries and zoning of the PPMR.

**The People** describes the institutional arrangements for implementation of the plan, *inter alia* how the PPMR could be cooperatively managed by the Ministry of Tourism (MITUR) and Ministry of Fisheries.

## 1.3 PURPOSE OF THE PLAN

The intent of this plan is, in conjunction with other management mechanisms to protect and conserve the values of the PPMR while allowing for reasonable opportunities to access and use the PPMR by its local coastal communities. The population along the coastline and adjacent to the Maputo Special Reserve is on the increase thus escalating the demand on marine resources within the PPMR.

This management plan serves to inform a variety of stakeholders (including the management agencies) of the purpose and operational framework of the PPMR. It is a living, public document subject to periodic review. The management plan should also serve as the basis of the cooperative management agreement between the Ministries of Tourism, Fisheries and Transport<sup>1</sup>.

## 1.4 LEGAL FRAMEWORK

The management of marine living resources is a national responsibility. The Fisheries Law of September 26<sup>th</sup>, 1990, Decree 3/90, Articles 35 and 69, read together with The Marine General Fishing Law of 10 December 2003, Decree 43/2003, Article 114, and supported by The Environmental Law, 1st of October 1997, Decree

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<sup>1</sup> The Ministry of Transport's sub-department and the National Maritime Institute (INAMAR) has a formal mandate that includes the licensing and safety surveillance of ski boats within the PPMR. In addition to this, the Ministry of Fisheries has delegated the duties and responsibilities of fisheries compliance to INAMAR to date (refer proclamation decree, the mandate to manage the PPMR is under MITUR).

20/97, Article 11 was applied by The Council of Ministers to proclaim the Ponta do Ouro Partial Marine Reserve – refer to Appendix 1 for the Proclamation Decree.

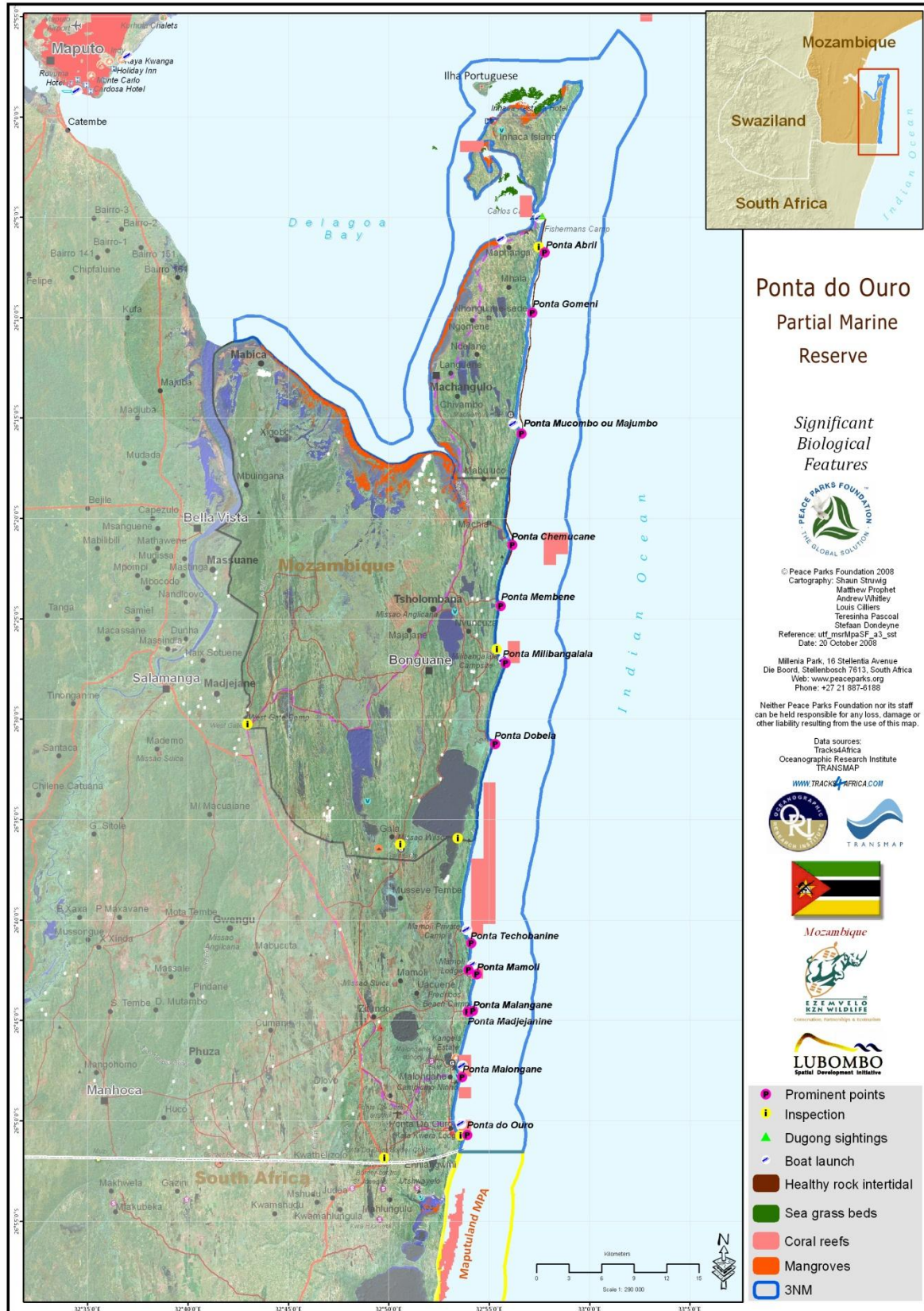


## 2 THE PLACE

The special biological features of the PPMR (refer Map 1) have been described and researched in the series of collaborative reports compiled by ORI with Universidade Eduardo Mondlane and Instituto de Investigação Pesqueira, namely *unpubl. reports no 129. and 130.*

Through the synthesis of this information, consultation with responsible Transmap researchers and Ezemvelo KZN Wildlife, GIS experts, a map was derived during the proclamation process of the PPMR to depict where these features lay.

The various features (e.g. coral reefs, mangroves) depicted on the map are discussed individually. Mapping these layers ensure that the zones and management areas are placed in the correct locations.



Ponta do Ouro  
Partial Marine  
Reserve

Significant  
Biological  
Features



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Data sources:  
TracksAfrica  
Oceanographic Research Institute  
TRANSMP

WWW.TRACKS.AFRICA.COM



Mozambique



Conservation, Partnerships & Accountability



- Prominent points
- i Inspection
- ▲ Dugong sightings
- Boat launch
- Healthy rock intertidal
- Sea grass beds
- Coral reefs
- Mangroves
- 3NM

Map 1: PPMR – Significant Biological Features

## 2.1 GEOGRAPHY AND HABITAT

### 2.1.1 Beaches and Rocky Shoreline

The PPMR extends from the coastal town Ponta do Ouro in the south to Cabo de Santa Maria, a distance of about 86km. It also includes Inhaca Island, which is separated from the mainland Machangulo peninsula by the narrow Ponta Torres strait, and its eastern shore adds a further 12.5km of open ocean coastline. The mainland eastern coastline is linear, consisting primarily of extensive sandy beaches interspersed with minor rocky points, and with well-vegetated sand dunes. The rocky shores comprise about 13% of the length of the coastline on the mainland, and consist of wave cut sandstone platforms with large tidal pools and gullies. Most of the rocky shores are submerged at high tide.

The coastline between *Ponta Chemucane* and *Ponta Mucombo* is believed to contain the best example of intertidal rocky shoreline. The areas within the multiple use area are being systematically harvested, in what appears to be an unsustainable manner. Observations over three spring tides have shown mussel harvesting on the exposed platforms at *Ponta do Ouro*. No bag limits exist, and the rate of harvesting certainly exceeds the reproductive potential of these invertebrates (pers. obs. 2007, pers. com. Gullen, 2007) It is suggested that this method of harvesting may have severe impacts on the biodiversity of the intertidal rocks and sustainability of the harvest, to a seaweed and limpet dominated community (Fennessey & Van der Elst, 2004). This accentuates the need for an intertidal sanctuary zone, as other platforms outside of the restricted area are exploited in the same manner.

### 2.1.2 Sub-tidal Reefs

Sub tidal rocky reefs extend seawards from the rocky headlands and many of these are encrusted with corals and associated organisms. The main mapped offshore rock and coral reefs include:

- Patch reefs between Ponta do Ouro and Ponta Mamoli
- Ponta Techobanine
- Ponta Milibangalala
- Baixo de S. João
- Baixo de Santa Maria
- Ponta Torres
- Barreira Vermelha
- Baixo Danae

A short description of each reef is provided below.

**Techobanine:** Its special structure makes it susceptible to damage. It contains up to 84% coral coverage and is considered to be both unique and the best example in southern Mozambique.

**Milibangalala:** The reefs contain little coral cover, but the high profile rock ridges create aggregation areas for certain pelagic fish species (Schleyer, 2007, pers. com.).

**Baixo de S. João:** Contains what is termed as intermediate coral cover and warrants protection.

**Baixo de Santa Maria:** No specifics for this reef were found during the collection of the various spatial information.

**Ponta Torres:** Coral cover inside the bay close to Santa Maria at  $S26^{\circ} 04' 07.2''$   $E32^{\circ} 57' 02''$ .

**Barreira Vermelha:** Coral patch off Barreira Vermelha near  $S26^{\circ} 01' 25.2''$   $E32^{\circ} 53' 50.8''$ .

**Baixo Danae:** This reef rises from 40m to 3m below the surface. It is an important concentration point for pelagic game fish species, where catches should be strictly managed according to the National fisheries regulations. This reef receives high levels of ski boat pressure especially during fishing competitions.

### 2.1.3 Mangrove Forests and Intertidal Sand flats

Inhaca's eastern shores comprise of similar habitat to that of the Machangulo Peninsula while mangroves with intertidal sand/mud flats fringe its western shores.

The area within Maputo Bay, are markedly different, being sheltered from the open ocean unlike the exposed stretch between Ponta do Ouro and Cabo de Inhaca. The shores shelf gradually, are composed of fine sediments, and are lined by mangrove forests and associated flora. These physical oceanographic conditions result in fewer opportunities for coastal eco-tourism and development. Large-scale seine netting and artisanal fishing does occur within this area, owing its less exposed and more protected nature.

Mangrove layers obtained from ORI (Transmap database) were used to depict this widely dispersed habitat type occurring in Multiple Use Area C.

Mangrove Sanctuaries are recommended, especially adjacent to the shores of the estuary and along the northern side of Inhaca Island where it is suspected they would protect the shoreline during cyclones, by absorbing the energy exerted by heavy seas.

### 2.1.4 Sea Grass Beds

These are found in the on the northern and southern inter-tidal sand flats, including a small patch on the western side of Inhaca Island. The sea-grass beds described provide an important refuge for dugongs (*Dugong dugong*) and the protection of them is therefore very important for the conservation of this species amongst others.

### 2.1.5 Estuaries

Ponta Dobela is a temporary open system that originates from Lake Piti. The lake breeches periodically connecting it to the sea.

The Rio Bembi estuary in the bight of the Machungulo Peninsula is strongly affected by the state of the tide. It is lined with Mangroves along its banks and has important nursery functions for many marine fish species that are dependent on it during the later stages of their life cycle.

## 2.2 MARINE FLORA AND FAUNA

### 2.2.1 Beaches

The coastal dunes are generally well vegetated, with the primary colonisers including *Ipomoea brasiliensis* (goat's foot), *Scaevola plumiera* and *Arcotheca populifolia*. The coastal bean bush, *Sophora inhambanensis* is also common on the dunes.

Ghost crabs (mostly *Ocypode ryderi*), mole crabs (*Emerita austroafricana*) and whelks (*Bullia natalensis*) dominate the macro fauna, which inhabit the sandy shores (Robertson *et al.* 1995). Beach traffic, has a deleterious effect on ghost crab populations with sizes and densities. Utilisation of this resource predominantly as a bait source for fishing from the beaches has resulted in lower densities in the south of the PPMR between Ponta do Ouro and Ponta Techobanine, with highest densities between here and Ponta Chemucane. Once again, their numbers decrease because of harvesting from Ponta Mucumbu to Cabo Santa Maria (Prophet pers. obs. 2007, 2008).

Mole crabs (mainly *Emerita austroafricana*) are also significantly more abundant and larger adjacent to the Maputo Special Reserve.

Despite a survey by Robertson *et al.* (1995), that produced little evidence of harvesting of sandy beach organisms by coastal communities, this is no longer the case. A population increase and resultant demand for protein has lead to local people harvesting these and other organism along the coastline. Harvesting of shellfish over springtides at the more populated points is a regular occurrence and has resulted in many species being virtually completely removed between the above the low tide mark.

Two species of turtle nest along the beaches from October to January between Ponta do Ouro and Inhaca Island, namely the loggerhead turtle *Caretta caretta* and the leatherback turtle *Dermochelys coriacea*. Hatching occurs from December to April each year. The main nesting area is between Ponta Malongane and Ponta Chemucane. Turtle monitoring will be discussed in more detail in a later chapter. Robbing of turtle nests and killing of turtles occurs, mainly by individuals within the local communities. The most vulnerable areas seem to be between Ponta do Ouro and the South African border (Prophet, pers. obs. 2008). Ponta Techobanine and the areas north of Ponta Chemucane also experienced turtle poaching by local communities.

A concerted turtle monitoring effort occurs over the border in South Africa within the Maputaland Marine Protected Area where Ezemvelo KZN Wildlife's monitoring programme records about 590 nestings each year (Hughes, 2002). Based on mark and recapture data, the turtles do migrate across the border, suggesting that the entire region from St. Lucia to Inhaca represents a turtle-nesting zone. Turtles are Cites listed species and are a priority in terms of protection and monitoring are concerned.

Indian bottle-nose dolphin and humpbacked dolphins occur in Maputo Bay and the coastal waters, and humpback whales *Megaptera novaeanglia* offshore.

De Boer (2000) has described harvesting of organisms in the mangrove/mudflat habitat of Inhaca, and the techniques and harvested organisms are the same on the western shores of the Machangulo peninsula. Harvesting on the northern shores of the MSR is limited owing to lack of settlements, since there is not much high ground i.e. that is not inundated or semi-swamp. There is also difficulty in access the shore through the dense mangrove forest.

In 1995, numbers of subsistence fishers on Inhaca were estimated at about 320, and about 40 on the Machangulo peninsula (IDPPE, unpublished data). This figure has however undoubtedly increased in the past 14 years.

Fishing boats from the Machangulo peninsula based at the Santa Maria, Inhaca and Maputo operate in the area (Hatton 1995). Harvesting of fish occurs by means of spearing, hook and line, traps, deep and shallow gill nets and beach seines. **Semi-industrial trawlers from Maputo also operate where water depths permit, targeting penaeid prawns.** The main fish species caught in the eastern part of Maputo Bay are purse-mouths, mullets and sea breams (Sparidae), and the Inhaca fishery appears to be over-exploited (de Boer 2000).

Collection of marine invertebrates by women and children is by hand, and is determined by tidal state. Their catch is mainly comprised of swimming crabs (Portunidae) and bivalve and gastropod molluscs (Fennessy & van der Elst 2004).

### 2.2.2 Rocky Shores

In the Kosi Bay area, which lies immediately to the south of Ponta do Ouro, large quantities of brown mussels, red bait *Pyura stolonifera*, oysters *Striostrea margaritacea* and limpets *Patella pica*, as well as a variety of other organisms, are harvested by coastal communities (Kyle *et al.* 1997). Along the Transkei coast in South Africa, areas that are completely cleared of mussels may not be re-colonised even after eight years (Dye 1992). Artisanal and subsistence harvesters frequently scrape mussels from the rocks, leaving large areas of bare rock. Clearing of areas of mussels has been shown to cause a small-scale, virtually irreversible change from a mussel community to a seaweed or limpet dominated community (Dye 1992). Thus this method of harvesting may have a severe impact on the sustainability of the harvest, as well as on biodiversity of the intertidal rocks (Fennessy & van der Elst 2004).

Intertidal mussels, limpets, redbait and oysters are generally low in abundance along this coastline (Robertson *et al.* 1996). Mussels are relatively more abundant at Ponta Milibangalala and Ponta Chemucane than at Ponta do Ouro and Ponta Malongane.

Limpets are most abundant at Ponta do Ouro, Ponta Malongane and Ponta Dobela. There is little redbait in the intertidal zone, although this animal is abundant sub-tidally (Fennessy & van der Elst 2004).



Populations of these useful low-density resources have been diminished drastically over the years and the need for a concerted effort to educate local subsistence users within the PPMR cannot be overemphasized. The unfortunate reality to date has been that these communities have been allowed to denude the resource, almost completely.

No regulations have applied to subsistence users in past years. Of key importance is the understanding of the commitment required by the Government of Mozambique in terms of applying the regulations of the declared PPMR.

About 13% of the coastline between Ponta do Ouro and Ponta Abril is rocky shore (Robertson *et al.* 1996). Algal moss/turf, beds of *Sargassum* spp., mussel beds, coralline turf and barnacle flats grow on these rocks. Small numbers of coastal oysters *Saccostrea margaritacea* occur sub-tidally. Sun oysters (*S. cucculata*) are rare because of the scarcity of rock above the mid-high tide level (Fennessy & van der Elst 2004).

Seaweeds occur in three main zones in the intertidal area (Bandeira 1995). The upper zone is dominated by *Padina boryana*, *Colpomenia sinuosa* and some filamentous algae. The middle zone includes common species such as *Anadyomene wrightii*, *Gelligiela acerora*, *Haliptylon subulata*, *Hormpophysa triquetra*, *Hypnea* spp. *Sargassum* spp and *Valonia macrophysa*. Rocky pools, which are common in this zone, contain the sea grass *Thalassodendron ciliatum*. The third zone is dominated by *Sargassum* and *Gracilaria* spp which occur mostly in the sublittoral area (Bandeira 1995). The rocky shores on the east and south-east coast of Inhaca have similar communities (Kalk 1995).

Robertson (1996) suggested that sand scouring was the most important physical factor affecting the distribution and abundance of intertidal organisms on the coast of southern Mozambique; however, removal by subsistence gatherers has increased dramatically over the past years and is far greater force now.

On Inhaca, de Boer (2000) found that mussels were no longer being harvested, probably because of over-exploitation and a lack of suitable habitat.

### 2.2.3 Sub-tidal Reefs

While the total reef area in Mozambique has been estimated at around 1 900 km<sup>2</sup> (Spalding *et al.* 2001), the reef area in southern Mozambique is only around 5 km<sup>2</sup> (ORI, unpublished data). The reefs in the southern area can be broadly categorised into three types (Pereira 2003): (1) massive, "barren" rocky reefs, with minimal coral cover; (2) flat, shallow ledges, dominated by soft corals, and with abundant fish life, particularly small species (3) flat deep ledges also dominated by soft corals but with extensive areas of hard coral and fewer fish.

Corals are generally found in tropical to sub-tropical waters from the intertidal zone to a maximum depth of about 45m, depending on water clarity (Dubinsky 1990). The symbiotic algae on which many corals are partly dependent for food require light for photosynthesis, and turbidity therefore limits the depth distribution of corals to a maximum of 30 m. The southern Mozambique reefs are amongst the highest latitude coral reefs in the world, and, as marginal reefs, they exhibit characteristics that make them unique. Although turbidity is generally low because of reduced riverine input, the reefs are exposed to strong wave action and currents, which are powerful determinants of invertebrate community composition. The reefs can be classified as patch reefs, with corals growing as a thin veneer on sandstone substrata formed from fossilization of Pleistocene coastal sand dunes (Ramsay 1994, 1996) i.e. they have not been formed by reef-building corals. Most reefs run 1-2k m offshore, parallel to the coastline. They are not exposed at low tide, and are low in profile i.e. without major drop-offs and reef crests. They vary in width between 10 and 600m. The longest being the Techobanine complex starting in about 5m of water extending northwards for about 18 km between Ponta Techobanine and Ponta Dobela.

Robertson *et al.* (1996) examined reefs between Ponta Abril and Ponta do Ouro in the survey. From Milibangalala northwards, reefs had very little coral cover, while the Techobanine reefs had the highest – up to 84% soft and hard coral cover combined. The reefs off Malongane were next highest in terms of coral cover, while reefs off Ponta do Ouro and the Sao Joao shoal reefs were intermediate. Soft corals provide the dominant benthic cover on the reefs between Milibangalala and Ponta Do Ouro, particularly those that were shallower and exposed to swell-generated turbulence with associated higher

sedimentation (Schleyer 1999, Pereira 2003). However, on the Techobanine reefs, hard corals predominated. Hard coral cover was also higher on deeper reefs (> 20m). Alcyonacean corals of the genera *Sinularia* and *Lobophytum* dominate the soft coral community, and the hard coral community mainly comprised Scleractinia of the genera *Acropora* (branching and foliose forms) and *Montipora*.

The Techobanine reef complex is considered the best in southern Mozambique and of unique biological value. It is a deeper reef and has a coral community that is diverse, including extensive patches of branching and tabular *Acropora* species or, alternatively, patches of foliaceous *Montipora* species, interspersed with mixed hard and soft coral communities. The reef is rendered susceptible to damage by virtue of the sensitivity of the afore-mentioned Scleractinia. It clearly does not fit comfortably in the reef categorisation of Pereira (2003) and warrants special protection in view of its susceptibility to damage, its extent and its unique value in southern Mozambique, being the best representative of high latitude coral reef communities in the country. It is for this reason that approximately two thirds of the Techobanine reef now falls within the **Techobanine Sanctuary**, thereby ensuring its protection if damaging activities are excluded by the PPMR's responsible management agency (MSR marine component).

Apart from forming substrata for corals, the shallower inshore reefs also provide a habitat for several edible invertebrates e.g. rock lobsters (*Panulirus* spp.), mussels, oysters, red bait and limpets. These sub-tidal populations help support intertidal populations harvested by coastal subsistence communities (Kyle 1992).

Five palinurid rock lobster species *Panulirus homarus*, *P. longipes*, *P. penicillatus*, *P. ornatus* and *P. versicolor* occur within the area, albeit at low densities with *P. homarus* being the most common.

Although not abundant (apart from red bait), these sub-tidal populations may greatly reduce the impact of harvesting, as they represent a protected reproductive stock that can supply larvae to areas where exploitation occurs, thereby reducing the risk of over-fishing. These sub-tidal organisms are not harvested, with the possible exception of rock lobsters, some of which may be collected by tourist divers.

The fish fauna of the sub-tidal reefs is very diverse, with 376 species identified to date (Pereira *et al.* 2004). They mostly comprise widely distributed Indo-Pacific species, with some southeast African endemics. Nocturnal and cryptic species have not been well described. Species composition varies from reef to reef, depending on the nature of the reef (structure, substratum, depth). Small species such as wrasses, goldies, damsels and angelfishes were more abundant on shallower reefs, while larger, predatory, piscivorous fish such as rock cods, snappers and kingfishes were both more abundant and diverse on the deeper ones. On Techobanine, small fish diversity was similar to the shallower reefs, but abundance was generally lower, apart from the butterfly fishes *Chaetodon* sp. which were more abundant because of their close association with hard corals.

There are similarities in the ichthyofauna between southern Mozambique and the Maputaland coastline of South Africa. In many cases, there are transboundary movements between stocks on either side of the national border. In an ongoing comprehensive fish tagging study conducted by the Oceanographic Research Institute the following species have to date been recorded a migrating across the border:

- Spotted ragged-tooth shark - *Carcharodon carcharias*
- Sailfish - *Istiophorus platypterus*
- giant kingfish - *Caranx ignobilis*
- king mackerel - *Scomberomorus commerson*
- brassy kingfish - *Caranx papuensis*
- large-spot pompano - *Trachinotus russeli*

## 2.2.4 Mangrove Forests and Intertidal Sand Flats

The western shores of the Machangulo Peninsula and the northern boundary of the Maputo Special Reserve (MSR) abut onto Maputo Bay. There are extensive areas of mangrove forest, and five species have been recorded:

- *Avicennia marina*;
- *Rhizophora mucronata*;
- *Bruguiera gymnorrhiza*;

- *Cerriops tagal*; and
- *Lumnitzera racemosa*.

The same species, apart from *L. racemosa*, also occur on Inhaca Island in the southern and northern bays. *A. marina* is the dominant species, with a succession change in zoning depending on tidal inundation. de Boer (2000) notes that the mangrove areas on the Machangulo Peninsula, the northern boundary of the MER, and on Inhaca have increased by about 10 percent since 1958.

The mangroves and associated mudflats and sea-grasses are a nursery area and habitat for a myriad of fish and invertebrate species, including the commercially valuable penaeid prawns (de Freitas 1984). Kalk (1995) and de Boer (2000) provided a comprehensive description of these fauna in the Inhaca area. Other fauna here include polychaete worms, acorn worms, echinoderms such as sea urchins, starfish and sea cucumbers, bivalve and gastropod molluscs, shrimps and prawns, and crabs.

The fish are population in the bay is dominated numerically by the gobies, although purse mouths, mullets and rabbit fish are also common. The most common birds are whimbrels, sand pipers, gulls and terns (Fennessy & van der Elst 2004).

### 2.2.5 Sea Grass Beds

The endangered dugong (*Dugong dugong*) was reported to occur in the shallow waters of Maputo Bay north of the MSR. Guissamulo (1993) estimated the herd to comprise less than 15 individuals. Two adults and a juvenile were sited near Hell's gate (Cabo Santa Maria) during 2007 (Strydom pers. com.), a single adult in the same location in May 2008 (Prophet, pers. obs. 2008). Despite these sighting no other records of herd, sightings have been recorded.

### 2.2.6 Estuaries

Estuary systems are important in terms of the nursery function that they fulfil. More than 50% of marine fish species depend on estuaries within their lives in some way or another.

Some species are estuary dependent too. Protection of estuaries is essential for fish conservation as many species that spend their initial two years with them, are also vulnerable to overfishing at this stage. Exploitation of stock during the sub-adult phases within estuaries effects recruitment into the adult population in the sea later on.

When temporary systems like the Dobela Estuary breach, fish larvae, which use the changes in salinity as olfactory cues, are guided into the system, where they grow into adults, safe from predators and with an abundance of food (Whitfield, 2000).

Once mature these fish are then able to return to the sea to spawn. This is the general pattern with most estuaries sharing *Dobela's* characteristics.

Reports of river snapper *Lutjanus argentimaculatus* have been recorded from this system.

## 2.3 CURRENTS, WIND, AND WEATHER

The continental shelf extends about six NMs offshore with the easterly seaward boundary extending to 3NMs (Technical proposal, draft 5, September 2008). The predominant Agulhas current flows strongly south while inshore counter-currents flowing northwards occur commonly.

The prevailing winds blow parallel to the coast with the southerly component being the strongest and most frequent i.e. operating against the flow of the Agulhas current. As a result, large swells of up to 5m are frequently generated. Northerly and north easterly winds from the other major component of the wind regime.

The coastal water is oligotrophic (poor in nutrients), and terrestrial input to this stretch of coast is minimal as no major rivers enter the sea in the area. The western shores of Inhaca Island and the Machangulo



Peninsula are washed by water derived from Maputo Bay, which carries a high load of terrigenous material from the several rivers that drain into the bay.

Rainfall is in the region of 900mm per year, falling on about 110 days per year but mostly in January and February. The annual mean sea surface temperature for the area is 24.5°C, ranging from 22.5°C in winter to 26.4°C in summer. Higher temperatures are recorded in the southern and western bays of Inhaca because of the sheltered nature of the waters there. The tidal cycle is semidiurnal (two high tides and low tides per day) and the tidal range lies between 2m and 2.4m (Kalk 1995).

## 2.4 HUMAN SETTLEMENTS AND HISTORY

Harvesting of fishes from the shore occurs by local subsistence fishermen and sport fishermen using hook and line. The former sector tends to catch smaller rock-associated fishes such as stone bream *Neoscorpis lithophilus*, grey grunter *Pomadasy furcatum* and blacktail *Diplodus sargus capensis*, while the latter targets wave Garrick *Trachinotus botla*, stumprhoses *Rhabdosargus spp.* and kingfish *Caranx spp.* Some spearing of fish by tourists occurs, mainly targeting king mackerel and barracudas. There is substantial participation in fishing by sport fishermen on ski boats – this sector mainly targets pelagic species such as tunas, king mackerel *Scomberomorus commerson* and kingfish, although demersal, reef-associated species are also caught (van der Elst *et al.* 1996).

In 1996, about 49 000 people inhabited the Matutuine District, which has an area of about 5 400km<sup>2</sup>, and hence a low average population density of 9 people per km<sup>2</sup>. More recent estimates put the population at 35 000 (IUCN unpubl. data). There are more than 5 000 people in the Machangulo Peninsula, and there were about 7 000 people on Inhaca in 1998. The residents of the district are mainly small-scale farmers and subsistence fishers, who use a wide range of natural resources. Many of the men on the mainland immigrated to South Africa to look for work during the civil war, but many returned with the cessation of hostilities.

The livelihood of families is still heavily dependent on women, who mainly practice slash and burn agriculture, and who also collect natural resources such as firewood, fruit, inter-tidal organisms, building materials and water. Men practice hunting and fishing. Land ownership is complex and the boundaries often difficult to determine, being a mixture of traditional chiefs, Maputo Special Reserve, and Ministry of Transport Concession.

The coast is largely undeveloped. The town of Ponta do Ouro has a few shops, a petrol station, hotel, a resort comprising chalets and campsites, and a small resident population with approximately eight diving operators. The towns of Zitundo, Salamanga and Bela Vista lie inland on the road from Ponta do Ouro to Maputo.

The number of people inhabiting the coastal strip is unknown, but is generally considered low. Many people moved to the cities during the hostilities, but they returned to the area after the war. The population of Inhaca also increased markedly during the war, but has since declined as people moved back to the mainland.

As well as houses for local people, large tourist resorts have developed at Ponta do Ouro and Ponta Malongane. Ponta do Ouro accommodates people in a hotel, self-catering chalets and houses, guest-houses, scuba diving camps and in the campsite. The resort at Ponta Malongane (Parque de Malongane) has chalets and camping facilities. Adjoining Malongane is the residential Kangel Estate comprising several privately-owned houses, and a full-board residential resort has been developed at Mamoli.

The MSR, has a small camp at Ponta Dobela and Ponta Chemucane with no facilities, and a rudimentary campsite at Milibangala.

The Panorama tourist resort which now extends from Mucombu to Ponta Abril is nearing its completed stages. This development was being planned in 2004 when the Machangulo Peninsula's eastern beaches were remote. New roads have been made and at least 30 large timber frame homes have been constructed, many of which occur with 100m of the HWM (Prophet pers. obs. 2008). Impact on breeding turtles will occur, caused by lighting.

MSR begins at Matonde, 21km north of Ponta Malongane, and extends northwards for 34 km and inland for about 30km, covering an area of approximately 80 000ha. The Reserve is unfenced and about 1 000 people inhabited the area in 1996 (Robertson *et al.* 1996). Immediately to the south of the South Africa/Mozambican border lies the iSimangaliso Wetland Park, a world heritage site containing the Maputaland and St Lucia Marine Reserves.

## 3 THE PLAN

### 3.1 THREATS AND PRESSURES

The PPMR is a popular area amongst foreign tourist and developers. There has also been an influx of Mozambican people into this area since the civil war ended with Tonga (Zulu speaking) communities scattered along the coastline.

This scenario has resulted in a wide range of user activities occurring within the area, many of which threaten the areas conservation status. If left unchecked these activities would result in the further degradation of the PPMR. It is for this reason why stringent management actions must take place to protect and maintain the PPMR, so that natural heritage is maintained and eco-tourism responsibly developed.

The following critical areas requiring management intervention for PPMR to meet its objectives are addressed and their management actions referenced:

- Ponta Techobanine Port Development
- Fishing
- Scuba Diving
- Use of vessels/Launch site management
- Dolphin and Whale Watching
- Shark Diving
- Jet-skis
- Coastal development
- Community Pressures

#### 3.1.1 Ponta Techobanine Port Development

This controversial development, which remains clouded in secrecy, is the single biggest threat to the conservation and eco-tourism value of the coastline concerned.

There has been talk of the development of a Port funded by publicly owned Mozambique Ports and Railway Company (CFM) and the British owned Porto Dabela Developments. The port is said to harbour vessels up to 300 000 tons in weight. In 2000 it was estimated to cost \$500 million. The development would incorporate an inland industrial free trade zone opposite Techobanine, an inland commercial zone, south of Lake Piti, with transport linkages between the development site and Maputo. There was talk that the Port development would employ 10 000 people.

In 2000, an agreement between the Mozambican government and developers was signed, but could not be implemented until the consequences to the environment were known. The implementation of the project is dependent on an Environmental Impact Assessment (EIA). Numerous press releases relating to this story have circulated over the past few years. During the two years during which the PPMR (2007-2009) was being planned, the true story or progress relating to this development was never given. The matter was raised at all the Marine Protected Area Working Group Meetings, which incorporated representatives from all the relevant government departments, no clear answers were ever provided. Furthermore, no public scoping has been conducted relating to this development to date within the PPMR.

A further development, which has been planned by Oil Refinery (Oilmoz), and Shell Global Solutions is also planned for the Matutuine district. The exact location of where this development is planned for is unknown and should be verified. Ed Daniels the sales and marketing vice president for Shell Global Solutions made a statement relating to the efficiency of the project in 2008.

Large development like these would permanently change the character of the PPMR.

The beach between Ponta do Ouro and Inhaca Island is an essentially important turtle nesting area that is irreplaceable in terms of its importance in maintaining populations of leatherback and loggerhead turtles in southern Africa's east coast.

PPMR reserve management should keep abreast of any developments relating to this controversial project as it conflicts directly with the goals of the PPMR.

### 3.1.2 Fishing

Important points to understand relating to fishing threats and pressures:

- Uncontrolled over-fishing reduces the stocks of fish species, which are one of the key attractants of the marine reserve. Fish are valued by people who will go to great energy or financial expenditure to catch them. The perception by many that fish are an inexhaustible resource could not be anything further from the truth. In fact, many of the coastlines important fish species have been exploited to the point where less than 50% of their original stock probably remains.
- Fish distribution is determined by habitat preferences, water temperature, currents and food availability. Man is not able to contain a population of fish within a reserve for their protection, like a herd of antelope within a game reserve. Fish are able to move freely in and outside of proclaimed marine reserves. This means that exploitation of fish species that leave marine reserves undoubtedly reduces populations of these species and recruitment back into them. The benefit of the PPMR's –no sanctuary areas in terms of contributing to fisheries cannot be under-estimated. It is a well-researched area, and managed no-take sanctuary areas enable in stock recovery of exploited species faster than any other approach. Overspill from recovering fish populations within marine reserves contributes to the catches made by angler outside of them. This is become an undisputed fact, that has been shown scientifically throughout the world.
- In areas where resident bottom fish species like rock cods and snappers (popular amongst local angler) have been, depleted permanent closure (>10 years) will show recovery. What needs to be understood is that the rate of exploitation is never equal to the rate of recovery. Sanctuary areas to be effect must be upheld for the long term, if they are to serve to serve the goals of a marine protected. Compromising these goals is not an option if the area is to maintain its status as a sanctuary area. A ban on bottom fishing has therefore been initiated, in an attempt to assists the recovery of species vulnerable to overfishing (see regulations Appendix 12).
- Angling and spear-fishing permits are required by people fishing within the PPMR (no fishing is allowed within the sanctuary areas) In this way the principle “the user pays” is adopted, which discourages anglers who would otherwise be seeking to “exploit”. The approach of “the sea is not for free” must be adopted (see regulations Appendix 12).
- If necessary, additional management areas will be proposed to the management committee for resource protection or to separate user groups to ensure that the natural resources are protected, user-conflicts are reduced, and to ensure safety for all user groups.
- The effective management of fishing competitions is important. Management authorities must be notified and a permit applied for (see section: Regulations, 2.8.4.f) Boats returning from the sea must be inspected when possible and the catches identified, measured and recorded on the appropriate catch cards (Appendix 4). The Institute of Fisheries Research (IIP) will be supplied with the catch statistics from all competitions for statistical analyses.
- The only exception for extractive use inside of a Sanctuary Area would be under an exemption for Scientific Research. However, these applications will be subject to stringent assessment and only issued when appropriate.
- Voluntary compliance with regulations will be encouraged through education and awareness programmes. The “Fishers Code of Conduct” will be promoted (see Appendix 4)

### 3.1.3 Scuba Diving

At present scuba diving takes place mainly within the Scuba diving management area. With the increase in the number of Scuba diving businesses in the area additional Scuba management areas might well be created or some might require closing, thereby allowing for resource protection or to separate user groups to ensure that the natural resources are protected, user-conflicts are reduced, and to ensure safety for all user groups.

The “Ponta do Ouro Partial Marine Reserve, Diver Code of Conduct” will be promoted (Appendix 2). This code of conduct has been developed based on discussions with the dive community and is designed to ensure that safe and low impact diving occurs. Specialised guidelines for diving with sharks have been developed.

Restrictions are placed on certain gear use associated with diving that may have an impact on the values of the MPA. These include unfavourable activities such as cage diving, the use of electro/acoustic-discharging devices, the use of diver propulsion vehicles, chumming and fish feeding and the removal of historical artefacts from shipwrecks.

The limits set on the number of diving operations defined in the regulations (Appendix 12) are deemed necessary in order to maintain low impact operations with minimal conflict between users. The Oceanographic Research Institute has advised that carrying capacities can be determined through a desktop exercise based on their research that was conducted in 2008 at Shallow Malongane, comparing it to 2 mile reef in Sodwana Bay within the St Lucia MPA.

### **3.1.4 Use of Vessels/Launch Site Management**

The management of boats and their activities within the PPMR is important in terms of all spheres of maintaining the PPMR's integrity. The range of impacts derived from boating are therefore varied from, exploitation of resident fish stocks, the number of divers in the water, noise levels, human safety etc. It is therefore important that boating pressure or threats be reduced to a minimum.

The management of certain vessels has been considered e.g. jet-skis/personal water-craft, as these vessels impact on the values of the MPA.

The creation of management areas, which designate launch sites, and no-go areas are ways of reducing the impacts of undesirable boating activity.

To ensure the safety of divers, all vessel operators will be urged to abide by the "PPMR Diver Code of Conduct".

### **3.1.5 Dolphin and Whale Watching**

Dolphin watching between Ponta do Ouro and Ponta Malongane has become a popular tourist activity in the area with four dolphin watching businesses operating in the area. Dolphin Encounters is the long-standing charter based at Ponta do Ouro that takes tourists on a rubber duck to view the Indian bottlenose dolphins that frequent the area.

Dolphin Encounters monitor the Ponta do Ouro dolphin population and contribute significantly in terms of the beach control and awareness of tourists in the area. However due to this businesses success other operators have chosen to open dolphin watching operations with the local dolphin population becoming subjected to higher levels of disturbance than should be allowed.

With a new business having started full-time dolphin tourism in 2008 and two others operating partially, the activity needs to be controlled. The limits defined in the regulations (refer Appendix 12) are deemed necessary in order to maintain low impact operations with minimal conflict between users. These operations do not lend themselves to high-volume disturbance.

### **3.1.6 Shark Diving**

Diving with sharks is a very popular Scuba diving enthusiasts. It is a wonderful experience to spend time under the water with these top predators. Contrary to popular belief, not all sharks are dangerous to humans and diving with them is considered the ultimate experience by most Scuba divers. The larger species such as Zambezi (bull) and tiger sharks are potentially dangerous to operate due to the large size and opportunistic nature and should always be treated with respect. However, there are very few cases of Scuba divers being attacked by even these species, since a man adorning a BCD, wetsuit and aluminium diving cylinder does represent a shark's natural food.

When diving with sharks on Scuba, there is very little threat from these animals. A group of Scuba divers under the water is more threatening to the shark than most people understand. Of key importance however is that the "PPMR Diver Code of Conduct" (Appendix 2) is adhered to when diving with these impressive animals.

With shark numbers, dwindling throughout the world due to over-exploitation by long-liners it is important that diving activities be conducted correctly, planned, and executed in a way that does not cause any harm to the sharks themselves or the way in which they behave.

### 3.1.7 Jet-skis

Jet-skis or personal watercraft is highly mobile, fast craft that can be operated easily, even by inexperienced seaman. They are easy to launch, transport, and provide access to the sea by anybody who can afford them. It is because of this that Jet ski's also known as personal watercraft has become a problem within the confines of the PPMR.

In South Africa, stringent laws exist relating to the use of these craft, which are banned from all marine reserves. Jet-skis have a place, in terms of rescue craft, as they are quick and easy to launch and are very sea worthy, however they mobility and speed combined with the skills of the normally inexperienced operators conflicts directly with the values of the PPMR. Jet-skis are used purely for high speed racing by their operators in the area, who play in the surf zone with them where they are a constant threat to swimmers, snorkelers and surfers who are enjoying themselves and the environment without the use of a high-powered machine. Furthermore, they frequent the bays in which scuba diving operator's launch. It has been seen that this user group shows no respect for other marine reserve users and race about oblivious to the consequences of their actions which are:

- Production of high noise levels
- Danger to swimmers, snorkelers and surfers and kite –surfers
- A constant disturbance to dolphins and whale sharks
- Output of fumes and oils into the sea around the bathing areas, especially during high season
- Disregard for the laws and rules of the sea

Please note that the user groups mentioned do not interfere with jet-ski users, so it is a question of removing one user group for the benefit of all the others.

It is for all these reasons that a jet ski ban is called for in terms of this management plan. With the signing of this plan, INAMAR, the coastal transport authority and one of the management agents of the PPMR must cease the use of all jet-ski activity within the PPMR to reduce the conflict that has been felt by other user groups. This should be advertised and enforced the Ponta do Ouro border post.

### 3.1.8 Coastal development

Coastal developments within the area have increased dramatically within the past 10 years. Many of the developments have been built within the Primary dunes, which is illegal. Now that the PPMR extends 100 metres inland from the low-water mark, it is important to make sure that coastal developments do not infringe on this.

Coastal development bring with its pressures that can negatively influence the state of marine reserves. With development come more people, who place added pressure on marine resources. Turtles are impacted on by the bright lights that currently light up the front of many of the houses between Ponta do Ouro and Malongane. The bright lighting has been shown to disrupt turtles who are trying to lay eggs along the coastline and affect their ability to locate favourable nesting sites or prevent them from exiting at them.

Minimal standards for lighting of houses should be set. Those causing particular disturbance must adapt their lighting in such a way as to emit lower levels of light over the beach during the turtle-nesting season.

MICOA's sub department DPCA is the governing body responsible for keeping coastal development in check. The extension of the PPMR landwards for 100m along most parts of the coastline places the boundary within the un-vegetated dunes. This is due to the fact of the wide beach profile that exists on Maputaland beaches.

For this reason, most developments will probably be managed by the use of the Regulations stemming from Environmental Law, 20/97 administered by MICOA.

### 3.1.9 Community Pressures

Local communities living along the coastline have a poor comprehension of marine conservation efforts and in certain cases threaten the very resources that the PPMR aims to protect. Most of these threats stem from shoreline based activity. Such as poaching of turtles for meat, digging up of their eggs; the use of gill and seine nets to catch fish or the stripping of invertebrates such as mussels from the intertidal zone.

Poaching of turtles by local coastal communities is a serious problem in Mozambique and in most areas; its turtle population faces the serious threat of extermination. There are eight major breeding sites in the Mozambique, of which the PPMR's coastline is recognised as one of the most important sites. Communities within the PPMR realize that turtles may not be hunted; however, some communities kill turtles for their meat. A regular presence by turtle monitors at night during the breeding season (December to March) has been an effective deterrent to poachers. This is because the monitoring coincides with the same period at night during which the turtles emerge from the sea to lay their eggs. Protective measure and action taken against apprehended poachers is necessary to reinforce to these communities that turtle poaching is illegal and negatively impacts of tourism for the area. Turtles are protected animals in Mozambique under the Forests and Wildlife Regulations, 6<sup>th</sup> of June 2002, 12/2002.

Since December 2007, members of the MoVukuza community at Milibangalala and Ponta do Ouro have been trained as turtle monitors by the MSR marine programme and Centro Terra Viva. Monitors are then employed for the period of the breeding season. The initiative aimed at raising awareness and improving understanding within the communities in an effort to further protect turtles. This approach is required annually to help develop the communities thinking in terms of correct practice.

Seine netting is practiced by local communities at Ponta do Ouro and along the Machangulo Peninsula and gillnetting within Maputo Bay. Observations have shown very poor yields by these netters in Ponta do Ouro. Most of the resident fish that would live within the area where most of the netting takes place have been caught out. The group, which use nets here on a weekly basis, very seldom catch more than a couple of kilograms of fish, due to years of uncontrolled fishing. The practice is not sustainable as there are no regulations in terms of net mesh sizes or size limits.

Collection of invertebrates within the tidal zone by local communities has left the rocky platforms denude of mussels, limpets, red bait and other potential food items.

No regulations exist controlling the impact caused by subsistence collectors in the inter-tidal zone. The sanctuary areas in this plan provide the framework for the protection of this over-exploited area if the management committee decides to exclude collection of organisms within these areas, which is strongly recommended.

An education programme needs to be initiated through which the collectors are taught the implications of over-exploitation. In most areas of the PPMR's inter-tidal area, it is too late, since the bulk of inter-tidal resources have been completely removed.

Of key importance is that the government recognises that marine resources are the very thing that supports eco-tourism in the area, thereby providing potential employment for Mozambicans. With the further degradation of the marine environment, the PPMR will lose its attraction to tourists, who will over time chose to visit in other countries for a better experience. The long-term benefits to local communities are therefore dependant on long-term marine ecotourism. Short term benefits such as providing exemptions communities to use nets or denude habitats conflicts directly with the values of a marine reserve.

An example of this would be as follows: If the number of scuba divers visiting coral reefs is not regulated the condition of these reefs is maintained at a level that they remain impressive to Scuba divers. The area maintains a reputation as a quality dive site and continues to attract clients through the marketing of the various businesses in Ponta do Ouro. As long as this balance is maintained, Mozambicans will have the opportunity to become involved in commercial operations through which local Mozambicans can be uplifted. Destroy the resource (the reefs) through too much pressure and the opportunity is lost to Mozambique.



## 3.2 ACTION PLAN

### 3.2.1 Vision

It is envisaged that the PPMR's habitats and marine life are **protected** into the future, through responsible cooperative management, and thus that Mozambique's natural heritage is not compromised and lost through irresponsible actions, thereby allowing for the sustainability of well managed ecotourism activities that does not conflict with the objectives of the PPMR.

### 3.2.2 Key Performance Areas and Objectives

The following Key Performance Areas (KPA) form the basis of the action plan:

- Biophysical
- Socio-economic
- Governance

The objectives for each of the KPAs of the PPMR are namely:

#### **Biophysical**

- Protection of marine habitats that are representative of the sub-tropical coastal zone, thereby maintaining biodiversity and ecological functioning, including among other coral reefs, sea grass beds, beaches, mangroves, rock platforms and intertidal sand flats.
- To protect over-exploited fish stocks, endangered and endemic species and their populations, for example breeding turtles, bottom fish and dugongs.
- To ensure the sustainability of marine fisheries by their protection.
- To provide opportunities for research and training of managers

#### **Socio-economic**

- To promote non-consumptive ecotourism opportunities.
- Maintenance of high quality ecosystems attractive to quality ecotourism development.
- To improve the understanding of marine ecosystems and their importance amongst local communities and resource users for the purpose of conservation and tourism.

#### **Governance**

- Reduction of conflict between different user groups.
- To ensure that appropriate legal structures are developed for protecting the biodiversity of the MPA.
- To ensure cooperative management, thereby maintaining funding and the management of the PPMR.
- To fulfil Mozambique's international commitment to marine protection in terms of international protocols and conventions.

### 3.2.3 Required Actions

#### 3.2.3.1 Biophysical

The following actions are required to achieve the objectives set for this KPA:

- Investigate developments that threaten the values of the PPMR
  - ~ Ensure PPMR representation at EIA scoping meetings, thereby ensuring that PPMR's values are represented and stated.
  - ~ Maintain clear records of processes and decision making.
  - ~ Establish relations with national media in terms of information networking.
- Ensure that Restricted, Multiple Use Zone and Management Plan Regulations are implemented
  - ~ Manage overfishing and tourism pressures.
  - ~ Protection of sanctuary areas.



- ~ Strict application of the compliance plan to prevent exploitation of marine resources.
- ~ Ensure protection of turtles and coral reefs and other listed habitat types.
- Adaption and review of "management area" effectiveness
  - ~ Creation of new "management areas" to manage pressures and threats if necessary.
- Monitor and Assess Ecosystem Health
  - ~ Develop and implement key monitoring projects.
  - ~ Marine health indicators such as bottom fish populations and turtle populations should be monitored to give baseline information from which degradation can be measured against.
- Assess impacts of resource use. Investigate ways in which impacts can be reduced
  - ~ Identify initiatives that would relieve pressures placed on marine resources by local communities.
- Management of marine pollution
  - ~ Maintaining low-levels of plastic pollution that accumulates within the bays along the coastline.
- Develop marine research and monitoring partnerships
  - ~ Improve access to data by encouraging relevant agencies to make data available.
  - ~ Ensure research agreements with researchers (MOUs).
- Management of marine ecotourism businesses
  - ~ Set limits in terms of scuba diving, dolphin and whale watching operators to reduce the negative impacts on these resources, thereby improving their protection.

### 3.2.3.2 Socio-economic

The following actions are required to achieve the objectives set for this KPA:

- Increase knowledge and awareness of PPMR management in the area.
  - ~ Identify needs and advise on priorities for education and training relating to PPMR management issues, especially within local traditional communities.
  - ~ Create awareness amongst home owners along the coast, relating to their impacts on nesting turtles, dune vegetation etc.
- Increase community and business involvement in PPMR management.
  - ~ Support initiatives that raise community awareness of the importance of the PPMR.
  - ~ Build community capacity for participation in monitoring of priority marine issues such turtle conservation, and through organising formal training, special meetings and involving local traditional leaders.
  - ~ Review existing stakeholder consultation mechanisms to ensure effective and efficient participation in planning and management.
- Promote and facilitate the involvement of Mozambicans within the commercial eco-tourism sector as part of the national commitment to involve and train Mozambicans.
  - ~ Investigate opportunities in terms of funding for community-based projects through the Peace Parks Foundation.
  - ~ Assist with the prospective work to source funding for such projects, which would must be sustained by a project manager and budget.

### 3.2.3.3 Governance

The following actions are required to achieve the objectives set for this KPA:

- Increase efficiencies in enforcement and compliance activities within the PPMR
  - ~ Implement appropriate PPMR permit processes.
  - ~ Investigate compliance challenges with the increasing use of marine resources within the PPMR
  - ~ Develop and implement memorandum of understandings relating to joint compliance between the navy and PPMR management.
- Review legislation

- ~ Investigate PPMR specific regulations, including revenue generation ability.
- ~ Manage impacts of users through permit conditions and specific management area creation.
- Establishment of the PPMR the management committee that is accountable for the sustained management of the PPMR
- Ensure co-operative management between government departments through the management committee:
  - ~ Maintenance of the co-operative management agreement.
  - ~ Application of income generation systems e.g. licensing, fines, taxes and concession fees.
  - ~ Correct administration of financial systems thereby sustaining management agencies budgets.
- Follow through Transfrontier Conservation Area commitments in terms of the March 2000 "Memorandum of Understanding" signed between the Mozambique, South African Governments for the establishment and management of Transfrontier Conservation Areas.
  - ~ Ensure Trans-frontier interaction between Ezemvelo KZN Wildlife in South Africa who manage the neighbouring Isimangaliso Wetland Park and the PPMR management committee through bi-annual action group meetings. Thereby developing Trans-frontier management between Mozambique and South Africa and sharing of resources to accomplish conservation objectives.
- Allow for capacity building within marine management, servicing the needs of the PPMR into the future.
  - ~ Investigate funding options to support and maintain marine management within the PPMR. The PPF has maintained its commitment to better marine management within the area<sup>2</sup>.

### 3.2.4 Plans

The following plans are included for the respective KPAs:

- **Biophysical**
  - ~ Scientific Research and Monitoring
- **Socio economic**
  - ~ Awareness
- **Governance**
  - ~ Compliance
  - ~ Infrastructure, Equipment and Maintenance
  - ~ Financial Sustainability

#### 3.2.4.1 Scientific Research and Monitoring

##### Overview

Scientific research and monitoring are key components of MPA management. Research conducted within the PPMR should serve to guide managers and preferably focus on the key issues such as utilization of natural resources by user groups, alternative benefits of marine reserves to communities and protection issues. Research and monitoring should be compatible with the goals of the PPMR.

Monitoring serves as an important feedback mechanism that allows management to keep check on the status of critical aspects within the PPMR. Monitoring project should therefore indicate the effectiveness of the PPMR. These types of monitoring projects are also referred to as baseline monitoring.

The monitoring of nesting turtles, coral reef health and catches made by fisherman and law enforcement statistics are all-important examples of baseline monitoring projects.

Research and monitoring can be separated into two classes, which are:

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<sup>2</sup> A marine manager is currently employed by PPF with budget and two marine rangers to improve levels of marine management adjacent to the Maputo Elephant Reserve within the Restricted Zone of the PPMR.

- Research and monitoring required by the PPMR management committee.
- Research and monitoring proposed by outside institutions or universities.

### Objectives

- To provide information for management decisions and strategies.
- To maintain a current understanding of the state of the values of the PPMR, and to identify threats at an early stage.
- To facilitate scientific research of the physical, biological and socio-economic systems of the PPMR.

### Categories of Monitoring and Research

The baseline monitoring and research can be separated into three categories.

- Biodiversity and ecological processes e.g. turtles, corals and beach profiles
- Fisheries e.g. catch cards, law enforcement, fish tagging, and utilization by local community's etc.
- Socioeconomic activities e.g. scuba diving, whale and dolphin watching impacts, alternative uses of the PPMR.

A list of generic baseline monitoring projects that can be applied in most marine reserves is presented in Appendix 7.

These categories are described as follows:

#### **Biodiversity and Ecological Processes**

- Utilise existing data to guide management and improve conservation management within the PPMR.
- Mapping of the PPMR's bathymetry (topography) to determine distribution of habitats.
- Survey the eco-systems of the PPMR to determine habitat and species diversity.
- Investigate ecological processes to gain an understanding of the PPMR's eco-system functioning.
- Monitor episodic events like coral bleaching events or damage to reefs after cyclones.
- Identify biodiversity target in terms of endangered species.
- Identify and establish benchmark-monitoring sites especially within sanctuary areas, so that recovery of these areas can be monitored, such as coral diversity and fish counts.
- Monitor threats and correlate with resource loss where possible to clearly demonstrate the pressures.
- Develop and maintain databases for the aforementioned baseline projects.
- Determine limits relating to exploitation through fishing, recreation and tourism.
- Encourage and culture a co-operative stance to research with Universities and research institutes.
- Record and examine marine mortalities to identify possible threats and thereby preventative measures.

#### **Fisheries Monitoring and Research**

- Existing fisheries data from the Mozambique Institute of Fisheries Research (IIP) should be collated and analysed, thereby providing relevant fish population data to manager to improve their and fishermen's understanding of the status of the resource.
- Contribute to IIP catch card programme, by collecting information and providing this to IIP for analyses. (An agreement currently exists between the MSR-marine manager and IIP).
- Access impacts on ecosystems through depletion of fisheries
- Access impacts of subsistence fisheries such as the harvesting of shell fish by local communities.
- Monitor protected species at heavily utilised sites such as potato bass and other groupers species as indicators in terms of bottom fishing pressure.

#### **Socio-economic Activities**

- Record and document various activities occurring within the PPMR and maintain a schedule of their level in terms of increase or decrease.
- Record and map population increase or decrease within the restricted zone of the PPMR. This information can be used to inform DNAC of population trends within the MSR, which affect eco-system health adjacent to sanctuary areas.

- Map different user groups that can be overlaid with physical and biological data. This gives the manager a spatial representation of what is occurring within the PPMR.

### Policy

Any research conducted within the PPMR is subject to exemption in terms of this management plan (PPMR Management Plan as approved in 2009).

The researcher must submit a research proposal to the PPMR management committee explaining the scope of the research project.

A memorandum of understanding should be drawn up by the relevant manager and researcher that include the following conditions.

- The researcher must submit annual reports and final reports to the relevant manager at the completion of the scientific research.
- The researcher must ensure that all equipment deployed in the PPMR is marked with the University or Institutes name with a permit number indicated.
- The researcher must ensure that all equipment is removed at the end of the study.
- The researcher must inform the relevant manager at least one month prior to arrival so that PPMR management can plan their involvement if necessary.
- The researcher must make photographic or media resources available to the relevant manager within reasonable time frames.

### Research Conducted to Date

Research on sea turtles and coral reefs has taken place within the PPMR prior to its proclamation. Appendix 6 shows a table of the research conducted to date and the responsible researchers.

### Evaluating Management Effectiveness

The Management Effectiveness Tracking Tool (METT) included in this plan is a template that was adopted from the Western Cape Nature Conservation Board in the South Africa. It can be used for both marine and terrestrial reserves. Some of the terminology differs to that used in Mozambique. The METT has been populated with information relating to the current management effectiveness of the PPMR, and can be reviewed and updated annually to reflect on long-term success. There are many different formats of METTs. The one used in this instance is relevant to the PPMR. Refer Appendix 8.

#### 3.2.4.2 Awareness

##### Overview

The importance of the awareness plan is to promote and understanding of the importance of healthy marine eco-systems, the importance of the PPMR and the role that public and community play in terms of their care.

The PPMR was proclaimed because of this coastlines rapid deterioration through over-consumption and the need to better protect the marine, which sustains eco-tourism within the area.

Local communities within this area are ignorant to the importance of protection and emphasis must be placed on raising their levels of understanding relating to conservation management activities within the area. Attempts must be made to improve their understanding of conservation management through regular interaction with the key communities along this coastline, including the business owners and visitors to the area that utilise the PPMR through direct interaction and with the use of developed resources such as signage and brochures.

##### Signage and Brochures as Resource for Creating Awareness

Education Resources must be developed and improved to help educate PPMR users.

These resources include the following:

- New signboards at the various access points are required as discussed in the Compliance plan. These should be made out of rust –resistant metal with galvanised frames. They will need to be approximately 4x2m and show the boundaries of the PPMR, its zones and sanctuary areas, and the main regulations. This is a major task and its implementation should be viewed as urgent.
- Regulation brochures. A PPMR specific brochure must now be developed by the PPMR – restricted zone, marine manager. This brochure should be in full colour and show the boundaries, zones and sanctuaries of the PPMR and its main regulations.
- A second brochure can be developed outlining the specific fisheries restrictions and bag limits
- Estimates based on 2008-2009 volumes show that approximately 30 000 of these are required per year for the border post, businesses and marine rangers for handing out.
- Turtle awareness brochures and signboards were developed by Centro Terra Viva during 2008. These are important educational tools to be used, especially amongst community and schools.
- Diving "code of conduct".

### **Awareness of the Protection of Marine Diversity**

The management of the PPMR must plan and implement various awareness programmes that will improve the understanding of the various user groups within the PPMR. Efforts must be aimed at achieving public awareness in terms of the values, services and products offered by the PPMR to the following groups.

- Local communities.
- School children.
- Business owners.
- Fisherman, tourists & divers.
- Commercial fishing sector.

#### **Awareness within Local communities**

All local communities within the boundaries of the PPMR should be visited at least once a year. Meetings should be held at these communities, where the following can be achieved:

- Dialogue between PPMR management and the community.
- Opportunity for questions and answers.
- Improve community understanding of PPMR.
- Develop goodwill within PPMR.
- Eliminate misunderstandings.

#### **Awareness within Schools (the Future)**

Annual visits to the local schools must be organised and attended by PPMR management. The school in Ponta do Ouro is the main school in the area and should be a focal point. Schools on the Machangulo Peninsula should also be approached and incorporated into the PPMR's awareness efforts. The following types of activities can be planned for school children.

- Interpretation by marine rangers as to the importance of the sea on the livelihoods of Mozambicans. For example why the sea is important for sustaining tourism in the area.
- Competitions can be held within the schools e.g. drawing of posters (paper and colour pencils funded by PPMR) relating to why the PPMR is important.
- Other topics include, beach pollution, overfishing.
- Children over the age of 10 years can be involved in beach clean-up events or snorkelling.
- Use of awareness DVDs to improve comprehension of marine conservation.
- Small groups of children can be involved in turtle monitoring during the breeding season

#### **Awareness of Business Owners - Scuba Operators, Guesthouses, Hotel Operators, Restaurants**

- Annual meetings with this sector should take place.
- Goals and objectives of the PPMR should be presented.
- Creates dialogue between business sector and PPMR management.

- Allows for transparency thereby developing goodwill.
- Illuminates against misunderstandings.

#### **Awareness of Fisherman, Tourists & Divers**

- Direct interaction between marine rangers and fisherman is required during patrols.
- Measuring and recording of catches.
- Interpretation of the law.
- Development and handing out of regulation pamphlets that gives the various restrictions relating to fishing and the PPMR zones and sanctuaries.
- Promote and hand out diving code of conduct to divers to recreational divers.

#### **Awareness amongst Commercial Fishing Sector**

Raise awareness of the industrial, semi industrial and artisanal fleets relating to boundaries and regulations of the PPMR. Meetings should be hosted by Ministry of Fisheries since they are the administrative body.

Promote marine conservation through local, national and international Media (Internet, newspapers, magazines and TV) - PPF is an important link in terms of international promotion.

Ensure that marine guards are well trained in the understanding of marine conservation so that they are able to convey information to the various user groups in the correct way, so that it is clear and understood. Staff should be sent on the environmental educators' course that is hosted by WESSA in South Africa. In 2008, two of the MSR-marine component guards along with the marine manager, attended this course, which was funded by the Peace Parks Foundation.

#### **Benefits to Users**

Promotion of the sanctuary areas is important to develop an understanding of them. They are the heart of the PPMR and through their existence; the consumptive activities can be maintained. This is because sanctuary areas provide "overspill" of resources, such as fish. In other words, fish production inside the sanctuary areas replenishes stocks outside, as fish swim in and out of these areas. This is an important value and benefit to fisherman especially.

Through the designation of management areas provided in Map 4, different user groups can be managed so that negative impacts are reduced.

Through consultation with these various user groups e.g. scuba divers, fisherman, local communities etc user group guidelines and codes of conduct (e.g. Divers Code of Conduct, Fishers Code of Conduct) can be applied and promoted.

#### **Address conflict between User Groups over Access to, and Use of the PPMR**

Facilitate communications between user groups to address user issues in the form of formal meetings.

Develop clear and logical signage relating to the PPMR's zoning, and sanctuary and management areas thereby eliminating confusion relating to these and promoting compliance.

Ensure that the signage is placed at all the relevant access points to the PPMR and is constructed from quality long-lasting materials that are rust and vandal resistant.

#### **Voluntary Compliance**

Provide information on the PPMR for inclusion in awareness at community level, by providing support to educators.

Conduct annual general meetings in Ponta do Ouro, through the PPMR Management Committee (AGMs) at which the rules and regulations of the PPMR are promoted and clearly explained to all sectors of this community.

Encourage individual and community participation within the PPMR.

### 3.2.4.3 Compliance

#### Objectives

The compliance objective for the PPMR is to achieve resource protection through compliance with the declaration as a marine reserve and its related regulations (refer Appendix 12), and other applicable laws. The compliance plan is intended to contribute to resource protection, facilitate fishery management, and reduce user conflict arising from competing uses in the MPZ. It is intended to complement other elements of the management plan and lead to an increased level of success. High profile, visible enforcement will require proper funding, supervision, staffing, and equipment.

The PPMR lies along the largely unpopulated Maputaland coastline between Ponta do Ouro and Ponta Santa Maria. Law enforcement patrols have to date not been an occurrence along this piece of coastline.

Most of the coastal headlands ("point" or "pontas") along this stretch of coast are accessible and offer a wide range of recreational opportunities to the visitor. The area is a very popular holiday area for South Africans who are attracted to the hotspots like Ponta de Ouro for its diving and beautiful surroundings. Other sites of high-use include Ponta Malongane, Ponta Santa Maria, Ponta Millibangalala and Ponta Mamoli. Medium-use areas attracting fewer people include Ponta Chemucane and Ponta Dobela. The latter sites being more remote but still supporting most of the activities found at the busier points.

An increase in user activity is experienced over long weekends, school holidays and public holidays. User activities include non-consumptive and consumptive activities listed below.

Consumptive activities include:

- Rock and Surf Angling
- Ski boat Angling
- Subsistence fishing and commercial fishing
- Spear fishing

Non-consumptive activities include:

- Surfing
- Swimming
- Scuba
- Snorkelling
- Kite Surfing

Jet-skis – A banned activity according to this plan.

The compliance plan recognises that compliance can be achieved partly through community involvement and education, in addition to traditional enforcement operations, including patrols, apprehension of offenders, confiscation of equipment and convictions for offences. Signage is used to advise the community of the marine reserve and what activities may or may not occur within the various zones and management areas.

If marine rangers encounter a member of the public or tourist on the rocks he or she will be advised of the regulations pertaining to the PPMR before an offence is committed. "A summarised brochure describing the most relevant marine regulations will be distributed" and catch cards filled in. This approach offers an easy introduction to the person being inspected, were the action taken may not necessarily be a fines but an effort to inform and educate.

Planned poaching syndicates and commercial enterprises knowingly commit offences for financial gain. When these culprits are apprehended, admission of guilt fines and appearance in court charges are laid. In serious cases, confiscation of equipment and marine organisms takes place and even arrest. In most

instances, confiscated organisms are all returned to the inter-tidal zone after being registered, photographed with the culprits and recorded.

At times fishers will illegally remove bait and exceed bag/size limits of fishes. Scuba divers may not operate in accordance to "acceptable codes of conduct" as determined by the protected area authority. Foreign and local tourists drive on beaches. This activity has negative impacts within the inter-tidal zone and must be stopped through regular enforcement. Illegal overnight camping and littering does occur.

Adherence to zoning and management areas must be ensured so that these are effective in meeting their purpose.

This will be ensured through:

- activity control
- gear limitations
- signage
- issuing of fines
- effective signage that needs to be erected at all access points to the PPMR. This will help minimize the level of ignorance to visitors strengthens the credibility of once enforcement actions.

Illegal long lining and trawling occur within the PPMR at times and is of particular concern. Co-operation of the navy, police and South African authorities is essential in terms of helping to prevent these very harmful practices.

Vessel based fishing within the PPMR is carried out by recreational as well as commercial fishers. Ski-boaters are mainly in pursuit of desirable pelagic game fish, but some do fish for demersal species (bottom fish) which are vulnerable to over-fishing. An operational patrol boat is essential to manage vessel-based fishing. A new 16ft patrol boat was purchased in 2009 and became available for operational use in 2010. The boat is managed by the MSR-marine manager and is currently based at Ponta do Ouro.

Admission of guilt fines are issued by the MSR-marine manager or authorised personal, and INAMARS –Port captains at Ponta do Ouro and Inhaca island.

Markers and signage will be installed along the shoreline to facilitate zone and boundary demarcation.

Regulation boards highlighting the most relevant laws relating to the PPMR's proclamation must be erected at the following locations informing the public of the regulations and boundaries:

- Ponta do Ouro/South Africa Border Post
- Launch Site Ponta do Ouro
- Town square Ponta do Ouro
- Ponta Malongane
- Ponta Mamoli
- Ponta Techobanine
- Ponta Dobela
- Ponta Milibangalala
- Ponta Chemucane
- Ponta Mucombu
- Santa Maria-Port
- Inhaca Port
- Maputo Special Reserve – Gala Gate and Acampamento principal

Sign must be in Portuguese and English. They should depict the boundaries of the reserve, its zones and the relevant regulations. Pamphlets will be made available to tourists entering the country informing them of relevant marine regulations within the PPMR.

Beacons that will be visible from vessels must be installed on shoreline boundaries. These should be placed at the following locations:

- Southern boundary



- Southern boundary of the restricted zone
- Northern boundary of the restricted zone
- Rio Maputo boundary

They will give the skipper at sea an indication of his latitude in terms of position in relating to a boundary. The beacons should a highly visible colour and permanent in nature.

### Community Involvement

All user groups and members of the public are encouraged to report offences of the PPMR regulations.

Local communities are encouraged to support the management through communication of the correct information to tourists, especially South African fisherman visiting the area.

These regulations must be explained to the community (e.g. Milibangalala). This then ensures that both the community and visitors understand the regulations and mitigates against confusion. It is essential to arrange any meetings with these communities with the relevant community leaders with a clear and supported agenda. Individual meetings with community leaders are advised prior to involving the whole community.

The perception created that management activities have negative implications to the community, by deterrence of illegal anglers creates major disruptions. These can be avoided through meetings with the community during which management intervention is explained.

### Voluntary Compliance through Education

The Awareness Plan includes elements designed to help the public understand the conservation significance of marine protected zones and why it is important to comply with the PPMR regulations. This promotes voluntary compliance by the public through education and awareness programmes.

### Enforcement Operations

#### Patrol Schedules

The responsible agents to determine enforcement/compliance priorities for that week must conduct weekly staff meetings. Compliance requires vessel patrols, diver patrols, inspections at the launch site and shore patrols. The intention is to conduct patrols daily with night patrols taking place as needed, especially during the turtle-breeding season.

Patrols are conducted on foot along the beaches, vehicle patrols are conducted on management roads to cover larger areas quickly (motorcycles and 4x4 bakkies). Regular vessel patrols will be conducted with the use of the MSR-marine components ski-boat Chemucane.

Weekends, public holidays and school holidays are heavy utilisation periods and extra patrols are implemented. During patrols, all aspects of the local regulations are enforced.

On occasion, it may be necessary to carry out "high impact operations" to ensure high law enforcement visibility and presence. This is when co-ordinated efforts between INMAR and the MSR-marine are arranged and conducted together. The benefits of joint operations are:

- Strengthens co-operative management between INMAR and MSR-marine
- Acts as a strong deterrent to possible offenders
- Sharing of resources
- Aligns activities with quarterly management committee planning

A computerised database will be maintained by the MSR-marine component to ensure easy access to compliance information (e.g. repeat offenders).

#### Staffing and Equipment Requirements

## Staffing

The PPMR requires the following staff to be for the co-operative management of it.

### MSR marine component

Principality of Monaco and WWF Netherlands currently fund the existing staff and management costs within the Restricted Zone through the Peace Parks Foundation (PPF). The Peace Parks Foundation has supported the establishment of the PPMR in terms of technical advice and management since 2007. The current marine manager for the MSR-marine component can be contacted relating to the progress of this effort to build capacity within this zone.

The tables below show the actual human resources, the required and existing funders.

**Table 1: Human Resources for the MSR Marine Component**

Required Staff	Employed	Pending	Funder
Marine Manager	yes		PPF/MITUR
Senior Ranger	yes		/MITUR
10x Marine Rangers	yes	7	PPF/MITUR
Marine Biologist	no	1	MITUR/PPF
Support staff	no	5	MITUR/PPF

### INAMAR and Navy staff compliment

**Table 2: Human Resources for the INAMAR and Navy Staff Compliment**

Required Staff	Employed	Pending	Funder
Marine Manager(port captain)	yes		INMAR
Navy	yes	Available	Navy

### Inhaca Authority staff compliment

**Table 3: Human Resources for the Inhaca Authority Staff Compliment**

Required Staff	Employed	Pending	Funder
1 Manager(	yes		Estação de Biologia Marinha
2 Law Enforcement Officer	yes		Estação de Biologia Marinha
1 Researcher	yes		Estação de Biologia Marinha
33 marine guards	yes?		Estação de Biologia Marinha

## Qualifications

The marine managers require the proper qualifications to manage the PPMR and its staff.

The staff required to patrol and conduct the monitoring programmes are the marine rangers who have been selected and interviewed by the management committee.

Staff must be qualified in further specialist courses such as ski-boat skipper's ticket, diving ticket, peace officer certificate, first aid certificate. Staff must attend various workshops and short courses as required.

The marine rangers should have ability to read, write, and speak English. It would be desirable for as many staff as possible to become qualified to skippers and hold commercial diving qualifications. In this way, they attain skills that would assist them outside of marine conservation if they look for jobs elsewhere.

### **Navy and Army Involvement**

High impact operations required the involvement and support of the navy and or army. This is especially important when operations occur at sea that are focused on the arrest of illegal industrial or semi-industrial boats. These operations require thoughtful planning and a trained crew that are committed and able to carry out the boarding of a large vessel at sea, and bring accompany it to Maputo.

At the time of writing there was a force of three naval and 12 army recruits stationed at Ponta do Ouro, who were able to assist with enforcement operations.

The involvement of the Ministry of Fisheries is also essential in cases like this.

#### *3.2.4.4 Infrastructure, Equipment and Maintenance*

##### **Overview**

Infrastructure development and the maintenance thereof are essential for the support of the people employed to conduct marine conservation work.

Infrastructure requirements range from staff accommodation, office and storage units.

Without these basic requirements, it is very difficult for organised marine management activities as provision of basic working conditions are critical to all.

Staff accommodation need not be sophisticated, but rather practical in terms of where it is to be built, taking into consideration the logistics in terms of the building of structures in remote locations.

The same applies to equipment required. The basics include reliable properly equipped 4x4 vehicles in which beach patrols can be safely conducted and boats launched.

Patrol boats are also an essential requirement, so that the waters of the PPMR can be patrolled and illegal fishing and recreational activities stopped.

Proper registers should be kept of all the PPMR's infrastructure as well as its capital assets. This is the responsibility of the relevant managers along with the maintenance of the listed equipment.

##### **Buildings**

###### **MSR Marine Component**

The following infrastructure exists which has been funded by the Peace Parks Foundation.

- Two quality four man tents at Milibangalala for marine ranger accommodation.
- Two houses are rented in Ponta do Ouro for the marine manager and staff, since no accommodation is currently available within the restricted zone.
- Management within the restricted zone has operated using the temporary camp at Milibangalala and the rented accommodation in Ponta do Ouro to date.

The following infrastructure and equipment is required to support the MSR marine component. These needs were submitted to the Peace Parks Foundation in 2008, which made applications to external funders to

seek support. Follow up with the MSR-marine manager on this matter. These are the standard requirements in addition to what already exists that would ensure effective management of the restricted zone.

The table below shows the infrastructure requirements for the Restricted Zone managed by the MSR-marine component.

**Table 4: Infrastructure Requirements for the Restricted Zone**

Infrastructure required	Status	Funder
<b>Permanent marine base camp</b>		
office	pending	PPF
managers house	pending	PPF
3 x Marine Rangers units	pending	PPF
storeroom/workshop	pending	PPF
Boat & vehicle	pending	PPF
Solar power system	pending	PPF
Water storage and sewage system	pending	PPF
<b>Ranger outpost (Millibangalala)</b>		
3 x outpost 28m <sup>2</sup> each	pending	PPF
storage cabin	pending	PPF
water storage and system	pending	PPF
shower and toilet	pending	PPF
Solar power system	pending	PPF

### INAMAR Buildings

The following infrastructure exists:

- Office
- Accommodation with bathroom, electricity, water and sewage provision.

This infrastructure requires maintenance and must be upgraded.

The table below shows the infrastructure requirements for the Multi-use Zone, south, managed by INAMAR.

**Table 5: Infrastructure Requirements for the Multi-use Zone**

Infrastructure required	Status	Funder
Office	in-situe	INAMAR
Accommodation	in-situe	INAMAR

### Estação de Biologia Marinha da Inhaca

The table below shows the infrastructure required at Inhaca island.

**Table 6: Infrastructure Requirements at Inhaca Island**

Infrastructure required	Status	Funder
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Biology Station?	In situ	Biologia Marinha da Inhaca
Ranger outpost –Portuguese Island	In-situ	Biologia Marinha da Inhaca
Ranger outpost – Ponta Torres	In-situ	Biologia Marinha da Inhaca

## Communication Systems

The communication systems used must be compatible with the marine standards. Most boats within the area use either VHF-band or 29MHZ. The patrol boat, Chemucane, is fitted with both these systems. All three zones should communicate through the same system. Radio communications with the PPMR is essential to ensure its effective management.

The table below shows the communication requirements for the three zones.

**Table 7: Communication Requirements**

Communication System required	Where	Status	Funder
VHF & 29MHZ	Restricted zone	pending	PPF
VHF & 29MHZ	Multi Use, south	pending?	World-Bank
VHF & 29 MHZ	Multi-Use, north	pending?	World Bank/Inhaca

## Vehicles

4x4 Vehicles are an essential piece of equipment in terms of coastal management. They are used for beach patrols, launching of boats, monitoring and general operational support and transport.

These and boats are the most important and expensive equipment used for the management of the PPMR. Their maintenance is of utmost importance, since their purchasing takes months, even years of planning in terms of fund-raising and approval. Very often vehicles in the government service are not cared for properly and this attitude is not acceptable or conducive to efficient management.

The vehicles must be washed well with “fresh” water after returning from patrol.

Driving in salt-water must be avoided at all cost as there is nothing more damaging to a 4x4.

The table below shows the vehicle requirements for the three zones.

**Table 8: Vehicle Requirements**

Vehicles required	Where	Status	Funder
4x4	Restricted zone	Toyota Landcruiser, diesel, 4x4, 2006	PPF
4x4	Restricted zone	pending	PPF
4x4	Multi Use, south	quad bike	PPF/MITUR/INAMAR
4x4	Multi-Use, north	none	?
	Multi-Use, north	2 quadbikes & car	Biologia Marinha da Inhaca

The table below shows a basic maintenance plan for PPMR vehicles.

**Table 9: Maintenance Plan**

Vehicles Type	Air Filter	Oil and Filters	Timing belt	Tyres	Cleaning
4x4 diesel	10 000km	5000-10 000km	100 000km	40 000-60 000km	weekly

### Boats

Boats, like 4x4's are an essential component of marine management. They are used for offshore patrols, diving, monitoring and rescue work. Without a patrol boat, the values of the PPMR cannot be protected. It is for this reason that their maintenance and care is of equal importance.

All patrol boats should be fitted with the following equipment.

- Safety equipment
- GPS
- Radar as extra
- Anchor
- Flotation
- Navigational lights

See Appendix 9 for patrol boat specifications

The table below shows the boat requirements for the three zones.

**Table 10: Boat Requirements**

Boats required	where	status	Funder
16ft Ski-boat, twin engines	Restricted zone	MSR-marine component has new patrol boat	World-bank funded
16ft Ski-boat, twin engines	Multi Use, south	Pending	PPF
16ft Ski-boat, twin engines	Multi-Use, north	Pending	PPF/MITUR
	Multi_Use, north	6 boats (small boats used for research and sampling, these are not suitable for patrol work)	Biologia Marinha da Inhaca

Ski boats have an effective patrol range of about 10NM (one-way) per day.

Maintenance of patrol boats is essential.

The following table shows an important maintenance plan for patrol boats.

**Table 11: Maintenance Plan for Patrol Boats**

Eng. Serv.	Hull inspections	Safety Equip.	Ropes	Electrics	Batteries	filters
every 100 hours	Wash and clean after use. Check for hull damage and fix immediately.	yearly, replace used equipment	monthly	Yearly. Make sure that navigational, radar and lights are in permanent good working order	quarterly	quarterly

### Equipment

Certain equipment is required to be able to conduct reserve management. Equipment varies from clothing, computers, sampling equipment etc.

Spending time away from the base camp is a regular occurrence that marine rangers need to be equipped to deal. Camping out-doors is therefore required.

Appendix 10 provides a list of some of the most important equipment that is required by management teams so that they may be able to perform their functions. It is not complete and gives an indication of the type of equipment required by management within the PPMR.

### 3.2.4.5 Financial Sustainability

The “user-pays” principle will be applied, with the aim of covering part of the management costs. The financial sustainability of the PPMR underlies the sustainability of the resource.

#### Income Avenues

Marine reserves are generally seen as the responsibility of the country. There are however ways in which the marine reserve can generate income. The funds collected through fishing and launch licences, scuba fees, lodge concessions and fines can be used to subsidise management costs of the PPMR.

The current income avenues are shown in the table below.

**Table 12: Income Streams**

Type	Departments/Authority	Activity	Zone	Frequency
Licences/permits	MSR-marine	Fishing	Restricted (MSR)	Weekly
Licences/permits	INAMAR	Fishing, boating, diving	Multi use zones (north and south)	Weekly
Dive taxes	INAMAR	Scuba operating taxes	Multi-use zones	Monthly
Fines	MSR-marine & INAMAR	Driving on beaches, illegal fishing and boating, diving activities	All Zones	Regular

INAMAR and MSR – marine component , would require full delegation of authority to apply the all the laws of the PPMR. This would entail the issuing of fines, licences and taxes generated by the regulations stipulated in this managements plan and the articles proclaimed in the decree.

The table below gives the desired state of income generation.

**Table 13: Desired State – Income Generation**

Type	Departments/Authority	Activity	Zone	Frequency
Licences/permits	INAMAR & MSR-marine	Fishing, boating, diving	In all	Weekly
Dive taxes	INAMAR & MSR -marine	Scuba operating taxes	Multi-use zones	Monthly
Fines	INAMAR & MSR -marine	Driving on beaches, illegal fishing and boating, diving activities	All zones	Regular

## Description of Income Avenues

### Licences

This is a regular income source. Licences or permits are required to conduct activities such as fishing, diving and boating. It is required that both Mozambicans and foreign tourists be in possession of a valid licence if they intend engaging in fishing, diving or boating activities. Fishing licences are currently sold by INAMAR and MSR –marine component under the delegation of the Ministry of Fisheries. Diving and boating licences are currently sold by INAMAR.

### Dive Taxes

This is a definite source of income that should back into the management of the PPMR. The scuba diving operators in Ponta do Ouro and Ponta Malongane which number approximately 10 registered operators pay monthly dive taxes to INAMAR's Ponta do Ouro based Port Captain. This income avenue is probably sufficient most of this zones management costs, a proper costing of these figures is required. INAMAR should be contacted for this information.

### Fines

Fines issued and paid should go allocated to the respective management authority that issued them for the management of that zone.

Fines are less regular than licences and taxes. Fines however discourage illegal activity faster than any other management intervention. They provide immediate results. As fining increases, contraventions of the commonly disregarded laws are reduced, thereby lowering the need and costs of management intervention.

## Central Fund

All income generated through the various income avenues should be reflected by the steering committee on its income statements and be paid into a central fund that is used for the management of the PPMR.

The purpose of such a fund is to ensure that the income generated within the PPMR is used for the management of the PPMR. It aims at ensuring a self funded marine reserve.

## Budget Submissions and Approvals

Approach:

- The funds collected by MSR, marine component and INAMAR are paid into a PPMR management fund, which is administered by the key government department Ministry of Fisheries.
- Budget submissions are made to the PPMR steering committee, which then approves these, in conjunction with Ministry of Fisheries.
- Fisheries then approve budgets, and the necessary funding is allocated to the respective management agencies operational accounts on a quarterly basis.
- Monthly income and expenditure statements are then submitted to the Ministry of Fisheries so that all expenditure and income is properly accounted for.

## Accountability

Management authorities should be seen as responsible and accountable for the income that they collect. Income submissions must be recorded and correspond with that of income collected.

The Steering Committee should be accountable for review of budget submissions by the management authorities and submission of these to the Ministry of Fisheries.

An accurate variance budget that indicates actual income paid into the management fund or relevant account should be updated on an quarterly basis. It should also reflect expenditure versus the actual budget that was allocated for the period.



The term variance budget encompasses all these aspects of financial reporting and should be adopted.

The relevant management authorities are to ensure that all expenditure is responsibly recorded and reported so that variance reports are accurate and dependable.

An annual operational budget is included as Appendix 11.

### 3.3 BOUNDARIES AND ZONING

#### 3.3.1 Key Navigation Points

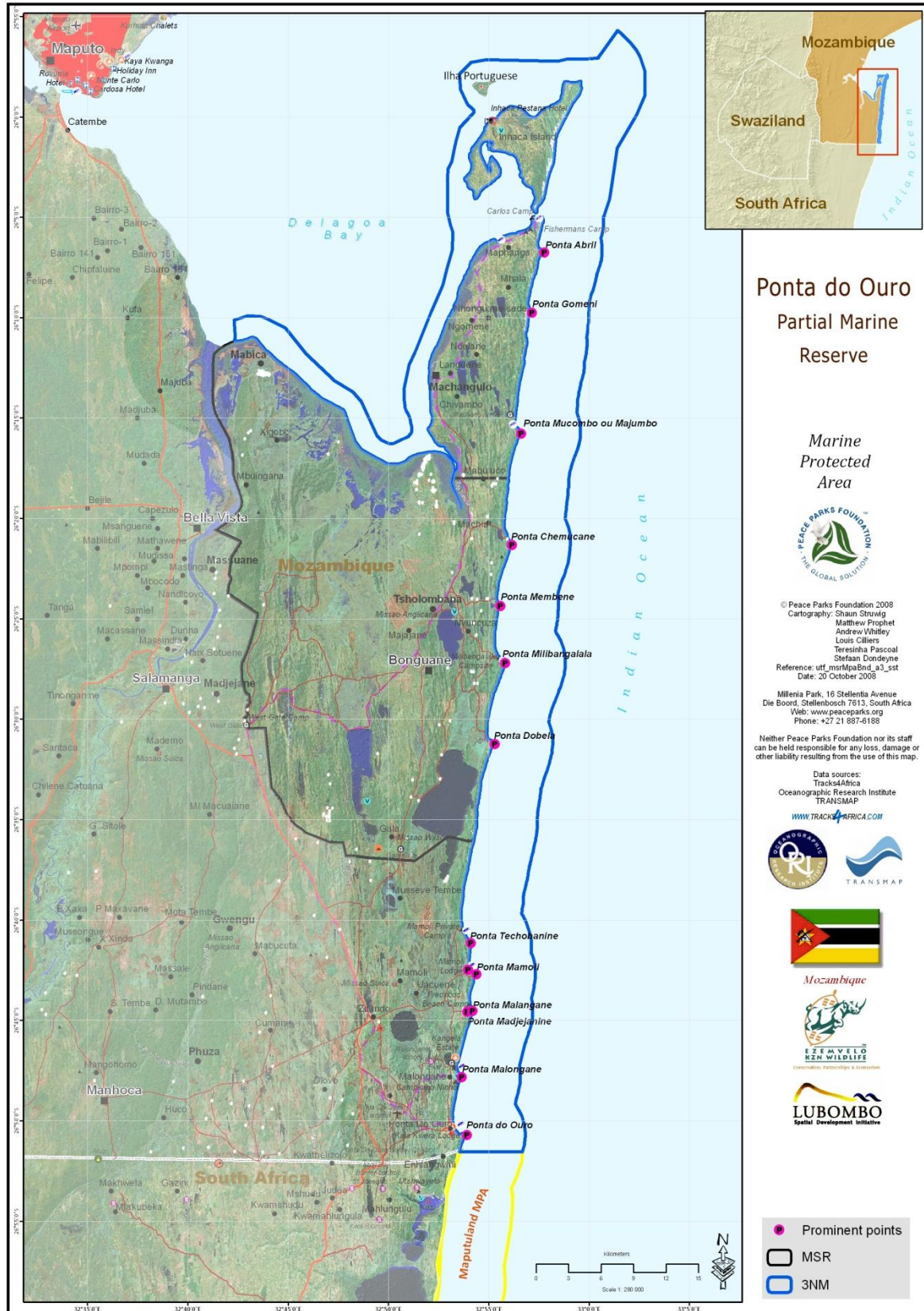
The total surface area of the PPMR is 678km<sup>2</sup>, with the key navigational points as gazetted sited below, and from the Decree submitted by MICOA (refer Map 2).

**North:** From point **t01**, on the coordinates **S26 ° 11' 38.4" and E 32° 41' 27.6"** to the point **m01** on the coordinates **S26° 10' 37.2" and E 32° 41' 27.6"**; passing through point **m02** with coordinates **S26° 16' 19.2" and E 32° 50' 06"** and more to the north is delimited by point **m06** with coordinates **S25° 57'07.2" and E32° 54' 54"**; and its uppermost point is given under **m14** with coordinates **S 25° 55' 40.8" and E33° 01' 26.4"**. (The area proclaimed between m01 and m08 is predominantly 1NM from land).

**West:** From the northern most point of Inhaca Island where you find the point **t14** with coordinates **S25° 58' 15".6 and E3 ° 59' 34".8**, until Ponta do Ouro on point **t11**, with coordinates **S26° 51' 36" and E32° 53' 31".2**, following its contours, including the primary dunes on the continental area covering the prominent points of Malongane, Madejanine, Mamoli, Thechobanine, Dobela, Milibangalala, Membene, Chemucane, Mucombo, Gomeni, Abril and, on a straight line 100 m to the interior of Machangulo peninsula.

**East:** Washed by the Indian Ocean in a width 3NM along the territorial waters from Ponta de Ouro contouring The Machangulo Peninsula.

**South:** From point **t11** with coordinates **S26 51 36 and E32 53 31.2** and the point **m11** with coordinates **S26 51 32.4 and E32 56 45.6** at Ponta de Ouro, exactly on the border line with The Republic of South Africa.



Map 2: PMR Boundary

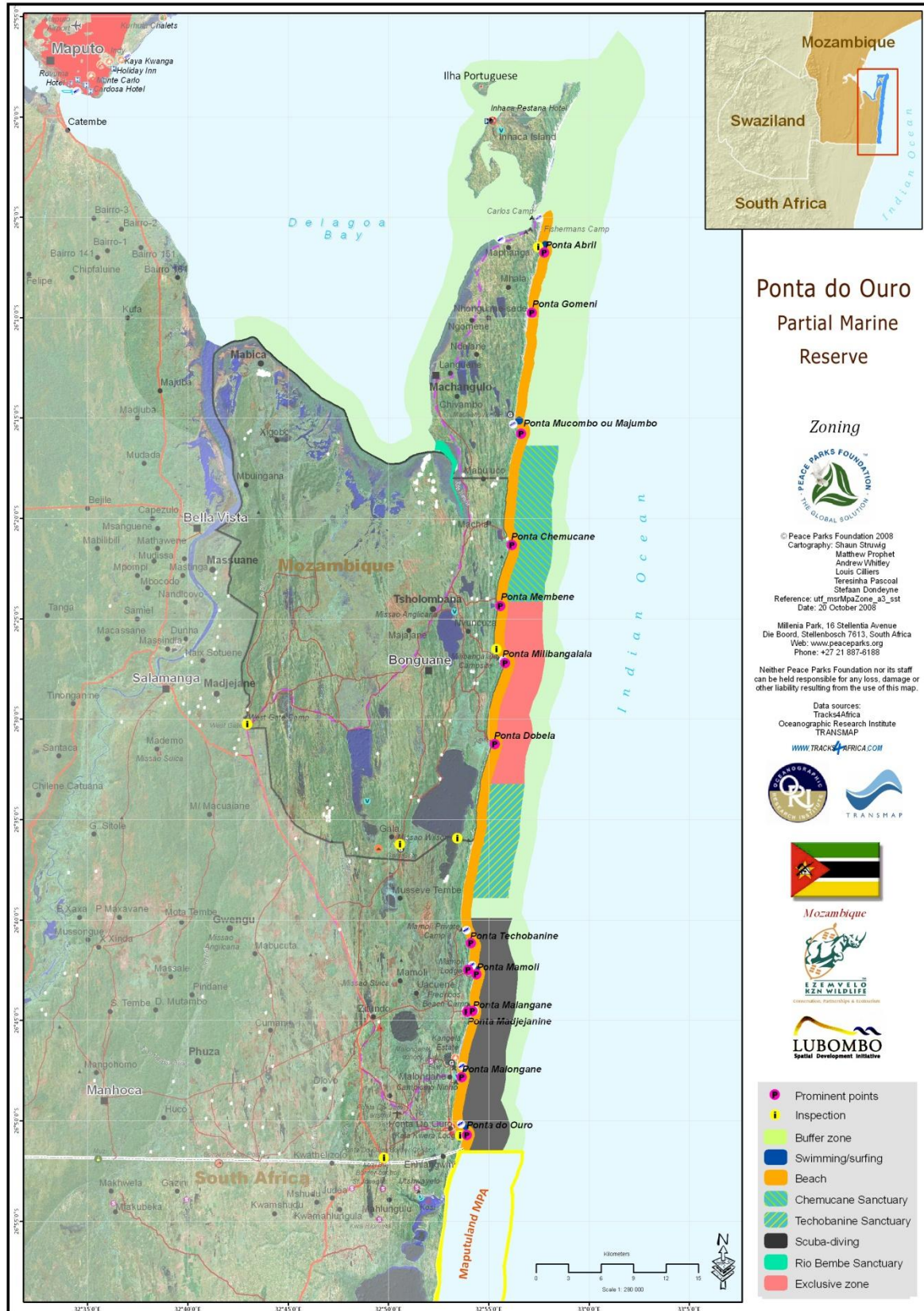
### 3.3.2 Zonation Detail and Management

Zoning is the method used to keep people out of ecologically sensitive areas and to limit impact by and between user groups. The term user groups refers to people who either live within along the coastline and visit the marine reserve for subsistence or business reasons, or tourists to the marine reserve practices either consumptive or non consumptive practices. Consumptive activities refer to things like, fishing and collection of bait organisms, non-consumptive activities include things like scuba diving, dolphin watching etc. Zoning is therefore used to manage these types of activities, for which an explanation of the PPMR's zoning is given.

The reserve is has two distinct Management Zones (In Portuguese they are referred to "zonas" these are referred to as the **Restricted Zone** (Zona do Restrita) and the **Multiple use Zone** (Zona do Uso de Multipla) (refer Map 3). Within these zones there are defined \*management areas e.g. sanctuary areas where consumptive activities are prohibited and scuba diving areas, swimming and surfing areas etc.

\*Please note that the term "management area" is referred to a "zone" in South Africa and Australia marine management circles. The reverse terminology has been derived amongst the Mozambican decision makers.





Map 3: Zonation of PPMR

### 3.3.2.1 Restricted Zone

This zone lies adjacent to the MSR. It starts at 100m due west of the low tide mark at Ponta Mucombu at **t13, S26° 15' 25.2" E 32° 56' 20.4"** and progresses due east to point **m13, S 26 °15' 25.2" E32° 59' 20.4 "**, from **m13** then south 3 NMs from the landward boundary to point **m12, S26° 39' 57.6" E32° 53' 34.8"** (the south eastern most point of this zone) then to **t12, S26° 39' 57.6" E 32° 53' 34.8"** about 2km north of Ponta Techobanine. The distance of this north to south boundary is approximately 24 NM or 44km (refer Map 2).

Strict access control is essential by MSR/MPA staff at , *Gala* and *Acampamento principal (MSR)* camp gates to ensure the proper management of the area. Vehicles entering this area must pass through these inspection points and be informed accordingly of user restrictions and limits. Low impact, high value tourism (International Finance Corporation – Proposed Investment Procurement Strategy, 2007) is favoured in this area that would complement the higher conservation status of this area. Future concessioners will be required to comply with the regulations laid out as per management zone to ensure that it has looked after.

The restricted area includes the following prominent points/headlands:

- Matonde
- Ponta Dobela
- Ponta Milibangalala
- Ponta Membene
- Ponta Chemucane

The Restricted zone consist of the following management areas.

### 3.3.2.2 Beach Management Area

The area from the low water mark to 100m inland, beginning at the South African border and running north and then west until it reaches the east bank of the *Rio Maputo* estuary. Vehicles will only have access to the beach for launching purposes or under exceptional circumstances for management and research purposes. Non-permitted use of off-road vehicles including motorbikes and four-wheelers is not allowed.

People may access the beach on foot to pursue activities. This area achieves better beach management and ensures that nesting turtles are left relatively undisturbed, along this coastline, it therefore achieves both protection and user conflict objectives of the PPMR.

### 3.3.2.3 Core Area: Milibangalala and Dobela

The Core Area starts at S26° 33'12.4" E32° 55'05.9 heads 90°E until reaching point S26° 33' 13.85" E32° 56' 45.88" on the 50m depth line. From here the line is projected for 9NM (16.8km) northwards to point 26° 24' 8.38" E32° 57' 41.97" were it heads W270° until it meeting the seaward boundary of the beach zone already described (800m from the HWM).

The inclusion of this area allows one to retain limited use of the areas coastal resources. With interest from investors being expressed, it ensures low-level use of the area while still providing access to marine resources in a controlled manner.

This management area contains rules that pertain to this and the beach zone that ensure a relatively high level of protection. The two proposed sanctuary zones however signify the highest level of this.

### 3.3.2.4 Launch Areas

The official launch sites within the restricted zone are found at Ponta Milibangalala and Ponta Chemucane, and Dobela (these are the only suitable launch sites within the along the MSR coastline). Most of the boats launching at this site are from the MSR Tourism development situated at this points. All boats launching at this site must comply with the safety and sea-worthiness laws that are administered by INAMAR. Boats visiting this launch and all others are required to attain their launch licences from the INAMAR Port Captain in Ponta do Ouro. Vessels that cannot produce sea worthy certificates signed by Country Marine Authority,

e.g. South African Maritime Authorities (SAMSA) of which the skipper has a valid skipper's ticket (South African or Mozambican, Zimbabwean, etc.) will not be permitted to launch at any of the designated launch areas.

Vehicles and trailers may be permitted to park on the beach after launching at Milibangalala, Ponta Chemucane, Dobela due to the fact that the time delay between launching, parking the trailer and the driver returning to the ski-boat now afloat within the surf is not practical and a safety hazard. These launch sites are managed by the MSR-Marine Reserve management component. Collection of fees and inspections are discussed in Financial Sustainability section above.

### 3.3.2.5 Multiple Use Zone

This zone includes all the remaining proclaimed area around the restricted zone, for which the coordinates are provided in the table below.

**Table 14: Coordinates for the Multiple Use Zone**

t01	S26° 11' 38.4"	E32° 41' 27.6"
m01	S26° 10' 37.2"	E32° 41' 31.2"
m02	S26° 16' 19.2"	E32° 50' 06"
m03	S26° 06' 36"	E32° 53' 13.2"
m04	S26° 04' 33.6"	E32° 52' 58.8"
m05	S25° 59' 38.4"	E32° 54' 18"
m06	S25° 57' 07.2"	E32° 54' 54"
m07	S25° 57' 07.2"	E32° 58' 51.6"
m08	S25° 57' 03.6"	E32° 00' 28.8"
t14	S25° 58' 15.6"	E32° 59' 34.8"
m14	S25° 55' 40.8"	E32° 01' 26.4"
t11	S26° 51' 36"	E32° 53' 31.2"
m11	S26° 51' 32.4"	E32° 56' 45.6"

## Management Areas within the Multiple Use Zone

### Beach Management Area

As stipulated under restricted zone beach management.

### Swimming, Snorkelling and Surfing Area

Three main swimming/surfing areas exist within this section. These are namely *Ponta do Ouro*, *Ponta Malongane* and *Ponta Mamoli*. Motorised boat activity is forbidden within these areas, unless for launching purposes and then only at the designated launch sites. Each area should be flagged and recognisable.

These areas constitute an area that includes a 500m arc on the north western side of the aforementioned points. Positions are not necessary for describing these points, as they are prominent landmarks.

Water sports like surfing and kite-surfing are viewed as environmentally friendly activities. Ponta do Ouro is drawing large numbers of surfers from all over the world with the majority being South Africans. It has become a well-known point break and should be valued accordingly. Certain South African coastal towns generate much of their income from travelling surfers e.g. Jefferies Bay, which make the effort to protect this non-consumptive user group's interests.

These bays also provide an opportunity for snorkelers to dive in safe shallow waters, where they can experience the underwater pleasures of these points.

Jet ski's are banned in all areas of the PPMR, unless they are used for fishing purposes, in this case they must be shown to have been converted and adapted for this purpose, in which case they must be fitted with fishing rod holders, GPS (global positioning system, fishing rods etc).

An activity is heavily restricted within the South Africa's coastal zone and forbidden on most beaches and certainly within marine reserves. The same applies within this area, as it will reduce conflict between user groups and reduce disturbance to marine mammals, which draw volumes of tourists to the area.

Within the neighbouring Maputaland and St Lucia MPA's in Kwa-Zulu Natal, South Africa a maximum of three jet-skis – converted for fishing, are allowed to launch per day at Sodwana Bay.

### Scuba and Cetacean Watching Area

Bjerner and Johansson (2001) found that 72% of the tourists visiting this management area were scuba divers, by far the largest user group within the MPZ and the biggest income source for the local community.

Scuba diving pressure has however taken its toll with quality of diving experience being diminished on the patch reefs within this area, hence the reason for its zoning, aided through management such as limiting the number of operators and placing a limit on the number of divers per site per year (these management interventions will need to be described in the management plan along with a diver code of conduct).

The area was placed according to the feature data that was provided in the section pertaining to it. Its southern boundary point begins at the southern border 800m from the HWM, adjacent to the beach zone, from here it follows the 90° E heading until reaching S26° 51' 33.2" E32° 55' 40" at 50m depth mark. It is at this depth that recreational scuba ceases (PADI dive manual). It follows this depth northwards until it reaches S26° 39' 58.6" E32° 56' 09.7" mark and then 270° W to S26° 39' 57.3" E32° 54' 07.4".

One commercial operator conducts whale and dolphin watching tours. They operate within the same zone, resulting in no conflict between themselves and the scuba operators. Further similar operations would however not be encouraged and it is felt that another operator may result in excess disturbance to whales and dolphins.

It is suggested that the coastal line should be licensed to one operator for 20km.

### Launch Areas

These include the access points for ski-boats which are currently used, namely:

- Ponta do Ouro
- Ponta Malongane
- Ponta Mamoli
- Ponta Techobanine
- Ponta Gomeni/Mucombu
- Cabo Santa Maria

(This information has been gathered on site through regular patrols and are the only points at which access can be gained with a boat on a trailer, due to an lack of access it is not possible to launch elsewhere) 4x4's may access the beach at these points in order to launch boats only.

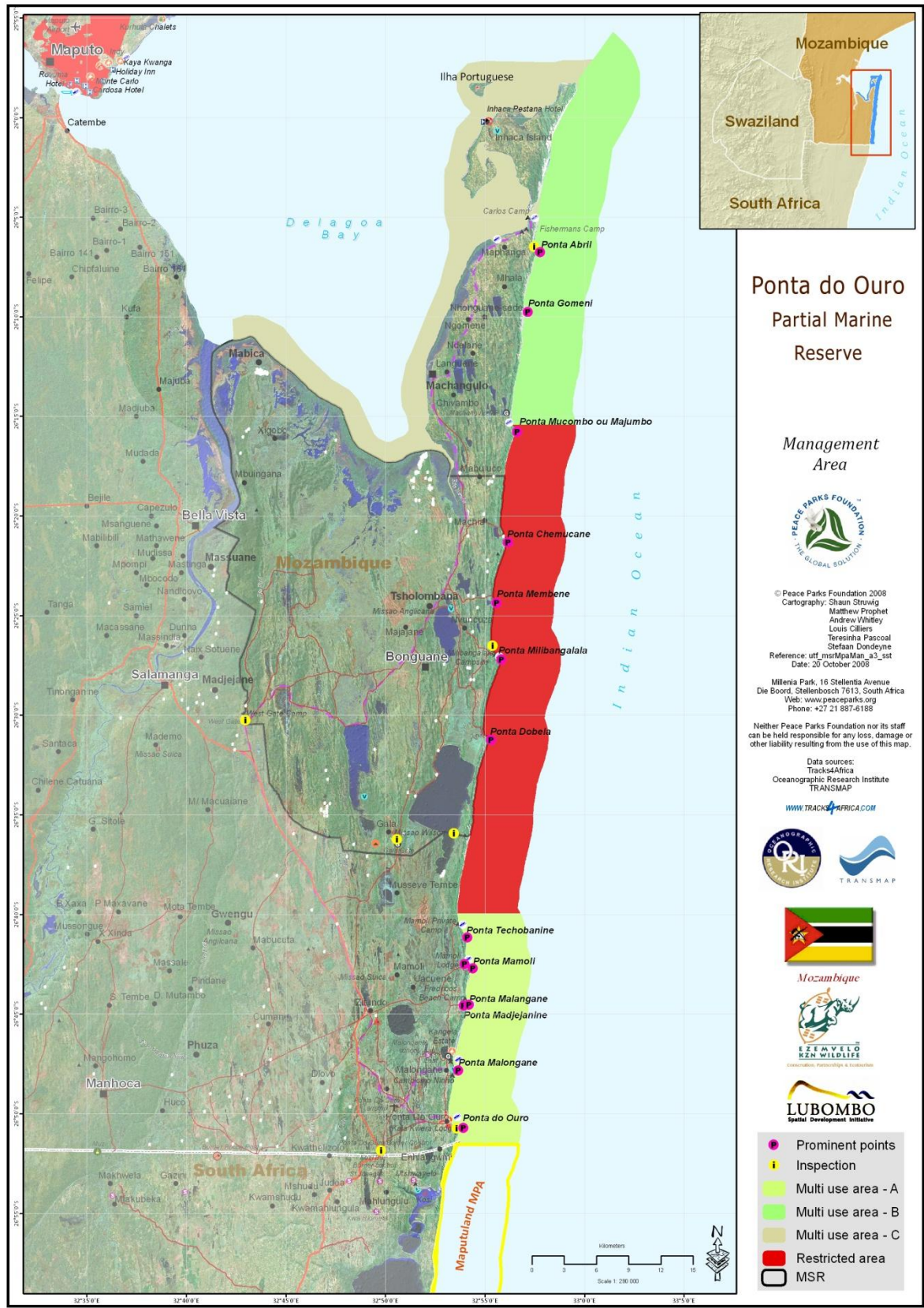
Skippers once underway are to proceed out of the beach zone and to open water so that users within the swimming, snorkelling, surfing zone are not threatened.

These zones are important access and monitoring points where inspections will take place by management agent staff.

A ski-boat launch site exists at *Cabo Santa Maria* where at least six private developments exist. Regular inspection at these sites is necessary to ensure compliance of the national legislation and proposed



regulations set aside in this document relevant to this area. The Panorama development will also place added recreational fishing pressure on fish resources within the area.



Map 4: Management Areas within the PPMR

### 3.3.2.6 Buffer Zone

The decree states (Article 1) that at the surroundings of the reserve borders, a buffer zone is established with a radius of 500 meters, an integral part of this Decree, prone to be expanded according to The Management Plan foreseen in Article 2 of the present Decree.

Therefore a buffer zone with a distance of **1NM (1.85km)**, following the seaward periphery of the reserve. The decree proposed a seaward peripheral buffer zone of 500m. This distance is too little and makes it easy for industrial fishing boats to fish the **boundary** line of the PPMR hence the greater proposed buffer zone become law according to Articles 1 and 7 of the proposed decree.

It is an integral part of the reserve, prone to being if this management plan deems so in the future. The main purpose of the buffer zone is to ensure that fishing boats don't fish with the proclaimed borders of the PPMR. The Buffer zone carries certain regulations stipulated in Article 2 of the Decree.

## 3.4 SANCTUARY AREA BOUNDARIES

### 3.4.1 Overview of Marine Sanctuaries

Sanctuary areas provide the best form of protection to marine resources, and allow areas for spawning refuge (Schleyer pers. com.) and for proliferation of marine organisms at the best possible rate thereby ensuring replenishment of adjacent areas (Secretariat of the Convention on Biological Diversity, 2004, CBD report 13).

### 3.4.2 Techobanine Sanctuary Area

Techobanine's unique and high biodiversity value warrant it's safeguarding in the form of a no-take sanctuary area. It has been suggested that a coral reef sanctuary area should be one to two times the size of the larval dispersal distance of the target species (Macia 2001). Schleyer (pers. com. 2007) accentuated the need for inclusion of the wider southern part of the reef, which is important in terms of larval production. He suggested that the influence of the current be from the southern side towards the north that allows for larval movement towards the narrower less vigorous end. It is for these reasons that the complex should be protected throughout a larger area as possible.

The sanctuary begins at the high-water mark at **S26° 38'55" E32° 53' 41.9"**, follows a compass heading of **90°E** to **26° 38' 55" E32° 55' 55.65"**. At this point following a northern direction to **S26° 33' 13.85" E32° 56' 45.88"**, where it heads **90°W** until it strikes the HWM at **S26° 33' 13.3" E32° 54' 36.6"**.

This area is seen as the most important part of the PPMR, without which the marine reserve would be achieving considerably less. The much talked about harbour development at Ponta Techobanine/Dobela would destroy this area's biological value and leave it degraded.

### 3.4.3 Chemucane Sanctuary Area

The Chemucane sanctuary area provides protection to inshore resources such as inshore fish species, invertebrates, and corals and provides as a spawning refuge for pelagic game fish.

It follows the northern boundary of the restricted zone from the HWM, heads northwards in 50m of water for **8NM (14.8km)** to **S26° 16' 22.6" E32° 58' 29.4"**, then **270°W** until striking the HWM at **S 26° 16'22.1" E32°56'17.9"**. This sanctuary will benefit inshore resources (Fennesey, 2004) and its position supported from zoning scenarios drawn by Harris (Ezemvelo KZN Wildlife). The reef **Baixo de S. João** is included, and would allow for spawning refuge of pelagic fish species. Aligning its boundaries with those of the Techobanine Sanctuary eliminates confusion among stakeholder and minimise the need for interpretation of these.

### 3.4.4 Rio Bembi Estuary Sanctuary

The *Rio Bembi* estuary in the bight of the *Machungulo Peninsula* would warrant a no-take sanctuary zone. Starting at the northern shore at **S26°16' 37.3" E32° 52' 22.4** and at **S26° 16' 37.3" E32° 52' 16.9"**, progressing upstream to **S26° 20' 11.9" E32° 53' 53"**.

### 3.4.5 Barreira Vermelha Coral Gardens

This area is of ecological significance and requires better protection in the form of a coral sanctuary managed according to the management plan. The Association of the Friends of Inhaca, ANAI in conjunction with UEM and the Biology Station of Inhaca are concerned regarding the area's status. INAMAR must heighten its activities to ensure that coral damaging activities are disallowed.

## 4 THE PEOPLE

The success of implementation of any of the any plans depends entirely on the level of cooperative governance in Mozambique. It provides a practical and cost effective approach to the management of the PPMR.

However, if co-operative governance is not the favoured approach, then the following alternative exists: The creation of an new PPMR management unit with budget, equipment and staff that would be required to take control of the proclaimed area. The final version of decree states that the MPA lies under the MITUR's responsibility. INAMAR's presence in the area probably will be based under Memorandum of Understanding with DNAC since the Proclamation of the PPMR was driven by these Ministries. An alternative to employment of new staff, would be the absorption of the relevant existing staff into a the newly created management unit, falling under a single Ministries control. In this way, the park would be managed by a single entity. This is obviously the simplest approach for long-term management and is strongly recommended. The nature of the PPMR management plan however does not deal with the restructuring of existing government departments to simplify governance. It deals with the management and governance of the proclaimed PPMR considering current roles. It is strongly urged however that the afore-described approach be considered.

### 4.1 COOPERATIVE MANAGEMENT

The concept of cooperative governance is fundamental in the management of most marine reserves. In countries where budgets for marine management are non-existent or weak, it is important that the relevant government departments share the responsibility of managing these very important areas. This involves adopting the mindset that the reserve is shared responsibility and involves the co-operation of normally two government departments to ensure the management of it.

In the case of the PPMR, this approach will be fundamental in order for this reserve to meet its goals.

Cooperation between the Mozambican authorities and South Africa's Ezemvelo KZN Wildlife is essential, so that the transfrontier conservation objectives of the Lubombo Transfrontier Conservation Area are met.

In South Africa, marine reserves are proclaimed under the Marine and Living Resources Act, in other words, South Africa's Fisheries Act. Statutory boards, with funding generated directed back into their management, manage National Parks. Many Marine Reserves border these National Parks. The Fisheries Department however does not have the capacity to staff these Marine Reserves. The National Parks Boards therefore receive a budget allocation from Department of Fisheries, which comes from money collected through licensing, fines and taxes collected within the Marine Reserve. This subsidizes the management costs. The National Park agencies have established base camps adjacent to these Marine Reserves from where the conservation management activities occur. The infrastructure, combined with the staff component, roads required to access the coastline, communication systems and transport, exist within these parks. The National Parks Board have traditionally managed these Marine Reserves without funded mandates. This has changed through the Department of Fisheries allocating subsidies to assist with their management. It is merely a reallocation of collected funds back to the Marine Reserve where it was collected, which sustains the management in a partnership fashion.

This approach is recommended within the PPMR and other marine reserves within Mozambique. Marine Reserve and National Parks exist to protect natural heritage, it is therefore the responsibility of the Mozambican government to fund their management either through this approach or it becomes the responsibility of the taxpayer.

Conservation costs money and the sustained approach of co-operative management is essential if the PPMR is to meet its goals.

### 4.2 COMPOSITION

Co-operative management within the PPMR involves the formalisation of relationships between the various government stakeholders namely the Ministry of Fisheries, Tourism, Environment and Transport.

The **PPMR Steering Committee** should represent these departments and direct the management of the PPMR through the relevant management authorities.

The Steering committee will consist of the Ministries of Fisheries, Environment Affair, Tourism and Transport and communication. The chairman of the committee will be indicated by the implementing agent of the PPMR (this could possibly be incorporated into the steering committee).

The management authorities are governmental. The two current authorities that conduct marine management work within the area are MSR's marine component and the Department of Transport's INAMAR.

The MSR-marine component comprises of a PPF funded marine manager and three specifically appointed marine rangers with a boat and vehicle and all the MSR other terrestrial staff component.

The INAMAR group comprises of a Port Captain based at Ponta do Ouro and another on Inhaca Island.

The Navy has placed 3 of its staff and the Army, 12 soldiers at Ponta do Ouro to assist with compliance issues.

The steering committee must include representatives from INAMAR -Maputo and DNAC (MSR), so that the actions of these communications between the committee and the reserve management are clear.

### 4.3 RESPONSIBILITIES

The long-term management of the proclaimed area is of fundamental importance in order for it to meet its stated objectives.

Section two of this plan describes how the PPMR has been divided into two manageable zones. The Multiple Use Zones and Restricted Zones follow parameters creating manageable units. These units are situated in relation to maritime authority (INAMAR) or Maputo Special Reserve presence. The responsibility of the management of PPMR should be split between the two agencies that currently function within the PPMR. These are MSR-marine component that concentrates its activities between Ponta Techobanine and Ponta Mucombu (within the Restricted Zone) and INAMAR who has staff employed at Ponta do Ouro and Inhaca Island within the Multiple Use Zone - the issue requires further detailed discussion:

- Multi Use Zone, south – INAMAR - Ponta do Ouro – Malongane collaborating with MSR
- Restricted Zone – MSR-marine component
- Multi Use Zone, north – INAMAR – Inhaca authority in collaboration with MSR

Management actions are therefore guided by this plan. The MSR-marine manager and INAMAR's port captains must become acquainted with this document in its entirety so that their new roles are properly understood.

INAMAR responsibilities lie within Multi Use Zones, situated in the north and in the south of the PPMR.

Ecologically the Restricted Zone is the one of most biological significance as research has shown e.g. the presence of the Techobanine coral reef complex. Maputo Special Reserve's marine component would then assume responsibility for this zone due to its proximity and its access points leading in this zone.

### 4.4 MEETINGS

#### 4.4.1 PPMR Steering Committee Meetings

Quarterly steering committee meetings should be held.

All members of the steering committee are required to attend these meetings.

Protected Area Management Team must be present at these meetings.

Minutes taken, actions and accountability checked.

#### **4.4.2 Finance Meetings**

Bi-Annual meetings with MITUR to check on Expenditure vs. Budget (The Fisheries Ministry delegate the responsibility to manage the area to the Ministry of Tourism).

Annual Budget submission meeting with Ministry of Fisheries/ MITUR and Steering Committee.

#### **4.4.3 Reserve Management Meetings**

These are operational meetings that occur on a monthly basis.

MSR-marine manager and INAMAR Ponta do Ouro and Inhaca Island port captains, with Navy, Army or Police representation.

Minutes are recorded and forwarded to PPMR steering committee.



## REFERENCE LIST

- De BOER, W.F. 2000. Between the tides – the impact of human exploitation on an intertidal ecosystem, Mozambique. PhD thesis, Groningen University, Groningen. 268 pp.
- DYE, A.H., 1992. Experimental studies of succession and stability in rocky intertidal communities subject to artisanal shellfish gathering. *Netherlands Journal of Sea Research*, 30: 209-217.
- DUBINSKY, Z.1990. Ecosystems of the world 25. Coral Reefs. Amsterdam, Elsevier: 1 550.
- FENNESSY, S.T. & VAN DER ELST, R.P. 2004. Lubombo Transfrontier Marine Protected Zone, ORI unpublished report 216.
- IDPPE, unpublished data
- KALK, M. 1995. A natural history of Inhaca Island. Johannesburg, Witwatersrand University Press: 1-395.
- KALK, M. 1995. A natural history of Inhaca Island. Johannesburg, Witwatersrand University Press: 1-395.
- KYLE, R., ROBERTSON, W.D. and BIRNIE, S.L. 1997. Subsistence shellfish harvesting in the Maputaland Marine Reserve in northern KwaZulu-Natal, South Africa: Rocky shore organisms. *Biological conservation* 82: 173-182
- PEREIRA, M.A.M. 2003. Recreational scuba diving and reef conservation in southern Mozambique. MSc thesis University of Natal, Durban. 109 pp.
- PEREIRA, M.A.M., VIDEIRA, E.J.S and ABRANTES, K.G.S. 2004. Listagem de pexies associados a recifes e zonas litorais do extremo sul de Mozambique. *Journal de Investigacao e Advocacia Ambiental* 1: 1-7.
- PONTA DO OURO PARTIAL MARINE RESERVE TECHNICAL PROPOSAL, 2008, draft 5, unpublished report by Peace Parks Foundation for MITUR.
- ROBERTSON, W.D., SCHLEYER, M.H., FIELDING, P.J., TOMALIN, B.J., BECKLEY, L.E., FENNESSY, S.T., VAN DER ELST, R.P., BANDEIRA, S., MACIA, A. and GOVE, D. 1995. Inshore marine resources and associated opportunities for development of the coast of southern Mozambique: Ponta do Ouro to Cabo de Santa Maria. Oceanographic Research Institute Unpublished Report No. 130: 51 pp.
- SPALDING, M.D., C. RAVILIONS and E.P. GREEN. 2001. World atlas of corals reefs. Berkeley, University of California Press.
- VIDEIRA, E.J.S. PEREIRA, M.A.M. CRISTINA LOURO, C.M.M. & NARANE, D.A. 2008. Monitoring, Tagging and Conservation of Marine Turtles in Mozambique. Historical data and Annual Report 2007/08. Unpublished report.



## Appendix 1: Proclamation Decree of PPMR



REPÚBLICA DE MOÇAMBIQUE

### PROPOSAL OF THE DECREE FOR THE GAZETMENT OF THE PARTIAL MARINE RESERVE OF PONTA DO OURO



REPÚBLICA DE MOÇAMBIQUE

### THE GOVERNMENT OF MAPUTO PROVINCE PROPOSAL OF THE PROJECT FOR THE DECREE N.er ...../ 2008

.....Of.....

The Law 20/97, of 1st of October, (Law of The Environment) in its article 11, establishes the general grounds for the regime of Biodiversity protection, inhibiting the practice of all activities that are not environmental friendly against conservation, reproduction, quality and quantity of biological resources, especially those classified as threatened, giving authority to the Government to enhance that measures are taken for the maintenance and regeneration of animal species, recovery of habitats through the control of activities or use of substances prone to harm vegetation and animal species as well as those declared as being rare or under extinction, establishing therefore environmental protection areas;

On the other hand, The Law 3/90, of 26th of September (Fisheries Law), in its article 35 bound with article 112 of The Marine General Fishing Law, gazetted by the Decree 43/2003, on December 10th, foresees the establishment of conservation, preservation and management measures for fishery resources baring in mind the species and fishing areas as well as the need for the protection of marine mammals and other rare or endangered species;

Therefore and under the content of the articles 35 and 69 of the Law 3/90, Fisheries Law of September 26th, together with the article 114 of the Decree 43/2003, of December 10<sup>th</sup>, The Council of Minister decided:

#### Article 1.

1. The gazetment of The Partial Marine Reserve of Ponta do Ouro intended to preserve and protect coastal and marine species and their habitats with a total surface 678 sq. km, according to the map under Annexure I which forms an integral part of this Decree, with the following borders:

**North:** From point t01, on the coordinates **S26 ° 11' 38.4" and E 32° 41' 27.6"** to the point **m01** on the coordinates **S26° 10' 37.2" and E 32° 41' 27.6"**; passing through point **m02** with coordinates **S26° 16' 19.2" and E 32° 50' 06"** and more to the north is delimited by point **m06** with coordinates **S25° 57'07.2" and E32° 54' 54"**; and its uppermost point is given under **m14** with coordinates **S 25° 55' 40.8" and E33° 01' 26.4"**.

**West:** From the northern most point of Inhaca Island where you find the point **t14** with coordinates **S25° 58' 15".6 and E3 ° 59' 34".8**, until Ponta do Ouro on point **t11**, with coordinates **S26° 51' 36" and E32° 53'**

**31".2**, following its contours, including the primary dunes on the continental area covering the prominent points of Malongane, Madejanine, Mamoli, Thechobanine, Dobela, Milibangalala, Membene, Chemucane, Mucombo, Gomeni, Abril and, on a straight line 100 m to the interior of Machangulo peninsula.

**East:** Washed by the Indian Ocean in a width 3 NMs along the territorial waters from Ponta de Ouro contouring The Machangulo Peninsula.

**South:** From point **f11** with coordinates **S26 51 36 and E32 53 31.2** and the point **m11** with coordinates **S26 51 32.4 and E32 56 45.6** at Ponta de Ouro, exactly on the border line with The Republic of South Africa.

2. At the surroundings of the reserve borders referred to in the previous number, a buffer zone is established with a radius of 500 meters, as indicated in annexure I, an integral part of this Decree, prone to be expanded according to The Management Plan foreseen in article 2 of the present Decree.

#### **Article 2.**

The management of The Marine Reserve referred to in the previous article shall take into consideration The Zoning Plan referred to in annexure I which is an integral part of the present Decree, with multiple and restricted use zones.

#### **Article 3.**

Within the limits of the Reserve and without losing sight of all the other restrictions and prohibitions foreseen in applicable legislation, the activities listed below are forbidden:

- a. Semi-industrial and industrial fishing;
- b. Spear fishing of deep sea fish species;
- c. Net with poison and long line fishing;
- d. Fishing with dynamite, traps or any other harmful methods;
- e. Fishing of any fish species protected by law.
- f. Driving of any motorized vehicle along the beach line;
- g. Construction of any type of infrastructures.

#### **Article 4.**

In multiple use zones under specific permit, the following activities may be carried out:

- a. Artesanal and sport fishing;
- b. Line, sport and recreational fishing;
- c. Spear fishing of pelagic species;
- d. Fishing for scientific purposes;
- e. Diving activities;
- f. Collection/gathering of invertebrates;
- g. Nautical sport without motorized vehicles.

#### **Article 5.**

Exceptionally and according to the approved management plan in the restricted use zone, the following activities shall be allowed:

- a. Line fishing or spear fishing of pelagic species;
- b. Diving activities;
- c. Fishing for scientific purposes;
- d. Collection/gathering of invertebrates;
- e. Sport fishing according to the law.

#### **Article 6.**

The violation of the restrictions foreseen in previous articles of this Decree, it is a violation punishable according to the due and specific laws, being aggravated by the fact that the same will have been committed in a protection zone, without uplifting other applicable norms.

**Article 7.**

1. Is due to The Ministers for Fisheries, Environmental Coordination and Tourism, to approve, through a Ministerial Diploma, The Management Plan for The Partial Marine Reserve.
2. The above mentioned Management Plan, should, amongst other issues:
  - a. Secure the protection of coral recipes and respective Sanctuaries.
  - b. Define mechanisms for participative administration and management.
  - c. Ensure benefits for the Local Communities

Approved by The Council of Ministers.

To be Published.

The Prime Minister, *Luísa Dias Diogo*.

## Appendix 2: Diver Code of Conduct

This Divers Code of Conduct was based on the Cape Nature Conservation Boards Goukamma Marine Protected Areas management plan prepared by Stephanie Lemm in January 2006. Amendments have been made and the document should be tailored to where necessary.

### Vessels

1. Skippers should familiarise themselves with the local conditions and rules before launching, and make sure that they are compliant.
2. A top man must be present at all times on the dive vessel. The top man must be a registered skipper.
3. Vessels must fly an Alpha flag if there are divers in the water.
4. Each dive vessel must remain within 50 metres of its surface marker.
5. A person in control of a vessel must not bring a boat closer than 30 metres to a dive vessel displaying an alpha flag.
6. No anchoring may take place within the Ponta do Ouro Partial Marine Reserve, except in cases of emergency.

### Diving

7. Divers must adhere to training standards and guidelines developed by recognised national certifying organisations and under no circumstances are they to dive beyond their qualification.
8. Trainee's first dives must be conducted over sand until buoyancy control has been mastered.
9. All Recreational dive groups and SCUBA diving business groups must tow a visible surface buoy.
10. Do not touch the reef areas - this causes breakages and infection of damaged areas due to the transmission of toxins and disease from one coral to another.
11. Divers are discouraged from wearing gloves-this prevents holding onto the reef. Holding onto the reef in a current or surge is particularly damaging and gloves can be a major vector of toxins and diseases between species.
12. Reef damage by diver's fins is frequently caused by either kicking the reef or kicking up sand that can cover the reef. If you have not dived in a while, your skills may need sharpening. Before heading to the reefs, spend some bottom time familiarising yourself with buoyancy and other techniques again.
13. Underwater photographers should exercise extreme caution when taking close-ups - no hanging on to marine life and no placement of equipment on the substrate.
14. Be careful with buoy lines when going into caves next to large corals.
15. Do not harass fish, especially territorial ones that expend a lot of energy trying to fend you off.
16. Do not collect souvenirs (dead or alive). Everybody must have the opportunity to see an untouched environment.
17. Report environmental disturbances or destruction of your dive sites to Cape Nature.
18. Never surround an animal/s. There should always be an area for the animal/s to move away from you.
19. Never touch marine animals. Do not hold onto turtles/seals as they can drown easily.
20. Standard permit conditions for Recreational SCUBA Divers and SCUBA Dive Business Operators will state, "The permit holder must not conduct fish feeding, chumming or dump any material, or discharge attractants in the PPMR".
21. Do not interfere with scientific equipment or markers.

### Diving with Sharks

(The Diving with Sharks Code of Conduct is based on open meetings held at Umkomaas, KwaZulu-Natal on 19 July 2001 and 22 August 2001)

22. Divers should not enter recesses, caves, gullies, caverns, sandy patches or overhangs where sharks are likely to be resting.
23. No skills exercises (specifically stationary Open Water Skills and Navigation skills) are to be performed in aggregation sites. .
24. A maximum of five groups should be in an aggregation site at a time.
25. Avoid descending on top of the sharks.

26. Relax and remain out of the shark's own space or COMFORT ZONE (do not approach closer than 3 metres to a shark).
27. Sharks have right of way.
28. Avoid approaching a shark head on (at an angle less than 45 degrees) as the shark feels threatened.
29. In a current, pass over the top of, or around, a group of resting sharks.
30. Do not block the sharks' exits or wedge the sharks against the reef.
31. Do not TOUCH, CHASE or HOLDN-ON to sharks.
32. Do not shine bright lights in the shark's eyes. Be aware that a strobe light from cameras can startle a shark. Strobe lights for photography should not be used at a distance of less than 5 metres from the shark. Divers should be considerate to both sharks and fellow divers and not chase off sharks as strobes do seem to affect the shark.
33. The sharks are often inquisitive. Should a shark approach, keep still, maintain buoyancy and breathe slowly, as a sudden exhalation will disturb a naturally inquisitive shark.

## Appendix 3: Dolphin, Whale and Whale Sharks Code of Conduct

Various marine mammals are found within the PPMR. Resident species include Indo Pacific Bottlenose dolphins and migratory like the Humpback Whale. The following rules should be strictly adhered to by both commercial and recreational boat operators within the PPMR. The following code of conduct is based on the approach practiced by the commercial business Dolphin Encounters in Ponta do Ouro.

1. No person will chase, herd, catch, kill, harass, feed or disturb marine mammals at any time. Keep a slow, steady speed without changing course. If your vessel is approached by marine mammals to bow ride, refrain from altering course to approach them. Always approach from the side, never from directly behind or from front. Minimize noise disturbance by maintaining a slow, steady speed. Do not approach dolphins/whales with small power craft i.e. jet skis.
2. Marine mammals have right of way.
3. Unless authorized, vessels are not to approach marine mammals within 300 meters.
4. Refrain from interference if signs of disturbance are apparent (change of directional swimming, fast 'escape' swimming or extended dive times, erratic directional surfacing).
5. Avoid mother and calf units. Do not enter into the water with newborns/calves.
6. Only enter into the water with qualified and authorized personnel.
7. Keep noise levels to a minimum. No shouting or loud whistling.
8. A 20-minute viewing time is to be followed. If marine mammals move off within this time, they must be left alone.
9. Fishing – dolphins may not be pursued for capture or attempt to be caught.

Human impacts on marine mammals:

- Harassment & noise pollution from high frequency jet ski sound & boat engines leads to possible boat strikes & habitat degradation resulting in physical displacement.
- Disease caused from commercial tourism and development resulting from affluent and pollution entering into the water.
- Accidental entanglement and ingestion of fishing gear and marine debris like fishing line, hooks and plastic could result in death.

## Appendix 4: Fishers Code of Conduct for PPMR

No fishing line may be discarded.

Fish that are not required for food purposes should be returned to the water. Release these fish carefully.

Promote catch and release. The use of barbless hook and circle hooks will ensure that fish can be released without too much damage to reduce fish mortalities.

IIP Linefish catch cards should be completed for all trips, even if no fish were caught (see below).

Bottom fishing is not allowed within the area. Anglers should therefore not be in possession of bottom fishing tackle on their boats while fishing within the PPMR.


 <b>Registo de Capturas da Pesca Recreativa</b> <b>Recreational Fishing Catch Card</b>						
Local Locality		Coordenadas Coordinates	Barco Boat		Praia Shore	
Data Date		Número de Pescadores N. of Anglers in Party	Residência Place of Residence			
Hora Time	De From	Até To		Clube ou Associação Club or Association		
Espécies/ Nome científico Species / Scientific name		Espécies/ Nome vulgar Species/ Common name		Peso (kg) Weight (Kg)		Comprimento/ Length FL (mm)    TL (mm)
Comentários Comments  Nota: Por favor preencha a ficha mesmo se não pescou nada Note: Please complete card even if no fish caught						

Figure 1: Fishing Catch Card

## Appendix 6: Monitoring and Research within PPMR

The following projects are either active or are being written up by the responsible researchers. Final reports must be forwarded to the marine manager for PPMR records.

### Fish

<b>Project:</b>	To monitor the Recreational Shore and boat angling within the PPMR.
<b>Objective:</b>	To monitor the species, size of fish species caught by recreational anglers along the shoreline and on ski boats.
<b>Explanation/Justification:</b>	Fishing from the shore and ski boats is conducted within the PPMR. The Institute of Fisheries Research, Maputo (IIP) in conjunction with the MSR-marine component collects this data and manages the data-capturing system. This is a useful tool to guide legislation on fish catch regulations.
<b>Implementation:</b>	10. Marine rangers go out to anglers during their patrols to capture data 11. Catch cards are made available at strategic points 12. Catch cards are collected and sent off to IIP
<b>Status:</b>	Ongoing
<b>Results:</b>	

### Marine Mammals

<b>Project:</b>	The Ponta do Ouro bottlenose dolphin population has been monitored for approximately 10 years by commercial operator Dolphin Encounters.
<b>Objective:</b>	To compile a data base of population size, movements and reproductively of the Ponta do Ouro/ Ponta Malongane dolphins, including other species such as whale sharks and humpback-whales.
<b>Explanation/Justification:</b>	Each species has its own unique ecological and physiological needs and, as a result, different responses to environmental changes will be exhibited by each species. Consequently, species-specific studies are needed to help us understand the ecology, behaviour, evolution, and physiology of as many species as possible, particularly those that could be viewed as keystones in various communities. Studies are also needed on a local scale to help us understand interactions of species within communities, and on a regional scale to allow investigation of entire ecosystems. Species lists are critically important in directing effective and focused flora management (Goukamma MPA management plan, compiled by S. Lemm, 2006).
<b>Implementation:</b>	13. Contact Angie Gullan of Dolphin Encounters for any data regarding marine mammals conducted within the PPMR. 14. Ensure signed MOUs. 15. Trained dolphin encounters staff collect the data. 16. All new data must be sent to MSR-marine component on a quarterly basis.
<b>Status:</b>	Ongoing
<b>Results:</b>	

### Marine Turtles

<b>Project:</b>	Co-ordinated monitoring effort of breeding turtles by Marine Manager (PPF/MSR) with Mozambique Turtle Working Group, WWF – Mozambique and Ezemvelo KZN Wildlife - South Africa. Reliant on partners in the private sector as well as NGO's to cover the 85kms of coastline between Ponta de Ouro and Santa Maria. It includes the 14-year long project being run Pierre Lombard for which reports are available, including those of other monitoring programmes
<b>Objective:</b>	To provide quantitative information on the nesting, tagging and mortality of marine turtles within the PPMR thereby ensuring their protection. To ensure to continued relationship with AICM, Pierre Lombardt (Malongane) and Centro Terra Viva as partners in the project.
<b>Explanation/Justification:</b>	Several anthropological and natural factors have contributed to the decline of marine turtle populations in Mozambique. These include incidental captures by the prawn and line fishing industries, along with hunting for turtle meat and egg consumption by humans. Turtles are also killed for their shells, which are used for ornamental purposes. Nests are destroyed by coastal erosion and habitat loss.



	Enhances working relations with the private sector and local community and will result in better turtle protection through regulation by the local community.
<b>Implementation:</b>	<p>Training was provided by Moz. NGO Centro Terra Viva (Maputo). Seven Communities seasonally employed during the breeding season with Monaco funding. Ponta de Ouro community supervised by Angie Gullan of Dolphin Encounters. Four Millibangalala. Community supervised by Marine Manager and Eduardo Mondlane student to ensure reliable data is delivered.</p> <p>Involves the close co-operation of KZN Ezemvelo Wildlife (Kosi Bay – Cons. Manager, Mr Finias Muchacha and Resource Ecologist, DR Scotty Kyle) who have provided tags and assured assistance with compliance and assistance.</p> <p>There are four teams each with a leader from the border to Santa Maria each with an area that is monitored.</p> <p>Data is collected on standardised data forms, which were compiled by Christine Louro who at the time was secretary of the Moz. Turtle Working Group, now with Centro Terra Viva. Completed forms are collected from various partners and checked on a monthly basis by Marine Manager.</p> <p>During the 2007-2008 breeding season the research institute AICM compiled a comprehensive report of breeding success of turtles along the Mozambican coastline. PPMR data dating back to 1994 was included into the report, which gave a good picture of turtle breeding distribution within the reserve, recorded mortalities and species composition.</p>
<b>Status:</b>	Ongoing
<b>Results:</b>	

### Reef monitoring and scuba diving

<b>Project:</b>	Can diving tourism fulfill the principles of ecotourism and assist local communities? Lessons from Mozambique PhD
<b>Objective:</b>	Raise knowledge about how diving tourism can deliver both environmental and social benefits in developing nations, particularly Mozambique, Africa. This research investigates diving tourism through an analysis of four elements of sustainability: socio-economic, managerial, environmental and cultural aspects.
<b>Explanation/Justification:</b>	Outcomes from this research will provide a better understanding about diving tourism sustainability in coastal communities and lay the foundation for robust management strategies of sustainable diving tourism in Mozambique and other developing countries.
<b>Implementation:</b>	<p><u>Contact person:</u> Yara Tibirica <a href="mailto:ecoyara@hotmail.com">ecoyara@hotmail.com</a>, <a href="http://yara@responsibledive.org">yara@responsibledive.org</a> PhD project, James Cook University, Queensland, Australia, 07 4781 6369</p> <p>Through a series of structured, unstructured interviews and workshops with commercial dive operations within the PPMR and other study sites.</p>
<b>Status:</b>	
<b>Results:</b>	Pending

### Assessing the condition of the Maputaland coral reefs using bio indicators

<b>Project:</b>	(Bio indicators are animals that can be used as early warning signals for stress in an environment)\
<b>Objective:</b>	To ascertain a carrying capacity for scuba diving on Maputaland coral reefs so that mitigating measures against reef deterioration are supported scientifically.
<b>Explanation/Justification:</b>	Effective and justified control of the expanding scuba diving industry in Ponta do Ouro and other parts of the PPMR is essential in terms of insuring long-term sustainability of quality dive sites.
<b>Implementation:</b>	<p><u>Contact person:</u> Camilla Floros, <a href="mailto:cfloros@ori.org.za">cfloros@ori.org.za</a>, Coral reef monitoring</p> <p>Initial dive surveys conducted by ORI, aimed to use selected bio-indicators to assess fish community condition on South Africa's coral reefs. These bio-indicators consisted of 27 fish species that were chosen based on a number of criteria such as their trophic level, sensitivity to diving/fishing etc. Underwater visual point count method was used to capture fish data. Each point count had a 10 m diameter. A 10 m rope was laid on the reef substratum and any of the selected fish species entering the point count area were counted and their size was visually estimated. An attempt was made to conduct equal number of fish counts at each reef and to conduct the counts on similar reef type i.e. on South Africa's coral reefs, Coral zonation types due to earlier work by ORI are already understood and the same coral community was therefore stuck to.</p>

	The project should be continued as a standard monitoring project by the management authority or in partnership with a favourable commercial operator.
<b>Status:</b>	
<b>Results:</b>	<p>The reef called Shallow Malonganewas surveyed, to compare it to similar South African reefs. It is not situated within an MPA, and was therefore compared to the well surveyed 2-maile reef in Sodwana Bay's MPA.</p> <p>It was found that the fish community on Shallow Malongane had a lower t number of species, average abundance and average biomass compared to the protected reefs within Sodwana Bay. It had far fewer predators and, in particular, a total absence of key predators such as the potato bass.</p> <p>The general picture from the ORI analyses is that the fish community on Shallow Malongane has/is being disturbed and the most likely cause is fishing.</p> <p>At Sodwana Bay and 2-Mile Reef in particular, high diving intensity is having a negative impact on the fish communities. The diving intensity is about 50 000 dives per year at 2-Mile Reef.</p> <p>Dive numbers on Shallow Malongane from Marcos Pereira's MSc thesis, showed approximately 3 000 dives/year. Even if this number has doubled in the last few years, it still suggests that fishing is the most influential activity affecting the fish communities.</p> <p>Carrying capacities, 3 000-5 000 dives/site/year may not be overly high but should be subjected to a separate assessment. This could be done as a desktop study based on the ORI records of the reefs. At this stage, it is recommended by ORI researchers that scuba diving pressure be kept within this range, and that all forms of fishing on the reefs be banned (ORI, unpublished data).</p>

### Beach profiles

<b>Project:</b>	Beach profile survey between Santa Maria and Ponta do Ouro
<b>Objective:</b>	To establish the requirements of nesting turtles in terms of beach suitability.
<b>Explanation/Justification:</b>	Identification of suitable nesting beaches will guide management in terms of protection and zoning.
<b>Implementation:</b>	<p>Contact person: Marcus Pereira (AICM, <a href="mailto:marcuspereira@gmx.net">marcuspereira@gmx.net</a> Eduardo Videira, <a href="mailto:pipocas99@yahoo.com">pipocas99@yahoo.com</a></p> <p>The entire coastline was driven in a 4x4 vehicle. Every 100m a beach profile was recorded along with sand, moisture and vegetation samples. The work was conducted by the AICM in conjunction with the MSR- marine manager.</p>
<b>Status:</b>	
<b>Results:</b>	Pending

## Appendix 7: Generic List of Monitoring Projects

These categories should be followed and implemented within the PPMR.

### PHYSICAL OCEANOGRAPHY

- Sea temperature
- Beach profile

### SPECIES

- Intertidal species (age and abundance)
- Fish (age and abundance)
- Sensitive species (including rare and endangered, CITES listed and protected species)
- Alien (introduced) species

### POLLUTION

- Oil
- Heavy metals
- E. coli
- Litter (e.g. plastic)

### HUMAN ACTIVITY

- Monitored through permits issued.
- Fisherman numbers
- Diver numbers
- Contraventions (fines)
- Boat numbers

## Appendix 8: Management Effectiveness Tracking Tool (METT)

Refer to the complete Excel Spreadsheet, only the Summary Sheet is included in this document.

<b>1: CONTEXT</b>	<b>VALUE</b>	<b>SCORE</b>	<b>% SCORE</b>
1.1. Legal status	3	3	
1.2. Protected Area regulations	3	1	
1.3. Boundary demarcation	3	1	
1.4. Biodiversity Resource Inventory	3	2	
1.5. Heritage Resource Inventory	3	0	
<b>Subtotal</b>	<b>15</b>	<b>7</b>	<b>47%</b>
<b>2: PLANNING</b>			
2.1. Protected area design	3	3	
2.2. Strategic Management Plan (SMP)	3	1	
2.3. Conservation Development Framework	3	0	
2.4. Land & water use planning outside PA	3	0	
Supplementary items	5	0	
<b>Subtotal</b>	<b>17</b>	<b>4</b>	<b>24%</b>
<b>3: INPUTS</b>			
3.1. Research & Monitoring programme	3	3	
3.2. Human Resource capacity	3	1	
3.3. Current budget	3	1	
3.4. Security of budget	3	3	
3.5. Income	3	1	
3.5. Law enforcement	3	1	
<b>Subtotal</b>	<b>18</b>	<b>10</b>	<b>56%</b>
<b>4: PROCESS</b>			
4.1. Annual Plan of Operation	3	0	
4.2. Biodiversity resource management	3	2	
4.3. Heritage resource management	3	0	
4.4. H R management	3	0	
4.5. Administrative systems	3	0	
4.6. Operational equipment & infrastructure	3	1	
4.7. Maintenance of equipment & infrastructure	3	0	
4.8. Education & awareness programme	3	1	
4.9. Neighbours	3	2	
4.10. Advisory committee/Forum	3	0	
4.11. Community partners	3	0	
4.12. Commercial Tourism	3	0	
4.13. Performance Evaluation system	3	0	
Supplementary items	3	0	
<b>Subtotal</b>	<b>42</b>	<b>6</b>	<b>14%</b>
<b>5: OUTPUTS/OUTCOMES</b>	<b>3</b>		
5.1. Visitor facilities	3	2	
5.2. Ecological condition assessment	3	0	
5.3. Heritage condition assessment	3	0	
5.4. Protection systems	3	1	
5.5. Economic and social benefit assessment	3	1	
Supplementary items	2	0	
<b>Subtotal</b>	<b>17</b>	<b>4</b>	<b>24%</b>
<b>TOTAL SCORE</b>	<b>109</b>	<b>31</b>	<b>28%</b>

## Appendix 9: Patrol Boat Specifications

<b>Specs for Twin Hull Fibre Glass Ski boat</b>	
Make :	Optional
Model :	-
Standards of Ski boat	16-20 ft
Material	Fibre glass hull
Floatation	Foam Filled
Windshield	With stainless rail
Bollard and bow roller	Stainless steel
Shelves and racks	Built in under gunwales
Battery Boxes and Batteries	Built in
Stern and bow eyes	Stainless steel
Keel strips	Stainless steel
Scuppers	At stern
Flush fuel and hatches	Depending on deck layout
Console	Centre type, two thirds up
Walk-round deck	Walk around console, granting passage on either side of it
Stowage	In bow for anchor
Motor Well	With platform step
Built in Fuel Lines	
Timber trimmings	And bump rails
Hydraulic steering	
Motor connector bar	
2 batteries and terminals	connected
Installation of motors and electrics	Sold with boat
Fuel can x 8	Jerry-can style
Flotex carpeting	Or alternative deck finish
Bow rail	stainless
Grab handles	stainless
Safety equipment	40Nm
Live well system	Built in
Compass	On console
29MHz Radio and aerial	Connected, working, built into console
Vhf radio	As per 30
Sign writing	Name and number
Switch panel	
Navigation lights	And deck lights
Echo sounder and GPS	Mounted on console

Tarpaulin Top	On stainless frame work, retractable
Radar	16 mile, mounted, sold with boat
Trailer	
Galvinised, single 15' axle, brake neck trailer with chevron	Chevron must be removable for launching
Double Winch and cable	
Docking boards	
Mesh –walk on grid	
Spare Wheel	
Motors	
2 x 85 Yamaha	Pre mix, ultra long shank
Gauges, looms, beach mods, control cables and PDI	

## Appendix 10: Pro Forma Equipment List

Equipment Type	Purpose
folding mattresses	camping
gas cookers	camping
water cans	camping
Fuel Cans	fuel transport
compressor	Inflation of tires when required
cooler box	camping
puncture repair kit	repairs
florescent lights -portable	camping
computer 60GB hard drive	admin
camping chairs	camping
40l portable fridge	camping
cell phone solar charger	admin
mosquito nets x 2	camping
cutlery and crockery (10 sets)	camping
camera	monitoring
GPRS email connection	communications
radios x 9, VHF	communications
extra battery to run lights	camping
tables	camping
tools	maintenance
spanner set # 8 up to #23	maintenance
tarpaulin	camping
washing up stand	camping
hi-lift jack	maintenance
jumper leads	maintenance
water bottles	patrols
bush shower	patrols
galvanised tool box	maintenance
30l backpack	patrols
binoculars	patrols
stretchers (beds)	patrols
Protective clothing for marine patrols	patrols
Puncture repair kit	maintenance

## Appendix 11: Budget Forecast

Table 15: Annual Budget PPMR

Ref	OPERATIONAL BUDGET - MARINE PROGRAMME	Restricted Zone	Multi use Zone, north	Multi use Zone, south
	ACTIVITY	RANDS		
<b>1</b>	<b>Salaries</b>			
1.1	Marine Guards x 3 per management zone (salary per marine guard 5,425.00Mt)	57,000	57,000	57,000
1.2	Seasonal Staff for turtle monitoring (community employees)	20,000	20,000	20,000
1.3	Marine biologist			
	<b>Total Salaries</b>	<b>77,000</b>	<b>77,000</b>	<b>77,000</b>
<b>2</b>	<b>Equipment</b>			
2.1	Vehicle (Land Cruiser x 1)	MSR-marine	350,000	350,000
2.2	Radios	20,000	20,000	20,000
2.3	Computer, Notebook, Printers	0	10 000	10,000
2.4	Binoculars, GPS, Handcuffs, Camera, etc.	50,000	10,000	10,000
2.5	Camping Equipment	0	10,000	10,000
2.6	Uniforms	equipped	8,000	8,000
2.7	Signage	50,000	50,000	50,000
2.8	Patrol Boat -fully equipped - or the Maputo Bay - Multi-use Zone North		250,000	
2.9	Furniture & Fittings	10,000	10,000	10,000
2.10	Dive equipment	20,000	20,000	20,000
	<b>Total Equipment</b>	<b>150,000</b>	<b>728,000</b>	<b>458,000</b>
<b>3</b>	<b>Travel/Accommodation/Maintenance</b>			
3.1	Vehicle operation, maintenance, & accessories	80,000	80,000	80,000
3.2	Boat operation and maintenance, Insurance & Accessories	40,000	40,000	40,000
3.2	Communications	30,000	30,000	30,000
3.3	Accommodation rental (have office and accommodation)	0	0	0
3.4	Utilities	10,000	10,000	10,000
	<b>Total Equipment</b>	<b>160,000</b>	<b>160,000</b>	<b>160,000</b>
<b>4</b>	<b>Training</b>			
4.1	Training for skippers, diving, environmental educators courses, coral and fish identification	50,000	50,000	50,000
	<b>Total Training</b>	<b>50,000</b>	<b>50,000</b>	<b>50,000</b>
	<b>Total Travel/Accommodation/Maintenance</b>	<b>387,000</b>	<b>160,000</b>	<b>160,000</b>
	<b>TOTAL</b>	<b>664,000</b>	<b>1,015,000</b>	<b>745,000</b>



## APPENDIX 12: REGULATIONS

The regulations designed to protect the PPMR have a number of sources. The first are the regulations that arise from the proclamation of the PPMR. The second source are those regulations that are described within this management plan.

### 1. Restricted Zone and Multiple use Zone Regulations

The following extracted articles from the proclamation decree define the regulations within the two zones of the PPMR. Please note these are the laws.

#### **Article 3.**

*Within the limits of the Reserve and without losing sight of all the other restrictions and prohibitions foreseen in applicable legislation, the activities listed below are forbidden:*

- a. *Semi-industrial and industrial fishing;*
- b. *Spear fishing of deep sea fish species;*
- c. *Net with poison and long line fishing;*
- d. *Fishing with dynamite, traps or any other harmful methods;*
- e. *Fishing of any fish species protected by law.*
- f. *Driving of any motorized vehicle along the beach line;*
- g. *Construction of any type of infrastructures.*

#### **Article 4.**

*In multiple use zones under specific permit, the following activities may be carried out:*

- a. *Artesanal and sport fishing;*
- b. *Line, sport and recreational fishing;*
- c. *Spear fishing of pelagic species;*
- d. *Fishing for scientific purposes;*
- e. *Diving activities;*
- f. *Collection/gathering of invertebrates;*
- g. *Nautical sport without motorized vehicles.*

#### **Article 5.**

*Exceptionally and according to the approved management plan in the restricted use zone, the following activities shall be allowed:*

- a. *Line fishing or spear fishing of pelagic species;*
- b. *Diving activities;*
- c. *Fishing fishing for scientific purposes;*
- d. *Collection/gathering of invertebrates;*
- e. *Sport fishing according to the law.*

#### **Article 6.**

*The violation of the restrictions foreseen in previous articles of this Decree, it is a violation punishable according to the due and specific laws, being aggravated by the fact that the same will have been committed in a protection zone, without uplifting other applicable norms.*

### 2. Management Area Regulations

#### 2.1. Beach Management Area

No motorised activities may occur within this area other than at designated launch sites. Failure to comply carries a fine of 20 000Mt.

## 2.2. Core Area: Millibangalala, Dobela and Chemucane,

Suitable regulations can be amended to this plan upon approval that support low impact, high value tourism in the future e.g. closure of camp sites to accentuate the value of high value tourism.

Marine resource users within communities must be registered with the management authority. Those registered are not required to be in possession of angling licences.

Limits are determined in terms of the number of community resource users who collect bait and food organisms within the intertidal zone.

This approach is designed to ensure sustainability of the resources for those communities that most depend on them. It prevents outsiders or new comers from harvesting these resources to the loss of the local community.

## 2.3. Launch Management Area and Use of Vessels

Launch sites must be clearly demarcated with beach flags.

Each sign launch site requires a signboard display, showing the launch area and the swimming and surfing areas.

No swimming is permitted in the launch area. Removal, moving, possessing, damaging or interfering with a demarcation buoy or sign in the PPMR.

No launching or use of jet-skis also called personal watercraft, other than those that have been converted and used for fishing with the PPMR.

*Justification: Jet-skis (personal watercraft) are noisy, fast and detract from the values of the PPMR. Inexperienced operators who have no skipper's tickets and are both a hazard to launching boats, swimmers, surfers, and snorkelers normally operate them. Most jet-ski users in Ponta do Ouro come from the Gauteng province of South Africa. The reason jet skiing is such a popular activity in Ponta do Ouro is that these water craft have been banned in most parts of South Africa and are not permitted in any marine reserves as a result of the disturbance and danger that they cause. The current fisheries legislation states that jet skis must remain 100m from the low water mark, the law is difficult to enforce and does not work, hence the inclusion of point d) into the management plan.*

No person may moor or anchor any vessel within the Marine Reserve.

*Justification: The installation of moorings is not permitted in the PPMR, anchoring especially of large ships may damage habitat, especially the coral cover on patch reefs around Ponta do Ouro and Techobanine.*

All vessels that deploy divers must display an alpha flag

*Justification: To reduce user conflict and ensure diver safety*

Failure to comply with any of the above carries a penalty of 3000Mt.

## 2.4. Swimming, Snorkelling and Surfing Area

Launch sites must be clearly demarcated with beach flags.

Signboards must be displayed, showing the launch, swimming and surfing areas.

No launching is permitted within the swimming areas.

Failure to comply carries a fine of 6000Mt. (fine is higher than a swimmer in the launch area for the simple fact that a skipper should have his crews safety and those in the water in mind)

## 2.5. Scuba and Dolphin and Whale Watching Area

### 2.5.1. Scuba Area Regulations

No person may SCUBA dive or attempt to SCUBA dive in the PPMR (PPMR) except on the authority of a Recreational SCUBA diving permit.

Failure to comply with a) and b) carries a fine of 6000Mt. A second offence will result is a charge being laid according to the correct legal procedure.

*Justification - SCUBA diving has the potential to impact on the natural resources of the MPA. Specific management is required to ensure dive sites are protected.*

No person may operate or attempt to operate a SCUBA diving business within the PPMR except on the authority of a SCUBA diving business permit.

The following limits are set for SCUBA businesses(needs further discussion and talk with operators):

- Ponta do Ouro: Six (6)
- Malongane: Two (2)
- Mamoli: One (1)
- Ponta Techobanine Two (2)
- Ponta Dobela One (1)
- Ponta Milibangalala One (1)
- Ponta Chemucane One (1)
- Ponta Mucombu One (1)
- Ponta Abril One (1)
- Ponta Santa Maria One (1)
- Inhaca Two (2)

*Justification – SCUBA diving businesses have the potential to impact on the natural resources of the MPA, especially large groups that regularly access particular sites. Specific management is required to ensure dive sites are protected. The number of operations established in Ponta do Ouro has not be limited, sensitivity of the dive sites has not been taken into consideration. The quality of diving has deteriorated at the heavily dived Ponta do Ouro sites during the past ten years. If the number of operations continues to be allowed to increase, the dive site quality will continue to deteriorate and will negatively affect the long-term tourism value of the PPMR's patch reefs.*

No person may SCUBA dive or attempt to SCUBA dive in the PPMR before sunrise and after sunset. Failure to comply carries a fine of 3000Mt.

*Justification – Many illegal activities occur in marine reserves during the night hours so to ensure greater compliance with the PPMR, diving will be restricted to daylight hours. Codes of Conduct have been developed to ensure that only low impact diving occurs; this would be difficult to manage during the night hours.*

The following must be included as standard conditions on SCUBA Diving Business Operators permits:

The permit holder must submit to management authority the previous month's data on the "Monthly Data Return Sheet" by the 7<sup>th</sup> day of the subsequent month.

*Justification - It is essential that INMAR and MSR collects data on the number of divers accessing various locations to manage cumulative impacts.*

The following must be included as standard conditions on all SCUBA Diving:

- Permits (Recreational and SCUBA Diving Business Operators):
- The permit holder must not conduct fish feeding, chumming or dump any material, or discharge any attractants in the PPMR.

- The permit holder must not use cages for the purposes of cage diving in the PPMR.
- The permit holder must not use or possess any electro/acoustic-discharging devices in the PPMR.
- The permit holder must not use or possess a Diver Propulsion Vehicle in the PPMR.
- The permit holder must not remove or attempt to remove any historical artefact
- The permit holder must operate in accordance with the "Ponta do Ouro Partial Marine reserve, Diver Code of Conduct" (Appendix 2).
- The permit holder must ensure that there is no fishing gear or spear guns on dive vessels.

Failure to comply carries a fine of 20 000Mt.

*Justification – These conditions are considered necessary to ensure that only low impact diving occurs reducing impacts on the values of the MPA.*

### 2.5.2. Dolphin, whale shark and whale watching areas

No person will chase, herd, catch, kill, harass, feed or disturb marine mammals at any time.

Unless authorized, vessels are not to approach marine mammals within 300 Meters.

The following limits are set for this activity for the relevant areas: The number behind each place name indicates the max number of registered operators:

- Ponta do Ouro: Two (2)
- Ponta Techobanine: One (1)
- Santa Maria: One (1)
- Inhaca: One (1)

The permit holder must operate in accordance with the "Dolphin watching of Code of Conduct" (Appendix 3).

Failure to comply with the above carries a fine of 20 000Mt.

## 2.6. Sanctuary Areas

No fishing or scuba diving is permitted within sanctuary areas, including development of structures of within the sanctuary area.

Failure to comply in terms of fishing and scuba diving carries a fine of 20 000 Mt.

There is no admission of guilt fine for illegal developments. The structure must be removed and the site rehabilitated at the cost of the developer. A charge must be laid according to the correct legal procedure. The reserve management has the right to remove any illegal structures.

## 2.7. Buffer Zone

Regulations set aside, the following activities are prohibited (Appendix 1):

- No industrial and semi industrial fishing is allowed
- Long-lining
- Fishing with traps
- Fishing for protected species

## 2.8. Fishing

No fishing is permitted within Sanctuary areas. The following regulations therefore apply to the other management areas, without excluding any other regulations:

- Recreational angler and spear-fisherman are required to be in possession of a valid angling or spear fishing licence when fishing within the PPMR's non-sanctuary areas. Mozambicans and foreigners are required to have such licences if they intend to fish from the shore or a boat.
- No bottom fishing or may take place from boats. In other words fishing by means of weighted lines with baited hooks and or while at anchor. No spearfishing of bottom dwelling fish may take place.
- A maximum of five pelagic game fish may be caught per person per day. Fish caught by recreational anglers and charter businesses may not be sold.
- Catching or being in possession of protected species is not allowed. These include potato bass *Epinephelus tukula* and brindle bass *Epinephelus lanceolatus*.
- A maximum of 6kg of processed pelagic fish may be transported per person from the PPMR.
- Organised fishing competitions require authorisation from the reserve management committee, and are subject to a permit.
- The permit holder must operate in accordance with the "PPMR's, Fisher's of Code of Conduct" (Appendix 4).
- Failure to comply with a) carries a fine of 1000 Mt.
- Failure to comply with above carries a fine of 20 000Mt.

## 2.9. Other

No person may operate or attempt to operate a tourist programme in the PPMR except on the authority of a tourist programme permit issued by the management committee.

*Justification: There is the potential for many tourist programmes to occur in the MPA. The regulation is required to adequately manage all activities and ensure equity among commercial users.*

No person may use aircraft or attempt to use aircraft in the PPMR except on the authority of a permit to use aircraft within the PPMR.

*Justification: There is potential for user conflict regarding low flying aircraft, including amenity issues.*

No person may camp or attempt to camp in the PPMR, other than at designated campsites.

*Justification: This activity is not compatible with the natural values of the PPMR and to assure consistency with formal sites.*

No person may attempt to light a fire in the PPMR.

*Justification: Encourages illegal overnight camping and fishing.*

## 2.10. Permits Types

### 2.10.1. Recreational angling and spear fishing licences

A permit in terms of the Recreational Sports and Fisheries law, 31 August 1999, 51/99, Article 31. These are currently issued by Maputo Special Reserve –marine manager, under the authority of the provincial fisheries authority as well as INMAR –Ponta do Ouro (Port Captain).

### 2.10.2. Fishing competitions

A permit issued in terms of Recreational Sports and Fisheries law, 31 August 1999, 51/99, Article 31 is required. These are currently issued by the Provincial Fisheries authority, in Maputo.

### 2.10.3. Scuba diving permits

A permits in terms of the Regulation for Recreational Diving, 29 November, 2006, Decree 4, is required.

All recreational divers require these.

These are currently issued by INAMAR, who also handles the registration of commercial diving businesses and inspections relating to them e.g. dive tax collection, boat inspections, dive log submissions etc.